

PHARMACIST EDUCATIONAL OUTREACH
FOR IMPROVED PRIMARY CARE OF
ASTHMA IN CHILDREN

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SUMMARY

Introduction

Underdiagnosis and undertreatment of asthma in children are barriers to optimal health care delivery and health, incurring substantial costs to both the families and health services. A tailored multifaceted educational outreach intervention (“academic detailing”) was designed and implemented among private sector general practitioners (GPs) serving a poor working class urban community in Cape Town, South Africa. The intervention aimed to improve primary care childhood asthma by promoting the adoption of guideline-based key messages. The effectiveness of the intervention was tested in a randomised controlled trial, *Chestiness and Asthma in Mitchell's Plain* (CHAMP) (Zwarenstein 1999). This thesis describes the design, implementation and qualitative evaluation of the outreach intervention.

Methods

Qualitative interviews and quantitative sample surveys were conducted among GPs to identify and measure the prevalence of perceived barriers to optimal asthma care in children.

A trained pharmacist visited GPs twice, promoting eight evidence-based primary care messages to overcome barriers to optimal care for asthma in children. The messages focused on key diagnostic indicators, a treatment algorithm based on severity, cost of drug therapies, inhaler and spacer use, and preventive treatment. These messages were formatted into attractive promotional material. The first visit promoted use of the messages, the second reinforced adoption in routine practice and assessed GPs' responses using unobtrusive qualitative data collection methods. The dialogue was tailored to each GP's needs.

Results

Thirty-two GPs received the intervention. All but one consented to both visits. At the first visit responses were varied. A few GPs were confused or suspicious; most were in agreement with the messages but seemed passive towards implementation; a few were

keen to adopt the messages into their routine practice. Response at first visit was not predictive of use as assessed at the second. At the second visit, most GPs claimed that they personally agreed with and used the messages, with a large minority less enthusiastic.

Conclusion

The intervention appears to have been broadly accepted as evident from GPs' acceptance of the outreach pharmacist, but reports of complete adoption of the messages and use of the kit were less prevalent. This finding is consistent with and helps to explain the improved health outcomes of children with asthma in the CHAMP trial.

The combination of qualitative and quantitative research methods was effective in identifying and assessing GPs' barriers. Further, the combination helped to confirm the determinants for the intervention. Unobtrusive qualitative methods provided valuable insight into GP behaviour in routine setting.

Additional studies conducted in public sector primary care settings and for other diseases are needed to confirm the wider acceptability and effectiveness of multifaceted outreach interventions aimed at improving professional practice. Such an intervention in our study setting seemed successful for childhood asthma.

Reference

Zwarenstein M, Adams J, Bheekie A, Swingler G, Ehrlich E, Lombard C, Pather S, Sladden M, Eccles M, with the National Asthma Education Programme. Chestiness and asthma in Mitchell's Plain (CHAMP): cluster randomised controlled trial of academic outreach demonstrates improved health status of asthmatic children attending private practitioners in a poor urban community in South Africa. *Int J Tubercule and Lung Dis.* 1999; 3(9): suppl 1. 30th International Union Against Tuberculosis and Lung Disease (IUATLD) World conference. Abstract book (Poster) 641-PD.p S76.

CHAPTER 1

INTRODUCTION

“Let every person breathe” was the theme for World Asthma Day (May 2000). Mr Nelson Mandela, former South African president and patron of the South African National Asthma Education Programme (NAEP), addressed a local gathering where he highlighted adherence to guideline-based care. He added that further efforts are needed to improve the management of patients with asthma:

World Asthma day serves to address the seriousness of asthma throughout the world but also highlights the improvement of asthma that has occurred with the development of [South African] guidelines. In South Africa these guidelines have helped all the caregivers, including the nurses in the rural areas, in improving the quality of life of the asthmatic patient and in educating their families about the disease. ...It is clear that in South Africa, although great strides have been made in this avenue, much still has to be done across this vast country to improve the [health] status of the asthmatic patient.

Poor adherence to asthma guideline recommendations has been attributed to numerous barriers encountered by patients and health care providers. Patient barriers range from misconceptions and fear associated with the disease to reluctance in accepting the diagnosis in children (Jones 2000). Further, poor parental knowledge of drug therapies and incorrect use of inhaler devices among children increases the burden of the disease. In addition, patients poorly perceive the severity of asthma leading to the provision of sub-optimal therapy (Rubinfeld 1976).

In primary care settings inappropriate use of drug therapy is commonly encountered. There are numerous reports of under-use of anti-inflammatory therapy and overuse of bronchodilators and variations in the provision of care to asthmatic children despite the availability of guidelines (Phin 1993). Health care practitioners lack agreement, awareness and familiarity with recommendations (Cabana 2000). The provision of cost-effective drug therapy is essential, but doctors lack awareness and knowledge of the costs of therapy (Ryan 1992).

One possible reason for lack of adherence to guidelines is poor dissemination and implementation strategies. Guidelines may lack an evidence base, may not be explicit

or concise, and may not be applicable to practice settings thus limiting its implementation in the local practice setting (Partridge 1993). Further, asthma guidelines often lack information on the costs of drug therapy, which is essential for practitioners when communicating with patients and families (Fitzmaurice 1996). Poor adherence to therapeutic guidelines leads to underdiagnosis and undertreatment of asthma, incurring a substantial burden to both families and the health services.

Impact of childhood asthma

Childhood asthma has increased in prevalence both locally and abroad. Increasing prevalence rates in Australia, the UK and USA are linked to improved detection of asthma and possibly to an increase in sensitisation among children to inhaled allergens. In South Africa prevalence rates shows a similar increasing trend, which is linked to rapid urbanisation (Van Niekerk 1979). The population prevalence of asthma in Cape Town is estimated between 7% and 13%, depending on the definition of severity (Ehrlich 1998).

Asthma hospitalisation is reported to be higher among inner city children from lower socio-economic areas (Watson 1996). Inappropriate and sub-optimal therapy has been found to be the most common cause of hospital admission. Prophylactic anti-inflammatory therapy is the mainstay of asthma therapy, but it is under-used.

Morbidity associated with asthma has been well documented. Nocturnal symptoms are indicative of severe asthma, disrupt sleep, leading to poor quality of life for the child and the family members. In addition, wheezing has been identified as a common reason for school absenteeism, resulting in poor scholastic achievement, low morale and poor productivity (Anderson 1983).

Why was the study done?

We aimed to improve the quality of health care provided to children with asthma by improving service delivery of general practitioners (GPs) in the private sector.

The focus of this thesis is the design, implementation and evaluation of a tailored multifaceted educational outreach intervention directed at private sector GPs, aimed at improving the quality of health care of children with asthma. The objectives of the study were to:

1. identify barriers encountered by private sector GPs and their perceptions of barriers encountered by parents in the provision of care to children with asthma;
2. design and implement a tailored multifaceted educational outreach intervention to address barriers to the provision of care to children with asthma; and
3. evaluate acceptability of the educational outreach intervention among private sector general practitioners (GPs).

The effectiveness of the tailored multifaceted outreach intervention was further evaluated in a randomised controlled trial, *Chestiness and Asthma in Mitchell's Plain* (CHAMP) (Zwarenstein 1999).

This thesis is based on a study of private sector GPs serving the community of Mitchell's Plain, a dormitory suburb, which has road and rail links to Cape Town. The area has a relatively poor socio-economic profile, which raises questions about the quality of primary care services. Studies have shown that asthma in Mitchell's Plain is under-recognised and undertreated (Ehrlich 1998; Bheekie 1998). Mitchell's Plain has a mix of private and public medical care services potentially able to support intervention research.

Private sector medical practitioners have been found to provide care to a large number of children with respiratory disorders, including asthma. Further, they have been identified as the highest referral sector to the local Red Cross War Memorial Childrens' Hospital (Strebel 1990). In view of regulatory, socio-economic and organisational

constraints, practitioners are faced with numerous barriers to optimal health care delivery.

One of the few proven guideline implementation strategies aimed at improving the quality of care delivery among health care professionals is a multifaceted educational outreach ('academic detailing') intervention (Thomson O' Brien 1999). It involves face-to-face visits by a health care professional in a clinical setting, and the use of educational material to highlight key management principles. Such interventions have resulted in more appropriate drug prescribing, reduction in health care costs through decrease in hospital admission and increase in clinic visits, and improved patient health outcomes (Avorn 1983). By identifying and addressing local barriers to care provision, multifaceted interventions has been identified as one of the most successful behaviour change strategies (Wensing 1994). However, no published studies exist in which rigorous *qualitative* evaluations of outreach visits have been performed.

Chapter description

Chapter 2 provides background information on the understanding of asthma, its impact, primary care management, barriers to adherence of asthma guidelines and evidence-based approaches. I provide an overview of private sector medical practice, with insight into a South African perspective. Further, a description of the community profile of Mitchell's Plain is presented.

Chapter 3 provides an overview of behaviour change implementation strategies aimed at professional medical practice. It includes the approaches, theories and factors that facilitate changing professional practice.

Chapter 4 consists of a review of qualitative and quantitative research methods.

Chapter 5 provides the research methods used to design and evaluate the CHAMP educational outreach intervention. A combination of qualitative (in-depth interviews) and quantitative (questionnaire survey) methods were used identify of barriers to care.

These served as determinants for the design the intervention. I also describe the in-depth interviews and unobtrusive participant observation used to evaluate GPs' subjective responses to the CHAMP intervention.

Chapter 6 provides the range and prevalence barriers identified to optimal health care in childhood asthma. In addition, I describe the rationale and approach used to design content items for the questionnaire survey.

Chapter 7 discusses the implementation of the CHAMP intervention, a tailored multifaceted educational outreach programme aimed at improving the quality of care provided by private sector GPs. The first part of the chapter deals with a summary of the knowledge and attitudinal barriers and the contextual factors. The second part discusses the contents of each of the eight key primary care messages. The third part discusses the design and implementation of the intervention focusing on the training of the outreach educator, and planning of visits to practices. The fourth part discusses each element of the support materials used in the intervention.

Chapter 8 evaluates GPs' responses to the CHAMP intervention during implementation. In particular, the chapter provides detailed insight into GPs' attitude and perceptions to components of the intervention during the first and second visits to the practice setting.

Chapter 9 discusses the feasibility of the research methods used in the study, the primary care management of childhood asthma, and the factors influencing professional practice. Further, I discuss the possibilities of the pharmacist as change agent. The chapter concludes with a consideration of the main findings and recommendations for future research.

A simplified cost estimate for development and implementation of a pharmacists' educational outreach programme extrapolated to national operational scale is appended (Appendix 1).

A note on the use of racial terminology

In seeking to describe the distribution of disease in South Africa, researchers have frequently used categorisation which seemed obvious on biological and sociological grounds, namely that of “race”. Apartheid policies led to discrepancies of several social, economic and health service factors, which resulted in distribution of disease among four “races” (alternatively termed “population groups” and more recently “ethnic groups”: black (alternatively African), white (Caucasian), coloured (mixed race) and Asian (Indian).

In this thesis the term “coloured” refers to “those South Africans loosely bound for historical reason rather than by common ethnic identity” (Erasmus 1997). The descent and heritage of the coloured people are varied and include indigenous San, slaves brought to the Cape Colony from Indonesia and Malayasia and the offspring of intermarriage. I use the term “black” or “African” to refer to indigenous South African people who speak indigenous languages, with the exception of Afrikaans. “White” is used to refer to Afrikaans and English speaking South Africans who are of European descent.

Use of the personal pronoun in qualitative research writing

In qualitative research the researcher is recognised as the sole instrument during the process of inquiry. One of the characteristics of qualitative research is to identify and capture the researcher’s unique role and his/her direct involvement with the research process. In keeping with the tradition of writing in qualitative research, I use the personal pronoun, rather than “the researcher” or “the author” to capture my experiences to closely resemble that of the real situation.

Referencing

Referencing is by first author and year of publication in parentheses in the text. When a study is mentioned in the narrative, only the first author is cited, without the rather cumbersome *et al.* An alphabetic bibliography, in the Vancouver style, is appended to each chapter. Although this entails overlap of chapter lists, it provides a more focused bibliography for each chapter.

References

- Anderson HR, Bailey PA, Cooper JS, Palmer JC, West S. Morbidity and school absence caused by asthma and wheezing illness. *Arch Dis Child* 1983; 58: 777-84.
- Avorn J, Soumerai SB. Improving drug therapy decisions through educational outreach: a randomised controlled trial of academically based "detailing". *N Engl J Med* 1983; 308: 1457-63.
- Bheekie A, Syce JA, Weinberg EG. An assessment of asthmatic patients at four Western cape community pharmacies. *S Afr Med J* 1998; 88: 262-266.
- Cabana MD, Ebel BE, Cooper-Patrick L, Powe NR, Rubin HR, Rand CS. Barriers pediatricians face when using asthma practice guidelines. *Arch Pediatr Adolesc Med* 2000; 154: 685-93.
- Ehrlich RI, Du Toit D, Weinberg EG, Jordaan E, Volmink JA, Zwarenstein M. Underrecognition and undertreatment of asthma in Cape Town primary school children. *S Afr Med J* 1998; 88: 986-993.
- Erasmus Z, Pieterse E. Conceptualising coloured identities: preliminary thoughts. Paper given at a conference: National identity and democracy. Cape Town: Mayibuye Centre, University of the Western Cape: 1997; March 14-18.
- Fitzmaurice DA, Bradley CP, Salter R, Slater AE. Evidence used to formulate guidelines on managing asthma did not include costs. *Br Med J* 1996; 313: 113-4.
- Jones SL, Weinberg M, Ehrlich RI, Roberts K. Knowledge, attitude and practices amongst parents of children with asthma/wheeze in Cape Town. *J Asthma* 2000; 37: 519-28.
- Partridge MR. The impact of asthma guidelines on clinical practice. *Monaldi Arch Chest Dis* 1993; 48: 367-8.
- Phin S, Oates RK. Variations in the treatment of childhood asthma. *Med J Aust* 1993; 159: 662-666.
- Rubinfeld AR, Pain MCF. Perception of asthma. *Lancet* 1976; i: 882-4.
- Ryan M, Yule B, Bond C, Taylor R. Knowledge of drug costs: a comparison of general practitioners in Scotland and England. *Br J Gen Pract* 1992; 42: 6-9.
- Strebel PM, Lachman PI, Painter ML, Stander IA, Ireland J. Utilisation of outpatient services at Red Cross War Memorial Children's Hospital, Cape Town. *S Afr Med J* 1990; 78: 408-412.
- Thomson O' Brien MA, Oxman AD, Davis DA, Haynes RB, Freemantle N, Harvey EL. Educational outreach visits: effects on professional practice and health care outcomes (Cochrane Review). In: *Cochrane Library*, issue 2, 1999. Oxford: Update software.
- World Asthma Day. Mr Mandela speaks on asthma. Courtesy Dr R Green, National Asthma Education Programme. 2000; May.
- Van Niekerk CH, Weinberg EG, Shore SC, Heese HDeV, Van Schalkwyk DJ. Prevalence of asthma: a comparative study of urban and rural Xhosa children. *Current Allergy* 1979; 9: 319-324.
- Wensing M, Grol R. Single and combined strategies for implementing changes in primary care: a literature review. *Intl J Qual Health Care* 1994; 6: 115-32.
- Watson JP, Cowen P, Lewis RA. The relationship between asthma admission rates, routes of admission and socio-economic deprivation. *Eur Respir J* 1996; 9: 2087-93.

Zwarenstein M, Adams J, Bheekie A, Swingler G, Ehrlich E, Lombard C, Pather S, Sladden M, Eccles M, with the National Asthma Education Programme. Chestiness and asthma in Mitchell's Plain (CHAMP): cluster randomised controlled trial of academic outreach demonstrates improved health status of asthmatic children attending private practitioners in a poor urban community in South Africa. *Int J Tubercule and Lung Dis.* 1999; 3(9): suppl 1. 30th International Union Against Tuberculosis and Lung Disease (IUATLD) World conference. Abstract book (Poster) 641-PD.p S76.



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CHAPTER 2: BACKGROUND (Part 1)

DISEASE AND SETTING

In the first section of this chapter I review the evolution of the meanings and definitions and the current understanding of asthma, and provide insight into patients' experiences with the disease. The second section focuses on the public health impact of asthma: its prevalence and hospital admissions in children, the costs (direct and indirect) associated with the disease and the mortality rates. The third section deals with primary care asthma, the organisation of asthma care delivery and the roles of the patient, parent and the doctor. I discuss the characteristics of asthma guidelines, and review the evidence-based approach to the delivery of care. The fourth section provides an overview of private medical practical practice, the target for the intervention, with a focus on the South African setting. In the fifth section, I provide a profile of Mitchell's Plain, a suburb of Cape Town, the setting for implementation of a multifaceted outreach intervention to improve the primary care management of asthma in children, which is described in this thesis.

Understanding asthma

Meaning and definitions

Asthma is derived from the Greek word *asthma -matos* (*azō* meaning to breathe hard); "gasping or panting" (Haubrich 1997), the Latin equivalent is *asma* (Sykes 1982). Although the dictionary pronunciation for asthma is *az'mah, or as' mah*, many people in Cape Town's Afrikaans speaking community refer to it as "*ash' mah*".

Asthma was first recognised by the Chinese about 4,000 years ago (Warren 2000), but in the first century Aretaeus (18-131 AD) first suggested that asthma was a disease and not a symptom (Jones 1994) and Celsus defined asthma as "wheezing" (Haubrich 1997). By the Middle Ages there was a suspicion that the cause of some respiratory illness might be extrinsic to the body. A Persian physician described the head cold that was suffered by some people when the roses flowered in Isfahan (Sournia 1992), now known as "hayfever". From the 17th to the 19th centuries, Floyer, Willis, Cullen observed the spasmodic nature of the disease, and identified

common precipitating factors (Jones 1994). Early in the twentieth century researchers elaborated the concept of precipitating factors with their discovery that when a dog's body came into contact with a foreign substance, it became "sensitised". They thus identified the basic mechanisms involved in allergic reactions (Sournia 1992). It was then established that a number of diseases could be explained by sensitization and allergic reactions.

By 1959, the Ciba Guest Symposium defined asthma as a functional disorder, a 'disease characterised by variable dyspnoea due to a widespread narrowing of peripheral airways in the lungs varying in severity over short periods of time either spontaneously or as a result of treatment'. The American Thoracic Society (1962) arrived at a similar definition but added the important observation that the bronchi also showed increase responsiveness. Scadding suggested that "...asthma is a disease characterised by wide variation over short periods of time in resistance to flow in intra-pulmonary airways...", but acceptance of this definition was limited, because of the omission of a clinical picture (Jones 1994).

The complicated pathophysiology and aetiology must have contributed to the confusing plethora of overlapping terms for different terms and conditions. Between the sixties and early seventies asthma was characterised by its origin (Stedman 1972). For example, *bronchial* asthma was described as being caused by involuntary muscle spasm around the small branches of the air tubes (bronchi) in the lungs, secreting mucus (Wingate 1976; Parr 1965); *cardiac* asthma was described as an attack which comes on suddenly, often in the middle of the night, due to spasm of the lungs, often from fluid accumulation due to heart failure (Parr 1965). However, in the mid-seventies cardiac asthma was found to be unrelated to bronchial asthma (Wingate 1976), and the term was discarded. The term 'asthma' was thereafter generally used to denote only bronchial asthma (Stedman 1976). A later description for asthma was a disease marked by recurrent attacks of dyspnea, resulting from contraction of the bronchial muscle (Dorland 1981).

X The situation was complicated further for children as the role of infection in asthma was not clear. Wheezy bronchitis was a term used by clinicians mainly in the UK to help differentiate an apparent respiratory tract infection from asthma (Williams

1969; Horn 1979; Sibbald 1980; Lenney 1978). The distinction was by no means sharp. In a child presenting with episodic nasal discharge, wheezing and cough, one physician might diagnose the condition as infective wheezy bronchitis, while another might label it as asthma. Williams and McNicol (1969) were unable to separate the two conditions, and suggested that wheezy bronchitis and asthma were polar extremes of a single disorder, a finding that was also supported in another study (Lenney 1978). Further, Sibbald (1980) showed that there are strong similarities between asthmatic and wheezy bronchitic children as evident from their family histories of asthma and wheezy bronchitis, suggesting that these two forms of wheezy illnesses share a common genetic defect. The use of the term "wheezy bronchitis" was eventually phased out as asthma was being increasingly defined more on functional rather than aetiological criteria.

The definition of asthma was captured in an editorial where it was pointed out that several criteria: clinical, physiologic, immunologic, histologic, and biochemical are used to identify subjects as "asthmatic" (Gross 1980). The physiologist would define asthma in terms of hyperactive airways; the pathologist in terms of inflammation, mucosal swelling and smooth muscle hypertrophy; and the clinician in terms of wheezy dyspnoea. Although it is universally agreed that asthma is a condition in which there is reversible airway obstruction, it remains impossible to reach universal consensus on precise categorisation of the disease by aetiology. However, from the clinical point of view the existence of a widely accepted functional definition (reversible airway obstruction) solves most problems.

Current understanding of asthma

From the eighties inflammation was seen to play a key role in the pathogenesis of asthma. Researchers identified a wide range of inflammatory mediators (leukotrienes, prostaglandins, histamines and cytokines) that cause remodelling of the airways (GINA 1995). Further contraction of the airway smooth muscle, increase in mucus-secreting cells and thickening of the basement membrane are characteristic inflammatory changes of asthma. The two predominant manifestations of disordered lung function are hyperreactive airways and acute airflow limitation, which also occurs even when asthma is asymptomatic, due to mild airway inflammation. From a clinical standpoint, airway inflammation is the most likely

variable factor to account for varying severity of asthma and is the element most responsive to medications.

By the mid-nineties the medical profession began to understand asthma as a variable multifaceted manifestation of an underlying set of variable allergic and inflammatory responses, with variable results at different times, ages and in different patients (GINA 1995). Even though this is clinically variable, it is worth bearing in mind that the pathophysiology and aetiology of the immune responses underlying asthma are not yet fully understood.

Asthma is especially difficult to define among children. There exist clearly different patterns of wheezing that require different definitions and which are likely to have different pathologies. Martinez and colleagues (1995) differentiated early transient wheezing with symptoms occurring before age three, that do not persist to age six, from wheezing with persistence beyond age six. The former children have smaller airways and are more at risk from maternal cigarette smoking than maternal asthma or allergy, whereas the risk factors for the latter include atopic family history, serum IgE, and other manifestations of atopy.

Given this complexity and variability of underlying pathophysiology and manifestations, it is not surprising that there is no single simple gold standard for the clinical diagnosis of asthma, like there is say, for hypertension. It is defined as a consistently elevated systolic blood pressure of 160 mmHg or more and/or a consistently elevated diastolic BP of 95mmHg or more, with levels down to 140/90mmHg at treatment level (Guidelines subcommittee WHO/ ISH 1993). Even the description of the sphygmomanometer to be used, the position of the patient, number of times for the average reading are all precisely standardised and universally accepted. By contrast, it has been difficult to standardise the clinical diagnosis of asthma, for no single test is similarly conclusive (McFadden 1980; 1983). Positive wheal-and flare reactions to skin tests can be demonstrated to various allergens, but this finding does not necessarily correlate with the intrapulmonary events. Sputum and blood eosinophilia are helpful, but are not specific for asthma. Chest roentgenograms showing hyperinflation are not diagnostic, and nor are tests of pulmonary function.

There is general agreement that asthma is characterised by variable and reversible airflow obstruction. In an attempt to refine this, reversibility is defined as a 15 percent or greater increase in forced expiratory volume in one second (FEV₁) following two puffs of a beta agonist. However, (and in contrast with blood pressure) this is not a feasible diagnostic manoeuvre in a standard primary care clinical practice. Further, the use of other lung function measurements such as ambulatory peak expiratory flow (PEF) monitoring is effort dependent and in children constant supervision is needed. Improved health status after a period of treatment with a beta agonist and possibly a corticosteroid is currently considered one of the surest realistic ways of establishing a diagnosis of asthma (GINA 1995). In addition, other clinical indicators such as wheeze, cough, dyspnoea, and chest-tightness, and evidence of inflammation and increased airway responsiveness to a variety of stimuli, are used to supplement the diagnosis of asthma (Sears 1997). Reversibility may also be diagnosed in challenge tests using histamine or methacholine, but these are used as research tools and referral level diagnostics, rather than in the primary care setting. Since a single definition for asthma seems remote, numerous clinical markers need to be considered when making a diagnosis of asthma in children.

Because there are no well-validated noninvasive measurements of airway inflammation in asthma, let alone one which could feasibly be used in outpatient and primary care clinical practice settings on children, the operational definition of asthma is based upon the functional consequences of airway inflammation (GINA 1995). There is not yet complete agreement on the definition, with the two main competing definitions being the National Heart, Lung and Blood Institute (NHLBI) in the United States (1997) and the UK's British Thoracic Society (1993) guidelines (table 2.1). No specific clinical definition for asthma appears in the South African guidelines, and it merely states that the dominant pathophysiological process underlying asthma is airway inflammation (SACAWG 1994; Motala 2000).

Table 2.1 Guideline definitions for asthma in the United States and the United Kingdom

	Guideline definitions for asthma
United Kingdom (BTS 1993)	Asthma is a common and chronic inflammatory condition of the airways whose cause is not completely understood. As a result of inflammation the airways are hyperresponsive and they narrow easily in response to a wide range of stimuli. This may result in coughing, wheezing, chest tightness, and shortness of breath and these symptoms are often worse at night. Narrowing of the airways is usually reversible, but in some patients with chronic asthma the inflammation may lead to irreversible airflow obstruction.
United States (1997)	Asthma is a chronic inflammatory disorder of the airways in which many cells and cellular elements play a role, in particular mast cells, eosinophils, T lymphocytes, neutrophils and epithelial cells. In susceptible individuals, this inflammation causes recurrent episodes of wheezing, breathlessness, chest tightness, and cough, particularly at night and in the early morning. These episodes are usually associated with widespread but variable airflow obstruction that is often reversible either spontaneously or with treatment. The inflammation also causes an associated increase in the existing bronchial hyperresponsiveness to a variety of stimuli.

Experiences with asthma

Descriptions of asthma thus far have been based on scientific and medical discoveries. In addition, a more holistic picture of the nature of the disease can be obtained from a patient's perspective. Patients and parents have offered vivid descriptions of their personal journey with acute and chronic asthma.

Patient experiences with asthma are terrifying and the disease is a challenge to both the child and the parent. In a gripping true story entitled "Memories of breathing" Clarke (1992) provides a vivid description of her 15-year-old daughter, Sasha's experiences of an acute asthma attack. Clarke goes on to reveal their combined feelings of fear, helplessness, and anguish, and their hopes when arriving at the hospital, their place for salvation and "liberation". The story shows the courage of mother and daughter in their shared "fight for air", where they create a ritual akin to prayer and meditation, to give them strength to embrace the disease together. Further, Sasha reveals her feeling of awkwardness when using her inhaler in the presence of other people and links her physical handicap at school to asthma. Clarke reflects on the onset of an attack when Sasha was five years old, and describes her flailing labored breathing during the night:

Throughout the day I have watched and listened, feeling the gradual escalation of the asthma attack. This path was well known to us. ...I knew our steps were quickening when I

saw her shoulders held tight and high and her nostrils flare on inspiration. ...I was asleep when I heard the asthma find a new tempo of assault. She sits Buddawise in the middle of her bed, hands on knees, shoulders high and wide, mouthing speechless words. I help her with the inhaler and there is some relief for the words to come –“Mummy, Mummy” – a small breathless chant. ...I pick her up, her arms around my neck. She grips but holds herself away, straining upward and leaning back with the need to have space all round her chest.She starts a barking cough so demanding that there is no space for breaths.

Other accounts from asthmatic patients offer insight into the discomfort, fear and panic during an acute episode (Snadden 1992):

.. it was just so hard and tight and it hurt, it felt like I was wearing a concrete brick around my chest...really tight and constrictive”

It's been at night...and all of a sudden I haven't been able to breathe at all and I've been terrified”

You can't get your breath and you're choking ...it's very scary ..you think you're not going to get your breath

The acceptance of the diagnosis has a profound effect on most patients, resulting in feelings of anger and low self-esteem:

...why do I have to get dumped on with this (asthma)? why does it have to me, that I have to get all these problems... I found it was interfering in my life...I would feel more frustrated because I couldn't do anything..

It's terrible...I sometimes think I feel self-pity for myself....

...I really felt it interfered with my whole life and 'I hate this thing', but you learn to accept it.

These fibres of human experience help to strengthen our understanding of the fabric of asthma.

Snadden and Brown (1992) proposed a dynamic model to illustrate the experience of asthmatics. The model shows asthma as a continuum from diagnosis to final acceptance. The transition phase includes a need to integrate knowledge, experience and self-awareness before progressing to awareness and control of asthma. A mentoring relationship such as a trusting relationship with a physician, other asthmatics and health care workers is thought to greatly facilitate resolution of the transition phase and which helps to gain control of asthma among patients.

Consequently, this progresses into diminished fear. Not all sufferers, however, reach a feeling of control as progress along the continuum can be arrested at any stage.

The public health impact of asthma

Asthma is a serious public health problem affecting both adults and children worldwide. With increasing asthma prevalence in many countries, the disease incurs substantial morbidity for patients. Sub-optimal clinical management of asthma in children may often lead to preventable hospital admission, overuse of medical services and inappropriate drug use. Asthma not only adds medical expenses to the health services and families, it is also a cause of school absenteeism and limits physical activity in children with the disease (GINA 1995). *→ important*

Asthma prevalence in children

Prevalence rates for asthma in children have been reported mainly from developed countries with variations attributed to the diagnostic criteria, survey method, population group and the geographical location of the studies (Burkholter 1995). In the US (1987), approximately 163,000 children under the age of 17 years of age received a hospital diagnosis of asthma, a rate of 257 per 100 000 population at risk (Gergen 1990).

A recent International Study of Asthma and Allergies in Childhood (ISAAC) done by Australian researchers, was designed to maximize the value of epidemiological research and allergic disease by establishing a standardised methodology and facilitating international collaboration (Asher 1995). The study aimed to describe the prevalence and severity of asthma, rhinitis and eczema among children across the world; to obtain baseline measures for assessment of future trends in the prevalence and severity of these; and to provide a framework for further aetiological research into genetic, lifestyle, environmental and medical care factors affecting these diseases (ibid). The ISAAC design comprised three phases. Phase One uses core questionnaires designed to assess the prevalence and severity of asthma and allergic disease in defined populations. Phase Two will investigate the possible aetiological factors, particularly those suggested by the findings in phase one. Phase Three will be a repetition of phase One to assess trends in prevalence (ibid).

Table 2.2 Summary of self-completed wheezing questionnaire (written) data, for 12-month asthma prevalence rates in 6-7 year old children from Canada, Australia, New Zealand, India and Latin America

	12-month prevalence							n
	Wheeze	≥4 attacks	Wheeze disturbs sleep	Severe wheeze limiting speech	Exercise wheeze	Night cough	Ever had asthma	
Canada	17.6	5.5	2.2	3.0	9.6	25.1	14.7	5755
Australia	24.6	8.7	2.8	3.9	14.8	29.8	27.1	10899
New Zealand	24.5	9.0	3.5	5.1	16.5	29.2	26.5	18569
India	5.6	1.5	1.2	1.9	3.6	12.3	3.7	31697
Latin America	19.6	4.0	3.8	4.5	9.1	30.6	12.4	36364

Summaries of the ISAAC Phase One study (1998) on self-completed wheezing questionnaire (written) data, for 12-month asthma prevalence rates in 6-7 (table 2.2) and 13-14 years old children (table 2.3) are presented.

Table 2.3 Summary of self-completed wheezing questionnaire (written) data, for 12-month asthma prevalence rates in 13-14 year old children in Africa, Australia, UK and USA

	12-month prevalence							n
	Wheeze	≥4 attacks	Wheeze disturbs sleep	Severe wheeze limiting speech	Exercise wheeze	Night cough	Ever had asthma	
<i>Ethiopia</i>	6.2	3.2	1.4	4.1	13.9	14.5	2.5	5978
Addis Ababa	10.7	5.6	2.5	7.3	27.2	27.3	2.8	2951
Jima	1.9	0.9	0.3	1.0	1.0	2.0	2.2	3027
<i>Kenya</i>	13.9	3.8	4.2	5.8	24.0	27.3	11.2	6267
Eldoret	10.4	2.3	1.9	3.0	17.4	18.4	6.8	3024
Nairobi	17.1	5.2	6.3	8.4	30.2	35.6	15.4	3243
<i>Nigeria</i>								
Ibadan	10.7	3.2	3.7	7.6	43.4	31.7	18.4	3057
<i>South Africa</i>								
Cape Town	16.1	3.3	3.6	5.2	21.4	23.6	13.1	5173
Africa: regional total	11.7	3.4	3.1	5.4	23.3	23.3	10.2	20475
<i>Australia</i>	29.4	10.0	3.0	8.3	37.0	28.3	28.2	12278
<i>UK</i>	32.2	9.3	3.5	8.5	29.1	42.3	20.7	35485
<i>USA</i>	21.7	6.5	4.2	10.0	28.7	31.9	16.5	7508

The ISAAC studies shows lower asthma prevalence rates in children from developing countries when compared to those of similar age groups from developed

countries. The prevalence rates for 6-7 year old children in developed countries ranges from 15% to 26.5%; while a lower range of 3.7 % to 12.4% is noted for those from developing countries. The prevalence rates for 13-14 year old children in developed countries varies between 16.5% to 28%; and a lower range of 2.5% to 18.4% is noted for those from developing countries. These differences are likely to be due to differences in exposure of environmental factors between the populations (Asher 1998).

Asthma was recognised as a major health problem in South Africa as early as 1978 (Westerman 1978). Although early studies reported far lower asthma prevalence rates than those from developed countries, the rates are increasingly converging. In 1993, Ehrlich and co-workers (1995) used a modified ISAAC questionnaire and estimated the prevalence of recent wheeze at 26.8% and for reported asthma at 10.6% in Cape Town school children 7 to 9 years of age. They further estimated that the prevalence of clinically significant asthma in coloured children Cape Town is between 7% and 13% depending on the definition of severity (Ehrlich 1998). If mild or occasional asthma is included, the prevalence based on reports of recent wheezing, tight chest, and exercise, wheeze in this population may be as high as 25%.

While it is estimated that the prevalence for children ranges at around 10 % (Burney 1990; Evans 1987), there seems to be growing evidence that this figure is on the increase especially in urban areas. Increases in childhood asthma prevalence rates were noted in the UK (1978- 1991) from 11.1% to 12.8% (Anderson 1994)], in Aberdeen (1964-1989) from 4.1% to 10.2% (Ninan 1992), and elsewhere in Scotland (1982-1992) from 12.6% to 19% (Rona 1995). In Australia, increases were also reported in Melbourne (1964-1990) from 19.1% to 46% (Robertson 1992) and in New South Wales (1991 – 1992) from 9.5% to 11.3% (Peat 1994).

Geographical variation contributes to higher asthma prevalence in urban children. A study of Zimbabwean schoolchildren showed an urban prevalence of reversible airways obstruction of approximately 3-6% compared to 0.1 percent in a rural population (Keeley 1991). In one such early study asthma prevalence among Xhosa-speaking children in urban Guguletu, a township in Cape Town and rural Tsolo

grassland area, were found to be 3.17% and 0.14% respectively (Van Niekerk 1979), showing a marked urban rural differential. Urbanisation appears to be correlated with increasing asthma prevalence in children (GINA 1995). Exposure to sources of pollution from inner-city traffic and industrial areas may precipitate episodes of wheezing among asthmatic individuals (Perry 1983) and increase the prevalence of allergy (Andrae 1988). It has been shown that Soweto, a black suburb of Johannesburg has among the highest levels of pollution in South Africa (Yach 1988). A study at the University of Natal, Durban, revealed that children from suburbs situated close to two of South Africa's oil refineries are more likely to have chest complaints than those from other areas of the city (Kistnasamy 1993). The report shows that the prevalence ratio for cough (3.63), chest congestion (2.71), wheeze (2.09), and visiting a doctor for chest illness (3.01) were significantly higher in children living near refineries ($p < 0.1$).

Asthma prevalence varies among different populations groups. An exercise challenge using a less stringent criterion level (a 10% fall in FEV1) was used to screen Cape Town school children. Asthma prevalence was found to be significantly higher for white children (5.87%) compared to their coloured (4.05%) counterparts, $p < 0.01$ (Terblanche 1990). Further, in their age stratified data (6-9 years) coloured preteens (6/95) had a higher prevalence of bronchial hyperresponsiveness than whites (1/92). The researchers speculate that these differences may be due to a higher school drop-out rate among coloured asthmatic children.

Asthma is responsible for substantial health care use, both in and out of hospital. Most estimates are available from developed countries with very little detailed information on developing countries. African-American children bear a disproportionate share of the burden of asthma compared to their white counterparts. For example, in African-American children asthma prevalence was twice (Gergen 1988), and hospital discharge rate (1979-1982) was three times (3.75/ 1000) that of their white counterparts (1.25/1000)(Wissow 1988). Further, higher use of emergency department (70%) and inpatient services (43%) was reported among African-American compared with white children (Lozano 1995). In addition, hospitalization rate (6.9/1,000 persons, 1992) among black neighbourhoods within

Boston was 2.5 times that to the rest of Boston (Gottlieb 1995). Suboptimal care seems to be a contributory factor for increase in use of health services.

Extensive use of outpatient services for respiratory disorders have been noted in Cape Town as early as the 1970's. Results from the Cape Morbidity survey conducted in general practices over a 12-month period, showed an overall incidence of lower respiratory tract diseases at 6.1%; while in the 6-12 year age group the incidence was as high as 8.4% (Silbert 1970), but this figure was not specific for asthma.

The morbidity spectrum seen by South African private general practitioners showed respiratory disease to have one of the highest incidence of first contact care in the mid-eighties (Bourne 1991). Acute respiratory infections (11.10%), influenza (5.56%) bronchitis, emphysema and asthma (5.17%), and pneumonia (0.56%) and other diseases of the respiratory system (3.44%) were the most common reason for first contact care in private practices. The high prevalence of respiratory illness was confirmed in a Mitchell's Plain community survey where it was shown that acute respiratory infection comprised 59% of all reported acute illness; while the most commonly reported chronic illness, asthma, comprised almost a third (32%) of all chronic illness in children under the age of 15 years (Lachman 1990). Respiratory diseases also account for the highest utilization of outpatient services (33%) at Red Cross War Memorial Children's Hospital (Strebel 1990).

The rising prevalence rates for childhood asthma are of special importance in a developing country given the shortage of resources. Increases in asthma prevalence will add to the healthcare burden, therefore it is crucial that every healthcare resource is efficiently utilised. The promotion of improved quality of healthcare delivery in primary care settings is a vital step towards optimal care. Primary care practitioners such as doctors, nurses and pharmacists are pivotal in identifying barriers and improving the health care needs of the community. A concerted effort from primary care practitioners in offering preventive care services would help minimise hospital admissions and reduce the high medical costs associated with asthma.

Hospital admissions for asthma in children

There is evidence of increase in hospital admissions for asthma in children in developed and developing countries. In the UK hospital admissions for asthma (1969 –1985) increased from 10.9 to 75.6/ 10 000 in the 0-4 year age group, and from 8.6 to 28/ 10 000 among the 5-14 year age group (Anderson 1989). The increase in hospital admissions has been attributed mainly to an increasing preference on the part of families and their general practitioners for acute asthma to be treated at hospital. A similar finding was obtained in another UK study, where researchers explored the relationship between hospital admission for asthma and socioeconomic deprivation (Watson 1996). They found that hospital admissions for asthma (1991-1992) were higher in the poor West Midlands region (1.91 /10 00) compared to one of the region's wealthier districts, Worcester (0.82/1 000). While detailed analysis of the narrower age bands for the Worcester district was not carried out because of small patient numbers, asthma admission rates (1991-1992) for the West Midlands region in the 0-4 year age group was found to be higher (9.0/ 1 000) than that of the 5-14 year age group (3.0 /1 000). The researchers believed that increased hospital admission for asthma could have been due to increased severity, differences in medical care received by patients or a combination of these factors.

South African studies on hospital admissions for asthma in children are limited to the Red Cross War Memorial Children's Hospital in Cape Town. In the mid-seventies to mid-eighties it was found that almost a third of intensive care unit (ICU) admissions for acute severe asthma (32 %) were recurrent (Roux et al 1993). In another study Ehrlich and Weinberg (1994) reported that annual asthma admissions (1978 to 1989) rose sharply, almost five fold (189 to 908), among coloured/ Asian; while an 8-fold increase (17 to 135) was found among blacks. The most important demographic change in Cape Town (1980-1990) was a rapid increase in black population from 13% (225 000) to 25 % (500 000) of the total population, and with the number of black children estimated to have increased 2-to 3-fold (62 000 to 140 000). The researchers further found perennial asthma admissions showing two seasonal peaks, where a May (autumn) peak is linked to viral infection that is associated with acute asthma (Potter 1984), while a second November (spring) peak is linked to high pollen counts.

Increases in asthma prevalence and hospital admissions have been attributed to greater awareness of asthma through improved detection, increase in environmental trigger factors, and changes to therapy (Evans 1987).

Costs of asthma

Asthma incurs substantial costs to the family and health services (Barnes 1996). The costs of asthma to society include direct medical costs of doctor' services, medication and hospital care, the indirect costs attributable to school days lost, work lost, premature mortality and psychosocial effects of the disease (Weiss 1992).

In Australia, UK and the US where information on asthma costs (1991) is generally available, the per capita costs of asthma ranged between \$ 25 and \$ 40 per year (table 2.4; GINA 1995). The costs of asthma per affected individual ranged between \$326 and \$700 per year (1991).

Table 2.4 Comparison of direct and indirect costs of asthma (1991) for Australia, UK and US, adjusted to US dollars

Country (year of data)	Population in 1990 million	Asthma prevalence	Direct medical costs million	Indirect costs million	Total costs	Per capita costs per person	Costs per asthma patient
Australia (1991)	16.5	8.5%	\$ 250,0	\$ 207,0	\$ 4570	\$ 27.70	\$326
UK(1988)	57.2	6.0 %	\$ 722,5	\$ 1,07 billion	\$179 billion	\$ 31.26	\$522
US (1990)	249	4.0 %	\$3,6 billion	\$ 2,6 billion	\$64 billion	\$ 25.70	\$640

The annual cost of hospitalising Australian asthmatics has been conservatively estimated at \$ 58 million (1991) for 155, 000 bed days (National Asthma Campaign 1992). The average hospital bed day cost was estimated at Aus \$379, which includes outpatients, emergency and pharmaceutical costs as well as general hospital operating costs. Allied health treatment costs represent the cost of patients with asthma visiting all other health professionals (except pharmacists) were estimated at Aus \$8 million. The total Australian ambulance cost for asthma was \$4.9 million.

The only estimates available in South Africa for asthma come from a cost-of-illness study (1993), conducted in rural Transkei (GINA 1995). Hospital and observation stay costs were estimated to be US \$18.00 (R80.00) per patient day. While patients

with asthma in developed countries consumed about \$350 to \$ 500 (US) per year in direct medical care expenditures, in contrast, patients with asthma in Transkei consume \$10 (US). However, when adding the indirect cost of the disease, the cost of asthma per patient in developed countries increased to over \$ 600 to \$ 800 (US). The average length of stay for asthma in a Transkei homeland was estimated to be 9 days (GINA 1995). Although this figure may not be truly representative of the duration of hospital care for all asthmatic patients in South Africa, it provides a fairly reasonable estimate of inpatient care of a typical poor working class community in a developing country. The annual cost (1993) of providing beclomethasone to a patient in Transkei was equivalent to the cost of 2.25 days in the hospital, or roughly one-fourth of a typical asthma-related hospitalisation. In contrast, cost estimates for asthma in an urban private sector health care setting was notably higher than that of a rural public sector setting. An exacerbation of asthma may cost from just under US \$ 44.50 (R200.00) to over US \$ 667 (R3000.00) per day, depending on severity, and annual costs of simple nebuliser therapy for acute exacerbations may be as high as US \$ 419 (R1885) (Green 1998). Thus, making prophylactic therapy available to those at greatest risk of hospitalisation seems sensible. Cost estimates for asthma are obtained mainly for adults, as data for children are not available. More extensive economic evaluations for asthma across public and private health care facilities would be useful for planners.

Price differences between the original drug and its generic product need to be considered especially when providing care to poor asthma patients. The difference in cost between a generic salbutamol inhaler (R25.00) and the original (R60.00) was over two-fold (Generics Dictionary 1998). In the UK (1995) prescriptions for inhaled corticosteroids cost over US \$ 320 million (£200 million) and wide variations in practice could contribute to such high costs of asthma (Keeley 1997).

Asthma mortality

Asthma mortality rates have been obtained mainly for adults. In England and Wales, asthma mortality for the 5-34 year age group rose sharply in the mid 1960's, and again by an annual average (1974-1987) of 4.7% (Burney 1986). In the USA, the annual asthma death rate of 0.8 per 100 000 general population in the late 1970's increased twofold to 1.6 in the mid 1980's (Sly 1988). In New Zealand, asthma

mortality was the highest in the world in the 5-34 year age group, averaging 2.3 per 100 000 per year in the mid 1980's (Pearce 1995). The excessive use of bronchodilator therapy was found to be the main cause of such mortality rates.

In South Africa, Benatar and Ainslie (1986) reported that in the early 1980's asthma mortality among the black (11.4) and mixed race groups (8.2) showed higher deaths than whites (5.6) per 100 000 per year. Poor access to health care facilities was one of the reasons cited for the higher mortality rates among the black population. When compared to England and Wales, asthma mortality in Cape Town (8 per 100 000 per year) was found to be almost threefold to that of England and Wales (3.2 per 100 000 per year). In an extension of the study, Ehrlich and Bourne (1992) recorded that coloured death rates among the 5-34 year age group were second only to that of New Zealand (1967 to 1988) and in 1985 exceeded that of New Zealand. The authors further reported that in 1988 asthma was the cause of 2257 deaths in South Africa, of which 211 occurred in people under the age of 35. In a Transkei study, the investigators found that in four study hospitals 21 out of 2 600 deaths were patients with asthma (GINA 1995) and noted that poor infrastructure and the lower socio-economic conditions added to the mortality.

Primary care management of asthma in children

The current widely agreed primary care management of asthma is the stepped care approach which aims to provide optimal care with the least possible medication to maintain control of symptoms (GINA 1995). The pharmacotherapeutic approach involves the use of inhaled short acting bronchodilators such as beta-2 agonist (eg. salbutamol, fenoterol) to take as needed to relieve mild intermittent symptoms. Bronchodilators have no effect on the inflammation associated with asthma. Inhaled medication is preferred to oral therapies such as theophylline because of the rapid onset of action and is associated with minimal side-effects. Regular doses of inhaled anti-inflammatory agents such as corticosteroids (eg, beclomethasone, budesonide), sodium cromoglycate or leukotriene antagonists are used to supplement the bronchodilator therapy when treating persistent symptoms. A short course of oral steroids (prednisone) is added to inhaled bronchodilator and anti-inflammatory therapies for severe asthma.

The South African guidelines for management of chronic asthma in children and adolescents were first published in 1992 by the Childhood Asthma Working Group (SACAWG), a subcommittee of the Allergy Society of South Africa (ALLSA). These asthma guidelines were revised in 1994 because the scoring system proved impractical, the central role of inflammation needed to be stressed, limited availability of certain drugs in rural areas required alternative agents to be suggested, and to introduce newer inhaled long acting β_2 -agonists and steroid therapies to practitioners. SACAWG reconstituted in 1998 and co-opted more paediatricians and general practitioners from the public and private sectors.

Acute asthma in children is defined as an acute exacerbation of wheezing unresponsive to therapy necessitating hospitalisation (SACAWG 1993). A child should be referred to a specialist if he/she cannot be controlled on doses greater than 400mcg/ day, or if oral steroids are required frequently, if the asthma is uncontrolled at regular doses, or if the diagnosis is in doubt or after a life-threatening acute episode.

Organisation of asthma care delivery

The modern pharmacotherapeutic management of asthma involves a concerted effort from health care professionals world-wide towards improving the delivery and quality of health care. One example is the Global Initiative for Asthma (GINA) established in 1995, which was created to help health professionals and public health officials reduce asthma prevalence, morbidity and mortality. The initiative involves the preparation of scientific reports on asthma management and prevention, encourages dissemination and adoption of reports and promotes international collaboration on asthma research. GINA was the result of the joint efforts of the National Heart, Lung and Blood Institute (NHLBI) of the USA and the World Health Organisation (WHO).

The optimal management of asthma is dependent on the patient and, in the case of children, their parents and their medical practitioners. They must be aware of the diagnosis, attentive to symptoms and their rise and fall, and committed to long term medication use for prevention, rather than only for symptom treatment. This

requires substantial understanding of the disease and its treatment, and high levels of support and education from the health care providers. The patient and their carers must also attend regularly for assessment and repeat prescription. Such provision of care must not only be affordable, it must help to alleviate barriers and misconceptions towards improved health outcomes.

Little attention has been paid to how asthma care should be delivered and by whom—the organisational aspects of the delivery of care, the modes of the delivery of the service as opposed to the treatments themselves (Eastwood 1996). For example, within primary care should treatment be given through general practice consultations, nurse consultations or an asthma clinic? The organisation of care is an important component of health care delivery to inform policy planners in a developing country, of the most affordable and effective strategies aimed at improving patient outcomes.

Asthma care could be organised in many ways. In a systematic review Eastwood and Sheldon (1996) identified 27 studies evaluating different organisational methods of asthma care delivery across both primary and secondary sectors. The types of primary care management of asthma that the reviewers cited were integrated care, general practice (asthma clinics and consultations), community-based provision and out-patient care.

Although no conclusive evidence was found in favour of any organisational form, the authors proposed that insufficient education of general physicians in the treatment of asthma may explain in part why specialist care may yield better health outcomes. The issue of *who* delivers asthma care seems to influence outcomes and may be independent of *where* care is delivered. Patients would benefit more when treated by healthcare professionals with expertise and interest in asthma.

Patients' views on the organisation of asthma care are equally important in improving the delivery in primary health facilities. For asthma care to be useful to patients, it needs to be provided in a way that allows individual choice and flexibility (Paterson 2000). Patients' identify factors such as accessibility of care from a health professional, access to medical care when asthma is severe and in

dealing with uncertainty, attaining self-knowledge and self-management, access to expert knowledge and maintaining therapeutic relationships with their health care professional as influencing the quality of care.

The spectrum of organisational delivery of asthma care clearly outlines the active involvement of the patient and care-giver, as well as the practitioner. Understanding their unique roles would provide insight into barriers and facilitators when designing and implementing localised asthma improvement interventions.

The role of the patient and the parent

Current management approaches requires patients and care-givers to effectively carry out complex pharmacotherapeutic approaches, institute environmental control strategies, detect and self-treat most asthma exacerbations, and communicate appropriately with health care providers (NHLBI 1997). Patient education is the mechanism through which these can be accomplished, and serves as a powerful tool for helping patients gain motivation, skill, and confidence to control asthma. A guided self-management plan means that a patient with asthma or care-giver can: take medications correctly, understand the difference between quick-relief and long term preventive care, avoid triggers, monitor symptoms, recognise signs that asthma is worsening and seek timeous medical help (GINA 1995). However, such self-management teaching programmes do not seem to reduce morbidity in childhood asthma (Bernard-Bonin 1995). A possible reason is that formal local community programmes supplement, and do not replace the formal education provided by individual clinicians (NHLBI 1997).

Although asthma self-management programmes in South Africa have shown positive health outcomes, the methodological quality of the studies was poor and the interventions lacked applicability to routine practice. A significant improvement in morbidity was noted in the clinic when a trained nursing sister offered patient education on metered dose inhaler technique, the nature of the disease and its treatment, followed by routine theophylline monitoring by a doctor to individualise therapy (Brandt 1994). Although the study groups were matched they were not randomised. Bheekie and co-workers (1996) compared symptom only versus symptoms and peak flow self-monitoring among patients attending community

pharmacies and found that the latter was a more appropriate management tool for asthma. However, the study patients were neither matched nor randomised. In contrast, Bateman and colleagues (1999a) conducted a randomised parallel-group controlled intervention involving regular home-monitoring using an electronic lung function monitor with a computerised decision support system. The study results showed improved quality of life and significant saving in hospitalisation, and total direct health care costs (Bateman 1999b). However, the use of such a sophisticated programmed management tool would not be affordable to practitioners serving the majority of poor communities of South Africa.

There are numerous parental and patient barriers that need to be identified and addressed in improvement programmes. Poor parental knowledge, lack of adherence to medication among children, and doctor-hopping are recognised as common barriers to optimal care.

Although parents are the main care-givers of asthmatic children, they lack knowledge and management skills. A Mitchell's Plain study found that the most common parental concern centred on the management of acute asthma attacks and they voiced a lack of confidence in handling such attacks (Moosa 1997). The authors found that most parents (80%) incorrectly identified asthma as an inspiratory difficulty and held many misconceptions about inhaler therapy. About 60% of parents felt that inhalers "weaken the heart", while 75% believed that regular administration of medication would lead to "addiction" (dependency) and render the medication ineffective. Further, more than 50% of parents did not know that inhalers provide a lower dose and fewer side-effects than tablets and syrups. Reports from another study indicate that the symptom of "wheeze" was not commonly used among parents to identify asthma in children and held similar misconceptions and fears about inhaler therapy (Jones 2000). The authors found that parents used traditional medicines such as Dutch chest drops ("borsdruppels") and home-made remedies as alternative approaches for their child's asthma.

Lack of adherence to recommended asthma drug therapies

Medication for asthma is particularly vulnerable to adherence problems because of the long duration, the use of multiple regimens on both routine and multiple dosing

schedules and the periods of remission (Rand 1994). In one study, 47% of patients cited side-effects as the reason for not taking their medication, while another 31% of moderate to severe asthmatic patients missed doses on a chronic basis (Hindi-Alexander 1987). In another study which assessed patient attitudes to asthma medication, the researchers found that the most significant predictor of patients' dislike to taking their own inhaled steroid were, dislike of steroids generally and a dislike of taking medicine everyday (Osman 1993). Fear of side-effects and dependence were reasons cited for dislike of the long term use of inhaled medication, which has been deemed an unconventional mode of drug administration in the Asian culture (Harding 1985; Lim 1996a).

Poor inhaler technique among children is one factor contributing to poor adherence to asthma therapy. Children may lack the skill and confidence (Clark 1986) to use inhaler therapy, which is further heightened by parental reservations for medication. One study found that a third (36%) of parents either felt opposed to inhaler therapy and/ or preferred oral medications (Lim 1996a).

Psychosocial barriers to asthma education such as psychological adjustment and degree of family conflict versus cohesiveness also contributed to poor adherence (FitzGerald 1994). Compliance among adolescents depends on the psychosocial developmental process of puberty, which may induce feelings of guilt (Court 1992). For example, in adolescents with asthma, the chronic nature of the disease serves as a reminder of being different from peers, and that compliance with medical treatment may reinforce the feeling of being impaired and add to the stigma of disease or disability. Interviews in a general practice showed that children may be reluctant to be seen using inhalers in case they are considered "odd" by their peers (Harding 1985). Similar psychosocial barriers were cited as influencing adherence to treatment of asthma in South Africa (De Jongh 2000).

In a review of outpatient clinics in Egypt, the researchers found that only 52% of children with mild asthma were given inhaled bronchodilators during acute attacks, and that a small proportion (6.8%) of moderate and severe asthmatic children took prophylactic drugs (Bassili 2000). The authors concluded that numerous cultural and economic factors were the primary predictors of suboptimal quality of care, and that

defective health education rather than problems in the availability of medications or access to health services led to poor adherence. Such a situation could easily reflect the quality of care delivered in South Africa where cultures are diverse and economic factors play a role in the delivery of care.

Discontinuity of care

Regular patient attendance of the usual practitioner for the same illness is a prerequisite for continuity of care towards optimal healthcare delivery, but this may not always occur in a clinical out-patient setting.

Doctor-hopping is defined as the changing of doctors without professional referral in the same illness episode (Lo 1994). Researchers in Hong Kong estimated the prevalence of doctor shopping at nearly 40%, the main reason being the persistence of symptoms (ibid). Technical competence and socio-emotional factors in the doctor-patient relationship are important to both upper- and lower-income people (Kasteler 1976). In a study assessing asthma medication use among children in East Harlem, the researchers found that over a third used anti-inflammatory therapy (39%), and cited regular physician visits associated with this (Diaz 2000). The authors reflect that better quality care is achieved through an ongoing relationship with one practitioner.

Documented evidence on doctor-hopping in South Africa is limited, even though it is widely believed to be highly prevalent. In a study in Mitchell's Plain it was found that doctor hopping was more prevalent among care-givers attending private (55.5%) than public (39.3%) health facilities (Engels 1998). Doctor shopping is a cause of lack of continuity of asthma care in children, and possible reasons for dissatisfaction include lack of confidence in the doctor's competence, unwillingness of doctors to spend time talking to patients and high costs of services (Ware 1983; Kasteler 1976).

While these barriers are predominantly aimed at patient level, they do not take into account barriers experienced by the practitioner, an important member of the primary health care team.

The doctor's role in asthma management

The role of the doctor is pivotal in optimal asthma care delivery. Responsibilities for the doctor range from establishing the diagnosis, undertaking periodic assessment and monitoring, controlling factors contributing to asthma severity, prescribing appropriate pharmacologic therapy for acute and chronic asthma and educating the patient/ care-giver (NHLBI 1997). The doctor's role in the long-term management of asthma is to ensure minimal symptoms, minimal attacks, no emergency visits, minimal need for bronchodilator, no limitations to physical activity, nearly normal lung function and minimal side-effects from medication. These can be achieved by making a proper diagnosis and controlling asthma by providing appropriate treatment based on asthma severity. The indicators used to diagnose asthma include the recurrence of cough, and/ or wheeze, chest-tightness, and nocturnal symptoms. The doctor takes a thorough medical history and conducts a physical examination to further assess symptoms. Further, objective lung function measurements may also be used to diagnose and monitor asthma.

Because of the variable nature of asthma, an assessment of its severity helps to guide treatment decisions by enabling the practitioner to provide more appropriate pharmacotherapeutic approaches to care. A step-wise approach to therapy allows the practitioner to control asthma with the least possible medication. Doctors are advised to prescribe inhaled anti-inflammatory therapy as early as possible to control and prevent asthma attacks, while inhaled short-acting bronchodilators are used only when needed. The doctor can encourage and teach patients how to use inhaler and drug delivery devices and offer cost-effective approaches in the management of chronic asthma. Furthermore, the doctor's knowledge and management of an acute attack using oxygen, administering of beta-2 agonist inhaler therapy and the use of oral steroid is crucial to the health of the asthmatic patient.

The doctor is responsible for the promotion of preventive care through regular monitoring of asthmatic patients, patient education and the implementation of self-management programmes. Follow-up consultations help to maintain continuity of care by allowing practitioner to check the patients' use of medication, identify worsening asthma, and to enable patients to take appropriate action, including when

and how to seek medical attention. Furthermore, the doctor provides information to patients on how they can avoid exposure to indoor and outdoor allergens and irritants.

In practice settings, the doctor may not always be able to implement guideline-based recommendations leading to variations in physician practice patterns. Such variations could result in underdiagnosis and undertreatment of asthma.

Variations in physician practice patterns

Studies on variation in physician practice patterns has focused on differences in care among physician specialties. There is growing evidence that care received from specialists was found to result in better than that offered by family physicians (Engel 1989; Legoretta 1998; Osman 1987; Vollmer 1997). Differences in provision of care seem to be acceptable within loosely defined boundaries (Dawson 1999) were practitioners may not be able to recognise the onset of asthma or may be disinclined to attach such a label to the patient (Wilson 1993). This could lead to underdiagnosis and undertreatment of asthma.

Underdiagnosis and undertreatment of asthma

In the UK, numerous reports have indicated that asthma in children is not diagnosed and that many are not receiving appropriate treatment (Anderson 1983; Speight 1983). Insufficient rates of asthma labeling for children with 'asthma' was further shown to result in under-use of preventive therapy (Anderson 1981). A similar pattern seems to exist in Australia (Bauman 1992). In the US, difficulties in access to care for acute attacks and the limited use of preventive medications for severe asthma, led to the higher use of emergency department visits/ hospitalisation (Crain 1999; Diaz 2000) especially in poor minority groups. Secondary care utilisation was found to be higher especially among poor urbanised black patients when compared with their white counterparts (Finkelstein 1995; Gottlieb 1995; Lozano 1995). In Cape Town Ehrlich and co-workers (1998) found that lack of acknowledgement of a diagnostic label 'asthma' was attributed to fear of alarming parents. Such poor communication between primary care GPs and parents (Reddihough 1978) could lead to sub-optimal care.

Because of the lack of specific biologic markers for asthma, the diagnosis rests entirely on the physician's clinical judgement. Numerous biochemical diagnostic tests (metacholine, histamine) have shown little diagnostic certainty (Weiss 1993). In addition, an Australian survey found that the knowledge and reported asthma management showed substantial differences among general practitioners (Coates 1994). Other studies have also confirmed the lack of knowledge about the pathophysiology of the disease, its treatment modalities and preventive care measure among GPs (Bauman 1990; Phin 1993). Assessment of GPs' knowledge and primary care management of asthma in South Africa is limited, as studies have been mainly directed to patients or parents.

Underuse of prophylactic drug therapy is commonly encountered in primary care facilities. Warner (1995) reviewed the prescribed treatment for children with asthma at general practices and noted that a high number were prescribed oral bronchodilator therapies (syrups 14.5%; tablets 7.7%) with a small proportion (14.5%) taking regular prophylactic therapy and using their short-acting beta agonists on average 4-8 times a day. A US drug utilisation study revealed a widening gap between optimal and actual asthma drug prescribing patterns, with under-use of inhaled steroids being closely associated with lower educational levels of patients (Lang 1997). A review of medical records (n=10628) at UK general practices showed that only 1.2% of children with asthma (133) were treated with inhaled steroids (Neville 1992).

The South African guidelines support the need for early anti-inflammatory use to reduce asthma severity and to minimise the use of bronchodilators, but there is little evidence for this having been widely implemented. While in the UK, significantly higher prescribing ratio of prophylactic to bronchodilator has been noted (Naish 1995), in South Africa the ratio of beta-2 agonists to inhaled steroids was 7:1, indicating that practitioners are under-using anti-inflammatory therapy (Green 1998). Heavy reliance on bronchodilators could mean that numerous barriers encountered by patients could prevent practitioners from implementing guideline-recommended therapies routinely.

Quality of asthma care provision in South Africa

Few South African studies have assessed the quality of care based on prescription analysis and clinic audit. Rothberg and co-workers (1996) analysed private sector GP and paediatrician prescribing in children below the age of 16 years. The data showed that GPs used more salbutamol (29.1%) and theophylline (10.3%) preparations than paediatricians (16.2% and 3.5%). Further, adherence to guideline-based care was significantly higher among paediatricians (59.6%) than GPs (41.7%), $p < 0.05$. The inappropriate use of theophylline is common to primary care settings and Morris (1994) provided anecdotal inferences for physicians' preference for oral theophylline. He mentioned that it was easy to prescribe, unlike inhaler therapy, which required time-consuming procedures. Morris further stressed the need for active dissemination of guidelines as a means of promoting preventive care.

Mash and Whittaker (1997) assessed the process and outcome of care at a public-sector outpatient community clinic. The audit revealed that asthma care was poor and noted that because of a regulatory barrier, patients were under treated with inhaled steroids receiving 200mcg/ day rather than the recommended 800mcg/day. Further, spacer devices and alternative delivery systems were not routinely available. The audit reflected data that were gathered from a clinic register, and did not take into account practitioner barriers. In another study after implementation of a practical diagnostic and treatment protocol, the investigators found that patient-reported adherence increased significantly (79% to 87%; $p < 0.03$) (Coleman 1998).

Lack of practitioner and patient adherence to guideline-based therapy for asthma is attributed to a range of internal and external barriers (Cabana 2000) (table 2.5).

Asthma guidelines

Clinical practice guidelines are defined as systematically developed statements to assist practitioner and patient decisions about appropriate health care for specific clinical circumstances (Field 1992). In any modern definition of clinical practice guidelines the common themes are a systematic approach, support for clinical decision making and concern with specific clinical problems (Hutchinson 1999). Guidelines are thought to provide a means to standardise, simplify and optimise therapy. However, adherence to clinical guidelines among general practitioners is

poor.

Table 2.5 Internal and external barriers to adherence to asthma guidelines

Internal barriers	External barriers
Lack of awareness	Poor distribution of guidelines to practice setting Lack of time to stay informed
Lack of familiarity	Poor distribution of guidelines Lack of access to experts or specialists Lack of time to stay informed Guidelines poorly presented- not clear, confusing, thick and cumbersome, repetitive, and tedious
Lack of agreement	Disagreement with categories- not applicable to patient population, not practical to use Recommendations not up-to-date Recommendations too step-wise and too cookbook
Lack of self-efficacy	Difficulty using guideline categories Lack of time to perform recommendations and to educate patients, parents and staff Lack of reimbursement No continuity of care for follow-up
Lack of outcome expectancy	Patient noncompliance Patient lack of understanding- use of medications, ability to use handouts Parents and patients' lack of appreciation of preventive care- reliance on emergency department Parent denial that the child has a chronic disease (asthma), that the child is affected by environment, and that symptoms are present
Inertia of previous practice	Need to test to see if recommendation is beneficial first Loathes changing practice if patient is doing well Preference for gradual changes- would rather not make sudden changes

Possible reasons for the ineffectiveness are that guidelines themselves may have limited real world applicability, the process whereby the guidelines are disseminated and implemented is inadequate, or that the guidelines may not be making evidence based recommendations. A review by Partridge (1993) indicated that asthma guidelines lack empirical evidence and that excessive complexity and inapplicability limits their use in local clinical practices.

Guidelines often lack the information that practitioners want. Few guidelines report the potential side-effects and the costs of drug therapies (Fitsmaurice 1996; Gibson 1993; Keeley 1997) which are two essential factors used by drug evaluating bodies

when considering registration of new treatments. A survey among British GPs showed that almost half (48%) wanted safety data on inhaled steroids (McGovern 1996). In a letter Fitsmaurice (1996) highlighted the lack of reliable published evidence on the cost-effectiveness of inhaled dry powder devices, and added that guideline development groups in the UK should serve as a vehicle for achieving affordable health care. The North of England evidence-based guidelines (1996) recommends the use of dry powder inhalers, but it too excluded the cost of these devices. Such information is invaluable to the primary care clinician serving as a vehicle for cost-effective care especially to patients who are financially disadvantaged. In developing countries alerting patients to the cost of asthma drugs is of particular relevance since dry powder inhalers are more expensive and alternative cheaper aerosolised metered-dose inhalers are used.

Practitioners may view guidelines as imposing on their clinical freedom (Partridge 1993) which could explain their limited impact on changing practice behaviour. For example, GPs in the UK vary considerably in their views about asthma guidelines, perhaps because they are looked upon as policy statements rather than agendas for action (Armstrong 1994). Further, the results from one study indicated that physicians described asthma guidelines as a "cookbook" (Cabana 2000). In contrast, messages are viewed as allowing flexibility and clinical freedom (Boissel 1997).

Asthma guideline recommendations seem unable to address changes in treatment options. For example, changes to designs of spacer therapy are not made explicit to patients and necessitate the use of a variety of devices. This not only adds to the complexity of the treatment regimen and decreases compliance (Powell 1993), it adds to rising health care costs in families. Further as the range of inhaler devices increases, their lung deposition and delivery characteristics also varies, but this information does not seem to expand in parallel (Keeley 1997). Providing prescribers with information on individual delivery characteristics would enable them to inform patients accordingly.

Many asthma guidelines are based on consensus, expert opinion, clinical experience, and they lack information on the validity and efficacy of the recommendations (Gibson 1993). Some statements in the BTS guideline suggest the existence of

evidence without citing the appropriate references, for example the link between passive smoking and childhood asthma (Keeley 1997). Guidelines derived from authority based on expert opinion rather than external scientific evidence from systematic reviews of randomised controlled trials or meta-analyses tend, to exert subjective selectivity which bias the recommendations (Lim 1996b; Taylor 1996). Even the quality of underlying reviews can be suspect. In a critical evaluation, Jadad and co-workers (2000) reported that most reviews and meta-analyses on asthma treatment published in peer reviewed journals or funded by industry have serious methodological flaws that limit their value in guiding clinical decisions. Finally, if guidelines themselves are not regularly revised, then out-of date information is disseminated to practitioners (Partridge 1993).

Guidelines work better whenever a localised educational approach is carried out (Partridge 1993). For example, Asthma guidelines that are adapted to make them locally relevant are more likely to be used by clinicians, since achieving change is possible among those to whom the guidelines apply (Holmes 1996).

Evidence-based asthma guidelines

Evidence-based medicine (EBM) is the practice where clinicians make “conscientious, explicit and judicious use of current best evidence in making decisions about their care of individual patients”(Sackett 1996). The practice of evidence-based medicine means integrating individual clinical expertise with the best clinical evidence from systematic searches. Doctors practising EBM will identify and apply the most efficacious interventions to maximise the quality and quantity of life for individual patients. Sackett and Rosenberg (1995) suggest three EBM strategies which can be successful in keeping practitioners up-to date. These are learning evidence-based medicine, seeking and applying evidence-based medical summaries generated by others and accepting evidence-based practice protocols developed by colleagues.

Systematic reviews of RCTs are the gold standard for judging the benefits of treatments, mainly because it is conceptually easier to attribute any observed effect to the treatments being compared (Barton 2000). Cochrane Collaboration systematic reviews on the treatment of asthma were found to be more rigorous and better

reported than those published in peer reviewed journals (Jadad 2000).

The North of England guidelines development project (1996) consisted of a wide representation of health service providers who based their key recommendations on evidence for asthma in adults. Where evidence was not available, consensus was reached and the authors agreed to refer to the British Thoracic Society (1993) asthma guidelines. However, in South Africa access to such a closely co-operative health care organisational framework is not prevalent.

Evidence-based asthma guideline implementation

Just as guidelines themselves are best based on rigorous evidence, so too should be the strategy chosen for dissemination.

An example of an evidence-based asthma care management project directed to children was conducted in the US (Richman 1998). The initiative aimed to increase patient health outcomes by ensuring that clinical services were derived from RCTs and recommendations from experts, to reduce costs and to facilitate evidence based health care. The guidelines were implemented using educational outreach visits by a clinical pharmacist, reminders, feedback reports and opinion leaders. While such an initiative was conducted in a hospital setting with adequate staff support and resources, an evidence-based guideline implementation and evaluation in South Africa has yet to be attempted.

A different approach has been reported when changing the behaviour of solo-practitioners in asthma care. Social structures impact upon the performance of individual clinicians (Dawson 1999; Eisenberg 1979). In the case of single-handed GPs, there is a tendency to be defensive about their practice, lack reflexivity and self-critical analysis (Dawson 1999). Further GPs regard their own experience or the experience of a trusted colleague as critically important, and are more likely to be out-of-date with scientifically based evidence. Although training courses, scientific articles and protocols designed by professionals are recognised as important sources of influence, these reflect widely held social values, and not the individual GPs' real opinions (Fernandez 2000). A similar situation is likely to exist among single-handed private sector practitioners in South Africa.

Systematic reviews show that guidelines are poorly disseminated. Passive dissemination such as lectures, continuing medical education (CME) meetings or mailed delivery of guidelines has minimal impact on changing physician behaviour. Davis and colleagues (1995) systematic review revealed that traditional instructional continuing medical education is ineffective in modifying clinical practice and improving the health outcomes of patients. Thomson (1999) further concluded that outreach visits combined with social marketing are effective in changing professional practice.

The acceptance of evidence based practice to alter clinical practice towards improved care is a universal challenge to health researchers, service managers and policy makers. Approaches to implement evidence based care in general practices include individualised audit and feedback, receiving advice from a respected teacher and visits from a non-commercial 'detailer' (outreach educator) to clinical settings (Sackett 1995). However, rigorous qualitative evaluations of outreach visits to GPs have not been achieved. Assessing GPs' acceptability of such interventions would provide planners with strategies on how to improve guideline adherence in primary care settings.

Targeted educational interventions that aim to improve asthma management need to address both physician and patient-related barriers in the complex realities of everyday practice. Appropriate dissemination and implementation strategies are not only essential in improving adherence to recommendations, but crucial to improving health outcomes through quality care delivery.

Private medical practice

In the UK asthma patients are cared for by the general practitioner through the National Health Service, while in South Africa a high proportion of children with asthma (59.1%) receive care from private practitioners (Ehrlich 1998). Understanding the shape and characteristics of private medical practice is vital to the design of improvement programmes.

This section focuses on the increasing demand for private sector care, despite the constraints of a developing country. The first section deals with patient preference for private sector care, patient load and provider payment system. The second discusses the practitioner's quality of service and level and scope of care. The third section describes the demographic profiles of the private sector practices and the community of Mitchell's Plain.

Patient preference for private sector care

Despite higher fees than the public sector, a high proportion of patients in many developing countries prefer private care (Brugha 1998). The urban poor increasingly seek private sector care through 'out-of-pocket' expenditure (Thaver 1997; Van den Heever 1998; Swan 1997) as they may be the only sources of care in underserved areas (Garner 1993).

The South African health system consists of a large public sector serving mainly indigent (51%) and low-income (18%) groups, while the private sector provides care to more affluent groups (31%) that choose to insure for their health care (Van den Heever 1997). Over the last decade development of a powerful trade union movement representing low-income workers resulted in employer-based medical benefits for people who previously relied on public sector care. This increased demand for privately funded benefits reflects the quality decline in quality and quantity of public services.

In SA, household surveys conducted in October 1995 revealed that private care was first choice for a substantial proportion of poor respondents, even among those with no medical insurance cover (Söderland 1998). For example, 19 % of urban residents in the lowest income quintile claimed to use the private sector as their first choice. Further, the survey report indicated that of the 25% of lowest-income urban ill persons seeking care from the private sector, only 5% were covered by medical aid. This suggests that there is considerable out-of-pocket payment for private health care in lower income groups.

Patients favour private care because of greater ease of access, shorter waiting periods, longer and more flexible waiting hours, availability of drugs, more

personalised, family-oriented care and sensitivity towards patient attitudes with greater confidentiality in diseases that carry a social stigma (Brugha 1998; Swan 1997). In addition, some private providers have informal/ formal agreements to lower fees for those lacking financial resources (Swan 1997).

Patient load

It is estimated that a private practitioner consults on average 25 patients a day and, assuming that he/she spends about 20 minutes with one patient, this results in 8 hours of consulting per day (Bhat 1999). In a questionnaire survey in India, Bhat (1999) reported that less than a quarter (21%) of private practitioners experience patient load that fell in the suggested range, while half had a maximum patient load. A high proportion of doctors (45%) spent less than 15 minutes on each patient case and this could be attributed to doctors attending to more patients.

Provider payment system

The dominant provider-payment system in private sector practices is fee-for service. Almost a third (30%) charge on a case basis in which the total charges depend on specific services and procedures. In India most providers (70%) charge on a fee-for-service, of which almost half (47%) use cost as the basis of arriving at their fees (Bhat 1999). This type of system has been found to create strong incentives, more visits, referral for more diagnostics and performing more procedures.

Medical aid schemes are non-profit employer-based and voluntary schemes offering comprehensive benefits to members and their dependents (Van der Heever 1997). Schemes reimburse providers primarily on a fee-for-service where members make monthly contributions with employers often contributing at least 50% of the payment. Medical schemes involve cross-subsidy, from healthy to unhealthy and from high to low income. In South Africa only around 18% of people have comprehensive access to private health care through medical scheme coverage, with the Western Cape having the 2nd highest proportion (28%), of medical scheme cover (Söderland 1998). However, out-of-pocket spending is an alternative means of obtaining private care. Out-of-pocket spending refers to direct payments by households for medical services, primarily general practitioner care. Even though the link between access to medical scheme cover and the use of private providers is

a strong one, non-medical scheme members also use private care considerably (ibid).

Quality of health service provision

The private health sector consumes over half of South Africa's health care resources (Söderland 1998). Although this vast expenditure is perceived to reflect better standards of care, more sophisticated methods of diagnosis and treatment and more luxurious facilities than the public sector (Broomberg 1990), there seems to be little available evidence to support this finding in South Africa. Descriptions of private sector health care services in other developing countries is likely to reflect the quality delivered among local practitioners.

Private sector GPs have less contact with current literature, and have fewer incentives to shift their behaviour towards recognised 'good practice' (Brugha 1998). For example high referral rates and fee-splitting are undesirable practices that were noted among private sector GPs in India. Half of private doctors refer occasionally, a third refer quite frequently to specialists, while over half (55%) refer frequently to diagnostic facilities (Bhat 1999). Further whenever a referral is made the referring doctor receives a portion of the fee charged to the patient by the receiving person, resulting in several consultations, unnecessary clinical investigations, and greater costs to the patient (Yesudian 1994). Fee-splitting goes against the ethical code for medical practice which specifies that a physician should restrict his income to the professional services provided to the patient.

Private GPs are largely influenced by unreliable, biased information supplied by pharmaceutical companies and fail to maintain awareness of recent reliable scientific evidence (Swan 1997). Although the use of generic drugs is widely advocated, prescribing is largely influenced by drug company promotions (Melrose 1982) and for GPs in developing countries, profits from dispensing is seen as an easy source of additional income. Further GPs lack access to evidence and the skill to appraise it for validity and applicability to the local context. All these factors contribute to inadequate knowledge and poor clinical practice (Brugha 1998).

Limited evidence indicates that the quality of service provided by private practitioners is often poor and this could be attributed to a gap between practitioner knowledge and practice (Swan 1997). Studies assessing the provision of private care in developing countries have reported inappropriate prescribing, polypharmacy and failure to comply with recommended guidelines. For example, in India private GPs ranked over-prescription of drugs as the first major undesirable practice followed equally between fee-splitting and inadequate measures for waste disposal. (Bhat 1999). Further studies of treatment practices among Indian practitioners showed that two-thirds of patients with cough and cold received costly and often unnecessary injections (Swan 1997).

Private sector providers in poorer areas may cut costs by providing low quality care and ignore standard practices (Bennett 1994). It has been noted that consultations are brief, and that GPs are unable to recognise symptoms and have poor patient record-keeping. A review states that “ ..consultations are brief with doctors seeing up to 100 patients a day...to ensure that costs are kept low ”(Garner 1993). A study of treatment practices in Indian children with acute respiratory infection found that large numbers of private practitioners were unable to recognise even the basic symptoms and were insufficiently informed (Swan 1997). In Egypt, doctors were found to be less likely than public sector workers to use oral rehydration solution, and more frequently prescribe antidiarrhoeal drugs that were contradicted in the national programme (Langsten 1995). In Malaysia, private family planning clinics services were found to be inadequate (Swan 1997). In a study of TB practices in India, doctors demonstrated that none had mechanisms for tracing defaulters and putting them back on treatment and that there was a total lack of record-keeping (Uplekar 1993). In addition, cost-containment strategies are not easily welcomed among private practitioners. For example, in South Africa, most practitioners (61.5 %) were resistant to an external funding health care agency influencing their practice style as a cost-containment strategy (Volmink 1993).

Level and scope of care

The level and scope of preventive public health activity of private practitioners is limited to curative services. For example, in Kenya less than a third (31%) of solo-practitioners and only 14% of partnerships offered immunisation services; in

Malawi almost three-quarters (73%) had no refrigerators and did not provide immunisations; while in Zimbabwe virtually all private practitioner services are curative (Swan 1997). Further, private practitioners are excluded from involvement in national disease programmes (Swan 1997; Uplekar 1993). Possible reasons cited are that the strong biomedical force in undergraduate training and poor promotion of public health perspectives among private practitioners could lead to a difference in care provision (Swan 1997). The greatest difference between public and private care is the tendency of private practitioners to identify individual behaviour as the cause of health problems, failing to focus on the broader socio-economic causes and determinants (Bhopal 1995). Private sector doctors have a tendency to be interested in more medical care, which is usually oriented to cure, than in health care which is aimed at prevention.

Private practitioners are more likely to be working in solo-practice clinical settings, which are isolated and independent when compared to those in the public sector and lack support from nursing and paramedical staff. Trained and qualified personnel are a prerequisite to the provision of good quality care. However, because of the widespread shortage and cost of paramedical staff in developing countries, doctors in private sector health facilities hire untrained staff or work single-handedly. With substantial growth in private sector, the supply of trained manpower has not kept pace and, this is likely to impact negatively on health service provision.

In South Africa most registered medical practitioners (1998), are employed in the private sector (56% i.e. 12977), compared to the public sector (37%) (Söderland 1998). It has also been noted that 10 years after qualification, the majority of GPs work in the private sector. Some reasons cited for increased employment in the private sector are better working conditions, experience and the availability of specialized skills (Bhat 1999).

The private sector plays a vital role in South Africa's health-care provision. Although documented evidence on the behaviour of South African private practitioners is limited, literature from other developing countries offer insight into numerous contextual factors that must be taken into account when implementing improvement programmes aimed at health care professionals.

Mitchell's Plain: community profile

In this section I describe the geographical location of Cape Town and how the suburb of Mitchell's Plain originated. I provide an overview of Mitchell's Plain: the population groups, socio-economic profile and employment status. In addition, I provide a brief description of the Town Centre and the health care facilities of the suburb.

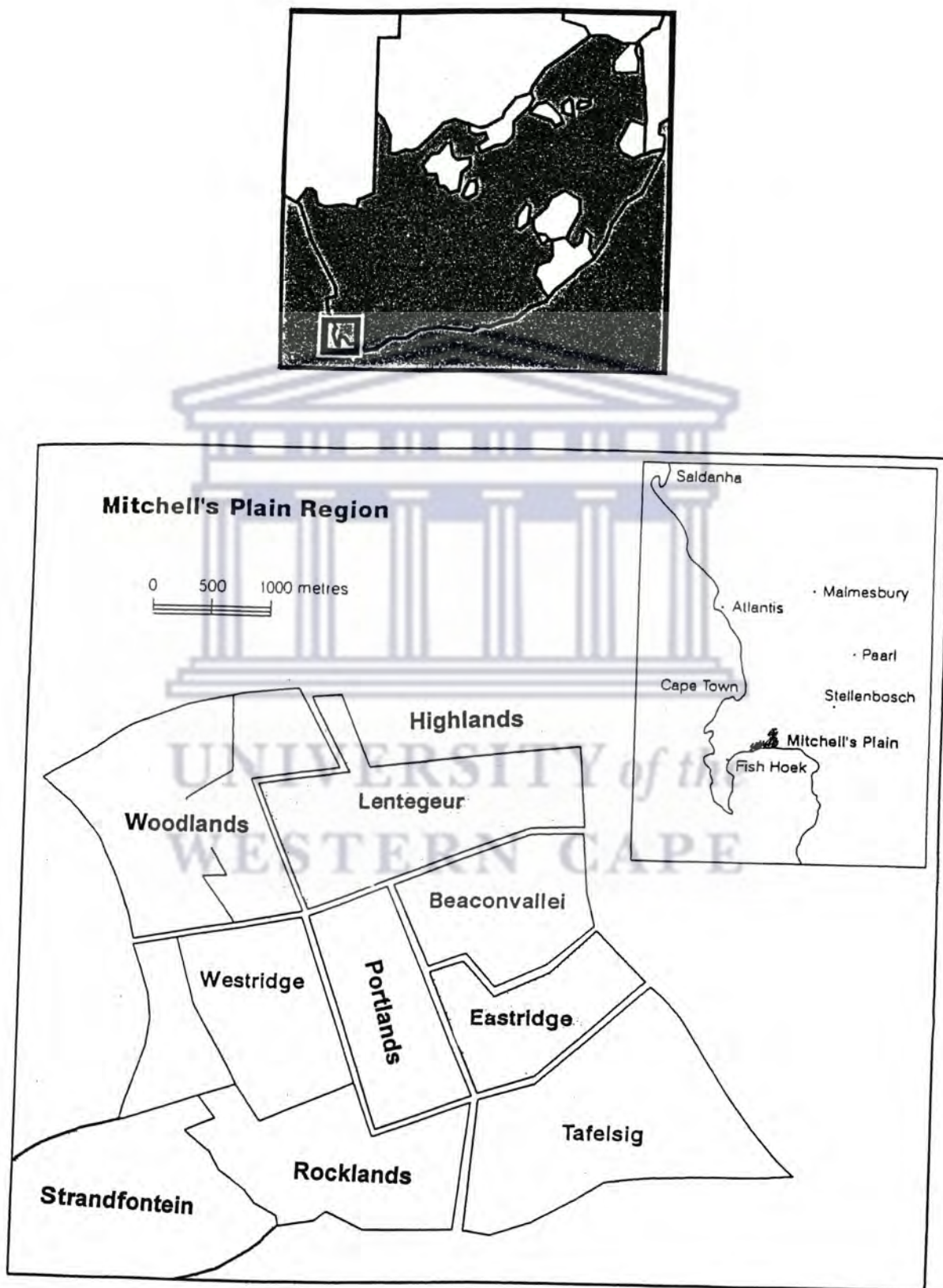
Cape Town lies on the south-western tip of the African continent (Figure 2.1). The climate is Mediterranean, with hot dry summers and cool wet winters. Strong south-easterly winds which sweep the area during the spring and summer months also serve as a catalyst for pollination. Cape Town is endowed with an extremely large array of flora and is regarded as a natural endemic area for allergic asthma (Joubert 1988).

The segregated dwelling of the different population groups in South Africa is a result of apartheid government. The lower socio-economic communities consisting of mainly the black, coloured and Malaysian people were scattered to the city's outlying Cape Flats region. Mitchell's Plain, a large suburban area of Cape Town, was thus home to mainly the poor 'coloured' population in terms of the Group Areas Act*.

The political and socio-economic instability led to uncertainty and ill-feeling in respect of relations between coloureds and the government, giving rise to a 'sense of rootlessness'. In the Western Cape, growth and poverty were the two most serious problems facing the coloured community. Since the '70s, rising unemployment, housing shortages with increasing informal (squatter) settlements, poor education and soaring crime rates led to an unfavourable position of the coloureds vis-à-vis Whites. In 1980 the Cape Town City Council implemented a massive housing development project in Mitchell's Plain to address many socio-economic problems that resulted from many years of white oppression.

* The Group Areas Act of 1950 restricted each racial group to its own segregated residential area.

Figure 2.1 Maps showing South Africa, Cape Peninsula and Mitchell's Plain



Mitchell's Plain is situated at the southeast rim of the Cape Peninsula, on the high water table sandy plain known as the Cape Flats, bounded by the coastal dunes of False Bay (Figure 2.1). Vegetation is sparse shrub, with Acacia and Port Jackson trees. The area is dusty owing to coastal dune sandblasting by the southeasterly winds, and damp owing to the coastal location and high water table of the Cape Flats. The area comprises approximately 3100 hectares of land divided into 13 suburbs and is approximately 27 kilometres from central Cape Town.

Mitchell's Plain has a well developed infrastructure of roads, schools, churches, shopping centres and sports facilities with informal dwellings erected on the periphery of the region. The number of dwellings includes both formal and informal homes such as pre-fabricated huts and backyard shacks, with a fairly high housing density (9.6 /hectare) leading to overcrowding. In 1990, the population of Mitchell's Plain was approximately 210 000 of whom 30 000 were aged between 5 to 9 years (Statistics South Africa 1991). Almost two thirds were Afrikaans speaking, almost all of the remainder speaking English. There were approximately 40 000 homes, the average family size was 5.2. The coloured community is the dominant population group in Mitchell's Plain (Table 2.6).

Table 2.6 Population distribution of Mitchell's Plain (1991)

	<i>n</i>	%
Black	8 729	3.8
Coloured	220 754	95
Indian	1 792	0.8
White	134	0.05
Total	231 409	

Occupational categories of employed members of the community range from a small proportion of professional and managerial, administrative and clerical people while the majority are employed in factories on the Cape Peninsula (Table 2.7). The income, educational and occupational status of the population of Mitchell's Plain (Table 2.7) is representative of the Cape Flats region (Statistics SA 1991).

Table 2.7 Income, education and occupational distribution of population in Mitchell's Plain and Cape Flats

Income distribution (rands (R))

	< R 9999	R10 000 to R49 999	R50 000 to R99 999	R100 000 to R299 999	> R 300 000	Unemployed	Total
Mitchell's Plain	43 389 (21.4%)	29 343 (14.4%)	226 (0.11%)	130 (0.06%)	33 (0.01%)	129 703 (64%)	202 824
Cape Flats	10 1678 (26.9%)	50 674 (13.4%)	902 (0.23%)	203 (0.05 %)	46 (0.01%)	224 247 (59.3%)	377 750

The majority of the communities have not received an income. Of those that receive an income the majority earn below ten thousand rands.

Education levels

	Primary & < std 6	Std. 6	Std. 7	Std. 8	Std. 9 to 10	Diploma	Degree	None/ unspecified	Total
Mitchell's Plain	69 107 (33.4%)	28 127 (13.6%)	22 234 (10.7%)	21 648 (10.4%)	19 739 (9.5%)	1 934 (0.9%)	303 (0.1%)	43 636 (21.1%)	206 728
Cape Flats	133308 (34.6%)	51 777 (13.4%)	35 972 (9.3%)	37 383 (9.7%)	42 615 (11.0%)	5 752 (1.5%)	1 810 (0.4%)	76 058 (19.8%)	384 675

Key : std = standard in school

The majority of the occupants have achieved their primary education and few in the area completed their secondary education.

Occupation categories

	Prof/ semi-prof/ tech	Manag/ Exec Admin/ Clerk/ Sales	Transport/ Delivery/ Community/ Services	Farming + related/ Artisan +related	Production/ Mining/ Quarry/	Unskilled	Not economically active	Total Active
Mitchell's Plain	2 137 (1%)	13 410 (6.5%)	11 598 (5.6%)	7 523 (3.6%)	25 553 (12.4%)	12 422 (6.0%)	133 368 (64.8%)	206 011
Cape Flats	8 414 (2.2%)	28 453 (7.4%)	24 936 (6.5%)	15 889 (4.1%)	57 613 (15.0%)	29 895 (7.8%)	218 552 (57%)	383 752

Since 1991 the unemployment rate in Mitchell's Plain has almost trebled and a large proportion, 43% of the population in Mitchell's Plain remains unemployed (Anon 1996). More than 40 000 are self-employed and work mainly in Mitchell's Plain. Almost three-quarters (74,1%) are traders. Growth of informal trading mushroomed because of increasing unemployment and deregulation. The majority (24 000) of self-employed people work in the central business district of Mitchell's Plain.

Lack of empowerment within the community has been largely attributed to rising unemployment, and has been identified as the root of social problems prevalent in Mitchell's Plain. Gangsterism, alcohol and drug abuse, domestic violence and

teenage delinquency are rampant in most suburbs, leading to disintegration of families and a fragmented society (Abrahams 1999; Sampson 1998). These factors are the cause of the soaring crime rates in Mitchell's Plain. The fears of the community and their plea for help are expressed through the Plainsman, the local newspaper:

How can we sleep safely at night with the sound of gun shots and people begging for mercy...We do not feel safe in our own houses. Boys are forced to steal, smoke, kill and rape. They cannot refuse or they will die. (Sanders 1998)

The gangsters think they can rule our area. The drug lords sell drugs to people and children...Will you help us with crime in our area. (Malgas 1998)

Mitchell's Plain Town Centre is easily accessible via major road networks (City of Cape Town 1991). It has a massive inflow of people to and through the Centre because of the high concentration of informal retailing sector (hawking). It is the only source of income for many people and growth of informal retailing has added pressure to the use of public sector services and facilities. Problems of overcrowding, increased crime activity, pedestrian and traffic obstructions, noise and littering are inherent in the Town Centre. Such problems have resulted in wealthier clientele avoiding the unpleasant condition and shopping elsewhere. Although several non-governmental organisations have initiated community upliftment programmes, many residents have low-literacy levels (Table 2.8) (Statistics South Africa 1991), are not well informed or have poor access to these resources.

Medical services are provided in the area by a number of private general practitioners and public health services in the form of one community health centre (general outpatients) and 5 poly clinics (providing antenatal services, immunization, and treatment of sexually transmitted diseases and tuberculosis). Two large outpatient facilities are located in the vicinity of the Town Centre; a public sector day hospital located across the main thoroughfare from the Centre, and a private medical centre and a dental school which share a complex within the Centre itself. The dental school offers low cost care to lower income families or to those who are unemployed.

Table 2.8 Average years of education and income distribution in Mitchell's Plain suburbs (1991)

	Population	Average years of education	Income (rands) < R 15 000 per annum
Beacon Valley	24 460	6.47	93.37 %
Eastridge	21 720	6.5	94.56 %
Lentegeur	33 482	6.66	92.35 %
Mandalay	5 149	8.41	74.50 %
Portlands	24 941	7.72	87.62 %
Rocklands	28 125	7.12	92.1 %
Tafelsig	35 274	6.23	96.17 %
Westridge	19 916	7.72	86.46 %
Woodlands	19 698	6.91	92.14 %

Conclusion

Asthma is an important disease. The disease is not only a serious public health burden, but the primary care management of children is poor and of major concern to both families and the health services. Private sector medical practitioners are one of the main sources of health care provision, but adherence to guideline-based care is lacking. There is a need for implementation of improvement strategies directed to private sector practitioners for the primary care management of asthma in children. The implementation of relevant evidence based management principles is needed for adoption into clinical setting.

A review of the strategies aimed at changing professional practice would provide insight into the most feasible approach towards improving the primary care management of asthma in children.

References

- Abrahams F. Community study of Mitchell's Plain. Final report. Bellville: Department of Social Work, University of the Western Cape. 1999.
- American Thoracic Society. Definitions and classifications of chronic bronchitis, asthma and pulmonary emphysema. *Am Rev Respir Dis* 1962; 85: 762-768.
- Anderson HR, Bailey PA, Cooper JS, Palmer JC, West S. Morbidity and school absence caused by asthma and wheezing illness. *Arch Dis Child* 1983; 58: 777-784.
- Anderson HR, Bailey PA, Cooper JS, Palmer JC. Influence of morbidity, illness label and social, family and health service factors on drug treatment of childhood asthma. *Lancet* 1981; ii: 1030-32.

- Anderson HR. Increase in hospital admission for childhood asthma: trends in referral, severity and readmissions from 1970 to 1985 in a health region of the United Kingdom. *Thorax* 1989; 44: 614-9.
- Anderson HR, Butland BK, Strachan DP. Trends in the prevalence and severity of childhood asthma. *Br Med J* 1994; 308: 1600-4.
- Andrae S, Axelson O, Bjorksten B, Fredriksson M, Kjellman N-I M. Symptoms of bronchial hyperactivity and asthma in relation to environmental factors. *Arch Dis Child* 1988; 63: 473-478.
- Anonymous. 40 000 self-employed in Mitchell's Plain. *Big: News for Small Business* 1996, Nov (no 1). Cape Town.
- Armstrong D, Fry J, Armstrong P. General practitioners' views of clinical guidelines for the management of asthma. *International Journal for Quality in Health Care* 1994; 6: 199-202.
- Asher MI, Keil U, Anderson HR, Beasley R, Crane J, Martinez F, et al. International study of asthma and allergies in childhood (ISAAC): rationale and methods. *Eur Respir J* 1995; 8: 483-91.
- Asher MI et al. International study of asthma and allergies in childhood (ISAAC) steering committee. Worldwide variations in the prevalence of asthma symptoms: the international study of asthma and allergies in childhood (ISAAC). *Eur Respir J* 1998; 12: 315-335.
- Bauman A, Hunt J, Young L, Larkin P, Peat JK. Asthma under-recognition and under-treatment in an Australian community. *Aust N Z J Med* 1992; 22: 36-40.
- Bauman A, McKenzie D, Young L, Yoon R. Asthma education: the perception of family physicians. *J Asthma* 1990; 27: 385-92.
- Barnes PJ, Jonsson B, Klim JB. The costs of asthma. *Eur Respir J* 1996; 9: 636-42.
- Bassili A, Zaki A, Zaher SR, El-Sawy IH, Ahmed MH, Omar M, Omar T, Bedwani RN, Davies C, Tognoni G, and on behalf of the Egyptian-Italian collaborative group on pediatric chronic diseases. *Pediatrics* 2000; 106: p.e12 (URL: <http://www.pediatrics.org/cgi/content/full/106/1/e12>)
- Barton S. Which clinical studies provide the best evidence? *Br Med J* 2000; 321: 255-256.
- Bateman ED, Abdullah I, Kruger MJ. Healthcare utilisation in adult asthmatics using a disease management programme. *Eur Respir J* 1999a; 14: 97s.
- Bateman ED, Kruger MJ. Improvements in quality of life and cost savings achieved with a disease management system involving regular home monitoring in adults with severe asthma. *Eur Respir J* 1999b; 14: 97s.
- Bernard-Bonnin AC, Stachenko S, Bonin D, Charette C, Rousseau E. Self-management teaching programs and morbidity of pediatric asthma: a meta-analysis. *J Allergy Clin Immunol* 1995; 95: 34-41.
- Benatar SR, Ainslie GM. Deaths from asthma in Cape Town, 1980-1982. *S Afr Med J* 1986; 69: 669-671.
- Bennett S, Dakpallah G, Garner P, Gilson L, Nittayaramphong S, Zurita B, Zwi A. Carrot and stick: state mechanisms to influence private provider behaviour. *Health Policy Planning* 1994; 9: 1-13.
- Bhat R. Characteristics of private medical practice in India: a provider perspective. *Health Policy and Planning* 1999; 14(1): 26-37.
- Bheekie A. Screening and monitoring of asthmatic patients at community pharmacies [Master's thesis]. Bellville: University of the Western Cape; 1996.

- Bhopal R. Public health medicine and primary health care: convergent, divergent or parallel paths? *J Epidemiol Community Health* 1995; 49: 113-6.
- Boissel JP, Nony P, Gueyffer F, Cucherat M. Differences between messages and recommendations/guidelines. Proceedings of the Second international conference. Scientific basis of health services and 5th annual Cochrane Colloquium. 1997 Oct 5-12, Abstract book. (poster p260). p 279.
- British Thoracic Society, British Paediatric Association, Royal College of Physicians, King's Fund Centre, National Asthma Campaign, Royal College of General Practitioners, General Practitioners in Asthma Group, British Association of Accident and Emergency Medicine, and British Paediatric Respiratory Group (1993). Guidelines on the management of asthma. *Thorax* 1993; 48; s1-s24.
- Brandt HD, Muntingh GL. Decreasing asthma morbidity. *S Afr Med J* 1994; 84: 842-844.
- Broomberg J, De Beer C, Price MR. The private health sector in South Africa – current trends and future developments. *S Afr Med J* 1990; 78: 139-143.
- Brugha R, Zwi A. Improving the quality of private sector delivery of public health services: challenges and strategies. *Health Policy and Planning* 1998; 13(2): 107-120.
- Burney PGJ. Asthma mortality in England and Wales: evidence for a further increase, 1974-1984. *Lancet* 1986; ii: 323-6.
- Burney PGJ, Chinn S, Rona RJ. Has the prevalence of asthma increased in children? Evidence from the national study of health and growth 1973-86. *Br Med J* 1990; 1306-10.
- Bourne DE, Bloom B, Sayed AR. The morbidity spectrum seen by general practitioners in South Africa. *S Afr Med J* 1991; 80: 513-514.
- Burkholter D, Schiffer P. The epidemiology of atopic diseases in Europe. *ACI News* 1995; 7(4): 113-25.
- Cabana MD, Ebel BE, Cooper-Patrick L, Powe NR, Rubin HR, Rand CS. Barriers pediatricians face when using asthma practice guidelines. *Arch Pediatr Adolesc Med* 2000; 154: 685-93.
- Ciba Guest Symposium. Terminology, definitions and classification of chronic pulmonary emphysema and related conditions. *Thorax* 1959; 14: 286-299.
- City of Cape Town. Mitchell's Plain Town Centre Extension, City Planner's Department. 1991.
- Clarke M. In Morse JM (ed), *Memories of breathing. A phenomenological dialogue. Asthma as a way of becoming.* In *Qualitative Health Research*. USA: Sage Publications. 1992.
- Clarke NM, Feldman CH, Evans D, Duzey O, Levinson MJ, et al. Managing better: children, parents and asthma. *Pat Educ Counsel* 1986; 8: 27-38.
- Coates JR, Steven ID, Beilby J, Coffey G, Litt JCB, Wagner C. Knowledge of and reported asthma management among South Australian general practitioners. *Br J Gen Pract* 1994; 44: 123-6.
- Coleman R, Gill G, Wilkinson D. Noncommunicable disease management in resource-poor settings: a primary care model from rural South Africa. *WHO Bulletin* 1998; 76(6): 633-640.
- Court JM. Adolescents and compliance. *Current Therapeutics* 1992; October: 55-59.
- Crain EF, Mortimer KM, Bauman LJ, Kerscmar CM, Weiss KB, Wissow L, Mitchell H, Rotor D. Pediatric asthma care in the emergency department: measuring the quality of history-taking and discharge planning. *J Asthma* 1999; 36:129-138.
- Davis DA, Thomson MA, Oxman AD, Haynes RB. Changing physician performance: a systematic review of the effect of continuing medical education strategies. *JAMA* 1995; 274: 700-5.

Dawson S, Sutherland K, Dopson S, Miller R. Changing clinical practice: views about the management of adult asthma. *Quality in Health Care* 1999; 8: 253-61.

Diaz T, Sturm T, Matte T, Bindra M, Lawler K, Findley S, Maylahn C. Medication use among children with asthma in East Harlem. *Pediatrics* 2000; 105: 1188-93.

De Jongh N, Fourie A. (Letter). *Allergy and Clinical Immunology* 2000; 13(2): 36.

Dorland's illustrated medical dictionary. 26th edition. USA: WB Saunders Company. 1981

Eastwood AJ, Sheldon TA. Organisation of asthma care: what difference does it make? A systematic review of the literature. *Quality in Health Care* 1996; 5: 134-43.

Ehrlich R, Bourne D. Asthma deaths in South Africa. *Current Allergy* 1992; 5(4): 11-13.

Ehrlich RI, Weinberg EG. Increase in hospital admissions for acute childhood asthma in Cape Town, 1978-1990. *S Afr Med J* 1994; 84: 263-266.

Ehrlich RI, Du Toit D, Weinberg EG, Jordaan E, Volmink JA, Zwarenstein M. Underrecognition and undertreatment of asthma in Cape Town primary school children. *S Afr Med J* 1998; 88: 986-993.

Ehrlich RI, Du Toit D, Jordaan E, Volmink JA, Weinberg EG, Zwarenstein M. Prevalence and reliability of asthma symptoms in primary school children in Cape Town. *Int J Epidemiol* 1995; 24: 1139-1146.

Eisenberg JM. Sociologic influences on decision-making by clinicians. *Annals Intern Med* 1979; 90: 957-64.

Engel W, Freund DA, Stein JS, Fletcher RH. The treatment of patients with asthma by specialists and generalists. *Med Care* 1989; 27: 306-14.

Engels D. An assessment of doctor hopping among asthmatic children in Mitchell's Plain. Unpublished manuscript. Cape Town: Health Systems Research, Medical Research Council; Public Health Programme, University of the Western Cape 1998.

Evans R, Mullally DI, Wilson RW, Gergen PJ, Rosenberg HM, Grauman JS, et al. National trends in the morbidity and mortality in the US. Prevalence, hospitalisation and death from asthma over two decades: 1965-1984. *Chest* 1987; 91(suppl) 65S-74S.

Fernandez LAL, Martin JMJ, Del Castillo JDL, Gaspar OS, Millan JIM, Lozano MJP, Keenoy EDM, Sources of influence on medical practice. *J Epidemiol Community Health* 2000; 54: 623-30.

Field MJ, Lohr KN (eds). In: *Guidelines for clinical practice: from development to use*. Washington: Institute of Medicine/ National Academy Press, 1992.

Finkelstein JA, Brown RW, Schneider LC, Weiss ST, Quintana JM, Goldman DA, Homer CJ. Quality of care for preschool children with asthma. The role of social factors and practice setting. *Pediatrics* 1995; 95: 389-394.

FitzGerald M. Psychosocial barriers to asthma education. *Chest* 1994; 106: 260S-263S.

Fitzmaurice DA, Bradley CP, Salter R, Slater AE. Evidence used to formulate guidelines on managing asthma did not include costs. *Br Med J* 1996; 313: 113-4.

Garner P, Thaver I. Urban slums and primary care. The private doctor's role. *Br Med J* 1993; 306: 667-668.

Generics Dictionary. In: Anley J (ed). Hout Bay, 1998: February. Paramedical supplies.

Gergen PJ, Weiss KB. Changing patterns of asthma hospitalisation among children: 1979-1987. *JAMA* 1990; 264: 1688-92.

Gergen PJ, Mullally DI, Evans R. National survey of prevalence of asthma among children in the United States, 1976-1980. *Pediatrics* 1988; 81: 1-7.

Gibson P. Asthma guidelines and evidence-based medicine. *Lancet* 1993; 342: 1305.

Global Initiative for Asthma (GINA). Global strategy for asthma management and prevention. National Heart, Lung and Blood Institute (NHLBI) / World Health Organisation (WHO) workshop report. National Institutes of Health. NHLBI Publication number 95-3659. January 1995. <http://www.ginasthma.com/WORKSHOP/DEFAULT.HTML>

Gottlieb DJ, Beiser AS, O' Connor GT. Poverty, race and medication use are correlates of asthma hospitalisation rates. *Chest* 1995; 108: 28-35.

Green RJ, Plit M, Plessis du W, Rothberg AD. Asthma in South Africa – a long way to go. *S Afr Med J* 1998; 88: 1389-1393.

Gross NJ. What is this thing called love? – or, defining asthma. *Am Rev Respir Dis* 1980; 121: 203-4.

Guidelines Sub-committee of the WHO/ISH Mild hypertension liaison committee. 1993 Guidelines for the management of mild hypertension: memorandum from a World Health Organisation / International Society of Hypertension meeting. *J Hypertens* 1993; 11: 905-918.

Harding JM, Modell M. How patients manage asthma. *J R Coll Gen Pract* 1985; 35: 226-8.

Haubrich WS. Medical meanings. A glossary of word origins. American College of Physicians. Philadelphia. United States of America. 1997

Hindi-Alexander M, Cropp G. Evaluation of a family asthma program. *J Allergy Clin Immunol* 1984; 74: 505-10.

Hindi-Alexander MC, Trom J. Compliance or noncompliance: that is the question! *Am J Health Promotion* 1987; Spring: 5-11.

Holmes B. Who owns the guidelines. *Practitioner* 1996; 617.

Horn MEC, Brain EA, Gregg I, Inglis JM, Yealland SJ, Taylor P. Respiratory viral infection and wheezy bronchitis in childhood. *Thorax* 1979; 34: 23-28.

Hutchinson A, Baker R. What are clinical practice guidelines? In: Hutchinson A, Baker R (eds), *Guidelines in clinical practice*. Oxford: Radcliffe Medical Press, 1999; 1-13.

Jadad AR, Moher M, Browman GP, Booker L, Sigouin C, Fuentes M, Stevens R. Systematic reviews and meta-analyses on treatment of asthma: critical evaluation. *Br Med J* 2000; 320: 537-40.

Jones A. Screening for asthma in children. *Br J Gen Pract* 1994; 44: 179-183.

Jones SL, Weinberg M, Ehrlich RI, Roberts K. Knowledge, attitude and practices amongst parents of children with asthma/wheeze in Cape Town. *J Asthma* 2000; 37: 519-28.

Joubert JR, Brink S, Hentzen GM. Allergic asthma in different population groups in the Western Cape. *S Afr Med J* 1988; 73: 150-154.

Kasteler J, Kane RL, Olsen DM, Thetford C. Issues underlying prevalence of "doctor-shopping" behaviour. *Journal of Health and Social Behaviour* 1976; 17: 328-339.

Keeley DJ, Neill P, Gallivan S. Comparison of the prevalence of reversible airways obstruction in rural and urban Zimbabwean children. *Thorax* 1991; 46: 549-553.

- Keeley D, Rees J. New guidelines on asthma management. (editorial) *Br Med J* 1997; 314: 315.
- Kistnasamy B, Knapp M. The relationship between location of residency and respiratory symptoms of primary school pupils. Unpublished manuscript. Durban: Department of Community Health, University of Natal. 1993.
- Lachman PI, Zwarenstein MF. Child health and health care utilisation. A community-based survey in Mitchell's Plain, CP. *S Afr Med J* 1990; 77: 467-470.
- Lang DM, Sherman MS, Polansky M. Guidelines and realities of asthma management. The Philadelphia story. *Arch Intern Med* 1997;157:1193-200.
- Langsten R, Hill K. Treatment of childhood diarrhoea in rural Egypt. *Soc Sci Med* 1995; 40: 989-1001.
- Legoretta AP, Christian-Herman J, O' Connor JD, Hasan MM, Evans R, Leung KM. Compliance with national asthma management guidelines and specialty care. A health maintenance organisation experience. *Arch Intern Med* 1998; 158: 457-64.
- Lenney W, Milner AD. Recurrent wheezing in preschool children. *Arch Dis in Child* 1978; 53: 468-473.
- Lim SH, Goh DYT, Tan AYS, Lee BW. Parent perceptions towards their child's use of inhaled medications for asthma therapy. *J Pediatr Child Health* 1996a; 32: 306-9.
- Lim TK. Asthma practice guidelines: common sense, expert opinion or evidence based approach? (editorial) *Singapore Med J* 1996b; 37: 340-1.
- Lo AY, Hedley AJ, Ong SG, Ho LM, Fielding R, Cheng KK, Daniel L. Doctor-shopping in Hong Kong: implications for quality of care. *Int J Qual Health Care* 1994; 6: 371-381.
- Lozano P, Connell F, Koepsell TD. Use of health services by African-American children with asthma on medicaid. *JAMA* 1995; 274: 469-473.
- Malgas P. Gangsters are ruining our lives. *The Plainsman*, 1998; July 22. Cape Town.
- Martinez FD, Wright AL, Taussig LM, Holberg CJ, Halonen M, Morgan WJ, et al. Asthma and wheezing in the first six years of life. *N Engl J Med* 1995; 332: 133-8.
- Mash B, Wittaker D. An audit of asthma care at Khayelitsha Community Health Centre. (Letter). *S Afr Med J* 1997; 87: 475-476.
- McFadden ER, Frank Austen K. Asthma. Lung disease caused by immunologic and environmental injury. In: Harrison's principles of internal medicine. Eds: Isselbacher KJ, Adams RD, Braunwald E, Petersdorf RG, Wilson JD. 9th edition. Chapter 257. McGraw-Hill Book Company. USA. 1980
- McFadden ER, Frank Austen K. Asthma. In: Petersdorf, RG Adams RD, Braunwald E, Isselbacher KJ, Martin JB. Wilson JD (eds), In: Harrison's principles of internal medicine.: 10th edition. Chapter 273. McGraw-Hill Book Company. USA. 1983.
- McGovern V, Cockcroft A. 1993 BTS guidelines: impact and shortfall. *Asthma Journal* 1996; December: 30-31.
- Melrose D (ed). Bitter pills. Medicines and the third world. Oxford: Oxfam 1982.
- Moosa SEI, Henley LD. An evaluation of parental knowledge of childhood asthma in a family practice setting. *S Afr Med J* 1997; 87: 42-45.
- Morris A. Is optimal management of childhood asthma achievable in South Africa? (Letter). *S Afr Med J* 1994; 84: 869-870.

Motala C, Kling S, Gie R, Potter PC, Manjra A, Vermeulen J, Weinberg EG, Green R. Guideline for the management of chronic asthma in children – 2000 update. *S Afr Med J* 2000; 90: 524-539.

Naish J, Sturdy P, Toon P. Appropriate prescribing in asthma and its related cost in east London. *BMJ*. 1995; 310: 97-100.

National Asthma Campaign. Report on the cost of asthma in Australia. Boston Consulting Group: 1992.

National Heart, Lung and Blood Institute. National Institute of Health. National Asthma Education and Prevention Program. Expert Panel Report 2. Guidelines for the diagnosis and management of asthma. Clinical practice guidelines. NIH publication no. 974051. April 1997.

Neville RG, Bryce F, Robertson FM, Crombie IK, Clark RA. Diagnosis and treatment of asthma in children: usefulness of a review of medical records. *Br J Gen Pract* 1992;42 :501-3.

Ninan TK, Russell G. Respiratory symptoms and atopy in Aberdeen schoolchildren: evidence from two surveys 25 years apart. *Br Med J* 1992; 304: 873-875.

North of England Asthma Guidelines Development Group. North of England evidence based guideline project: summary version of evidence based guideline for the primary care management of asthma in adults. *Br Med J* 1996; 312: 762-6.

Osman J, Ormerod P, Stableforth D. Management of acute asthma: a survey of hospital practice and comparison between thoracic and general physicians in Birmingham and Manchester. *Br J Dis Chest* 1987; 81: 232-41.

Osman LM, Russell IT, Friend JAR, Legge JS, Douglas JG. Predicting patient attitudes to asthma medication. *Thorax* 1993; 48: 827-830.

Parr's concise medical dictionary. Parr JA, Young RA (eds). London: Applied Science. 1965.

Partridge MR. The impact of asthma guidelines on clinical practice. *Monaldi Arch Chest Dis* 1993; 48: 367-8.

Paterson C, Britten N. Organising primary health care for people with asthma: the patient's perspective. *Br J Gen Pract* 2000; 50: 299-303.

Pearce N, Beasley R, Crane J, Burgess C, Jackson R. End of the New Zealand asthma mortality epidemic. *Lancet* 1995; 345: 41-3.

Peat JK, Gray EJ, Mellis CM, Leeder SR, Woolcock AJ. Differences in airway responsiveness between children and adults living in the same environment: an epidemiological study in two regions of New South Wales. *Eur Respir J* 1994; 7: 1805-1813.

Perry GB, Hyman Chai MS, Dickey DW, Jones RH, Kinsman RA, Morrill CG, et al. Effects of particulate air pollution on asthmatics. *Am J Public Health* 1983; 73: 50-6.

Phin S, Oates RK. Variations in the treatment of childhood asthma. *Med J Aust* 1993; 159: 662-666.
Potter PC, Weinberg E, Shore SCC. Acute severe asthma: a prospective study of the precipitating factors in 40 children. *S Afr Med J* 1984; 66: 397-402.

Powell C, White R, Primhak R. Asthma management guidelines. *Br Med J* 1993; 306: 1131-2.

Rand CS, Wise RA. Measuring adherence to asthma medication regimens. *Respir Crit Care Med* 1994; 149: (suppl) S69-S76.

Reddihough DS, Landau L, Jones HJ, Rickards WS. Asthma: the doctor's failure in communication. *N Z Med J* 1978; 88: 322-325.

Richman MJ, Scott P, Kornberg A. Partnership for excellence in asthma care: evidence-based disease management. *Pediatric Annals* 1998; 27: 563-68.

Robertson CF, Bishop J, Dalton M, Cuast J, Nolan TM, Olinsky A, Phelan PD. Prevalence of asthma in regional Victorian schoolchildren. *Med J Aust* 1992; 156: 931-833.

Rona RJ, Chinn S, Burney PGJ. Trends in the prevalence of asthma in Scottish and English primary school children 1982-92. *Thorax* 1995; 50: 992-993.

Rosenberg W, Donald A. Evidence based medicine: an approach to clinical problem solving. *Br Med J* 1995; 1122-6.

Rothberg AD, Walters L, Van Schoor J, Green R. Analysis of pediatric prescribing profiles in two health-funding systems. *S Afr Med J* 1996; 86: 672-674.

Roux P, Smit M, Weinberg EG. Seasonal and recurrent intensive care unit admissions for acute severe asthma in children. *S Afr Med J* 1993; 83: 177-179.

Sackett DL, Rosenberg WMC. The need for evidence-based medicine. *J R Soc Med* 1995; 88: 620-4.

Sackett DL, Rosenberg WMC, Gray M, Haynes B, Richardson WS. Evidence based medicine; what it is and what it isn't. (editorial) *Br Med J* 1996; 312: 71-2

Sampson L. Community study of Mitchell's Plain. Final report. Bellville: Department of Social Work, University of the Western Cape. 1998.

Sanders A. We can no longer sleep safely at night. *The Plainsman* 1998, August 5.

Sears MR. Descriptive epidemiology of asthma. *Lancet* 1997; 350 (suppl II) s1-s4.

Silbert MV. The Cape morbidity survey and its significance in the training for general practice. *S Afr Med J* 1970; February : 3-28.

Sibbald B, Horn MEC, Gregg I. A family study of the genetic basis of asthma and wheezy bronchitis. *Arch Dis Child*. 1980; 55:354-357.

Sly MR. Mortality from asthma, 1979-84. *J Allergy Clin Immunol* 1988; 82: 705-17.

Snadden D, Brown JB. The experience of asthma. *Soc Sci Med* 1992; 34: 1351-1361.

Speight ANP, Lee DA, Hey EN. Underdiagnosis and undertreatment of asthma in childhood. *Br Med J* 1983; 286: 1253-6.

Statistics South Africa. Census data. Community profile. Cape Town: 1991.

Stedman's medical dictionary. 22nd edition. Baltimore: Williams & Wilkins, 1972.

Stedman's medical library. 23rd edition. Baltimore: Williams & Wilkins, 1976.

Strebel PM, Lachman PI, Painter ML, Stander IA, Ireland J. Utilisation of outpatient services at Red Cross War Memorial Children's Hospital, Cape Town. *S Afr Med J* 1990; 78: 408-412.

Söderland N, Schierhout G, Van der Heever A. Private health care in South Africa. Technical report to chapter 13 of South African Health Review 1998. Durban: Health Systems Trust.

Sournia J-C. The illustrated history of medicine. England: Harold Starke 1992; Chapter XII: pp 431-2.

- South African Childhood Asthma Working Group (SACAWG). Management of acute asthmatic attacks in children. *S Afr Med J* 1993; 83: 286-9.
- South African Childhood Asthma Working Group (SACAWG). Management of childhood and adolescent asthma. 1994 Consensus. *S Afr Med J* 1994; 84: 862-866.
- Swan M, Zwi A. Private practitioners and public health: close the gap or increase the distance? Kelk S (ed) London School of Hygiene and Tropical Medicine 1997; PHP Departmental publication, no.24.
- Sykes JB. The concise Oxford dictionary of current English. 7th edition. Oxford: Clarendon Press, 1982.
- Taylor RJ. Experts and evidence. (editorial). *Br J Gen Pract* 1996; May: 268-70.
- Thaver IH, Harpham T. Private practitioners in the slums of Karachi: professional development and innovative approaches for improving practice. In: Bennett S, McPake B, Mills A (eds), *Private health providers in developing countries: serving the public interest?* London: Zed Books, 1997; pp 71-81.
- Terblanche E, Stewart RI. The prevalence of exercise-induced bronchoconstriction in Cape Town school children *S Afr Med J* 1990; 78: 744-747.
- Thomson MA, Oxman AD, Davis DA, Haynes RB, Freemantle N, Harvey EL. Educational outreach visits: effects on professional practice and health care outcomes (Cochrane Review). In: *Cochrane Library*, issue 2, 1999. Oxford : Update software.
- Uplekar MW, Rangan S. Private doctors and tuberculosis control in India. *Tubercle and Lung Disease* 1993; 74: 332-7.
- Van den Heever A. Private sector health reform in South Africa. *Health Economics* 1998; 7: 281-89.
- Van den Heever A. Regulating the funding of private health care: the South African experience. In: Bennett S, McPake B, Mills A (eds), *Private health providers in developing countries*. London: Zed Books, 1997.
- Van Niekerk CH, Weinberg EG, Shore SC, Heese HDeV, Van Schalkwyk DJ. Prevalence of asthma: a comparative study of urban and rural Xhosa children. *Current Allergy* 1979; 9: 319-324.
- Vollmer WM, O' Hollaren M, Ettinger KM, Stilbolt T, Wilkins J, Buist S, Linton KLP, Osborne ML. Specialty differences in the management of asthma. A cross-sectional assessment of allergists' patients and generalists' patients in a large HMO. *Arch Intern Med* 1997; 157: 1201-8.
- Volmink JA, Metcalfe CA, Zwarenstein M, Heath S, Laubscher JA. Attitudes of private general practitioners towards health care in South Africa. *S Afr Med J* 1993; 83: 827-833.
- Ware JE, Davies AR. Behavioural consequences of consumer dissatisfaction with medical care. *Evaluation and Program Planning* 1983; 6: 291-297.
- Warner JO. Review of prescribed treatment for children with asthma. *Br Med J* 1995; 311: 663-6.
- Warren E. Management of asthma in adults. Update June 2000; 20-25.
- Watson JP, Cowen P, Lewis RA. The relationship between asthma admission rates, routes of admission and socio-economic deprivation. *Eur Respir J* 1996; 9: 2087-93.
- Weiss K, Budetti P. Examining issues in health care delivery for asthma. *Med Care* 1993; 31(suppl) : MS9-MS19.

Weiss KB, Gergen PJ, Hodgson TA. An economic evaluation of asthma in the United States. *N Engl J Med* 1992; 326: 862-6.

Westerman DE, Bateman ED, Alexander MG, Benatar SR. The magnitude of the asthma problem in Cape Town. *S Afr Med J* 1978; 53: 574-577.

Wilson S. Patient and physician behaviour models related to asthma. *Med Care* 1993; 31(suppl) : MS49-MS60.

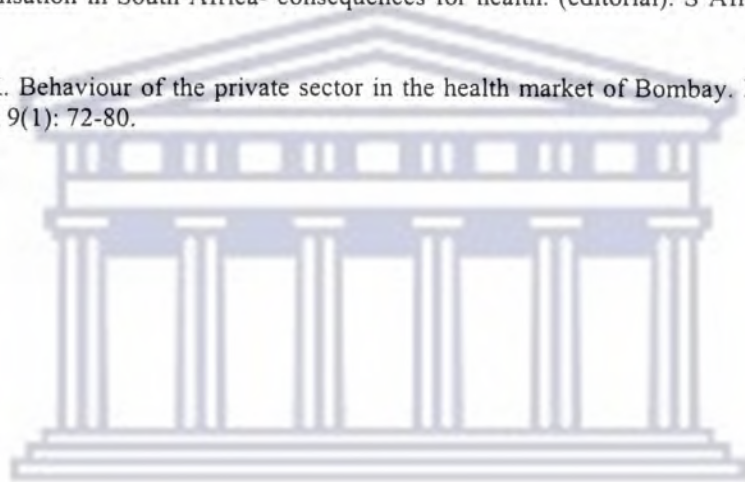
Williams H, McNicol KN. Prevalence, natural history and relationship of wheezy bronchitis and asthma in children. An epidemiological study. *Br Med J* 1969; 4: 321-325.

Wingate P. *Penguin medical encyclopedia*. 2nd edition. England: Penguin Books 1976.

Wissow LS, Gittelsohn AM, Szklo M, Starfield B, Mussman M. Poverty, race and hospitalisation for childhood asthma. *Am J Public Health* 1988; 78: 777-782.

Yach D. Urbanisation in South Africa- consequences for health. (editorial). *S Afr Med J* 1988; 74: 479-80.

Yesudian CAK. Behaviour of the private sector in the health market of Bombay. *Health Policy and Planning* 1994; 9(1): 72-80.



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CHAPTER 3: BACKGROUND (Part 2)

CHANGING PROFESSIONAL PRACTICE

The health professionals' inability to keep abreast with scientific evidence for good clinical practice often leads to the provision of sub-optimal health care, rising costs of health services and large variations in practice behaviour. This gap between scientific evidence on effective care and actual practice is linked to practitioners' poor ability to collect, interpret, communicate and apply their clinical findings in the care of their patients (Haynes 1983). The challenge of bridging this gap between health research and action is of particular relevance to health service providers and policy makers (Roland 1995; Crosswaite 1994; Smith 1993) and for developing countries this poses an even bigger problem (Yach 1991). While in developed countries attempts to facilitate better transfer of research findings into clinical practice has been accomplished through European collaborative research projects (Thorsen 1999; Humpries 1999; Hutchinson 1999), these guideline implementation strategies aimed at changing the behaviour of health professionals in South Africa has not yet been evaluated.

In this section I define the terminology used in implementation research, review the behaviour change strategies aimed at group/organisational level and at individual practitioners. I also provide an overview of the theoretical models associated with behaviour change and the steps that facilitate implementation of outreach interventions.

Definitions of terms

The provision of appropriate affordable health care emphasises the practitioners' need for relevant, useful and timely clinical information in order to respond appropriately to their patients' well-being. The understanding of implementation strategies is aided by a differentiation between the different types of management protocols that are disseminated to practitioners.

"Guideline" refers to a collection, rather than a single statement ("recommendations") about a defined health problem, and allows for some flexibility (Eddy 1990), while

“standards” are derived from the opinion of a group of interested participants and which offers no flexibility for the clinician (Farmer 1991). Clinical guidelines reduce the vast mass of clinical research to systematically developed statements on diagnosis and treatment which assist practitioners’ and patients’ decisions about appropriate health care for specific clinical circumstances (Field 1992), for example the Global Initiative for Asthma (GINA) guidelines (1995).

Guidelines aim to minimise practice variations, move closer to agreed standards of care in offering more effective care to more patients at minimum cost (Paccaud 1997). Even though practitioners claim to be either aware or knowledgeable about guidelines, their actual practice behaviour complies poorly with such recommendations (Lomas 1989) as evidenced from general practice and retail pharmacy audits. Adherence to asthma guidelines was found to be low in both the United States (Lang 1997; Legoretta 1998) and in the UK (Neville 1993).

The terms “implementation”, “dissemination” and “diffusion” are often used interchangeably to describe the process of transferring research findings on best therapy into usual clinical practice. However, Lomas (1993) finds it useful to give the three terms quite different connotations. As he uses the term, “implementation” is an active process which involves identifying and assisting practitioners to overcome barriers to health care provision by use of specific message(s) tailored to the needs of their individual practice. For example, organisational, social or economic barriers encountered by physicians in their practice setting are first identified. The proposed intervention then aims at addressing these barriers where possible. Implementation therefore involves a local process of communication of research findings with practitioners to bring about changes in their clinical decision-making. It is a persistent process that seeks to communicate the findings from research through numerous routes and in numerous ways that make it difficult for the physician to ignore. It is this meaning that we apply when studying guideline implementation procedures and problems.

Dissemination and diffusion are less active approaches than implementation. The term “dissemination” means ‘spread’ and increasing awareness, while implementation is more active, involving getting the information adopted into practice. Dissemination involves effective communication strategies, identifying and overcoming barriers to change by using effective administrative and educational techniques. Further, it is a more active concept, where flow of information from the source is more aggressive with greater targeting and tailoring of the information to the intended audience, than is the case with diffusion.

Diffusion is a passive concept. It is a form of communication that works only when potential recipients are highly motivated, when there is a relatively small pool of information. Although these conditions do not hold for busy physician faced with conflicting, confusing and voluminous findings from research, it helps to minimise search costs.

Messages

A “message” is defined as a vector of information between two protagonists, where the emitter targets the receptor (Gueyffer 1996). Various attributes of a message differentiate it from a guideline (Boissel 1997).

A message carries a piece of information related to an intervention (or class of interventions), a condition and a therapeutic objective whereas a guideline covers a condition/ disease. A message is drawn directly from available evidence, is based on a scientific method and provides quantitative information to the user. In contrast, guidelines consist of a summary of available evidence based on expert advice. The style of the message is neutral. It is not associated with expert opinion, has no sponsor, and does not involve interpretation and selection. Guidelines are positive and/or negative while a message leaves the final choice of the most appropriate intervention to the doctor, allowing flexibility according to patient profiles and the setting. There is limited flexibility to patients’ profiles when using guidelines. The time required to update a

message is short because new evidence is incorporated quickly; a guideline involves a tedious and lengthy process that requires consensus from several experts. If the message is relevant, and tailored to the audience's needs, there is good probability of awareness of the message.

Guideline implementation strategies aimed at changing the practice behaviour of health professionals emanate from three different approaches. These include evidence from a wide range of empirical studies; theoretical models derived from psychology, marketing and health promotion; and insights from case studies (NHS 1999). These approaches have offered a broad perspective to help understand behaviour change under varied circumstances.

I reviewed the literature for behaviour change implementation strategies for health professionals based on rigorous evaluations of empirical studies. In addition, I reviewed supporting evidence from less rigorous reviews and individual studies. I provide an overview of behaviour change strategies aimed at health care professionals working in group practice and as single-handed practitioners.

Evidence-based approaches provide a concise account of systematic searches and critical appraisal of the literature to assess its validity and applicability in clinical practice setting. These systematic reviews of rigorous studies aim to integrate the current best evidence from research with clinical practice to change behaviour of health professionals (Bero 1998). The main conclusions drawn from research findings aimed at changing professional practice are that most interventions are effective in some circumstances and that none is effective under all circumstances (NHS 1999). Oxman and co-workers (1995) further concluded that there are *no magic bullets* for improving the quality of health care. They found that there are a range of interventions aimed at changing the practice behaviour of health professionals, which if used appropriately, could lead to improvements in both service delivery and patient outcomes.

Behaviour change strategies aimed at group / organisational level

In the UK, the NHS (1999) conducted numerous projects to change professional practice in specific organisations. One such project conducted in general practices aimed to create a reproducible, cost-effective and quality controlled framework for appropriate care throughout Sheffield (FACTS). The Front-Line Evidence Based Medicine Project conducted with hospital teams explored whether doctors were able to apply research evidence in the context of their routine clinical practice and to identify potential barriers. The PACE (Promoting Action on Clinical Effectiveness) project involved various Health Authorities and NHS Trusts to support a national network of individuals interested in clinical effectiveness. These projects showed that a wide range of factors should be considered when designing organisational change strategies. These include identifying local priorities for change, exploring barriers to change, providing incentives for change, gaining commitment and building coalitions, establishing effective communication with the target audience, and supporting and monitoring the change process (NHS 1999).

Small group practice-based education aimed at changing physician behaviour towards guideline-based care for asthmatic patients have been conducted mainly in developed countries. In the Netherlands interactive small group education conducted among randomised GPs did not result in significant changes in patients' health status and quality of life (Smeele 1999). In the UK, researchers also used small group education and arrived at a similar conclusion (White 1989). In contrast, other researchers showed improved clinical management after practitioners received small group practice-based education for asthma (Feder 1995), and setting clinical standards for recurrent wheeze in children (North of England Study of Standards and Performance in General Practice 1992).

The implementation of group or organisational change strategies in South Africa would not be feasible. Local practitioners are unlikely to associate closely with each other within a small group to improve their clinical practice. The single-handed nature of practice precludes team intervention. The high staff turnover and the use of part-time

(sessional) GPs would make it difficult to implement change within a small group setting. Contextual factors such as the difficulty in getting the right groups and individuals to work together and to synchronise time could interfere with the implementation process. The strength of group learning is likely to fall foul due to pressure from individual practitioners who are not willing to participate or see change as a potential threat. There is evidence that local GPs would resist the involvement of an external agency to influence their practice style (Volmink 1993).

Behaviour change strategies aimed at individual practitioners

Implementation of behaviour change strategies directed at individual practitioners consist of dissemination of printed educational material, formal and informal continuing medical education, audit and feedback, opinion leaders, reminders and educational outreach.

Dissemination of printed educational material

Passive dissemination of information is generally ineffective at changing practice behaviour of health professionals (Bero 1998). Although the distribution of printed educational materials is one of the most common attempts, it has been found to have a small impact (Freemantle 1998). Printed educational material such as clinical practice guidelines and electronic publications delivered by hand, through personal or mass mailing, when used as a single strategy, seems unlikely to change behaviour. However, when these are combined with educational outreach visits and opinion leaders, the effects on behaviour change are larger and likely to be of practical importance (ibid). One factor that could determine the effectiveness of printed material in changing practice behaviour is its applicability and relevance to the target health care setting. For example, compliance rates were found to be poor with practice guideline recommendations that are complex and difficult to pilot (Grilli 1994). Since printed educational material has demonstrated such little success as a single strategy to change the behaviour of health professionals, it is used empirically and as a standard (control group) with which other guideline dissemination strategies (intervention group) can be compared (Thorsen 1999). This pragmatic approach enables investigators to determine

whether guideline implementation strategies are effective and efficient in real world settings.

Passive dissemination as a single intervention would not be feasible in a South African primary care setting. If used in combination with other approaches it would likely promote a change in clinical practice.

Formal and informal continuing medical education

Davis and co-workers (1995) highlighted that widely used formal continuing medical education (CME) interventions such as conferences have had little direct impact on improving professional practice. They further concluded that CME providers seldom used practice-based interventions and outreach visits to change the behaviour of health professionals. The use of traditional lectures has been widely criticized (Kanouse 1988), and didactic educational meetings or lectures (Davis 1997; Bero 1998) and consensus conferences (Kosecoff 1987) have had little or no effect on changing professional practice. In Zambia informal repeated seminars was effective in promoting rational drug use in a government-aided primary care health centre (Bexell 1996). Davis and co-workers (1995) concluded from their review that interactive CME sessions that enhance participant activity and provide the opportunity to practice skills would be more likely to change professional practice.

In South Africa CME is largely dominated by drug-company sponsorship and it not clear where resources for an alternate neutral agency to promote evidence-based care might come from. Generally, drug company sponsored CME is conducted at lavish venues, the lecturers are often highly paid and imported, and attendees are offered gifts. Neither the style nor the costs are within reach of a non-commercial programme in a developing country and arguably, should not compete with such efforts.

Audit and feedback

Audit and feedback consists of a summary of clinical performance that is used to reinforce performance of health care professionals by provision of information on gaps

in performance. Audit and feedback have been found to show mixed effects in changing the behaviour of healthcare professionals (NHS 1999; Bero 1998). While some researchers found that a clinical audit did not work (Berger 1998; Sutton 1998) there is continued debate about its effectiveness (Healy 1998; Woodhouse 1998). Although computerised feedback seemed effective (Hershey 1986), a less favourable behaviour change was found (Cohen 1982) in changing physician performance. Mailed feedback showed no impact on general practitioner prescribing (O'Connell 1999), but a meta-analysis on audit and feedback demonstrated small to moderate effects in improving prescribing and diagnostic test-ordering behaviour of practitioners (Thomson O' Brien 1999). Grol (1992) reported in his review that feedback seemed most influential when presented immediately after the performance and is continuous, to prevent practitioners from reverting to their old routines.

The implementation of audit and feedback in South Africa could well be perceived with some resistance among practitioners. Access to practice records could be viewed as 'intrusion' and would not be easily welcomed.

Opinion leaders

Opinion leaders are practitioners identified by their colleagues as educationally influential. Their use in changing practice behaviour of health care professionals has resulted in mixed effects (Thomson O' Brien 1999). In hospital settings opinion leaders were shown to have effectively reduced caesarean section rates when compared to audit and feedback (Lomas 1991); improved knowledge for catheter-associated infection control in nursing staff (Hong 1990), and improved continuing education in pulmonary disease for primary care physicians (Stross 1983). While primary care family physicians consider opinion leaders an effective vehicle for information dissemination (Gruppen 1987), the use and potential to identify opinion leaders in general practice is limited. Some researchers found that GPs expressed a negative attitude towards the use of opinion leaders (Flottorp 1998) as a strategy to change the practice behaviour of professionals.

In South Africa opinion leaders would be very difficult to identify in the private sector. Many of the “experts” are recognised from public sector academic (hospital) setting and private sector GPs are likely to have minimal contact with them.

Reminders

Reminders prompt the professional to perform a patient-specific clinical action. Reminders (manual or computerised) are generally effective for a range of behaviours (NHS 1999; Bero 1998). Although reminders from computer-based decision support systems may be effective in improving decisions on drug dosage, preventive care and clinical management, this approach may be less effective than feedback for reducing diagnostic test ordering (Hunt 1998). In Swaziland, a developing country, desk-top visual reminders used as a single intervention significantly improved prescribing in primary health care facilities (Kenyon 1997). When compared with other guideline implementation strategies, reminders have been found to be more effective than audit and feedback for preventive services (Thompson O’ Brien 1999).

Patient-specific reminders at the time of consultation were more likely to change behaviour than a general feedback mechanism. For example, parents and patients absorb written information when the topic is of interest and concern to them, and if it is accompanied by a personalised message from a health care professional (Glascoe 1998). Patient-centred factors are influential in medical decision-making and in physicians’ compliance with guidelines (James 1998). Thomson O’ Brien and co-reviewers (1999) concluded that reminders should not be used as a single strategy to change professional practice, and this is further supported by Grol’s review (1992) that when combining reminders with other interventions they are effective in influencing physician performance.

Reminders can be a useful behaviour change strategy for private sector practice in South Africa. If combined with another guideline implementation strategy such as educational outreach, it could be acceptable to GPs in routine practice setting.

Educational outreach

Educational outreach involves the use of a trained health-care professional to conduct brief face-to-face meeting with health professionals in their practice settings and provide information with the intent of changing their clinical performance. The outreach visits serve to improve clinical decision-making by imparting concise, unbiased, clinically relevant information to practitioners (Avorn 1983). Alternative terms used to describe educational outreach are “academic detailing”, “counter detailing” or “educational detailing” (Stern 1996). Bero and colleagues’ (2000) systematic review concluded that educational outreach is generally effective in changing prescribing behaviour.

Outreach visits typically form part of a multifaceted intervention consisting of the provision of written material and/or verbal interactive discussions with the target practitioners to facilitate adoption of the desired behaviour change. Outreach visits that were supplemented with reminders (Dietrich 1992; Steele 1989), audit and feedback (McConnel 1982; Putnam 1985; Steragachis 1987) and that provided printed educational material at clinical settings (Avorn 1983; Newton-Syms 1992; Wyatt 1998; Ray 1986; Cockburn 1992; Farris 1996; Stalsby Lundborg 1997; Gomel 1994) modified practitioners’ prescribing, promotional and preventive approaches towards more appropriate health care provision.

Outreach visits have shown changes in physician behaviour in improving the management of asthma in primary care practices. Feder and co-workers (1995) during their educational visits to UK practitioners provided simple structured consultation prompts (a stamp) which resulted in significant improvements in the quality of drug prescribing for asthmatic patients compared with that for diabetic patients ($p=0.03$). Haynes (1998) reported that strategies aimed at changing the practice of general practitioners are likely to be most effective if the barriers encountered in local clinical settings could be identified and if the desired behaviour change could be disseminated by active educational interventions such as face-to-face interactions (Grol 1992). For example, tailor-made interactive educational outreach sessions conducted in Swedish

primary health care settings, showed an insignificant increase in the proportion of asthma patients who had received inhaled steroids (Stalsby Lundborg 1999). Further, in a similar study significant differences were reported in physicians' knowledge about the use of lung function measurements and reversibility tests, with lowered ratios of beta-2 agonists to inhaled steroids use between the outreach intervention and their control groups (Tomson 1997).

Thomson O' Brien and co-reviewers (1998) identified four outreach approaches aimed at changing professional practice. The first, is a widely used social marketing approach using persuasive communication techniques (academic detailing) and which identifies and subsequently addresses the barriers in the design of an intervention (Soumerai 1990; 1993; Avorn 1983; 1992). The second outreach approach also includes persuasion, but with no assessments of barriers to change (McConnell 1982; Putnam 1985). The third type of outreach streamlines office procedures for preventive services (Dietrich 1992) while the fourth focuses on the development of skills to facilitate a change in clinical performance (Rabin 1994).

Outreach visits are typically conducted by a respected and competent health care professional. Visits have been predominantly conducted by trained pharmacists (Avorn 1983; Avorn 1992; Ives 1987; Peterson 1996; Petersen 1995; Newton-Syms 1992; Landgren 1988; Tomson 1997; Sandu 1993; Farris 1996;). Other health professionals such as a pharmacologist (Avorn 1983; Tomson 1997), doctors (Ray 1986; Goldberg 1998) and nurses (Fullard 1984; Premaratne 1999) have also conducted such visits. In some studies both doctors and pharmacists are employed as outreach educators /detailers, providing a multi-disciplinary team approach to health care provision (Goldberg 1998). Outreach visits conducted by pharmacists have been found to be effective in both North American (Avorn 1983; 1992) and Australian (Sandu 1993) studies. Outreach visits have been conducted at both primary and secondary health care facilities: pharmacies (Ross-Degnan 1996), office-based general practice settings (Petersen 1995; Newton-Syms 1992; Avorn 1983), primary care clinics (Goldberg

1998), obstetric units (Wyatt 1998) nursing homes (Gurwitz 1990) and surgical and medical departments at hospitals (Soumerai 1993).

Materials used during outreach visits to practice settings have consisted of printed, visual and graphic displays. Posters have been commonly used (Landgren 1988; Ross-Degnan 1996) so have patient educational materials (Ross Degnan 1996; Avorn 1983) as well as a videotape (Landgren 1988). Other researchers have used “unadvertisements” (Avorn 1983), drug bulletins (Avorn 1983) and key messages abstracted from a guideline recommendations (Stalsby Lundborg 1997; Tomson 1997).

The number of detailing visits has varied within studies. Single (Ray 1986; Wyatt 1998; Stevens 1997) and follow-up (Avorn 1983; Stalsby Lundborg 1997) visits are most common, while another study included a third visit (Avorn 1992). Follow-up visits serve to reinforce the change in behaviour.

Outreach visits have been conducted within a specified period, while some visits were undertaken within short periods lasting three (De Santis 1994) and six (Avorn 1983) months. The visits to practices have been conducted to individual and/ or to groups of practitioners. Group sessions have been conducted at health maintenance organisations (Goldberg 1998; Farris 1996) and in Swedish primary care community health centres (Diwan 1995).

Multifaceted interventions in primary care general practice settings consisting of two or more interventions that target different barriers to change are more likely to be effective than single interventions, but are more expensive (NHS 1999; Hulscher 1998; Wensing 1998). These interventions have shown practitioners’ improvements in preventive care such as influenza immunization (Gyorkos 1994), smoking cessation (Lancaster 1999) and cancer screening (Mandelblatt 1995). Multifaceted interventions have been directed mainly at practitioners in European primary care general practice settings (Thorsen 1999). However, their use in a multifaceted outreach intervention directed at private-

sector primary care general practitioners in a developing country, has not yet been evaluated.

Guideline implementation strategies aimed at changing physician behaviour in the management of asthma

In Sweden, successful educational outreach ('academic detailing') interventions showed improvement in knowledge and practice patterns in primary care GPs providing care to asthmatic patients (Tomson 1997; Stalsby Lundborg 1999). By addressing common problems encountered in their routine practice setting and adapting the guidelines to meet local practice needs, physicians were able to change their behaviour in their management of asthma. In Australia, a modified national asthma guideline adapted for a local general practice setting demonstrated some significant changes in physician behaviour (Fardy 1997). However, in South Africa an educational outreach intervention or a modified guideline to address local needs has not been evaluated for primary care asthma children.

Researchers have employed specially designed material, such as a pre-printed protocol, to encourage practitioner adoption of recommendations for the management of status asthmaticus (Webb 1992). There were reports of significant changes in the monitoring of the patient's response to treatment, assessment of the patient's severity upon admission, and increase in inhalation treatment among physicians who used the structured protocol, compared with the control group. Further, the researchers found greater adherence among parents and patient during follow-up visits in the protocol (14%) compared to the standard care group (4.6%, $p=0.05$). Structured protocols or prompted cards for use by primary care practitioners would serve as a useful tool for childhood asthma management.

Theories of behaviour change

Many of the attempts to change professional behaviour are not explicitly based on any single underlying theory of determinants of professional behaviour. Like the intervention developed for this thesis, they may be based upon implicit models for

understanding these behaviours and their determinants. These in turn may be based upon an eclectic reading of many theories of behavioural change, with some elements sometimes explicitly confirmed through interview research.

It has recently been argued that theoretical models of behaviour change can be used both to understand the behaviour of health professionals and to provide a comprehensive and systematic planning framework to guide the development and implementation of interventions intended to change clinical practice (NHS 1999). However, this is a recent perspective and it should be remembered that theory development for professional behaviour change is at an early stage.

Researchers undertaking guideline implementation have been open to a variety of social and behavioural theories (Moulding 1999; NHS 1999). These range from models primarily concerned with individual learning (Social Learning Theory (Bandura, 1986) to models of organisational change (Goodman 1997) which take into account complex internal and external environments in which behaviour change is nested.

In this section I provide an overview of these theoretical models, all of which have been considered by various implementation researchers in their attempts to change professional practice. Social cognitive theory, communications theory, the transtheoretical model, and diffusion of innovations theory are all descriptive-analytic models of behaviour determinants. The PRECEDE-PROCEED model, and social marketing theory, are models for the design of interventions to change behaviour. In the close to this section these theories and models are related back to a widely used empirical model of professional behaviour change, educational outreach (Soumerai 1990), which itself is the basis of the work described in this thesis.

Social cognitive theory

Social Cognitive theory (Bandura 1986; 1989) provides an understanding of how individuals learn and behave. The theory was developed to address both the psychosocial dynamics influencing health behaviour and the development of methods

of promoting behavioural change. It hypothesises that a person's behaviour results from continuous affective, personal (including cognitive) and environmental interactions. The individual's capacity to acquire knowledge, anticipate the outcomes of behaviour change, learn by observing others, have confidence in performing a behaviour (including overcoming barriers to performing this behaviour), self-determine, to reflect and analyse, are all crucial personal factors that influence behaviour change (Bandura 1986).

Beliefs concerning one's self-efficacy are considered central to understanding behaviour in social cognitive theory (Bandura 1989). How one perceives oneself and one's capabilities determines the motivations, goals and the expectation one holds for the outcomes associated with the intended behaviour. Efficacy expectations are formed as a result of cognitive processing of diverse information sources such as direct experience, observation, verbal persuasion and affective responses.

Direct experience is the strongest determinant of self-efficacy. Performance of a given behaviour provides the individual with a sense of mastery of the behaviour, which in turn reinforces a sense of efficacy and allows him/her to set higher goals. The casual and direct observation of others informs the individual of what is possible and provides generative rules to guide the behaviour, values and attitude.

Both observation and interactive learning techniques can be used in introducing and promoting each sequence of a targeted behaviour (Bandura 1986). Information can be transmitted through physical demonstration, pictorial representation or verbal description to change an individual's behaviour. Further, watching others perform or describe activities provides one with a sense of what is possible. This creates belief in one's own ability.

Verbal persuasion can lead people to believe in their ability and that changing their behaviour will result in successful outcomes (Bandura 1989). Although verbal persuasion alone is not enough, it can influence attitudes and beliefs which in turn can

influence behaviour. Affective responses, for example, anxiety and fear are associated with a lowering of one's belief in ability to perform a given behaviour and which leads to lowered expectations of oneself (Bandura 1986).

Learned behaviour may not always be enacted, as motivations and incentives will influence behaviour change. Motivations and incentives include benefits or inhibitions associated with the behaviour and these may be direct, observed or self-produced (Bandura 1986). For example, positive reinforcement, or reward, to a person's behaviour increases the likelihood that the behaviour will be repeated (Baranowski 1997).

An individual can process the new information through action, which can be retained through rehearsal and repetition to develop new skills. These new skills can then be refined through monitoring and feedback, which is believed to be essential for longer-term retention of the desired behaviour.

This theory is based on the concept of self-efficacy, the belief in one's ability to perform a new behaviour. This belief can be acquired in several ways, such as demonstration, persuasion, but above all, personal successful experience of doing the new behaviour.

Transtheoretical model

This model emerged from a comparative analysis of leading theories of psychotherapy and behavioural change but can be seen mainly as a refinement of the social cognitive model of behaviour change. Individuals are thought to pass through a sequence of five stages, where each stage requires different interventions to change their behaviour (Prochaska 1994).

In the *precontemplation* stage individuals have no intention to take action because they do not view their behaviour as problematic and do not see the need to change existing behaviour. This may be a knowledge gap, in that people may be uninformed about the

consequences of their behaviour. It may also be related to denial or rejection of a value, demonstrated by avoidance of information associated with the new behaviour or the reasons for it. The *contemplation* stage is an interactive period where an individual becomes aware of his/her existing behaviour and identifies a need for it to change. The balance between the costs and benefits of changing can produce profound ambivalence amongst individuals and keep them stuck in this stage for long periods. *Preparation* is the stage in which the individual has made a decision for change, and is planning for the practical application of the intended behaviour change. This stage involves evaluation and trial of the new behaviour. In this stage individuals establish self-efficacy beliefs and appropriate outcome expectations of the desired behaviour. The *action* stage occurs when an individual commits to undertaking and establishes the new behaviour. It is action itself that results in feedback and reinforcement of the behaviour to encourage its maintenance. The *maintenance* stage occurs when individuals have established the new behaviour and are less tempted to relapse as they become increasingly confident with their changes.

An individual may cycle through the stages on a number of occasions until the process is terminated either successfully, or without change. In addition to the five stages of change, the transtheoretical model also encompasses various processes of change that facilitate an individual's transition from stage to stage. These processes include consciousness raising, dramatic relief, self- and environmental re-evaluation, self-liberation, helping relationships, counterconditioning, contingency management, stimulus control and social liberation (Prochaska 1997).

Progress from precontemplation to contemplation occurs when interventions raise both consciousness and dramatic relief. In raising an individual's consciousness, such as learning new ideas and tips to support the desired behaviour and allowing him/her to experience negative emotions that risk unhealthy behaviour, a change in behaviour can be observed.

Communication theory

The communication theory provides various models to explain the communication process between individuals, and forms the basis of health care programmes to implement change through communication. In health promotion, persuasive communication attempts to consciously change the behaviour of another through the transmission of a message designed to change attitudes and beliefs towards adoption of a behaviour or product (Petty 1981; Engel 1987; Jaccard 1981; Shelby 1986). The effectiveness of the communication depends on the interaction between communicator, audience, message and the medium used to deliver the message (McGuire 1985; Winkler 1985).

The communicators' attractiveness (De Bono 1992), similarity with the audience (Berscheid 1966), expertise (De Bono 1988) and credibility (prior knowledge by audience of the communicator's expertise) have shown to increase persuasiveness of the message (Mills 1972) with the target audience.

The type of appeal which is most effective depends on the characteristics of the audience to which it is addressed (Weimann 1982). The audiences' existing attitudes, knowledge or feelings affects message acceptance (De Bono 1990). Messages inconsistent with pre-existing attitudes are likely to be avoided (Sweeney 1984), while those that have more personal relevance appeal more to the audience (Leippe 1987). Further, active participation of audience has been shown to have greater involvement towards the topic and is related positively to opinion change (Watts 1967).

The strength of the message is a determinant of successful persuasive communication (De Bono 1990) to facilitate behaviour change. Logical, coherent and well-argued messages are more persuasive for individuals who critically process information and are involved in the topic. Messages must also be comprehensible (Eagly 1974). The use of rhetorical questions can increase the persuasiveness by allowing the audience to judge the information that is presented in the answer (Howard 1990). The use of quantitative information is thought to provide credibility (Yalch 1984). Audiences who are knowledgeable and motivated to process numbers have shown enhanced interest in such

messages (Anderson 1980; Holbrook 1978). Preparing the audience of the intended message provides them with an opportunity to establish their initial position in relation to the message. This encourages cognitive processing of the information and can increase the persuasiveness of the message (Hass 1972). Further, a balanced message delivering both sides of the topic, as opposed to a one sided message, is more likely to be influential because it encourages cognitive processing. This is more likely to occur if the audience has a high involvement with the topic (Chebat 1988). Repetition of the message increases its persuasiveness, with repetition of similar but not identical messages being most influential (McCullough 1974). Casual messages are more influential than those intended to persuade the audience (Walster 1962). Appeal to emotion such as fear or threat can increase the persuasiveness of the message, especially if the information provided offers positive actions to avoid the threat (Heilman 1976).

The settings in which communications are received influences acceptance of new information (Winkler 1985). For example, group practice health care organisations differ from solo practice in profound ways for dissemination of information, in that the presence of many people in one place facilitates exposure to information and collegial interaction (Williamson 1975).

Various attributes of the communication theory can be manipulated to increase persuasiveness of a message to facilitate adoption of the desired behaviour. For example, the personal visits to clinical practices and the use of interactive persuasive communication techniques are one of the most successful sales promotional methods used by the pharmaceutical industry. Persuasive messages can be adapted to the practitioner's beliefs and attitudes, and through their repetition and reinforcement influence practice behaviour.

Diffusion of innovation theory

Diffusion is defined as the process by which an innovation is communicated through certain channels over time among the members of a social system. An "innovation" is

defined as an idea, practice or object that is perceived as new by an individual (Rogers 1995). The diffusion of innovation theory is derived from the communication theory, where messages that are communicated are concerned with new ideas.

The four main influences on the effectiveness of the diffusion process are the characteristics of the innovation, the channels used to communicate it, time, and the characteristics of the social system across which the innovation is communicated.

The characteristics of an innovation help to explain their different rates of adoption. Innovations that are perceived to have greater relative advantage, compatibility, complexity, and observability will be adopted more rapidly than other innovations.

A communication channel is the means by which messages get from one individual to another for example, either mass media or through interpersonal channels. Face-to-face exchange between individuals is more effective than mass media in persuading an individual to accept a new idea. This is more likely to occur if the two individuals share common meanings, a mutual subcultural language, and are alike in personal and social characteristics, such as socio-economic status and education.

There are thought to be five stages in an innovation-decision process. The *knowledge* stage is where the individual becomes aware of the innovation. The *persuasion* stage occurs when the individual forms positive or negative attitudes about the innovation. The *decision* stage is where the individual tests the acceptability of the innovation. The *implementation* stage is where the individual puts the innovation into use, and the *confirmation* stage occurs when the individual seeks reinforcement of the innovation-decision that has already been made. The innovation-decision process can lead to either sustained adoption or rejection.

Adopter categories depend on the degree of innovativeness of the individuals. These categories are classified as innovators, early adopters, early majority, late majority or laggards, depending on how quickly they can change their behaviour.

Much of the literature on innovation diffusion arises from the field of agriculture, where trained professionals were hired by state authorities to actively promote new approaches to farming (Rogers 1995). These individuals were change agents. A change agent is an individual who attempts to influence a client's innovation-decisions in a direction that is deemed desirable by a change agency (ibid). Change agents are often professionals with a university degree in a technical field.

It is important that although the innovation needs to be seen by the potential adopter the essence of innovation is information and knowledge. The change principles that underpin the diffusion process in health promotion typically involve changing the behaviour that will either reduce risk factors or promote health. Diffusion of innovation theory can be applied concurrently within a social marketing framework to facilitate adoption of the innovation in general practice settings.

PRECEDE-PROCEED planning model

The PRECEDE-PROCEED model was developed from social-psychological theories of individual behaviour (social cognitive theory, diffusion of innovation theory). It aims to enhance the quality of health promotion interventions by offering practitioners and programme developers a systematic planning process. The PRECEDE-PROCEED model outlines the steps for the planning of an intervention, and gives guidance on how to proceed with its implementation and evaluation. The PRECEDE acronym refers to Predisposing, Reinforcing, and Enabling Constructs in Educational Diagnosis and Evaluation (Green 1991). PROCEED stands for Policy, Regulatory, Organisational Constructs in Educational and Environmental Development, and was added later to recognise the need for health promotion interventions that go beyond traditional educational approaches to changing unhealthy behaviours (ibid). The PRECEDE-PROCEED model is based on the premise that as medical diagnosis precedes a treatment plan, so should educational diagnosis precede an intervention plan and the stages are concerned with problem specification and identification.

The process begins with the proposition that health behaviours are complex, multi-dimensional and influenced by a variety of factors. The *social diagnosis* phase aims to determine the subject groups' own perception of their own needs and quality of life. The *epidemiological diagnosis* helps planners to determine which health problems are most important for which target groups in the community. The *behavioral and environmental diagnosis* identifies determinants of (or risk factors for) the selected health problems; *educational and organisational diagnosis* identifies those antecedent and reinforcing factors that initiate and sustain the change process. Predisposing factors provide the motivation for change and include attitudes, beliefs and perceptions; enabling factors allow the motivation for change to be realised and includes resources, facilities and skills; reinforcing factors encourage change through reward, incentives and positive feedback. The *administrative and policy diagnosis* involves delineating the intervention strategies and final planning for their implementation in the community. The final *implementation and evaluation* phase determines the extent to which the programme was implemented according to the protocol and its impact on health and the quality of life indicators.

The PREDEDE-PROCEED planning model provides a systematic diagnostic approach to intervention planning. It ensures comprehensive problem solving by incorporating different levels of the problem (individual, behavioural and social environment). Further, by linking the determinants to the intervention strategies it offers a broad health promotion planning framework, that can be also be used in the rigorous application of theory to practice.

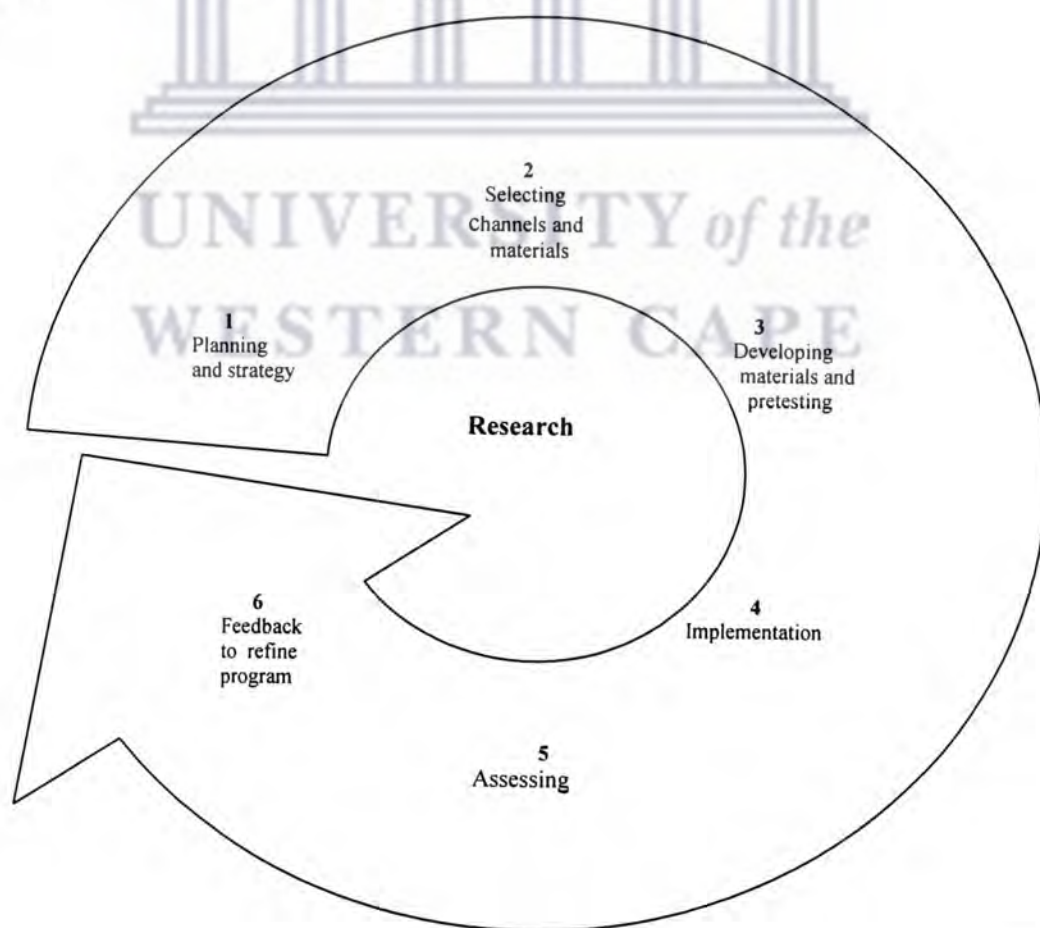
Social marketing

Social marketing is defined as the design, implementation and control of programmes that seek to increase the acceptability of a social idea, cause or practice in a target group. It involves the application of commercial marketing technologies to the analysis, planning, execution and evaluation of programmes designed to influence the voluntary behaviour of target audiences, in order to improve their personal welfare and that of their society (Lefebvre 1988). The 'product' in social marketing is intangible, and

might include ideas, social mobilisation for a cause, or aim at a health promoting behaviour change (ibid).

Social marketing is not itself a theory, but has been conceived as a theoretically based approach to design of interventions to achieve behaviour change (Tones 1994). The theoretical base lies in the world of economics where exchange theory is used to describe, predict and design marketing programmes that address consumer behaviour. Social marketing is based upon understanding and empathising with the perceptions, motivations and behaviour of the target group, satisfying needs and wants through mutually beneficial voluntary exchange between the health promoter and target group. Success is likely only when the needs, perceptions and requirements of the target group are determined and satisfied through the design and implementation of an intervention (NHS 1999).

Figure 3.1 Social marketing wheel



The social marketing wheel revolves around six stages (Lefebvre 1997). The first stage of social marketing (Figure 4.1) involves researching the target audience and assessing the available resources for the intervention. Stage two is selecting relevant channels and materials for intervention. The target group is segmented into homogeneous sub-groups. Stage three involves developing and piloting materials with the target audience so as to determine their relevance, comprehensibility and likely impact. Stages four and five are implementation and evaluation. Here effectiveness is assessed in terms of whether and how the intervention is meeting its objectives. In the final stage the intervention is refined on the basis of this evaluation.

Marketing mix consists of 4 P's: 'product, price, place and promotion' and an equivalent for each is found in health promotion. The 'product' in social marketing is intangible, and includes ideas, social causes and behaviour change promoting health (Lefebvre 1988). 'Price' refers to time, money, structural, psychological or physical costs in accepting the new behaviour. People are motivated by incentives, especially if tangible and offered in response to the intended behaviour change. 'Place' concerns the distribution channels to reach the audience, for example the use and motivation of intermediaries in product delivery through which the target audience can access the product. 'Promotion' is the means by which the health promoter communicates the product to the audience via sales promotion or personal selling. It is a tool to make the product more acceptable to and to enhance its utilisation in the audience. Each of the four elements are applied in conjunction with one another. The best combination is the one that comes closest to satisfying the needs of the customer.

When evaluating the health programme, continuous contact with the audience must be maintained (either formally or informally) to obtain insight and feedback on the level of acceptability. In addition, the type of medium, the commonality of language and images for health education must be considered. The language used must be understandable and visual elements decipherable and acceptable to the intended audience.

Social marketing principles have been implemented in outreach visits to physicians in general practice settings aimed at promoting preventive strategies for hypertension (Novelli 1990), cholesterol awareness (Lefebvre 1988), smoking cessation (Cockburn 1992), cervical screening (Stevens 1997) and alcohol abuse (Gomel 1994). Further, such principles have been used for rational drug use (Avorn 1983) and to promote adoption of asthma guidelines among primary care physicians (Tomson 1997; Stalsby Lundborg 1999; Feder 1995). Social marketing has common features with commercial marketing for example social marketing techniques are adopted by pharmaceutical company representatives during their sales promotion (drug detailing) visits to practices.

Pharmaceutical representatives are recognised as one of the major sources of drug information and are highly influential in physicians' clinical decision making. They are especially trained in persuasive communication techniques to influence GPs about product features and benefits, providing biased information with an underlying commercial motive. In contrast, outreach educators use persuasive communication to highlight key management principles, have an educational motive, represent an academic institution, provide neutral, evidence-based information and have no commercial motives.

Printed media and/or personal contact is the channel of communication with physicians. Both formal and informal communication channels increase the physician's awareness of latest developments (Winkler 1985). Informal communication is especially important for final translation of a message into a physician's clinical practice, perhaps because of its great immediacy. Formal publication channels, on the other hand, tend to be slow and indirect due to a delay in dissemination. Given the persuasiveness of professional sources and informal channels of communication, the most potent force for influencing practice behaviour appears to be informal inter-professional communication (Weinberg 1981). Informal collegial interaction corrects the deficiencies of formal scientific transfer, reduces delays, and helps physicians bridge the gap from research to practice (Young 1981).

In parallel to the communication theory, the technique used by the outreach educator is the IDEALS approach, a technique commonly used by trained pharmaceutical company representatives. During outreach interventions, the educator *Introduces* him/herself, explains the purpose of the visit and *Discovers* needs/ identifies problems experienced by the individual relative to the desired behaviour change. The educator further explores misconceptions/ fears and *Explains* the concept / behaviour that is being targeted. Further, (s)he *Addresses* any doubts or fears and asks if the individual is in agreement with the message, and *Leaves* educational materials to reinforce the desired behaviour change. Finally, the educator *Seeks* a commitment/ agreement from the individual to adopt the message in the practice setting.

Where to now for theory?

At their base, most of the theories of professional behaviour change currently used by researchers draw explicitly or implicitly on general theories of behaviour change. Professionals in the field of health promotion developed the theories and targeted patients or individuals. This clearly involves a dramatic shift in the nature of the target, the message, the messenger and the means of transfer. It is not yet confirmed that any single theory explaining the behaviour change potential and responses of individual persons in the community or patients under care can be applied unchanged to understanding the professional behaviour of individual practitioners.

It is likely that there are differences between the behaviours and behavioural determinants of lay individuals protecting or promoting their own health, and professional individuals making decisions about the health care they will provide for others. Other bodies of theory need to be incorporated into the development of professional behaviour change theory, such as theories of organisational development, or theories of professionalisation and professional behaviour. The understanding of professional behaviour change needs to be rooted in an explanation both of the individual professional's choices and of the social environment of his or her profession which affects behaviour. In order to develop this dual level explanation individual

behaviour (from psychology, behaviours affected by group identification (emanating from social psychology) and an approach to change of such behaviours (emanating from social marketing) would provide a comprehensive conceptual theoretical framework aimed at changing professional practice.

Linking theoretical perspectives to the atheoretical model of academic (or educational) outreach

Many of the empirical choices made by researchers aiming to influence professional behaviour can be linked back to theories of behaviour change. Of course, many of the models share common features, and so in this section we are looking for the model that best exemplifies each of the elements of educational outreach. This is not to say that the elements lie in a theoretical model, but it may suggest that such an understanding might benefit from some of the ideas encompassed within theory which the element shares.

The social cognition model emphasises the role of self-efficacy in allowing behaviour change. This element can be detected in the mode of operation of educational outreach visits in which the outreach educator uses persuasive verbal and written communication techniques to highlight the key management principles and to encourage the health professional to believe in the possibility of their mastery of the desired behaviour, that is, encouraging self-efficacy. The self-efficacy model also alludes to a role for incentives and rewards in achieving behaviour change, a notion incorporated into academic detailing through the giving of symbolic gifts and the reward of positive feedback and praise for behaviour change.

The stages of change model speaks to the highly individual process that each subject may go through (possibly several times) in achieving changes in behaviour. Applied to changing professional behaviour, the model supports the idea that interventions should be designed to meet individual subject's needs, or at least to target specific groups with homogenous needs, barriers and drivers for change, rather than adopting blanket interventions which assume that all subjects are alike and changing in step (NHS 1999).

Although personal characteristics such as age, education and experience of physicians are logically used to predict awareness and adoption of medical innovation in communication theory, empiric evidence indicates inconsistent relationships between personal characteristics and their adoption of innovations (Bauer 1966).

Physicians would be an important target for interventions to improve health care provision. The increased rate of adoption of innovations in group practice when compared to solo practices has been largely due to collegial interaction (Williamson 1978). Further, other attributes of a health care setting, including the size of the patient list, staff training and regulatory policies, also influence behaviour change.

Diffusion of innovations theory focuses on the differences in receptiveness to new ideas between different recipients of a message. In this sense, little of its theory is directly relevant to academic outreach, as this strategy aims at influencing all potential targets, rather than identifying a leading group who might be quickest to accept and implement new ideas, and focusing on them. Instead, academic outreach can be viewed as adapting to the particular needs of all targets, acknowledging that there are many differences between them, but attempting to accommodate these differences in a flexible approach to communicating messages to each individual.

The PRECEDE-PROCEED framework for behaviour change can be paralleled with the principles of an outreach intervention. A need for change or a problem is identified, possibly from epidemiological studies of health care delivery. Factors that are likely to predispose, enable and reinforce change among the health care professional target group are considered, in relation to the environment and the components of the proposed interventions. The range and magnitude of barriers to appropriate behaviour are identified (either particular forms of health care delivery behaviour, or, in the original PRECEDE-PROCEED model, in health behaviours among patients of individuals in the community). Programmes are then designed and implemented, aimed at specifically addressing these identified barriers to change. Interventions that aim to

promote and reinforce change in individual behaviour are used, and their impact and outcomes are evaluated in context.

A variety of techniques will be required to secure change, as the individuals and target groups differ in the degree to which they are prepared to change because of differences in benefits, barriers and resources. Promotional strategies and product designs using a social marketing framework can aid to refine implementation of the innovation.

The range of theoretical constructs described above, provide a root for adoption into implementation research and evaluation studies. Although Soumerai and Avorn (1990) researched both behavioural and communication theories to change practitioner prescribing, their principles of academic outreach are based primarily on empirical data. Therefore a common-sense approach when designing and implementing an educational outreach intervention, would be an empirical approach. The eight key principles of Soumerai and Avorn's academic outreach (1990) forms the main elements used in this implementation study (chapters 5,6,7):

- assessing current practice and barriers to change;
- developing programmes for specific physician targets;
- defined clear educational and behavioural objectives;
- establishing credibility through respected organisations, provision of unbiased information, presenting both sides of controversial issues;
- encouraging active physician participation in educational interaction;
- using concise educational materials;
- highlighting and repeating key messages; and
- providing positive reinforcement through follow-up visits.

Principles of educational outreach that facilitate professional behaviour change

Educational outreach interventions have demonstrated changes to alternative low-cost pharmacotherapeutic approaches. Rational drug prescribing patterns have led to reduced medical expenditure for families and improved patient health outcomes (Avorn

1983; Dietrich 1992; Steele 1989; Ray 1986; Cockburn 1992; de Burgh 1995). Successful guideline implementation at clinical practices requires a multifaceted approach (Oxman 1995; Grol 1992; Anderson 1993). Since changing practitioner behaviour goes beyond a simple educational approach (Eisenberg 1981), Avorn (1983) pioneered outreach combination with social marketing techniques to improve clinical decision-making ('academic detailing'). They based the principles of educational outreach on empirical evidence obtained from pharmaceutical representatives as well as research in adult learning, diffusion of innovations and persuasive communication (Soumerai 1990).

Assess current practice, identify and prioritise local barriers to change

The first step when planning change is to establish with practitioners and key partners the priority barriers that prevent current adoption of a guideline in clinical practice. Through demonstration and acknowledgement of a performance gap in actual practice, will any real attention be paid to proposed solutions for particular problems (Conroy 1995). Because of the numerous perceived barriers (Grol 1992; Haynes 1998), it is important to establish which ones are regarded by general practitioners as those most important in preventing them adopting the guidelines. By identifying and prioritizing local practice barriers, it helps to focus the planning and implementation of the intervention to target these barriers. Barriers to the provision of clinical care are identified from interviews, representative sample surveys of target practitioners and through ongoing communication between detailer/ educators and practitioners (Soumerai 1990) before development of the outreach intervention.

Target 'high-potential' physician

Outreach interventions have modified physician prescribing, and approaches to preventive care and health promotion in primary care setting. Avorn and Soumerai (1983) identified moderate to high-volume prescribers from pharmacy prescription data of target drugs. After the educational outreach intervention, these target physicians reduced their excessive prescribing. The benefit/cost ratio was the highest in the group with the highest initial volume of target drug use. In another study, family physicians

who showed lower use of office reminder systems than gynaecologists to encourage breast cancer screening, received a multimethod intervention and educator visits at the clinical setting (Lane 1991).

Define clear educational and behavioural objectives

During outreach visit(s) the goals of the behavioural change guideline implementation strategy should be made explicit during face-to-face discussion with practitioners. The aim, purpose, and method of guideline implementation should be clearly defined to each practitioner. The educator should identify the practitioner's concerns in terms of prescribing patterns, use of preventive strategies, cost of care, patient compliance, misconceptions and fears and should address these concerns by specifying clear alternatives towards improved health care provision. For example, Shaffner and co-workers (1983) identified general practitioners inappropriately prescribing tetracycline to children leading to the permanent discoloration of teeth. The researchers targeted these physicians by recommending the substitution of safer antibiotics and, to a lesser degree, reduction in antibiotic use for simple upper respiratory tract infections in children.

Establish credibility through respected organisations, provision of unbiased information and presenting both sides of controversial issues

The involvement of neutral professional groups represents a significant advantage for outreach educators from respected medical organisations. Official approval for outreach interventions has been obtained from a state medical society and from academic institutions such as a medical school drug-information programme (Avorn 1983; Shaffner 1983). The involvement of unbiased organisational identities have been found to be an important factor in achieving high rates of physician acceptance of the personal visits to their clinical settings (Avorn 1983). Academically based outreach educators offer practitioners up-to date, unbiased, relevant evidence presented in concise and easily accessible structured written format, for use in their practice setting.

Educational outreach interventions encourage two-sided communication during discussions with physicians. By acknowledging and presenting the pros and cons of a controversial issue, the educator helps to improve the physician's understanding and learning through the provision of literature to support the alternative conclusion (Soumerai 1988). The educator's ability to be tactful and not excessively criticise the physician's misperceptions is a pre-requisite for communication.

Active physician participation in educational interaction

Successful behaviour change is dependent on the educators's ability to relate the desired message to the physician's beliefs, needs, values and interests (Avorn 1983). The outreach educator engages in two-way communication by building a physician specific presentation (Watts 1967) to increase the physician's involvement in the interaction and to identify the physician's practice pattern. The educator's careful, logical and meaningful questioning enables the physician to actively follow the educator's thought direction, and allow the dialogue to crystallise physician's mindset into a positive closing challenge (Avorn 1983). Further, stimulating active learner involvement achieves a higher likelihood of attaining educational and behavioural objectives and satisfaction.

Concise educational materials

Clearly illustrated graphic and/or printed educational material supplement the two-way verbal discussions between the outreach educator and individual physicians, and serve to reinforce adoption of the main clinical recommendations. The printed material can be posted to practices and designed to form part of the patient's clinical record or used as a visual educational device during face-to face discussions between the outreach educator and the physician. The recommendation(s) for the desired behaviour change are repeatedly emphasised throughout the printed material which is designed to draw the physician's attention similar to detailing aids used by pharmaceutical representatives. Logos representative of credible organisations printed on the material serve to endorse their involvement, and supporting evidence from the literature is provided to physicians to further encourage their adoption of the recommendation(s).

Highlight and repeat key messages

Key guideline recommendations are repeated to aid retention and promote change in professional practice (Haynes 1984). When identifying the key messages intended for changing physician behaviour, only a few salient messages are selected for the outreach intervention. Physicians are inundated with pharmaceutical promotional material. Attempting to communicate too many complex messages during the outreach interaction will fail to achieve retention of the most important points (Soumerai 1990). Graphic support with headlines, photographs and use of written structured forms/format, and treatment algorithms have been used to enhance visual and verbal presentation of the key messages.

Positive reinforcement in follow-up visits

After the desired behaviour change has been communicated with physicians, their experiences with implementing the recommendations are discussed in a follow-up visit. Educational outreach educators can verbally encourage and applaud physician's change in practice in accordance with the key recommendations mentioned in the initial outreach visit. Furthermore, the follow-up visit can also be used to identify problems that may inhibit physicians from changing their practice. Ray and colleagues (1986) found that a reinforcement visit resulted in a persistent improvement in prescribing behaviour.

While educational outreach interventions have been aimed at changing professional practice in developed countries, changing the behaviour of South African private sector GPs for primary care childhood asthma has not yet been evaluated.

References

- Anderson G. Implementing practice guidelines. *Can Med Assoc J* 1993; 148(5): 753-755.
- Anderson RE, Jolson MA. Technical wording in advertising: implications for market segmentation. *J Marketing* 1980; 44: 57-66.
- Avorn J, Soumerai SB. Improving drug-therapy decisions through educational outreach: a randomised controlled trial of academically based "detailing". *N Engl J Med* 1983; 308: 1457-63.

Avorn J, Soumerai SB, Everitt DE, Ross-Degnan D, Beers MH, Sherman D, et al. A randomised trial of a program to reduce the use of psychoactive drugs in nursing homes. *N Engl J Med* 1992; 327: 168-73.

Bandura A. *Social foundations of thought and action: a social cognitive theory*. Prentice- Hall Inc, Englewood Cliffs, New Jersey 1986.

Bandura A. Human agency in social cognitive theory. *American Psychologist* 1989; 44(9): 1175-1184.

Baranowski T, Perry CL, Parcel GS. How individuals, environments and health behaviour interact: social cognitive theory. In : Glanz K, Lewis FM, Rimer BK, (eds), *Health behaviour and health education*. San Francisco. Jossey-Bass Publishers, 2nd edition , 1997: 153-178.

Bauer RA, Wortel LH. Doctor's choice: the physician and his sources of information about drugs. *J Marketing Res* 1966; III: 40-47.

Berger A. Why clinical audit doesn't work? (editorial). *Br Med J* 1998; 875-6.

Bero LA, Grilli R, Grimshaw JM, Harvey E, Oxman AD, Thomson AD. Closing the gap between research and practice: an overview of systematic reviews of interventions to promote the implementation of research findings. *Br Med J* 1998; 317: 465-468.

Bero LA, Mays NB, Barjesteh K, Bond C. Expanding the roles of outpatient pharmacists: effects on health services utilisation, costs and patient outcomes (Cochrane review). In: *Cochrane Library*, issue 1, 2000. Oxford: Update software.

Berscheid E. Opinion change and communicator communicatee similarity and dissimilarity. *J Pers Soc Psychol* 1966; 4(6): 670-680.

Bexell A, Lwando E, Von Hofsten B, Tembo s, Eriksson B, Diwan VK. Improving drug use through continuing education: a randomised controlled trial in Zambia. *J Clin Epidemiol* 1996; 49: 355-357.

Boissel JP, Nony P, Gueyffer F, Cucherat M. Differences between messages and recommendations/guidelines. Proceedings of the Second international conference. Scientific basis of health services and 5th annual Cochrane Colloquium. 1997 Oct 5-12, Abstract book. (poster p260). p 279.

Chebat J-P, Picard J. Receivers' self-acceptance and the effectiveness of two-sided messages. *J Soc Psychol* 1988; 128(3): 353-362.

Cockburn J, Ruth D, Silagy C, Dobbin M, Reid Y et al. Randomised trial of three approaches for marketing smoking cessation programmes to Australian general practitioners. *Br Med J* 1992; 304: 691-4.

Cohen D, Jones P, Lettenberg B, Neuhauser D. Does cost information availability reduce physician test usage ? *Med Care* 1982; 20: 286-92.

Conroy M, Shannon W. Clinical guidelines: their implementation in general practice. *Br J Gen Pract* 1995; 45: 371-375.

Crosswaite C, Curtis L. Disseminating research results-the challenge of bridging the gap between health research and health action. *Health Promotion International* 1994; 9(4): 289-296.

Davis DA, Taylor-Vaisey A. Translating guidelines into practice. A systematic review of theoretic concepts, practical experience and research evidence in the adoption of clinical practice guidelines. *Can Med Assoc J* 1997; 157: 408-16.

Davis DA, Thomson MA, Oxman AD, Haynes RB. Changing physician performance: a systematic review of the effect of continuing medical education strategies. *JAMA* 1995; 274: 700-5.

De Bono KG. Pleasant scents and persuasion: an information processing approach. *J App Soc Psychol* 1992; 22(11): 910-919.

De Bono KG, Telesca C. The influence of source physical attractiveness on advertising effectiveness. A functional perspective. *J Appl Soc Psychol* 1990; 20(17): 1385-1395.

De Bono KG, Harnish RJ. Source expertise, source attractiveness, and the processing of persuasive information. A functional perspective. *J Per Soc Psychol* 1988; 55(4): 541-546.

De Burgh S, Mant A, Mattick RP, Donnelly N, Hall W, Bridges-Webb C. A controlled trial of educational visiting to improve benzodiazepine prescribing in general practice. *Aust J Public Health* 1995; 19: 142-8.

De Santis G, Harvey K, Howard D, Mashford ML, Moulds RFW. Improving antibiotic prescription patterns in general practice. The role of educational intervention. *Med J Aust* 1994; 160: 502-505.

Dietrich AJ, O'Connor GT, Keller A, Carney PA, Levy D, Whaley FS. Cancer: improving early detection and prevention. A community practice randomised trial. *Br Med J* 1992; 304: 687-91.

Diwan VK, Wahlstrom R, Tomson G, Beerman B, Sterky G, Eriksson B. Effects of group detailing on the prescribing of lipid-lowering drugs: a randomised controlled trial in Swedish primary care. *J Clin Epidemiol* 1995; 48: 705-11.

Eagly AH. Comprehensibility of persuasive arguments as a determinant of opinion change. *J Pers Soc Psychol* 1974; 29(6): 758-773.

Eddy DM. Designing a practice policy. Standards, guidelines and options. *JAMA* 1990; 263: 3077-3074.

Engel JF, Warshaw MR, Kinnear TC. Promotional strategy- managing the marketing communication process, 6th edition. Irwin, Homewood, Illinois. 1987.

Eisenberg JM, Williams SV. Cost containment and changing physician's practice behaviour. Can the fox learn to guard the chicken coop? *JAMA* 1981; 246: 2195-2201.

Fardy HJ. Adaptation of clinical practice guidelines as continuing medical education: does it benefit the patient as well as the general practitioner? Draft manuscript 1997.

Farmer A. Setting up consensus standards for the care of patients in general practice, *Br J Gen Pract* 1991; 41: 135-6.

Farris KB, Kirking DM, Shimp LA, Opdycke RAC. Design and results of a group counter-detailing DUR educational program. *Pharmaceutical Res* 1996; 13: 1445-1452.

Field MJ, Lohr KN (eds). Guidelines for clinical practice: from development to use. Washington, DC: National Academy Press, 1992; p27.

Feder G, Griffiths C, Highton C, Eldridge S, Spence M, Southgate L. Do clinical guidelines introduced with practice based education improve care of asthmatic and diabetic patients? A randomised controlled trial in general practices in east London. *Br Med J* 1995; 311: 1473-8.

Flottorp S, Oxman A, Bjorndal A. The limits of leadership: opinion leaders in general practice. *J Health Serv Res Policy* 1998; 3: 197-202.

- Freemantle N, Harvey EL, Wolf F, Grimshaw JM, Grilli R, Bero LA. Printed educational materials to improve the behavior of health care professionals and patient outcomes. Cochrane review. In: Cochrane Library, issue 3, 1998. Oxford: Update software.
- Fullard E, Fowler G, Gray M. Promoting prevention on primary care: controlled trial of low technology 1984.
- Glascoe FP, Oberklaid F, Dworkin PH, Trimm F. Brief approaches to educating patients and parents in primary care. *Pediatrics* 1998; 101 (6): p.e10.
- Global Initiative for Asthma. Global strategy for asthma management and prevention. NHLBI/ WHO workshop report. National Institute of Health. National Heart, Lung and Blood Institute. Publication number 95-3659.1995.
- Goldberg HI, Wagner EH, Fihn SD, Martin DP, Horowitz CR, Christensen DB, Cheadle AD, et al. A randomised controlled trial of CQI teams and academic detailing. *Joint Commission Journal* 1998; 130-142.
- Gomel MK, Saunders JB, Burns L, Hardcastle D, Sumich M. Dissemination of early intervention for harmful alcohol consumption in general practice. *Health Promotion Journal of Australia* 1994; 4(2): 65-69.
- Goodman RM, Steckler A, Kegler MC. Mobilizing organisations for health enhancement: theories of organisational change. In: Glanz K, Lewis FM, Rimer BK, (eds), *Health behaviour and health education*. San Francisco. Jossey-Bass Publishers, 2nd edition , 1997: 287-312.
- Gruppen LD, Wolf FM, Van Voorhees C, Stross JK. Information-seeking strategies and differences among primary care physicians. *Möbius* 1987; 7(3): 18-26.
- Green LW, Kreuter MW. *Health promotion and planning: an educational and environmental approach*. London : Mayfield Publishing Company. 1991.
- Grilli R, Lomas J. Evaluating the message: the relationship between compliance rate and the subject practice guideline. *Med Care* 1994; 32: 202-213.
- Grol R. Implementing guidelines in general practice care. *Qual Health Care* 1992; 1: 184-191.
- Gueyffer F, Boissel JP, Cucherat M. Message integrable: probleme central de communication pour l'information therapeutique. *Therapie* 1996; 51: 240-45.
- Gyorkos TW, Tannenbaum TN, Abramhamowicz M, Bedard L, Carsley J, et al. Evaluation of the effectiveness of immunisation delivery methods. *Can J Public Health* 1994; 85: S14-S30.
- Gurwitz JH, Soumerai SB, Avorn J. Improving medication prescribing and utilization in the nursing home. *J Am Geriatr Soc* 1990; 38: 542-552.
- Hass RG, Linder DE. Counterargument availability and the effects of message structure on persuasion. *J Pers Soc Psychol* 1972; 23(2): 219-233.
- Haynes A, Donald A. Making better use of research findings. *Br Med J* 1998; 317: 72-75.
- Haynes RB, Sackett DL, Tugwell P. Problems in the handling of clinical research evidence by medical practitioners. *Arch Intern Med* 1983; 143: 1971-75.
- Haynes R, Davis D, McKibbon A, Tugwell P. A critical appraisal of the efficacy of continuing medical education. *JAMA* 1984; 251:61-4.

- Healy K. Success depends on type of audit. (Letter) *Br Med J* 1998; 316: 1905.
- Heilman ME. Oppositional behaviour as a function of influence attempt intensity and retaliation threat. *J Pers Soc Psychol* 1976; 33(5): 574-578.
- Hershey CO, Porter DK, Breslau D, Cohen DI. Influence of simple computerised feedback on prescription changes in an ambulatory clinic: a randomised controlled trial. *Med Care* 1986; 24: 472-481.
- Holbrook MB. Beyond attitude structure: toward the informational determinants of attitude. *J Marketing Res* 1978; 545-56.
- Hong ST, Ching TY, Fung JPM, Seto WL. The employment of ward opinion leaders for continuing education in the hospital. *Med Teach* 1990; 12: 209-217.
- Howard DJ. Rhetorical question effects on message processing and persuasion. The role of information availability and the elicitation of judgement. *J Exp Soc Psychol* 1990; 26(3): 217-239.
- Hulscher MEJ, van Drenth BB, Mokkink HGA, van de Lisdonk EH, van der Wouden JC, van Weel C, Grol RPTM. Tailored outreach visits as a method for implementing guidelines and improving preventive care. *Quality in Health Care* 1998; 10 (2): 105-12.
- Hunt DL, Haynes RB, Hanna SE, Smith K. Effects of computer-based clinical decision support systems on physician performance and patient outcomes: a systematic review. *JAMA* 1998; 280: 1339-46.
- Hutchinson A, Baker R, (eds). *Making use of guidelines in clinical practice*. Oxford: Radcliffe Medical Press, 1999.
- Humphries D, Littlejohns P, (eds). *Implementing clinical guidelines. A practical guide*. Oxford: Radcliffe Medical Press, 1999.
- Ives TJ, Frey JJ, Furr SJ, Bentz EJ. Effect of an educational intervention on oral cephalosporin use in primary care. *Arch Intern Med* 1987; 147: 44-47.
- Jaccard J. Toward theories of persuasion and belief change. *J Pers Soc Psychol* 1981; 40: 260-269.
- James PA, Cowan TM, Graham RP. Patient-centred clinical decisions and their impact on physician adherence to clinical guidelines. *J Fam Pract* 1998; 46: 311-318.
- Kanouse DE, Jacoby I. When does information change practitioners' behaviour. *Int J Tech Assess Health Care* 1988;4:27-34.
- Kenyon TA, Gama Z, Sibiya T, Burnham G. Evaluation of an intervention to improve prescribing practices in Swaziland. *South Afr J Epidemiol Infect* 1997; 12 (2): 49-54.
- Kosecoff J, Kanouse DE, Rogers WH, McCloskey L, Winslow CM, Brook RH. Effects of the National Institute of Health Consensus Development Program on physician practice. *JAMA* 1987; 258: 2708-13.
- Lancaster T, Silagy C, Fowler G, Spiers I. Training health professionals in smoking cessation. *Cochrane Review*. In: *The Cochrane Library*, 1999; issue 1. Oxford: Update software.
- Landgren FT, Harvey KJ, Mashford ML, Moulds FW, Guthrie B, Hemming M. Changing antibiotic prescribing by educational marketing. *Med J Austr* 1988; 149: 595-599.
- Lane DS, Polednak AP, Burg MA. Effect of continuing medical education and cost reduction on physician compliance with mammography screening guidelines. *J Fam Pract* 1991; 33: 359-368.

- Lang DM, Sherman MS, Polansky M. Guidelines and realities of asthma management. *Arch Intern Med* 1997; 157: 1193-1200.
- Lefebvre RC, Flora JA. Social marketing and public health intervention. *Health Educ Quart* 1988; 15 (3): 299-315.
- Lefebvre RC, Rochlin L. Social marketing. In: Glanz K, Lewis FM, Rimer BK, (eds). *Health behaviour and health education*. San Francisco. Jossey-Bass Publishers, 2nd edition, 1997; 384-402.
- Legoretta AP, Christian-Herman J, O'Connor RD, Hasan MM, Evan R, Leung KM. Compliance with national asthma management guidelines and specialty care. *Arch Intern Med* 1998; 158: 457-464.
- Leippe MR, Elkin RA. When motives clash: issue involvement and response involvement as determinants of persuasion. *J Pers Soc Psychol* 1987; 52(2): 269-278.
- Lomas J. Diffusion, dissemination and implementation: who should do what? *Annals New York Academy of Sciences* 1993; 226-241.
- Lomas J, Anderson GM, Pierre KD, Vayda E, Enkin MW, Hannah WJ. Do practice guidelines guide practice? The effect of a consensus statement on the practice of physicians. *N Engl J Med* 1989; 321:1306-11.
- Lomas J, Enkin M, Anderson GM, Hannah WJ, Vayda E, Singer J. Opinion leaders vs audit and feedback to implement practice guidelines. *JAMA* 1991; 265: 2202-2207.
- Mandelblatt J, Kanetsky PA. Effectiveness of interventions to enhance physician screening for breast cancer. *J Fam Pract* 1995; 40: 162-171.
- McConnell TJ, Cushing AH, Bankhurst AD, Healy JL, McIlvenna PA, Skipper BJ. Physician behaviour modification using claims data: tetracycline for upper respiratory infection. *West J Med* 1982; 137: 448-50.
- Mc Cullough JL, Ostrom TM. Repetition of highly similar messages and attitude change. *J App Soc Psychol* 1974; 59: 395-397.
- McGuire WJ. Attitudes and attitude change. In: Gardner A, Elliott A, (eds). *Handbook of social psychology*. 3rd edition, vol II, Special fields and applications. New York: Random House. 1985.
- Mills J, Harvey J. Opinion change as a function of when information about the communicator is received and whether he is attractive or expert. *J Pers Soc Psychol* 1972; 21(1): 52-55.
- Moulding NT, Silagy CA, Weller DP. A framework for effective management of change in clinical practice: dissemination and implementation of clinical practice guidelines. *Quality in Health Care* 1999; 8:177-183.
- Neville RG, Clark RA, Hoskins G, Smith B for General Practitioners in Asthma Group. National asthma attack audit 1991-1992. *Br Med J* 1993; 306: 559-62.
- Newton-Syms FAO, Dawson PH, Cooke J, Feely et al. The influence of an academic representative on prescribing by general practitioners. *Br J Clin Pharmacol* 1992; 33: 69-73.
- NHS Centre for reviews and dissemination. *Effective Health Care bulletin*. Getting evidence into practice. February 1999; 5 (1).

North of England Study of Standards and Performance in General Practice. Medical audit in general practice. I: Effect on doctor's clinical behaviour for common childhood conditions. *Br Med J* 1992; 1480-4.

Novelli WD. Applying social marketing to health promotion and disease prevention. In: Glanz K, Lewis FM, Rimer BK, (eds). *Health behaviour and health education. Theory research and practices.* USA: Jossey-Bass Publishers. 1st edition. 1990. 342-369.

O'Connell DL, Henry D, Tomlins R. Randomised controlled trial of effect of feedback on general practitioners' prescribing in Australia. *Br Med J* 1999; 318: 507-11.

Oxman AD, Thomson MA, Davis DA, Haynes B. No magic bullets: A systematic review of 102 trials of interventions to improve professional practice. *Can Med Assoc J* 1995; 153: 1423-1431.

Paccaud F. Variation in guidelines. *J Health Serv Res Policy* 1997; 2: 53-5.

Putnam RW, Curry L. Impact of patient care appraisal on physician behaviour in the office setting. *Can Med Assoc J.* 1985; 132:1025-9.

Peterson GM, Bergin JK, Nelson BJ, Stanton LA. Improving drug use in rheumatic disorders. *J Clin Pharm Ther* 1996; 21: 215-220

Petersen GM, Sugden JE. Educational program to improve the dosage prescribing of allopurinol. *Med J Aust* 1995; 162: 74-77.

Petty RE, Cacioppo JT. *Attitudes and persuasion: classic and contemporary approaches.* Wm C Brown Company, Dubuque, Iowa. 1981.

Premaratne UN, Sterne JAC, Marks GB, Webb JR, Azima H, Burney PGJ. Clustered randomised trial of an intervention to improve the management of asthma: Greenwich asthma study. *Br Med J* 1999; 318: 1251-1255.

Prochaska JO, Velicer WF, Rossi JS, Goldstein MG, Marcus BH, Rakowski W, Fiore C, Harlow LL, Redding CA, Rosenbloom D, Rossi SR. Stages of change and decisional balance for 12 problem behaviours. *Health Psychol* 1994; 13(1): 39-46.

Prochaska JO, Redding CA, Evers KE. The Transtheoretical model and stages of change. In: Glanz K, Lewis FM, Rimer BK, (eds), *Health behaviour and health education.* San Francisco. Jossey-Bass Publishers, 2nd edition, 1997: 60-86.

Rabin DL, Boekeloo BO, Marx ES, Bowman MA, Russell NK, Gonzalez Willis A. Improving office-based physicians' prevention practices for sexually transmitted diseases. *Ann Intern Med* 1994; 121: 513-9.

Ray WA, Blazer DG, Schaffner W, Federspiel CF, Fink R. Reducing long-term diazepam prescribing in office practice. *JAMA* 1986; 256: 2536-9.

Roland M. Getting research into practice. (editorial). *J Epidemiol Community Health* 1995; 49: 225-6.

Rogers EM. *Diffusion of innovations.* New York. The Free Press, 1995.

Ross-Degnan D, Soumerai SB, Goel PK, Bates J, Makhulo J, Dondi N, et al. The impact of face-to face educational outreach on diarrhoea treatment in pharmacies. *Health Policy and Planning* 1996; 11: 308-18.

Sandu G. Academic detailing to influence non-steroidal anti-inflammatory drug use in general practice. *Aust Presc* 1993; 16(suppl 1): 38-40.

- Shaffner W, Ray WA, Federspiel CF, Miller WO. Improving antibiotic prescribing in office practice: a controlled trial of three educational methods. *JAMA* 1983; 250: 1728-32.
- Shelby AN. The theoretical basis of persuasion: a critical introduction. *J Bus Communication* 1986; 23(1): 5-29.
- Smeele IJM, Grol RPTM, van Schayck, van den Bosch, van den Hoogen HJM, Muris. Can small group education and peer review improve care for patients with asthma/chronic obstructive pulmonary disease? *Quality in Health Care* 1999; 8: 92-98.
- Smith R. Filling the lacuna between research and practice: an interview with Michael Peckham. *Br Med J* 1993; 307: 1403-7.
- Soumerai SB. Improving the quality and economy of in-hospital prescribing : getting more. *Med J Aust* 1988; 149: 574-6.
- Soumerai SB. Improving the quality and economy of in-hospital prescribing: getting more for less. *Med J Aust* 1988; 149: 574-76.
- Soumerai SB, Avorn J. Principles of educational outreach ('academic detailing') to improve clinical decision making. *JAMA* 1990; 263: 549-556.
- Soumerai SB, Salem-Schatz S, Avorn J, Casteris C, Ross-Degnan D, Popovsky MA. A controlled trial of educational outreach to improve blood transfusion practice. *JAMA* 1993; 270: 961-966.
- Stalsby Lundborg C, Hensjo LO, Gustafsson LL. "Academic drug-detailing": from project to practice in a Swedish urban area. *Eur J Clin Pharmacol* 1997; 52: 167-172.
- Stalsby Lundborg C, Wahlstrom R, Oke T, Tomson G, Diwan VK. Influencing prescribing for urinary tract infection and asthma in primary care in Sweden. A randomised controlled trial of an interactive educational intervention. *J Clin Epidemiol* 1999; 52: 801-812.
- Steele MA, Bess DT, Franse VL, Graber SE. Cost effectiveness of two interventions for reducing outpatient prescribing costs. *DICP* 1989; 23:497-500.
- Stergachis A, Fors M, Wagner EH, Sims DD, Penna P. Effect of clinical pharmacists on drug prescribing in a primary care clinic. *Am J Hosp Pharm* 1987; 44:525-9.
- Stern CS. Academic detailing: what's in a name?. *JMCP* 1996; 2: 88-90.
- Stevens SA, Cockburn J, Hirst S, Jolley D. An evaluation of educational outreach to general practitioners as part of a state cervical screening program. *Am J Public Health* 1997; 87:1187-1181.
- Stross JK, Hiss RG, Watts CM, Davis WK, Macdonald R. Continuing education in pulmonary disease for primary care physicians 1983; 127: 739-746.
- Sutton GC, Collingwood J, Pattison K, Walker M. Clinical audit in nursing homes has proved ineffective. *Br Med J* 1998; 316: 1905.
- Sweeney PD, Gruber KL. Selective exposure: voter information preferences and the Watergate affair. *J Pers Soc Psychol* 1984; 46(6): 1208-1221.
- Thomson O' Brien MA, Oxman AD, Haynes RB, Davis DA, Freemantle N, Harvey EL. Local opinion leaders: effects on professional practice and health care outcomes. Cochrane review. In *Cochrane Library*, issue 4, 1999. Oxford: Update software.

Thomson O' Brien MA, Oxman AD, Davis DA, Haynes RB, Freemantle N, Harvey EL. Outreach visits to improve health professional practice and health care outcomes. In Bero L, Grilli R, Grimshaw J, Oxman A (eds.). Collaboration on Effective Practice Module of The Cochrane Database of Systematic Reviews, Cochrane Library. The Cochrane Collaboration; Issue 1. Oxford:Update software; 1998.

Thorsen T, Makela M, (eds.) Changing professional practice. Theory and practice of clinical guidelines implementation. Danish Institute for Health Services Research and Development. Copenhagen: DSI Monograph 1999.

Tomson Y, Hasselstrom , Tomson G, Aberg H. Asthma education for Swedish primary care physicians- a study on the effects of "academic detailing" on practice and patient knowledge. Eur J Clin Pharmacol 1997; 53: 191-6.

Tones K. Marketing and the mass media: theory and myth. Reflections on social marketing theory. (editorial). 1994 165-169.

Volmink JA, Metcalfe CA, Zwarenstein M, Heath S, Laubscher JA. Attitudes of private general practitioners towards health care in South Africa. S Afr Med J 1993; 83: 827-833.

Walster E, Festinger L. The effectiveness of "overheard" persuasive communications. J Abn Soc Psychol 1962; 65: 395-402.

Watts WA. Relative persistence of opinion change induced by active compared to passive participation. J Pers Soc Psychol 1967;5(1): 4-15.

Wensing M, Van der Weijden T, Grol R. Implementing guidelines and innovations in general practice: which interventions are effective. Br J Gen Pract 1998; 48: 991-997.

White PT, Pharoah CA, Anderson HR, Freeling P. Randomised controlled trial of small group education on the outcome of chronic asthma. J R Coll Gen Pract 1989; 39:182-186.

Williamson E. Medium or message. Communications medium as a determinant of interpersonal evaluation. Sociometry 1975; 38(1): 119-130.

Webb LZ, Kuykendall DH, Zeiger RS, Berquist SL, Lischio D, et al. The impact of status asthmaticus practice guidelines on patient come and physician behaviour. Qual Res Bull 1992; December: 471-476.

Weimann G. Dealing with bureaucracy. The effectiveness of different persuasive appeals. Social Psychology Quarterly 1982; 45(3): 136-144.

Weinberg AD, Ullian L, Richards WD, Cooper C. Informal advice- and information-seeking between physicians. J Med Educ 1981; 56: 174-80.

Williamson PM. The adoption of new drugs by doctors practising in group and solo practice. Soc Sci Med 1978; 233-236.

Winkler JD, Lohr KN, Brook RH. Persuasive communication and medical technology assessment. Arch Intern Med 1985; 145: 314-317.

Woodhouse J, Gorton R. Profession must rise to challenge of innovation. (Letter). Br Med J 1998; 316:1905.

Wyatt JC, Paterson-Brown S, Johanson R, Altman D, Bradburn MJ, Fisk NM. Randomised trial of educational visits to enhance use of systematic reviews in 25 obstetric units. Br Med J 1998; 317: 1041-6.

Yach D, Dick J. Implementation of research. The key to closing the gap between public health knowledge and action. CHASA, Journal of comprehensive health 1991; 22 (1): 15-21.

Yalch R, Elmore-Yalch R. The effect of numbers on the route to persuasion. J Consumer Res 1984; 11: 522-527.

Young DA. Communications linking clinical research and clinical practice. In Roberts EB, Levy RI, Moskowitz J, Sondik EJ (eds.), Biomedical Innovation. Cambridge, MA: MIT Press, 1981, 177-199.



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CHAPTER 4: BACKGROUND (Part 3)

RESEARCH METHODS

Introduction

In this chapter I provide an overview of the CHAMP trial to contextualise my thesis. In developing the intervention both qualitative and quantitative research methods were used, both of which are described in this thesis. I provide a general review of relevant qualitative and quantitative research methods. I then discuss the specific research methods used in designing and evaluating GPs' subjective responses of the CHAMP intervention. In evaluating the intervention, qualitative methods were used to assess acceptability, while quantitative methods were used to assess its effects. I report only on the qualitative aspects of the evaluation in this thesis.

Overview of CHAMP

The CHAMP trial aimed to assess the effectiveness of an outreach intervention programme ('academic detailing') on asthma health outcomes of asthmatic children and processes of care provided to them by private GPs in Mitchell's Plain (Zwarenstein 1999). The underlying hypothesis was that behaviour change interventions directed at practitioners would result in improvements in their management of asthma, which in turn would result in improved health care of asthmatic children in Cape Town, South Africa.

At baseline (November 1997, pre-intervention) parent-completed questionnaire surveys helped to identify asthmatic children and assess asthma severity among 18 041 pre-school and primary school children attending 21 schools in a contiguous area of Mitchell's Plain. Information obtained from the questionnaire established the names of moderate to severe asthmatic children. From a follow-up face-to-face interview the name of their usual GP was obtained, allowing linkage of child asthma health outcomes to the intervention or control arms of the proposed GP intervention. During follow-up (October 1998), parent-completed surveys and face-to-face interviews (seven months post-intervention) were conducted with 383 children who had moderate to severe asthma, and who had claimed having a usual GP in the baseline survey.

Forty-five private sector general practices in Mitchell's Plain were randomly allocated to receive either the outreach intervention (intervention practices) or only a copy of the standard South African guidelines for childhood asthma (1994) (control practices).

GPs in the intervention group received two face-to-face visits, one in May 1998 and a follow-up in September 1998, by a trained outreach educator (myself) to their practice settings. I used graphic educational materials to highlight eight primary care key messages based on the guidelines (1994) for childhood asthma. During the visits I discussed problems with GPs about asthma in an interactive fashion, and left behind a number of different items aimed at supporting desired changes in practitioner behaviour.

Results of CHAMP trial

The prevalence figure of wheeze (26.8%) in 7-9 year old children in Mitchell's Plain in the 1993 study was high when compared internationally. Asthma prevalence was 10.8%. In 1997 the prevalence of wheeze (29.8%) and asthma (11.6%) showed a clinically significant increase over the four-year period (Pather 1999). In the CHAMP trial, there was a clinically and statistically significant reduction after one year in asthma symptom scores of children attending intervention practices (4.03 points) compared to those attending control practices (3.23 points) [difference of 0,8 points, $p=0.03$] (Zwarenstein 1999). This suggests that the intervention was effective.

The research methods used to design the outreach intervention consisted of preliminary qualitative interviews and a follow-up quantitative survey. The qualitative interviews aimed to identify barriers encountered by private general practitioners (GPs) in the management of asthmatic children. The follow-up quantitative survey was used to assess the magnitude of the identified barriers in the representative GP sample. In evaluating the intervention the qualitative methods consisted of an unobtrusive participant observation technique and unstructured in-depth interviews. These methods were used to assess GPs' response (knowledge, attitude and perceptions) to the outreach intervention.

Combining qualitative and quantitative methods

I offer an overview of the characteristics of qualitative and quantitative methods, and the advantages of combining these two methods in the design of implementation research below. Further, I review the approaches used to combine qualitative and quantitative methods, provide examples of such studies, and explain the rationale for the choice of our combined research method for the design of the outreach intervention in this study.

Qualitative research approaches can be used to investigate practitioners' and patients' attitudes, beliefs and preferences by pursuing questions that are not easily answerable by quantitative experimental methods. They help bridge the gap between scientific evidence and clinical practice and provide rich detailed explanations accounts of how treatment regimens are used in everyday contexts (Green 1998). Qualitative work lacks representativeness as it is usually not based upon statistical samples, but is concerned about the replication of findings in similar cases, and how far the findings can be used to infer theory. Qualitative research method draws on techniques from anthropology for in-depth understanding, stressing the derivation of meaning from the subject's frame of reference. Qualitative research is discovery oriented (observations lead to theory), and is used to generate hypothesis (inductive) (Stange 1989). Qualitative methods were used to examine the concerns of single-handed general practitioners (Green 1993) and to understand GPs' and patients' perceptions of the meanings attached to the use of antibiotics for sore throats (Butler 1998).

Quantitative research is the dominant paradigm in biomedical research, public health and health services research. The method involves use of a pre-determined technological tool that provides objective measures which is seen to more reliable as it allows for much less flexibility, imaginative input and reflexivity (Brannen 1992). Quantitative research is a process of enumerative induction which aims to infer a characteristic or a relationship between variables from a sample to a parent population (Brannen 1992; Steckler 1992). Pre-defined variables and categories are linked as hypotheses before the data are collected and these hypotheses are then tested. Generalisability arises from statistical inferences made by linking two

characteristics in a parent population from a sample having no bias, within a specified range of certainty which is precisely estimated. Quantitative research uses techniques from biostatistics and epidemiology to determine the association between exposure and disease; isolates the phenomenon under study from its context, and is used to verify *a priori* hypothesis (deductive) (Stange 1989). For example, a cross sectional questionnaire survey was conducted to assess patients' and doctors' attitudes to the amount of information given after unintended injury during treatment (Hingorani 1999). The results indicated that more patients (92%) than ophthalmologists (60%) believed that a patient should always be told if a complication has occurred [$\chi^2 = 34.5$, 1 df, $p < 0.001$; odds ratio 7.4 (95% confidence interval 3.7 to 14.3)].

Both qualitative and quantitative methods can be combined with each other (Steckler 1992; Miller 1994; Morgan 1998) to explore different aspects of the same research problem (Brannen 1992) and to understand the complexity of the many different factors that influence health (Morgan 1998). By combining qualitative and quantitative methods, the researcher is able to cross-validate the data, develop valid and culturally relevant measurement tools, provide greater insights into possible sources of bias, increase ability to explain unexpected results/ outliers, generate new theories and hypotheses and explore the possibility of generalisability (Stange 1989).

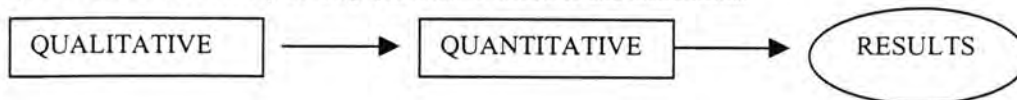
There are four ways that qualitative and quantitative methods might be integrated in health education research (Figure 4.1, Steckler 1992). In the first, qualitative methods are used initially to help develop quantitative measures. For example, the rich in-sights that in-depth interviews provide into attitude, values and behaviours can be invaluable for survey design and measurement decisions. This type of combination has been shown to avoid assumption, clarify questions through descriptions, and alert researchers to language sensitivity when studying social support among inner-city mothers of children who had chronic illnesses (Bauman 1992). In another study combining the two methods enabled feedback between assumptions and data, enhanced comparisons of results and critical reflection and

these were subsequently used to develop a Dutch smoking prevention project (De Vries 1992).

Figure 4.1. Four possible ways that qualitative and quantitative methods might be integrated.

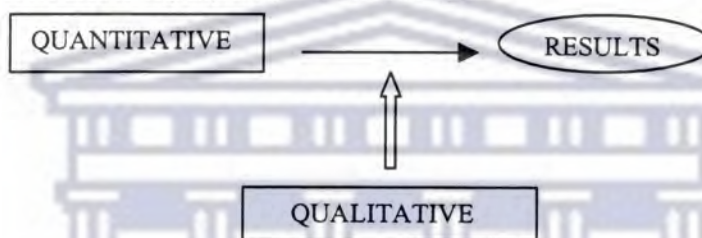
Model 1

Qualitative methods are used to help develop quantitative measures and instruments.



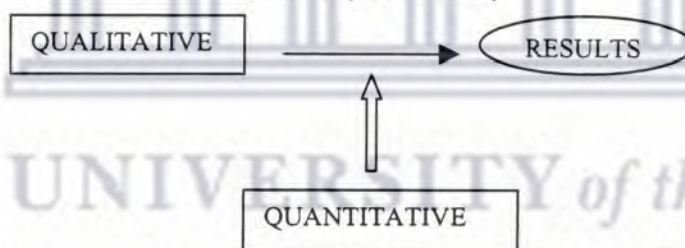
Model 2

Qualitative methods are used to help explain quantitative findings.



Model 3

Quantitative methods are used to embellish a primarily qualitative study.



Model 4

Qualitative and quantitative methods are used equally and parallel.



In the present study a similar multi-method approach (Bauman 1992) was used to design the outreach intervention. The initial qualitative study provided rich descriptions of barriers perceived by GPs and their perceptions of barriers encountered by caregivers of asthmatic children. The initial interview data were used to generate ideas/items for the questionnaire survey, and these follow-up results were not intended for generalising. Further, the findings from the survey

were used to verify whether the barriers identified qualitatively could be also be obtained quantitatively.

In the second approach the study is predominantly quantitative and qualitative results are used to help interpret and explain the quantitative findings. For example, in a study of occupational stress among employees the survey questions were developed from the interview findings to determine the extent of the specific concerns in a manufacturing plant (Hugentobler 1992). The combined methods helped to gain an increase in the understanding of the nature of the employees' problems throughout the plant, clarified and interpreted findings, and was used to cross-validate the data obtained from the combined research methods. This further set the stage for developing and evaluating the health education interventions.

In the third (a reverse of the second) approach quantitative results are used to inform predominantly qualitative findings. For example, qualitative methods allowed the researchers to make empirical observations in a directed and open-ended format that was sensitive, and provided insight into the way AIDS risk reduction messages may or may not be integrated into the lives for sex workers (Dorfman 1992). The structured questionnaire data could only provide limited information about how change is motivated, initiated and maintained. The authors found that neither the qualitative nor quantitative data alone were sufficient to understand AIDS risk for sex workers.

In the fourth approach the two methodologies are used equally and in parallel with each other. Often the results from each approach are used to cross-validate the study findings. For example, in a study of the cultural and behavioural factors which influence the use of antimalarial chemoprophylaxis during pregnancy in Malawi, the researchers found that the use of multiple methods protected them from inappropriate conclusions and provided hypotheses and explanatory mechanisms to account for diverse responses (Helitzer-Allen 1992).

With emphasis being placed on a transdisciplinary approach to care, the use of combined research methods is encouraged to assess local health service delivery (Stange 1996). These approaches have been used in health services research (Pope

1995; Dingwall 1998), health promotion strategies (Steckler 1992) and in identifying barriers in childhood asthma (Mesters 1991). In order to improve the practice of health promotion, not only it is necessary to examine whether the intervention worked or not but, also assess the internal dynamics between participants and the intervention (Steckler 1992). While the strengths of qualitative methods are that they generate rich, detailed valid process data and provide a contextual understanding of the health behaviour, quantitative measures are most appropriate for conducting some needs assessments and to objectively compare outcome and baseline measures. By combining the two research methods, the weaknesses of one are compensated for by the strengths of the other. In developing countries integrated approaches have been used to gain deeper understanding to diagnose broad community needs, assess health service utilisation and identify factors amenable to intervention for infectious diseases such as diarrhoea, malaria and schistosomiasis (Yach 1992) and AIDS (Meyer-Weitz 1991).

The sequence of the two methods is important, that is, whether it is placed in either complementary or follow-up relation to each other. Such a sequence would add new strengths to the existing data set (Morgan 1998). For example, combined methods in the study of hip-fractures (Borkan 1991) and women's perspectives on families in crises (Nichols-Casebolt 1995) have both consisted of a preliminary exploratory qualitative study with a follow-up quantitative survey. However, the combination of qualitative and a quantitative research methods to design an improvement programme for primary care childhood asthma has not yet been reported in South Africa.

Review of research methods

Qualitative methods

The two most commonly used qualitative research methods are interviewing and observation.

Interviewing is the most common way of trying to understand human behaviour. Interviewing is a paramount part of sociology, because both interviewing and sociology are interactions. The purpose of interviewing is to allow us to enter into the other person's perspective, one that is meaningful, knowable and explicit. It is

the interviewer's responsibility to provide a framework within which the interviewee can respond comfortably, accurately and honestly to questions posed to him/her. The interviewer's task is to make it possible to understand the interviewee's world. The quality of the information obtained is largely dependent on the interviewer. Interviewing can be used for marketing purposes, to gather political opinions, for therapeutic reasons or to produce data for academic analysis. It can be used for the purpose of measurement or to gain the understanding of an individual or a group perspective. An interview can be a brief one-time exchange, or it can take place over multiple, lengthy sessions. The most common type of interviewing is individual face-to-face verbal interchange.

An interview can be structured or unstructured. A structured interview entails preparing a list of questions to ensure that the information is obtained from a number of people by covering the same material in the interview. The structured interview provides topics within which the interviewer is free to explore and probe to illuminate a pre-determined subject. This helps to make the interviewing across a number of different people more systematic and comprehensive within the limited interview time. Since structured interviewing uses a series of pre-established questions with a limited set of response categories, there is little room for variation and little flexibility, thus limiting the scope and depth of the investigative process (Morse 1994). An alternate approach, which allows depth, is unstructured interviewing.

An unstructured interview may take the form of either an informal or formal conversational interview. In the informal interview there are no presuppositions and the interviewer pursues information in a direction that appears to be appropriate (Patton 1980) lying within the framework of the study. The interviewer's questions are individualised to establish in-depth communication with the respondent, taking into account both individual and situational differences. Through successive in-depth interviews the interviewer can establish a holistic picture of the respondent's behaviour. This type of interviewing depends on the skills of the interviewer who must be able to interact with people in a variety of settings, generate rapid insights and formulate questions quickly and smoothly (Patton 1980). Thus, the informal interview is a major tool when used in combination with participant observation to

understand the respondents' reactions and behaviour. In South Africa, informal interviews were conducted with parents of asthmatic children to identify problems in the management of the condition (Jones 2000; Engels 1998; Ehrlich 1995).

In a formal interview the exact wording and sequence of questions are determined in advance and all interviewees are asked the same basic questions in the same order. The interview questions are written out in advance, exactly the way they are to be asked during the interview. Careful consideration is given before the interview about how to word each question and any clarifications that are to be used, are written into the interview itself. Respondents answer the same question and data are complete for each person on the topics addressed in the interview. This type of interviewing reduces variation among respondents, does not permit the interviewer to explore topics not anticipated when the interview was written, and places constraints on the different lines of questioning.

Sampling

To obtain an in-depth understanding of the phenomena in question, without the need to generalise, purposive sampling is usually preferred. During purposive sampling certain varied information from among a diverse selection of cases is essential to obtain a reasonable overview of the topic. The sample being studied varies in its geographical location, characteristics and/or experiences. This maximum variety sampling is preferred because it provides a wide range and depth of respondent's views, thus adding richness to the information (Morse 1994). The heterogeneous sample is deliberately selected to identify patterns of commonalities and variations of participants' experiences, which is especially useful to explore concepts. Further, this sample helps to more accurately describe variation in the phenomena under study, and to understand variations in experiences. The data provide unique high-quality descriptions of variations among the respondents.

One of the mainstays of fieldwork is the use of key informants to obtain background information of the target audience. Key informants are people who are particularly knowledgeable about the target population and are articulate. Their insights prove particularly useful in helping an observer understand what is happening among participants, and to increase understanding of the population and phenomena under

study. Key informants serve as sources of information about what the observer has not or cannot experience, as well as a source of explanation of events that the researcher has actually witnessed or cannot have direct access to. Their involvement may occur at various stages of the study to help the researcher during the inquiry process. It is necessary to be aware of distorted or biased perceptions that may be obtained from key informants. The selection of the key informant must be done carefully to avoid arousing personal antagonisms. Data obtained from informants represent perceptions, not truths.

Unstructured in-depth interview technique

Unstructured interviewing is one of the many methods used to obtain insight into an individual's feeling, thoughts and perceptions.

In-depth qualitative interviews are most commonly used to obtain detailed information on the topic from discussions between the interviewer and informant. The major advantage is discovery of the informant's personal experiences and detailed responses to routine and problematic moments that are meaningful to that individual, which helps give the interviewer an inner perspective of the topic. The unstructured free attitude technique using open-ended questions offers greater breadth than other qualitative interviewing techniques (Fontana 1994).

The in-depth interview (or free attitude) technique is controlled and non-directive because the respondent is free to talk about anything (s)he feels like, as long as it is within the framework of the starting questions. The interviewer summarises, reflects, stimulates and asks for clarification to obtain structure to the respondent's information. The reflective summary helps focus the conversation and is used to prompt the respondent to provide more information. The validity and reliability of the results depends on the skills and sensitivity of the interviewer.

An opening (exploring) question in an in-depth interview is formulated in an open and vague enough way to explore the field. The formulation of the opening question may not contain a suggestion:

'Would you like to tell me about your experiences in the management of asthmatic patients?'

The opening question covers the interviewer's opinion or hypothesis formulated in an asking way. It is important that the interviewer asks one opening question and only at the beginning of the interview. It is possible to ask more exploring questions relating to the same topic in one interview session.

The questions during the interview are open-ended and neutral to identify the respondent's experiences. Open-ended questions minimises the imposition of pre-determined responses when gathering data permitting the interviewee to take whatever direction and use whatever words they want in order to represent what they have to say, for example:

'How do you feel about the programme?'

'What is your opinion of the programme?'

'What do you think of the programme?'

The interviewer's posture and attitude are crucial as they primarily serve as an invitation for the respondent to talk. Interviewing skills of the researcher include an open body posture, improved listening, probing, clarifying questions and reflective summaries which help the researcher get an in-depth understanding of the respondent's world. A reflective summary structures the respondent's information and helps the interviewer to understand the respondent's feeling more clearly. The reflective summary is proposed in a tentative and asking way through the interviewer's evocative tone which is increased at the end of his/her utterance:

'It is your opinion that....?'

'You have got the feeling that?'

'If I understand you well, you are saying....?'

The interviewer gives back the respondent's opinions and feelings in the interviewer's own words. It is not important for the interviewer to use perfect formulations in his/her reflections as stumbling may encourage the respondent to take over and reformulate his/her opinions or feelings, thereby stimulating the respondent to give more information. The reflective summary also reflects the nature as well as the intensity of the respondent's feelings. In addition, silence or a pause allows the interviewer and respondent time to think. In concluding the interview, the interviewer summarises the given information, with a reflective summary in which the most important points are reiterated.

A probe is an interview tool that is used to go deeper into the interview process, increase the richness of the data and to give cues to the interviewee about the level of response that is desired. Probes are used to communicate with the interviewee what depth of information the interviewer is seeking, and to guide the person being interviewed, maintaining control of the flow of the interview. Probes are always a combination of verbal and nonverbal cues. Probing is a skill that comes from knowing what to look for in the interview, listening carefully to what is said, and what is not said, and being sensitive to the feedback and needs of the person being interviewed. A major characteristic that separates probes from general interview questions is that probes are seldom written out in an interview.

Conversational probes are offered in a natural style of voice, and used to follow up initial responses using follow-up questions “who”, “where”, “what” and “how” to obtain a complete and detailed picture of the respondent’s experience. Another verbal response such as “uh-huh”, can be combined with gentle rocking of the whole upper body. The best cue to encourage an interviewee to continue talking is for the interviewer to gently nod his/ her head; avoiding overenthusiastic nodding as it would be perceived as agreement and that the interviewer has understood what has been said. If the response is ambiguous to the interviewer, clarifying questions are used to encourage the interviewee to say more about an answer, for example:

You said the programme is a ‘success’. What do you mean by ‘success’?

I didn’t quite catch your full meaning. Would you run that by me again?

The clarifying question should be run naturally and gently and convey the notion that failure to understand is fault of the interviewer, and not that of the interviewee. Silence at the end of a response can indicate that the interviewer would like the person to continue.

Training for in-depth interviewing is a pre-requisite for attaining good quality data. The exercises consist of developing an attitude of open-mindedness to the interviewees’ speech and the importance of unconditional positive regard. Role playing techniques are used, and the interviewer is trained to use non-verbal signs to establish an open inviting posture. These range from eye contact, nodding and uttering words such as “hmm, hmm” when replying to the respondent, having a bent torso in a 45 degree angle, shoulders turned in the direction of the respondent and

not crossing the arms or legs. Further, attention is drawn to unnecessary interruption that would spoil the atmosphere of trust and openness in the interview. The training emphasises the need for an appropriate, open and non-leading exploratory question, with no implied suggestion or direction, other than to encourage expression of the respondents own experiences, emotions and responses.

Unstructured in-depth interviewing provides greater breadth than other types of interviewing (Fontana 1994). It helps to understand the complex behaviour of the respondent without imposing any *a priori* categorisation that may limit the field of inquiry. Qualitative interviews have been widely used in health care settings to explore practitioner's attitudes and perceptions of obstacles to medical audit (Black 1993), understand their opinions and attitudes in relationships with patients, diagnosing, and in up-dating their knowledge about asthma (Lagerløv 1998) and to ascertain concerns of single-handed practitioners (Green 1993). Structured questionnaire surveys have been directed at physicians about their practice behaviour for asthma (Wolle 1995; Kahan 1996; Bauman 1990). Childhood asthma studies using unstructured in-depth qualitative interviews directed to private GPs have not yet been conducted in South Africa.

Participant observation

Observation has served as the bedrock source of human knowledge and is one of the earliest and most basic forms of research. As members of society, we make observations of the social and natural world around us to guide us in forging paths of actions and interpreting the actions of others, generating "common sense" or "cultural knowledge" (Adler 1994). Observation consists of gathering impressions of the surrounding world through all relevant human faculties. This generally necessitates direct contact with the subject(s) of observation, although some remote observation can be carried out by recording the data with an audiotape, videotape and studying it later (ibid). The researchers must actively witness the phenomena they are studying. Observers neither manipulate nor stimulate their subjects and do not ask their subjects research questions, but observe the flow of events. Behaviour and interaction continue as they would without the presence of a researcher, uninterrupted by intrusion. Qualitative observation is fundamentally naturalistic in essence; it occurs in the natural context of occurrence and follows the natural stream

of life. The observer is drawn into the phenomenological complexity of the subject's world, where connections, correlations and causes can be witnessed as they unfold. The researcher is not bound by predetermined categories of measurement or response, but is free to search for concepts or categories that appear meaningful to the subject. Naturalistic observers look for much larger trends, patterns and styles of behaviour. Participant observation is most likely to be used in conjunction with observing and interviewing (Patton 1980).

Participant observation occurs when the researcher actively participates and interacts with subjects while observing their actions in their natural social settings (Johnson 1975). The purpose of such participation is to develop an *insider's* view of what is happening. The researcher *feels* what it is like to be part of the group. During participant observation subjects may or may not be informed about their involvement in a study. Where subjects become aware of the observer's presence and behave differently compared to when they are not being observed, a more discreet method of participant observation known as unobtrusive ('covert') participant observation may be used.

One of the hallmarks of observation is its non-intrusiveness, where the observer directly identifies and describes meaningful human interactions and processes in the natural context of everyday occurrence. This could be done either through direct contact or remotely. The behaviour and feelings of people, the space, or structures that emerge are understood within a framework to give a more holistic perspective of the topic. The observer has the opportunity to see things that may escape conscious awareness, gain information of a sensitive nature, which would not otherwise be available and move beyond selective perceptions of participants.

The mode by which the researcher may gather data may vary with involvement in a setting. The researcher's role could range from: complete participant, the participant as observer, or as the observer as participant and the complete observer in an attempt to gather information (Adler 1994). In a naturalistic inquiry, researchers observe and interact closely with members to establish an insider's perspective without participating in those activities that constitute the core of group

membership. A more intrusive and widely recognised offshoot of the observational technique is unobtrusive participant observation.

Unobtrusive participant observation

Unobtrusive participant observation occurs when subjects are not aware that their behaviour is being evaluated to enable the researcher to capture a true account of interactions occurring in everyday situations. This method is used to study the behaviour of individuals in their natural social setting and consists of a combination of observation and informal interviewing.

Various factors may facilitate participant observation and the interviewing process. These include the researcher's role and presentation style, access into the setting and establishing rapport with the respondents. The culture, language and characteristics of the respondent's way of life must be known beforehand to avoid disruption of their 'normal' daily activities (Adler 1994). The researcher may conceal his/her true identity by undertaking a disguised role. Thus subjects may have no knowledge that they are being studied or that they are aware of the study (Bulmer 1982). In an attempt to access the study site and their subjects, the researcher's role varies with the nature of the participants. Examples of researcher(s) roles include him/her becoming an established member of a social crowd when studying drug dealers and smugglers, circulating as parents and coaches when observing the peer culture of school children (Adler 1994); becoming a sergeant when collecting material from the police force (Holdaway 1982); disrobing and strolling casually in a study of nude beaches (Douglass 1977); riding a huge motorcycle to befriend and study the Hell's Angels (Thompson 1985); becoming a 'pseudopatient' when studying psychiatric patients (Rosenhan 1982); adopting the role of a 'watchqueen' in a study of male homosexuals (Warwick 1982) and becoming a Pentecostal worshipper to study the language and behaviour of old-time Pentecostals (Homan 1982).

The researcher's presentation style may leave a profound impression on respondents, thereby influencing the outcome of the study. Presentation styles of the researcher have ranged from that of a representative from academia when studying medical students, 'dressing down' to look like respondents (Fontana 1994; Thompson 1985) or as acting as 'learners' (Wax 1960). However, in some instances

the presentation style may be misrepresented. In the study of a welfare office some employees assumed that the researcher was a 'spy' for the management despite his best efforts to convince them of the contrary (Johnson 1975).

Understanding the language and culture of respondents helps to overcome barriers to communication during the study. Wax (1960) found in her study of 'disloyal' Japanese in concentration camps in the United States of America (1943-1945) that sensitive issues that emerged in the discussions had to be overcome. She found that there were different ways of saying things and certain issues may not be probed. For example, she embarrassed the group by asking for a letter, as letters were not passed around freely. By familiarising herself with the groups' language and terminology, it enabled her to facilitate her process of cross-cultural inquiry.

Gaining trust and establishing rapport are one of the goals of unstructured interviewing (Fontana 1994) and especially during unobtrusive participant observation (Punch 1986, Johnson 1975). Rasmussen spent months waiting before masseuses divulged information about the nature of their 'massage' relations with their clients (Fontana 1994). Gaining trust is essential to a researcher's success and once gained it can be very fragile in covert research. Close rapport with respondents helps to open doors to more informed research. The researcher must be able to put him/herself in the respondents' role and see the situation from their perspective rather than impose the researcher's preconceptions on them. However, in some cases rapport may not be easily obtained between the researcher and his/her subjects. For example, Thompson as a participant observer was subjected to brutal beating by Hell's Angels when he bought a British model motorcycle after failing to realise that for true-blue Angels only a Harley-Davidson will do (Fontana 1994).

Ethics of unobtrusive research

When conventional explicit investigations may not be able to achieve scientific truth for the advancement of knowledge and explanation, covert methods may be employed provided that they do not deliberately damage the credibility, reputation and willfully harm its subjects (Denzin 1982). Since covert observation yields information about people's attitudes and beliefs without their prior consent,

numerous ethical issues have been raised which merit debate (Bulmer 1982; Denzin 1982; Punch 1986; Doyal 1998).

Firstly, unobtrusive ('covert') research represents demerits which range from an invasion of privacy, violation of the principle of informed consent, violation of the rights of the subjects, academic disciplines and the researcher's personal integrity - all of which can contribute to bad science. Shils (1982) argues that the respect for privacy rests on the appreciation of human dignity "... And that they [social scientists] cannot approve observations of private behaviour ..without the explicit and fully informed permission of the persons to be observed". Erikson (1967) adds that the researcher's adoption of a disguised role in entering a social setting violates trust and invades privacy in exposing a subject's personal world without his/her permission. It alters relations with the disciplines involved, as well as the public, and minimises the chance for traditional research (Galliher 1982). Further, the moral criticism of covert participant observation is the researcher's failure to meet accepted standards of individual morality by not honestly representing him/herself to the respondents (Reynolds 1982).

Denzin (1982) argues that taking an assumed role or wearing a mask during the research process is acceptable, provided that it does not injure the subject. He adds that sociologists assume a variety of masks, for example in the classroom, the office, the field - and further questions which of these roles are real. He further notes that as long as the mask does not injure the subject, then it is acceptable to wear one in the research process. By assuming a covert role, it simply underlines one of the many masks that people wear in various situations in their daily lives.

Secondly, it may seem that the researcher who assumes a disguised role jeopardises the broader professional community by tainting the image of his/her profession. Since any research method poses potential threats to fellow colleagues, every time a researcher ventures out into any research activity he/she places the reputation of the profession on the line. In such cases, it is no different to those experienced with a survey or experiment.

Thirdly, in covert research the presence of the researcher could influence the behaviour of respondents and their setting. To help overcome this, the researcher could undertake post-observational inquiry by taking concealed field-notes to measure his/her own perceived impact among respondents.

The continuum from secrecy to openness occurs in the face of situational constraints during research (Bulmer 1982). For example, some deception was practiced by Hart during his study of Australian aborigines when he pretended that he was older than he in fact was (twenty-three), in order to be taken seriously by the tribe. Sutherland practiced deception when researching Californian gypsies because of the nature of the setting (ibid). Deception may unavoidably have to be practiced thereby failing to make clear to respondents that (s)he is doing research. For example, the researcher's identity may be known when working with the police or medical students, but members of the public or patients themselves may not be fully aware of his/her roles as researchers.

A professional code of ethics is beneficial as a guideline but is unworkable in some sorts of observational research. If obtaining consent would undermine the behaviour one wished to observe, then it would be situationally inappropriate (Punch 1986). Subjects become sensitised to features of their own behaviour when observed and this would significantly change the phenomena under study (Homan 1982). Even if the researcher is completely honest with people about his activities, they will try to hide actions and attitudes they consider undesirable and so will be dishonest (Gans 1962). Consequently the researcher must be dishonest to get honest data, as Warwick and Douglas reiterated that "the use of covert methods reflects the nature of social reality..... and that secrecy and deception are particular characteristics of the centres of the power of society: in order to penetrate these, secrecy to outsiders must be matched by deception to get in"(Bulmer 1982). For example, Humphrey posed as a 'watchqueen' to observe male homosexuality, used a hidden tape recorder in his car, concealed the nature from his study to the police and further switched roles when undertaking a household survey (Warwick 1982).

There is no simple distinction between 'public' and 'private' domains, especially when studying subjects who are not aware that they being observed (Punch 1986).

For example, observing the work of an air hostess while one is travelling may be viewed as non-problematic; however, entering areas that are private domains such as a home or brothel, becomes more risky and delicate than in public places. However, the major safeguard against this invasion of privacy is the assurance of confidentiality.

Social scientists have not only a right, but an obligation to study controversial and politically sensitive subjects (Warwick 1982). If not, it would serve to protect the powerful (Punch 1986) and lead to bureaucratic protection and secrecy (Wilkins 1979).

In health services research (HSR), the aim is to identify more effective strategies in the provision of care, rather than acquire new scientific knowledge. When conducting HSR the problem of defining the boundaries of 'research' becomes necessary. If subjects are recruited into a research programme by being treated in a manner that departs from the usual way of health care provision, or, if the health care system or procedure departs from accepted standards of medical care, then these participants are identified as research subjects and require more protection (Brett 1991).

Three ethical principles – respect for persons, beneficence and justice are commonly cited in HSR. In studies randomising patients to two different health care systems, the benefits and harms are difficult to formulate for individual participants, because it is not known in advance what sort of health care that person will require during the study. In studies conducting primary randomisation of health care providers leading to secondary randomisation of patients, the question is raised about who the experimental subjects are and who must give consent. In cost-containment research, experimental strategies that reduce services may pose the possibility of harm without benefit. Target groups such as the indigent or patients with limited access to sources of medical care are tempting captive populations.

HSR performed as randomised controlled trials (RCTs) are clearly defined as research (Brett 1991). The label 'research' usually highlights the need for explicit approval from study subjects, for example through approval from an institutional

review board (ibid). However, when studies represent an institutional policy and patients receive a service according to explicit institutionalised guidelines, such studies are not randomised and the technology cannot be considered as innovative. It may then be difficult to categorise prospective evaluations sharply as research, distinguishing it from clinical activity. For example, a physician saw an opportunity to test a hypothesis that a respiratory therapy could be reduced after the hospital was notified that its utilisation far exceeded that of other comparable hospitals. The hospital administration felt compelled to take action because of a perceived threat to reimbursement, and supported the physician in implementing a programme for explicit medical indications for the respiratory therapy. Health services research must therefore minimise institutional biases and address the sponsoring institution during the process of informed consent, for example when pharmaceutical companies sponsor research involving their own product.

Although HS studies appear to be less intrusive than conventional studies involving drugs or surgery, lack of physical intrusiveness does not eliminate a subject's right to autonomy. When patients are arbitrarily assigned to strategies of care, it is difficult to justify the omission of informed consent. According to the International Review Board (Brett 1991) the criteria for omission of informed consent are: when the research involves no more than minimal risk to the subjects, if the waiver will not adversely affect the rights and welfare of the subjects, if the research could not practicably be carried out without the waiver and if the subjects will be provided with relevant pertinent information after participation. In addition informed consent could be waived if the study intervention is inherently similar to practices expected by reasonable persons, the expected variation in practice engendered by the study should not depart radically from the variation generally encountered in that institution and patients and physicians should retain their final decision making authority (ibid).

When physicians have been primarily randomised they may find themselves as primary care provider and an agent for research. In such an instance, obtaining study-specific informed consent may be in conflict with the validity of the design. Winkens and colleagues (1997) performed a randomised controlled trial in the Netherlands amongst family physicians to assess the effects of feedback on test-

ordering in routine practice. The researchers obtained general consent from the physicians implicitly before the study was performed. Study-specific informed consent was not obtained from the physicians, enabling the researchers to overcome the Hawthorne effect and preventing contamination of the trial arms due to information leakage, which could have reduced the accuracy of the trial results. The researchers concluded that obtaining general informed consent from GPs in advance is acceptable especially when assessing their performance under routine health-care conditions.

The need for an evaluation of a health care intervention on physician behaviour and the ethical principles in not obtaining informed consent can be brought into harmony provided that the study is not harmful and that the monitoring data are kept confidential (Winkens 1997). Since the performance of medical professionals has great impact on the quality of care, there should not be reluctance when undertaking a proper evaluation of their achievements.

Nature of observation

Observations inevitably shift in range and character from early to later stages of the study. Initially observations are unfocused and based on initial questions (Adler 1994). As the observer becomes more familiar with the setting, he/she grasps the key social processes in operation and distinguishes features of the interactions that are of most interest and relevance (Adler 1994). Their attention is given to refining the characteristics and relationships of questions previously selected for the study.

Observations vary with the level of the researcher's participation (Hammersley 1992). The observer can assume the role of the complete participant where the observers activities are wholly concealed through involvement in a group, for example Holdaway's (1982) research on the police. In contrast, the complete observer has no contact at all with participants that he or she is observing. Covert observation may take place through a one-way mirror, or from a window to gain knowledge of public behaviour in the street (Hammersley 1992). Complete observers may also videotape, audiotape or photograph. The midpoint of the two extreme researcher roles could vary between observer-as-participant and participant-as-observer, where researchers primarily observe their subjects for brief periods as

they attempt to conduct structured interviews (Adler 1994). These roles seek to balance involvement with detachment, familiarity with strangeness and closeness with distance.

In naturalistic inquiry researchers may be unknown or known to respondents in a research setting that is public and/or private. The extent to which fieldwork is covert or overt also affects observation. In covert research it is possible to interview persons who do not quite understand the researcher's exact role and to interview informally without letting on that one is doing so. When observing public places (bus depots, airports) the researcher simply enters the setting for the purposes of research. In closed settings access is not granted to just "anybody" and the situation requires a "deep cover". This becomes an ethical issue, which depends on the investigator's sensitivity, thoughtfulness and knowledge to determine whether covert research is justified or not.

Where the investigator is known, he/she has the task of seeking permission and making participants aware of the research intentions to gain their cooperation. Where the researcher is an outsider, seeking admission to a setting for the purposes of observing depends on contact with known people, good motivation for the study, knowledge of the field being studied and a courteous disposition. The purpose of the evaluation is made explicit to respondents in overt research, while this may not be possible in covert research, where names of participants and locations are concealed.

The duration of the observation can vary depending on the nature of the investigation (Patton 1980). The purpose of basic research in social science is to develop a holistic view of an entire culture by unveiling the basic complexities and patterns of social realities. When evaluating a programme activity, the duration of the observation is important as it ultimately determines the depth, detail and sensitivity of the data. The duration of observational data follows from the nature of the evaluation question being studied.

During the initial stages of an observation the evaluator tries to capture self-contained units of activity without looking for pre-conceived patterns and

relationships. During evaluation, descriptions of the setting direct quotations from participants about their reactions and perceptions are noted. Further, patterns of social interactions, background characteristics and events are reported in detail (Patton 1980). When describing implementation of a programme, the evaluator identifies units of activity that have a unity about them and for which a full sequence of the events is described (ibid). These units of activity are treated as separate self-contained events for the purpose of observation. During the evaluation, patterns across units of activity are identified. For example, an activity could involve some chronological sequence of events, which has a beginning, mid-point and an end to it; while units of activity may involve a counseling session or a consultation, which are formal activities.

Informal interactions that go on between formal and planned activities are also observed to capture a holistic view of the activity under study (Patton 1980). In some cases it may be appropriate to conduct informal interviews during natural conversation to capture greater understanding of the respondent's feelings and perceptions. For example, the evaluator asks "What did you think of the session today?". During observation it is necessary for the evaluator to be familiar with the native language of the participants and to record them in that language to represent participants' own understanding of their experiences (ibid).

No documented studies exist in which rigorous qualitative evaluations have been used to GPs' subjective responses to outreach interventions in routine clinical setting. Australian researchers have employed mainly structured telephone interviews and self-administered questionnaires to assess GPs' acceptability of the intervention (Gomel 1996; Yeo 1993). However, such approaches use closed questions and do not provide an in-depth perspective of GPs' acceptability of the intervention. Unobtrusive research methods such as in-depth interviews and participant observations provide a more realistic account of GPs' attitude and perceptions of the intervention.

Unobtrusive participant observations have been used in several studies to assess physician behaviour in their routine clinical setting. Schwartz and colleagues (1989) employed trained outreach workers to solicit information from physicians about

their motivations for prescribing target drugs in a natural and conversational manner, and they noted GPs' interest to the educational intervention materials after visits to their practice. The researchers did not make physicians explicitly aware that their prescribing or informal verbal responses were being monitored, nor were they aware that they were part of a study. In another study, Hemminki (1977) used silent observation methods to study the contents of pharmaceutical representatives script during drug-detailing, and she further supports the view that an observer should be unnoticed since awareness of the study would result in serious errors.

Data collection

Common data recording tools for qualitative research include the use of videos, cameras, audiotape and/or manual note-taking to help capture the field events and interactions. In using data recording instruments the researcher seeks permission and agreement from participants before the research process. A very common and pragmatic approach to data collection is manual note-taking as outlined by Patton (1980) and Riley (1990).

With manual note-taking, the researcher records descriptions of what he/she is observing in a particular setting. This includes the exact language used by participants to describe their experiences, the activities, interactions and other relevant information in detail. Also the researcher's own feelings and reactions at the time of experience, and its meaning, significance and initial interpretations are also noted. However, at times the presence of data recording equipment may be intrusive and interfere with the research process. Participants could be inhibited because of a researcher's presence and alter their behaviour in favour of the study (the Hawthorne effect). A biased outcome would therefore negate the evaluative process.

The mode of data collection and its influence in the setting is crucial when inquiring about personal and sensitive issues. Writing in the form of continuous notes by which the past is retained in the present is essential. For the observer the taking of field notes is an absolute necessity (Lofland 1984). Mental, jotted notes and full field notes are compiled during the course of participant observation. Mental notes about details of an observed interaction(s), the topic of conversation, the

respondent's tone, feelings and opinions and the physical character of the place, all help to provide a full account of the picture in context. Jotted notes constitute the little phrases, quotes and key words during the observation and at inconspicuous moments in order to have something physical to refer to, and have the function of jogging the memory of the event when writing the field notes. These field notes must be recorded regularly, promptly, with everything written down no matter how unimportant it may seem. Jotting notes inconspicuously, preferably at moments away from the setting and when shielded, reduces anxieties of those being observed. For example, Lofland (1984) took mental notes and rushed to the privacy of a bathroom to jot them down.

Use of the precise language of participants' own understanding of their experiences is an important way to record their own understanding of their experiences and to reflect a true view of their world. Observational data gathering continues until researchers reach theoretical saturation, that is when new findings replicate earlier ones. By directing the researcher's attention deeper within the social setting, specific questions that are theoretically or empirically essential need to be answered. From patterns of word usage, the researcher identifies emerging themes, which are categorised and used to interpret the findings.

Qualitative research uses analytic categories to explain social phenomena. These categories may be derived gradually from the data (inductively), either at the beginning or part way through the analysis (deductively) (Pope 2000). Grounded theory describes the inductive process of identifying analytical categories as they 'emerge from' the data (Glasser 1967). This process involves identifying a theme and attempting to verify, confirm and qualify it by searching through the data. Once all data match the theme, the researcher repeats the process to identify further themes and categories.

Qualitative data analysis

Central to qualitative research is the collection of data in the form of jotted notes, field notes/ text, interview transcripts and a field diary. Afterwards the researcher familiarises him/herself with the raw data, for example listening to tapes or reading field notes. Once all information has been gathered it is transcribed into full text.

Analysis of qualitative data is a systematic process that involves a defined and appropriate structure (Patton 1980; Riley 1990).

The researcher repeatedly reads the full text to identify phrases, interaction, behaviour, incidents, or terminology and his/her initial reactions to the data that relate to a particular category are also recorded. Each paragraph of the transcript is coded according to key ideas and categorised into emerging themes. Once all data relevant to each category are identified and examined it is constantly compared with the rest of the data to establish analytical categories (Peters 1990). Key concepts are identified and referenced by drawing questions from the aims and objectives of the study and from the experiences that recur in the data.

The margin of the transcripts is coded/ indexed into short text descriptions to encompass a large thematic framework (Patton 1980). Entries for several respondents are rearranged according to each key themes containing summaries of the field experiences. The coding process is inclusive because categories are added to reflect as many of the nuances in the data as possible. Some discrete incidents of the data will include multiple themes, which are coded using several categories. A system of cross-indexing facilitates the analysis of data having more than one category. Once categories are grouped, multiple copies of transcripts are made, and each similarly coded paragraph is cut and pasted together.

Cardex systems have also been used where relevant chunks of the data are grouped in a filing system. The repeated physical contact, handling and re-reading, sorting of the data into categories means that the researcher develops an intimate knowledge of the data. Although software packages are used to organise and access the data, the researcher's analytical skills are needed to examine individual cases, establish links and develop hypotheses or constructs about the data.

More than one analyst is often used to independently verify the analytic categories, for example, by checking the field notes with emerging categories (Riley 1990). This helps to establish reliability and to minimise researcher bias (Pope 2000). Using other neutral people is a powerful strategy for externalising the researcher's own ideas, for example presentation at a seminar (Riley 1990). Different researchers

offer different accounts of basic themes and categories, each with his/her unique insight into the data. Analysts of varied backgrounds have been used and in cases where disagreements have arisen, consensus between the researcher and analysts have been reached through re-analysis and discussions about the interpretations (Armstrong 1997).

Apart from the common qualitative analysis approach used by Patton (1980) and Riley (1990), other analytic approaches include content analysis, discourse analysis, linguistics and grounded theory.

Content analysis

Content analysis is a technique for gathering and analysing the content of text (Neuman 1997). The content refers to any message that can be communicated (words, symbols, ideas, themes, etc) and text serves as a medium for communication (articles, notes, speeches, films, etc). A typical approach to content analysis is to organise data into topics and files (Patton 1980). For example, from a researcher's field notes, he/she makes additional margin notes. Further, more reflective passages are reviewed carefully and a summary sheet is drafted, followed by coding and memo writing. Simplifying the complexity of reality into some manageable classification scheme is the first step of analysis. The data are numbered so that they are arranged from the descriptive to the explanatory and from concrete to the more abstract. The process of labeling the various kinds of data and establishing a data index is a first step in content analysis. A classification system is critical; without classification there is chaos. Computer data processing can be used to cross-classify and cross-compare coded passages for more complex analyses (Fielding 2001).

Discourse analysis

Discourse analysis seeks insight into the forms and mechanisms of human communication by examining the many dimensions of text, talk and their cognitive, social and cultural contexts (Fielding 2001). Discourse analysis has been applied to a range of disciplinary environments, namely, linguistics, cognitive psychology, sociolinguistics, poststructuralism and social psychology and communications (Potter 1997). In the latter, discourse analysis emphasises versions of society and inner psychological worlds. A relationship is established between text and its

meanings from the participants' constructions and from the researchers' own versions. Discourse analysis focuses on texts and talk in social practices and the one theme that is emphasised is its rhetorical or argumentative organisation. Typical discourse analytic studies focus on transcripts of talk from everyday or institutional settings, on transcripts from open-ended interviews or on documents.

Discourse analysis is inductive and starts with a particular discursive phenomenon rather than a formulated hypothesis. Part of the analysis may involve coding of extracts to make the data more manageable. During discourse analysis any order of detail in talk and text is potentially consequential for interaction, therefore, high-quality transcripts are used in conjunction with tape-recordings. Discourse analytic research avoids use of prior assumptions such as ethnographic particulars (participants' status, nature of context, etc.), preferring to formulate these from the interaction, rather than externally.

Code and theory building software can be used to classify discursive and rhetorical strategies by assigning codes to fragments of data, and these could then be used to match what the researcher identifies from different participants.

Linguistics

Ethnographers of speaking focus on understanding the large range of resources speakers have for the production and interpretation of language (Keating 2001). In the 1960's an innovative programme for researching combinations of the description and analysis of culture and language was introduced. Such a synthesis aimed to elucidate important relationships between language and culture. Actual language was the focus of research, and attention was paid to the context (ibid).

Culturally defined categories of ways of speaking among natives were acknowledged, and these served as important tools in the analysis of talk. Inquiry into units such as speech event, speech situation and speech community were looked at, and the relationships of these units to other components of speech use and culture were made.

Grounded theory

Grounded theory was presented initially by Glaser and Strauss in 1967 (Strauss 1994), as a general methodology for developing theory that is grounded in data which has been systematically gathered and analysed. They showed that theory evolves during actual research, and it does this through continuous interplay between analysis and data collection. A central feature of this analytic approach is constant comparison.

The theory may be generated initially from the data, or if existing theories seem appropriate to the area of investigation, then these may be elaborated and modified as incoming data are meticulously played against them. This is done throughout the course of a research project. During theory development, there is development of richness in concept development and relationships and with meaningful variation. Such a process is achieved by great familiarity with the data, which is checked on a systematic basis. These include the systematic asking of generative and concept-relating questions, theoretical sampling, coding procedures, suggested guidelines for attaining conceptual variation.

Theory consists of plausible relationships proposed among concepts (Strauss 1994). Theoretical conceptualization means that grounded theory researchers are interested in patterns of action and interaction between and among various types of social units and are concerned with discovering process that could result from reciprocal changes in patterns of actions.

In summary there are numerous approaches to qualitative data analysis. Each method is suited to the topic under investigation. Qualitative studies call for different modes of inquiry at different moments. The analysis aims to describe and explain a pattern of relationships, which are done with a set of conceptually specified analytic categories.

Qualitative methods are widely used and form an integral part of health services research as they offer an in-depth account of the phenomena under investigation. These methods are crucial when designing and evaluating health care interventions within the constraints of routine practice setting. Qualitative methods enrich our

understanding especially from the practitioners' perspective, on how best interventions could be implemented to improve the quality of care. These approaches help researchers and planners to bridge the gap between scientific evidence and clinical practice.

The next section reviews the quantitative methods used in the design of the intervention.

Quantitative methods

In designing the intervention for this thesis, a quantitative study was conducted in representative private-sector GP sample to verify the findings obtained in the initial qualitative study. The purpose of the survey was to assess the prevalence of barriers identified in the in-depth interviews and to focus the messages for intervention in accordance with these barriers.

In this section I provide an overview of the approaches used for a descriptive survey. I describe the sampling method, principles of questionnaire design, use of a rating scale, layout and advantages of self-administered questionnaires and the strategies used to improve response rates in postal surveys.

Sampling

In quantitative research, one should always want to generalise to the population. Random sampling is appropriate when one wants to generalise from to the larger population from whom the sampled subjects were drawn (Patton 1980). The reason is to increase the likelihood that the data collected are representative since each individual in the study population has an equal chance of being included in the sample (Katzenellenbogen 1997). While the researcher controls the sampling process, (s)he has no control over exactly which individuals are selected. Whether an individual is selected or not is determined by chance, thus minimising the risk of bias. To perform random sampling one needs a sampling frame, which is a list of all the individuals in the study population. A sample can only be representative if the original frame is complete.

Sample size is determined by the expected amount of variation in that population, and the amount of random error one is willing to accept.

Principles of questionnaire design

The main issues when designing a questionnaire include the use of open and closed questions, question wording and sequence, and dichotomous and multiple questions.

Both closed and open questions are used in the design of questionnaires. Closed questions are suited to situations in which there is a known range of possible responses and where only one frame of reference can be used to describe the position. Respondents recognise an experience and choose an answer from a pre-determined limited selection (Bennett 1975). The advantage of closed questions is that they allow for quick coding and are especially useful in medical and epidemiological surveys where more standardised data collection is required.

Closed questions are either dichotomous or multiple-choice. The dichotomous question is frequently employed in lengthy questionnaires because of simplicity of completion and coding, but may limit provision of information. In contrast multiple-choice question permits greater variety of responses. An example of this is the simple item check-list which consists of a statement of the problem followed by a list of possible answers. The respondent is required to check those answers relative to his/her experience. The main advantage of the checklist is to remind the respondent of a barely remembered experience such as an unusual terminology, which the respondent may not otherwise recall. Multiple choice questions also offer a choice of responses from complete statements.

Open questions do not suggest any specific response, allowing the respondent the expression of individual experience by recall. In some cases, it may elicit information not predicted by the investigator.

It is essential that question wording is precise to enable appropriate analysis of the data. Where medical terminology is used, it helps standardise the questions to avoid ambiguity and confusion (Bennett 1975). For example, there have been reports of wide discrepancy in doctors' interpretation of common medical conditions ('arthritis', 'palpitations'). Sophisticated terminology is a barrier to communication and vague terms ('occasionally', 'often') should be replaced by more precise terms. Descriptive terms may be particularly misleading, for example, "Do you have

trouble with your hearing?"). Confusion had arisen among respondents as to what constituted 'trouble'. Bad question wording results in contradictory responses due to varying interpretations of a present symptom, for example " Are you presently suffering from pain..?" In current usage presently means 'soon', an older meaning was 'now', hence the confusion. Furthermore, negative phrasing should never be used in questions.

Care should be taken to avoid the use of 'loaded' and 'leading' questions because they bias the respondent in a particular direction (Bennett 1975). Questions at the beginning of a questionnaire should be as neutral as possible followed by a logical sequence, to facilitate the response process and to prevent the respondent from constantly changing his/her frame of reference for each question. The investigator must be aware of the effects of placing items together as the respondent may assimilate the information from a previous question in a way which would influence subsequent responses. The respondent most likely presumes a relationship to exist between certain factors. A common approach to question sequence is to ask general questions first followed by more specific questions. It is important to avoid lengthy and boring questionnaires as this could reduce respondents' interest and attention. To help overcome this, dichotomous questions are used.

The characteristics of a well-worded questionnaire are that it is grammatically simple, avoiding where possible technical terms, adjectives, adverbs or vague descriptive terms (Bennett 1975). Questions that are short and attempt to express only one idea are generally preferred. Although at times longer questions may be preferable in that they can improve the information obtained by producing accurate responses, these questions should not contain any additional information that would interfere with the main idea.

Delay in response to mailed questionnaires is a problem for researchers. However, many techniques have been proposed to improve response rates. To ensure high response rate (over 80 percent), it is often necessary to send out two or three mailings to non-respondents (Streiner 1989). A covering letter should state the importance of the study, why the person's responses are necessary, reason for the research, promise of confidentiality, description of how the results will be used,

mention of any incentive, and signed by the researcher indicating his/her title and affiliations. Offering a token of appreciation in advance such as financial incentives, lottery tickets, stationary and stamps, should also be indicated in the covering letter.

It is safest to ensure anonymity especially when identifying the respondents in order to determine who should receive follow-up reminders (Streiner 1989). The purpose of the identification should be stated in the covering letter, along with guarantees that the person's name will be thrown away when it is no longer needed. Further, that the linked information is kept under lock and key in the meantime, and that in the final report, no subject will be identifiable. If a personalised greeting is used and the respondent's name is perceived as an invasion of privacy and threat to anonymity, the letter can be addressed to a group as "Dear colleague" and contain a handwritten signature. Further, enclosing a stamped, self-addressed envelope limits imposition on the respondent's time.

Rating scale

A Likert scale is a popular rating scale in which the respondent expresses an opinion by rating his/her agreement with a series of statements (Streiner 1989). The only unique character of the Likert scale is that responses are framed on an agree-disagree continuum.

In order to maximise precision and minimise bias the number of points on a rating scale and the order of successive response questions are important when designing a questionnaire (Streiner 1989). The number of points on a rating scale varies according to the subject matter of the scale and the level of differentiation that is required. The use of too few categories on a scale will not make use of the respondent's discriminative ability, which might be required by the research (Bennett 1975). For example, the use of two categories to express an underlying continuum will result in loss of information if the number of levels is less than the respondent's ability to discriminate. On the other hand a large number of finely graded categories may go beyond the limit of the respondent's ability to discriminate. Further, the use of an odd number of categories provides a mid-point that can be regarded as neutral or 'safe' as it allows respondents to avoid committal to a definite position. Questionnaires that employ an even number of response

options force the respondent to place him/herself to one end of the scale (Streiner 1989; Bennett 1975).

If the order of some scales is reversed, subjects may not notice the change, and this would result in responses that would be difficult to interpret. On the other hand, if the order is not reversed the subject looks consistently whether or not he/she paid attention to individual questions. The difficulty when using interval scales is the need to create equal intervals between scale points since the statistical methods which are used to analyse the data rest on the assumption of equality of distance.

Validity

Validity refers to the success of an instrument in measuring what it sets out to measure, and may be seen as a function of relevance, completeness and accuracy. Relevance refers to whether the questionnaire obtains the type of information that it was designed to obtain. Completeness refers to the extent the questionnaire has collected all the relevant information. Accuracy is a measure of the reliance that can be placed upon the response to each question, and is determined from the proportion of times that an answer to a question will be correct (Bennet 1975).

Layout of self-administered questionnaire

The layout of a self-administered questionnaire is designed with care, as the visual impact may either arouse interest or discourage the respondent from co-operating. The questionnaire usually begins with an introduction on a separate page informing the respondent about the purpose of the study. This information is very general to prevent introducing bias. The introduction includes the name of the relevant organising body; the professional organisation, a contact number and an identifying number. The paper on which the questionnaire is written should be strong as it will receive a great deal of handling; page size is selected so that questionnaire folds easily into a standard size envelope. If the data are to be coded appropriate numbered coding boxes alongside each item of data are provided for data processing.

Questionnaires can be administered to respondents using either an interviewer (telephonically or face-to-face), or they can be completed by respondents themselves (self-administered) via a postal survey. In telephone surveys the

questionnaire needs to be short, thus limiting the information, and there is sampling bias as they exclude people with unlisted numbers or no phone at all (Katzenellenbogen 1997). An interviewer-administered questionnaire allows for an increase in flexibility such as variations in personal characteristics of the interviewers and deviation from the standardised procedure, but this affects the reliability of the data. For example the interviewer's age, gender, general appearance, social status and his/her attitude are factors that influence data collection (ibid). Failure to adhere to a standardised administration procedure has been attributed to the interviewer's use of subsidiary leading questions or probes and faulty coding of responses during the interview. Therefore careful selection and training of interviewers are pre-requisites for questionnaire administration. Further, this method is time-consuming and more expensive than a telephone survey.

In a self-administered questionnaire the respondent completes the questionnaire without interference or assistance from an interviewer. There are several advantages with this type of questionnaire administration. It ensures standardisation of measurement in that all subjects are asked precisely the same question, the use of closed questions helps further improve test-retest repeatability, it eliminates interviewer bias, is simple in design and is cheaper than an interviewer-administered questionnaire.

Strategies to increase response rates to postal surveys

Although postal questionnaires are a relatively quick and cheap method of collecting information from health professionals, these advantages are often offset by poor response rates (Cartwright 1968; McDonald 1993; McAvoy 1996; Kaner 1998; Sibbald 1994; Asch 1998). Some reasons for GPs' not participating in postal surveys include loss of the questionnaire in a pile of paperwork and lack of time (Kaner 1998; McAvoy 1996). In order to achieve reasonable response rates in general practice, numerous strategies have been used (Hartge 1999). The use of coloured paper has been found to be attractive to respondents and light colours for postal questionnaire surveys appear to elicit more returns (Bennett 1975). Financial incentives (Deehan 1997; Asch 1998; McAvoy 1996), enhancement of the layout of the questionnaire (Cartwright 1968) a hand-written thank you note (Maheux 1989), and a personal visit (Alderson 1976) to non-respondents have all resulted in

improved response rates from general practitioners. Personal contact is desirable to increase co-operation. This may be achieved by personal delivery of the questionnaire or telephoning respondents (Bennett 1975).

Data collection and analysis

Responses to closed and open questions are coded numerically and entered into a computerised database (Epi-Info 6, 1997). Simple frequency distributions are obtained for each of the coded items and where possible associations between the variables are obtained.

When designing health care interventions quantitative methods can be used as a preliminary investigative process to identify problems perceived in practice setting. Such an approach would provide an objective assessment of practitioners' perceptions and these findings could then be verified from a follow-up qualitative study. This approach would help to improve our understanding of the contextual factors that should be considered when implementing a complex health care intervention within routine clinical practice.

References

- Adler PA, Adler P. Observational techniques. In Denzin NK, Lincoln YS, (eds). *Handbook of qualitative research*. London: Sage, 1994: 361-76.
- Alderson M. *An introduction to epidemiology*. London: Macmillan Press: 1976.
- Armstrong D, Gosling A, Weinman J, Marteau T. The place of inter-rater reliability in qualitative research: an empirical study. *Sociology* 1997; 31: 597-606.
- Asch DA, Christakis NA, Ubel PA. Conducting physician mail surveys on a limited budget. A randomised trial comparing \$2 bill versus \$5 bill incentives. *Med Care* 1998; 36: 95-99.
- Bauman A, McKenzie DK, Young L, Yoon R. Asthma education: the perceptions of family physicians. *J Asthma* 1990; 27: 385-92.
- Bauman LJ, Greenberg Adair E. The use of ethnographic interviewing to inform questionnaire construction. *Health Educ Quart* 1992; 19: 9-23.
- Bennett AE, Ritchie K. *Questionnaires in medicine. A guide to their design and use*. London: Oxford University Press, 1975.
- Black N, Thompson E. Obstacles to medical audit: British doctors speak. *Soc Sci Med* 1993; 36: 849-56.
- Borkan JM, Quirk M, Sullivan M. Finding meaning after the fall: injury narratives from elderly hip fracture patients. *Soc Sci Med* 1991; 33: 947-57.

- Brett A, Grodin M. Ethical aspects of human experimentation in health services research. *JAMA* 1991; 265: 1854-7.
- Brannen J. Combining qualitative and quantitative approaches: an overview. In: Brannen J (ed.) *Mixing methods: qualitative and quantitative research*. Brookfield, VT: Avebury. 1992; 3-38.
- Bulmer M. The merits and demerits of covert participant observation. In Bulmer M (ed), *Social research ethics*. London: Macmillan, 1982; 217-251.
- Butler C, Rollnick S, Pill R, Maggs-Rapport F, Stott N. Understanding the culture of prescribing: qualitative study of general practitioners' and patients' perceptions of antibiotics for sore throats. *Br Med J* 1998; 317: 637-642.
- Cartwright A, Ward AWM. Variations in general practitioners' response to postal questionnaires. *Br J Prev Soc Med* 1968; 22: 199-205.
- Dawson S, Sutherland K, Dopson S, Miller R. Changing clinical practice: views about the management of adult asthma. *Quality in Health Care* 1999; 8: 253-61
- Deehan A, Templeton L, Taylor C, Drummond C, Strang J. The effect of cash and other financial inducements on the response rate of general practitioners in a national postal study. *Br J Gen Pract* 1997; 47: 87-90.
- Denzin NK, Eriksson K. On the ethics of disguised observation: an exchange. In Bulmer M (ed), *Social research ethics*. London: Macmillan, 1982; 125-141.
- De Vries H, Weijts W, Dijkstra M, Kok G. The utilization of qualitative and quantitative data for health education program planning, implementation and evaluation: a spiral approach. *Health Educ Quart* 1992; 19: 101-115.
- Dingwall R, Murphy E, Watson P, Greatbach D, Parker S. Catching goldfish: quality in qualitative research. *J Health Serv Res Policy* 1998; 167-172.
- Dorfman LE, Derish PA, Cohen JB. Hey girlfriend: an evaluation of AIDS prevention among women in the sex industry. *Health Education Quarterly* 1992; 19(1): 25-40.
- Douglass JD, Rasmussen PK, Flanagan CA. *The nude beach*. Sage. California, 1977.
- Doyal L, Tobias JS, Warnock M, Power L, Goodare H. Informed consent in medical research. *Br Med J* 1998; 316: 1000-5.
- Ehrlich RI, Du Toit D, Jordaan E, Volmink JA, Weinberg EG, Zwarenstein M. Prevalence and reliability of asthma symptoms in primary school children in Cape Town. *Int J Epidemiol* 1995; 24: 1139-1146.
- Engels D. An assessment of doctor hopping among asthmatic children in Mitchell's Plain. Unpublished manuscript. Cape Town: Medical Research Council, Health Systems Unit, Public Health Programme, University of the Western Cape, 1998.
- Epi-Info. A word processing database and statistics program for public health. Version 6.04b January Centers for Disease Control and Prevention (CDC). USA. WHO, Geneva, Switzerland. 1997.
- Erikson KT. A comment on disguised observation in sociology. *Social Problems* 1967;14: 366-73.
- Fielding N. Computer applications in qualitative research. In: *Handbook of ethnography*. Atkinson P, Coffey A, Delamont S, Lofland J, Lofland L (eds). London: Sage, 2001: 453-467.
- Fontana A, Frey JH. Interviewing: the art of science. In: Denzin NK, Lincoln YS, (eds). *Handbook of qualitative research*. London: Sage, 1994: 361-76.

- Gallihier JF. The protection of human subjects: a re-evaluation of the professional code of ethics. In: Bulmer M (ed), *Social research ethics*. London: Macmillan, 1982; 152-165.
- Gans H. *The urban villagers. Group and class in the life of Italian – Americans*. New York: Free Press, Macmillan, 1962; 336-350.
- Glasser BG, Strauss AL. *The discovery of grounded theory*. Chicago, IL: Aldine, 1967.
- Gomel MK, Saunders JB, Wutzke, Hardcastle DM, Carnegie MA. Implementation of an early intervention for hazardous alcohol consumption in general practice. Final report for Research into Drug Abuse Program. Sydney, Australia: Department of Human Services and Health. July 1996.
- Green JM. The views of single-handed general practitioners. *Br Med J* 1993; 307: 607-10.
- Green J, Britten N. Qualitative research and evidence based medicine. *Br Med J* 1998; 316: 1230-32.
- Hammersley M, Atkinson P. *Ethnography: principles in practice*. London: Routledge, 1992.
- Hartge P. Raising response rates: getting to yes. *Epidemiology* 1999; 10: 105-7.
- Helitzer-Allen DL, Kendall C. Explaining differences between qualitative and quantitative data: a study of chemoprophylaxis during pregnancy. *Health Education Quarterly* 1992; 19(1): 41-54.
- Hemminki E. Content analysis of drug-detailing by pharmaceutical representatives. *Med Educ* 1977; 11: 210-5.
- Hingorani M, Wong T, Vafidis G. Patients' and doctors' attitudes to amount of information given after unintended injury during treatment: cross-sectional questionnaire survey. *Br Med J* 1999; 318: 640-41.
- Holdaway S. 'An inside job': a case study of covert research on the police. In Bulmer M (ed), *Social research ethics*. London: Macmillan, 1982; 59-79.
- Homan R, Bulmer M. On the merits of covert methods: a dialogue. In Bulmer M (ed), *Social research ethics*. London: Macmillan, 1982; 105-124.
- Hugentobler MK, Israel BA, Schurman SJ. An action research approach to workplace health: integrating methods. *Health Education Quarterly* 1992; 19(1): 55-76.
- Johnson JM. *Doing field research*. New York. Free Press, 1975.
- Jones SL, Weinberg M, Ehrlich RI, Roberts K. Knowledge, attitude and practices amongst parents of children with asthma/wheeze in Cape Town. 1997. *J Asthma* 2000; 37: 519-28.
- Kahan E, Weingarten MA, Appelbaum T. Attitudes of primary care physicians to the management of asthma and their perception of its relationship to patients' work. *Isr J Med Sci* 1996; 32; 757-62.
- Kaner EFS, Haighton CA, Mc Avoy BR. 'So much post, so busy with practice-so no time!': A telephone survey of general practitioners' reasons for not participating in postal questionnaire surveys. *Br J Gen Pract* 1998; 48: 1067-9.
- Katzenellenbogen JM, Joubert G, Abdool Karim (eds.) In: *Epidemiology. A manual for South Africa*. Cape Town. Oxford University Press, 1997.
- Keating E. The ethnography of communication. In: *Handbook of ethnography*. Atkinson P, Coffey A, Delamont S, Lofland J, Lofland L (eds). London: Sage, 2001:285-301.
- Lagerlöv P, Leseth A, Matheson I. The doctor-patient relationship and the management of asthma. *Soc Sci Med* 1998; 47: 85-91.

Lim SH, Goh DYT, Tan AYS, Lee BW. Parent perceptions towards their child's use of inhaled medications for asthma therapy. *J Pediatr Child Health* 1996; 32: 306-309.

Lofland J, Lofland LH. In : *Analysing social settings. A guide to qualitative observation and analysis.* California: Wadsworth, 1984.

Maheaux B, Legault C, Lambert J. Increasing response rates in physicians' mail surveys: an experimental study. *Am J Public Health* 1989; 79: 638-639.

McAvoy BR, Kaner EFS. General practice postal surveys: a questionnaire too far? *Br Med J* 1996; 313: 732-33.

McDonald P. Response rates in general practice studies. (letter). *B J Gen Pract* 1993; November 484.

Meyer-Weitz A, Steyn M. AIDS preventive education and life skills training for secondary schools. Development and evaluation. Human Sciences and Research Council, Pretoria, South Africa. 1991.

McAvoy BR, Kaner EFS. General practice postal surveys: a questionnaire too far? *Br Med J* 1996; 313: 732-3.

Mesters I, Pieterse M, Meertens R. Pediatric asthma, a qualitative and quantitative approach to needs assessment. *Pat Educ Counsel* 1991; 17: 23-34.

Miller WL, Crabtree BF. Qualitative analysis: how to begin making sense. *Fam Prac Res J* 1994; 14: 289-297.

Morgan DL. Practical strategies for combining qualitative and quantitative methods: applications to health research. *Qual Health Res* 1998; 8: 362-376.

Morse JM. Designing funded qualitative research. In: Denzin NK, Lincoln YS, (eds). *Handbook of qualitative research.* London: Sage, 1994: 220-236.

Neuman WL. Nonreactive research and available data. In: *Social research methods. Qualitative and quantitative approaches.* 3rd edition. Boston MA: Allyn and Bacon, 1997: 270-293.

Nichols-Casebolt A, Spakes P. Policy research and the voices of women. *Social Work Research* 1995; 19 (1): 49-55.

Pather S, Zwarenstein M, Ehrlich R, Swingler G, Lombard C, Sladden M, Eccles M, Adams J, Bheekie A. Chestiness and asthma in Mitchell's Plain (CHAMP): Prevalence of asthma related symptoms in pre-school children. *Int J Tubercule and Lung Dis.* 1999; 3(9): suppl 1, 30th International Union Against Tuberculosis and Lung Disease (IUATLD) World conference. Abstract book (Poster) 639-PD, p S76.

Patton MQ. *Qualitative evaluation methods.* California: Sage publications, 1980.

Peters V, Wester F. *Qualitative analysis in practice.* Netherlands, University of Nijmegen 1990, June.

Pope C, Mays N. Reaching the parts other methods cannot reach: an introduction to qualitative methods in health and health services research. *Br Med J* 1995; 311: 42-5.

Pope C, Ziebland S, Mays N. *Analysing qualitative data.* In: Pope C, Mays N (eds.) *Qualitative research in health care.* London: BMJ Books, www.bmjbooks.com. 2000, Second edition. Chapter 8.

Potter J. Discourse analysis as a way of analysing naturally occurring talk. In: *Qualitative research: theory, method and practice.* Silverman D (ed). London: Sage, 1997: 144-160.

Punch M. *The politics and ethics of fieldwork.* California: Sage, 1986.

- Reynolds PD. Moral judgements: strategies for analysis with application to covert participant observation. In Bulmer M (ed), *Social research ethics*. London: Macmillan, 1982; 185-216.
- Riley J. *Getting the most from your data. A handbook of practical ideas on how to analyse qualitative data*. Bristol, UK: Billing & Sons, 1990.
- Rosenhan DL. On being sane in insane places. In: Bulmer M (ed), *Social research ethics*. London: Macmillan, 1982; 15-37.
- Schwartz RK, Soumerai SB, Avorn J. Physician motivations for nonscientific drug prescribing. *Soc Sci Med* 1989; 28: 577-82.
- Shils E. Social inquiry and the autonomy of the individual. In Bulmer M (ed), *Social research ethics*. London: Macmillan, 1982; 125-141.
- Sibbald B, Addington-Hall J, Brennenman D, Freeling P. Telephone versus postal surveys of general practitioners: methodological considerations. *Br J Gen Pract* 1994; 44: 297-300.
- Stange KC. On size doesn't fit all. Multimethod research yields new insights into interventions to increase prevention in family practice. (editorial) *J Fam Pract* 1996; 43: 358-60.
- Stange KC, Zyzanski SJ. Integrating qualitative and quantitative research methods. *Fam Med* 1989; 21: 448-51.
- Steckler A, McLeroy KR, Goodman RM, Bird ST, McCormick L. Toward integrating qualitative and quantitative methods: an introduction. *Health Educ Quart* 1992; 19: 1-8.
- Strauss A, Corbin J. Grounded theory methodology: an overview. In: *Handbook of qualitative research*. Denzin NK, Lincoln YS (eds.). California: Sage, 1994: 273-285.
- Streiner DL, Norman GR. *Health measurement scales. A practical guide to their development and use*. Oxford: Oxford University Press: 1989.
- South African Childhood Asthma Working Group. Management of childhood and adolescent asthma. 1994 consensus clinical guidelines. *S Afr Med J* 1994; 84 (12): 862-866.
- Thompson H. *Hell's Angels*. New York: Ballantine, 1985.
- Warwick DP. Tearoom Trade: means and ends in social research. In Bulmer M (ed), *Social research ethics*. London: Macmillan, 1982; 38-58.
- Wax R. Twelve years later. An analysis of field experiences. In: Adams RN, Preiss JJ (eds.), *Human organisation research*. Illinois: Dorsey 1960; 166-178.
- Wilkins LT. Human subjects- whose subject? In Klockars CB, O' Connor FW (eds.), *Deviance and decency*. Beverly Hills, California: Sage, 1979; 99-123.
- Winkens RAG, Knottnerus JA, Kester ADM, Grol RPTM, Pop P. Fitting a routine health-care activity into a randomised trial: an experiment possible without informed consent? *J Clin Epidemiol* 1997; 50: 435-39.
- Wolle JM, Cwi J. Physicians' prevention-related practice behaviours in treating adult patients with asthma: results of a national survey. *J Asthma* 1995; 32: 131-40.
- Yach D. The use and value of qualitative methods in health research in developing countries. *Soc Sci Med* 1992; 35: 603-612.
- Yeo GT. Assessing the impact of an educational intervention on prescribing of hypnotic drugs in general practice settings. *Aust Prescriber* 1993; 16: 44-45.

Zwarenstein M, Adams J, Bheekie A, Swingler G, Ehrlich E, Lombard C, Pather S, Sladden M, Eccles M, with the National Asthma Education Programme. Chestiness and asthma in Mitchell's Plain (CHAMP): cluster randomised controlled trial of academic outreach demonstrates improved health status of asthmatic children attending private practitioners in a poor urban community in South Africa. *Int J Tubercule and Lung Dis.* 1999; 3(9): suppl 1. 30th International Union Against Tuberculosis and Lung Disease (IUATLD) World conference. Abstract book (Poster) 641-PD.p S76.



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CHAPTER 5

RESEARCH METHODS USED IN STUDY

In this chapter I describe the research methods used to design and evaluate the CHAMP intervention. In the first section, the GP barriers' studies, I describe the combination of qualitative and quantitative methods used to identify and measure prevalence of perceived barriers to asthma care. In the second section I describe the approach used to evaluate GPs' subjective responses to the intervention.

In designing the CHAMP intervention we planned to identify the full range of barriers encountered by GPs in the provision of care to children with asthma. We combined qualitative and quantitative techniques to collect data on barriers to appropriate care by using an initial in-depth study consisting of key informant interviews and a confirmatory descriptive representative sample survey. Common themes identified in the interviews were used to design items for the questionnaire survey. Questions posed to GPs focused on problems they perceived in the diagnosis, treatment and overall management of childhood asthma. Results from these barriers' studies were used to develop a tailored educational outreach intervention to improving the quality of care.

After we designed and implemented the intervention using social marketing techniques (chapter 7), we evaluated the intervention using unobtrusive qualitative methods. I used unstructured in-depth interviews and participant observation techniques to access the GPs' subjective responses to the intervention.

Design of educational outreach: GP barriers studies

The two GP barriers' studies were performed in a separate area of the Cape Flats with similar practice and patient demographics to Mitchell's Plain (Chapter 2 Table 2.7), to minimise contamination of the main trial. We perceived that GPs would be sensitized to the study and this would invariably influence their behaviour as they could feel threatened and would be likely to resist implementation of the proposed intervention (chapter 7).

The purpose of the two studies was to ascertain the range and prevalence of barriers encountered by private sector GPs for childhood asthma.

Aims

The barriers study aimed to identify the spectrum of barriers perceived by GPs in the management of childhood asthma in their practices. The two parts of the study, aimed to:

- qualitatively explore barriers encountered by private sector GPs and their perceptions of barriers encountered by parents using an in-depth interview technique and
- quantitatively measure the prevalence of these barriers in a group of GPs similar to and nearby the one in which the intervention was to be tested. This study was a self-administered representative random sample questionnaire survey.

Qualitative study: in-depth interview

Key informant interviews were conducted with a purposive sample of GPs, which aimed to explore the full range and detailed views, feelings and perceptions about barriers encountered in practice settings.

Key informant and identification of GPs

The principal investigator identified a key informant, a well-known and respected figure in the community, who works in a private practice located in the Cape Flats area of Cape Town. The informant has close ties with the GP fraternity and is part of their social and cultural organisational network. In a preliminary meeting scheduled with the informant, I described the aim and purpose of the proposed study and asked for a list of names of GPs. We used maximum variation purposive sampling (Patton 1980) to ensure that important subgroups of the private sector GP population were represented as far as possible and, to increase the confidence of common themes/patterns across different barriers that they perceive in their management of childhood asthma.

The criteria used to identify the GPs were: employed in private sector practices, located in the Cape Flats areas in both the northern and southern suburbs of Cape Town (excluding Mitchell's Plain) and serving predominantly the lower to middle

working class coloured communities. The informant identified seven GPs ranging from young to old; having varied patient load; and who are well known and not so well known in the community. These constituted a purposive sample of seven GPs. Of the seven GPs that were listed I interviewed five. The reason for not interviewing the other two GPs was that no new themes were emerging. This is known as data saturation.

A meeting was held with a key informant to identify potential GPs for the in-depth interviews. The criteria that were asked of the key informant when identifying GPs were that their practices be located in areas demographically similar to Mitchell's Plain. Further that they serve the lower to middle working class communities, and located are in both busy and in quiet areas of the suburb. Further, the characteristics of GPs are to vary with regard to age, gender, prominence / popularity in the community. The key informant identified the names of seven GPs.

Focus group discussions would not have been feasible logistically because of the isolated nature of private sector general practice. Even though GPs rely on peers and are part of a social network, GP behaviours are individualistic in nature (Dawson 1999). Individual discussions would also provide insight to first-hand individual experiences, as group meetings may alter reported behaviours (Fontana 1994). For example the emerging group culture may interfere with individual expression, the group may be dominated by one person, the group format makes it difficult to research sensitive topics and the requirements for interviewer skills are greater because of group dynamics. Therefore, group interviewing would minimise the possibility of obtaining in-depth personal experiences among single-handed practitioners who are likely to be defensive about their practice, lack reflexivity and self critical analysis (Dawson 1999). Furthermore, arranging a common time suitable for all participating GPs to meet for the study would have incurred costs to them (hiring of sessional GPs), and the offer of financial incentives would have distorted the purpose of a group meeting and been an likely source of influence (Fernandez 2000).

Approach to meet with the GPs

Contact details for the GPs were obtained from the local telephone directory and where the physical address was not provided, it was obtained telephonically from the receptionist.

Before meeting with GPs a letter (Appendix 2) was posted to each of their practices informing them about the aim and purpose of the proposed study. The letter stated that a childhood asthma management programme was being planned and that 15 minute interviews were being conducted with a couple of GPs to discuss their views and experiences about childhood asthma. GPs were assured of their anonymity and informed that once all phases of the programme was completed, they would be notified. Further, that an appointment to meet with the GP at their individual practices at a mutually convenient time would be greatly appreciated.

The letter was posted to individual GPs as the interviewing progressed, ie. only after main themes from the previous interview were identified, was an appointment made with the next GP. Since barriers encountered by third, fourth and fifth GPs seemed to be quite similar and repetitive, and as no new themes and concepts emerged after the 2nd interview, the two remaining GPs were not interviewed.

The principal investigator of CHAMP, a medical doctor, signed the covering letter and served as a contact for possible queries from GPs, since educational and occupational status and social class affect responses rates (Alderson 1976). Respondents are more likely to respond if the research is carried out by a respected organisation, and having the sender's personalized signature (Streiner 1989). The Medical Research Council (MRC) and the National Asthma Education Program (NAEP) served as the two umbrella organisations involved in the study. MRC is a well-established credible science council that aims to improve the nation's health status and quality of life through relevant and excellent health research. NAEP is a non-governmental organisation whose aim is to improve the quality of care of all asthmatic patients by educating patients and health care providers. The letters posted to each of the five GPs were printed on especially designed letterheads containing logos of the MRC and that of NAEP, the two representative organisations.

In October 1997, I contacted each GP telephonically, informed them about the purpose of the study and the frame of reference for the proposed interview. After obtaining verbal agreement to participate I scheduled an appointment with the receptionist usually a few days later. I stressed to the receptionist that I required some “quiet time” for a meeting with doctor for at least thirty minutes. The appointments were scheduled from Tuesdays to Thursdays in the morning, during the practice lunch-break or in the afternoon at a mutually convenient time. While Mondays and Fridays were perceived to be ‘busy days’ for the practice, Friday was also reserved by some practices for mosque attendance.

When meeting at the appointed time with individual GPs at their practice, I briefly introduced myself and reminded them about the purpose of the interview. I sought verbal informed consent before each interview. Further permission to tape-record our conversation was needed, because manual note-taking would have interfered with the interview process that was limited to 30 minutes. GPs were informed that there are no right or wrong answers and were further encouraged to respond in their own terms, and in whatever order or direction they wished. GPs were reassured of their anonymity and of the confidentiality of the information they provided.

In preparation, I attended a two-day training workshop conducted by an anthropologist at the Medical Research Council (Meulenberg-Buskens 1997) to acquire skills to conduct the face-face in-depth interviews.

The in-depth interview technique

I adopted an unconditional positive regard, keeping eye contact and an open inviting posture, a bent torso in an angle of 45 degrees, with shoulders turned in the direction of the respondent, and seated with uncrossed arms or legs. I gave my attention to the respondent in a non-verbal way by eye contact, gentle nodding with the head accompanied by verbally uttering encouraging words: “hmm..hmm..” and “yes...yes..” in response to the GPs’ comments. I gave some background information about the purpose of the proposed study and the frame of reference for the interview.

- A: I’m Angeni Bheekie from the MRC. We are designing an improvement programme for childhood asthma and for the preliminary phase, I am conducting interviews with GPs to identify their concerns for childhood asthma. The information that we obtain from GPs would be used in the design of a programme for childhood asthma.

I kept the introduction as 'short' as possible to reduce the time to reach the GPs' opinion. GPs were free to explore their own feelings and ideas as long as it remained within the framework of the opening question, which had been carefully planned.

Informed consent

Before commencement, I obtained informed consent and permission from each GP to audio-tape the interview. I explained that the purpose of the interview was to explore GPs' experiences in the provision of care to asthmatic children, a preliminary phase of the planning of an MRC and NAEP initiated asthma care improvement programme. All GPs were reassured of their anonymity and of the confidentiality of their information and that they could withdraw from the interview at any time.

A: Dr _____, I'd like to let you know that whatever you say is neither right nor wrong. I assure you that whatever you say will remain anonymous, and if at any time you do not feel like participating, or are feeling uncomfortable in the course of the interview, please stop me.

I ensured that the GPs did not feel threatened by my visit and created a relaxed atmosphere. I adopted a cordial relationship and a conversational style to encourage open discussions with the GPs.

The opening question for this qualitative study was refined from other attempts in arriving at one that was open-ended, neutral, clear and phrased with a pre-determined category, "experiences":

"What are your experiences in the management of childhood asthma"

A second question was decided without containing a suggestion. Our primary aim was to identify GPs' barriers to health care provision in asthmatic children, an experience/behaviour question was used to elicit descriptions of actions and activities.

A: Dr _____, what are your experiences when treating asthma in children?

Although this sentence is open-ended, the term "treating" in medical terminology is specific, implying drug treatment. Since a much broader perspective was needed from the GPs, allowing them to take whatever direction and to use whatever words they want, to represent what they have to say, the question was formulated in an open, neutral and vague enough way:

A: 'Dr ____, would you like to tell me about your experiences in the management of childhood asthma?'

This question was formulated in an asking way. I asked it only once at the beginning of the interview. This question was phrased and delivered in the same words and tone to all GPs. It was necessary to keep the introductory information as clear as possible to avoid interrupting GP's train of thought and disturbing the structure of the interview. This question served to minimise subjectivity and bias and helped me to focus the discussion towards the care of children with asthma in the local community, without prejudging or guiding GPs towards any particular barrier. This question elicited GP's own perceptions from which I could ask them to explain their statements, behaviour or attitudes. The open-ended question did not lead GPs to any particular responses.

The answer was slowly given by the GP:

Dr: This is a broad question...[looks around the room away from me] ...let me see, well ...there are so many issues that needs to be said

As the response progressed reflective summaries were used to confirm the information with the GP, and clarifying questions were used to expand information on key points, to obtain a clearer picture of GP's views and thoughts and to keep the interview focused. Phrases used to formulate a clarifying question were:

A: Can you tell me more about parent's reluctance to use inhaled therapy in children..

A: What do you mean by 'fear of steroid therapy?'

I asked for examples to have GPs further illustrate their specific points. I ensured that the use of clarifying questions did not intrude upon or threaten them in any way. For example,

A: You mentioned earlier that parents are afraid to accept the diagnosis of asthma in children and may visit another GP. Others GPs experience the same problem in their practices too. From your experiences... how were you able to handle this? If perhaps you find this question intrusive please refrain from answering it.

Probes and follow-up questions were used to deepen the response to a question, to increase richness of the data, and to give cues to GPs about the level of response that was desired (Patton 1980). Detail-oriented probes are 'who', what 'where', 'when' and 'how'. 'Why' questions were intentionally avoided because they presume cause-

effect relationships, pre-suppose that things occur, moving the subject beyond his/her experiences, feelings or perceptions to speculation (ibid). I wanted to avoid speculation because respondents would cover a multitude of dimensions that would make analysis of the data difficult.

As the interview progressed I paid heed to their experiences in the management of asthma and these cues were taken to probe GPs to elaborate on problems they perceive. During the course of the interview I probed into GPs' perceptions of caregivers' experiences with an asthmatic child:

A: Dr ____, you mentioned parents' involvement in the care of their child with asthma. What are your views about parental management of asthma in children?

The purpose of this question was to obtain GPs' perceptions of barriers parents encounter. Answers to such questions help to gain greater insight into GPs' understanding of barriers to optimal care for asthma in children.

In clarifying GPs views about adherence to drug treatment I asked the GP "What do you mean' children comply poorly with asthma medications' and they explained fully their barriers to use of inhaler therapies, and taking regular preventive therapy. In ascertaining GPs' experiences about diagnosing asthma in children I used a reflective summary to obtain more information. For example, when GPs had mentioned that 'wheeze is not always present' and this makes diagnosing (of asthma) difficult, I clarified this with them.

A: You have got the feeling that when wheeze is not present ..then asthma cannot be easily diagnosed [increasing the tone of my voice] in children...

This led to GPs adding more insight into barriers that they encountered in diagnosing asthma such as parental reluctance to accept the diagnosis.

GP: Parents do not want to hear about [the diagnosis of] asthma. ..

Because no particular pre-planned sequence was imposed, the flow of the information depended on the GPs' perception of priorities. The interview is a framework within which respondents can express their own understanding in their own terms (Bauman 1992), therefore GPs were encouraged to talk about their experiences in childhood asthma. The topics and order of the discussion was determined from the GPs' own perspective and understanding. Open-ended follow-up questions were used to get GPs

to expand on issues which in my mind might represent barriers that they feel are important and relevant, and which could be modifiable. This allowed them to provide a more personalised account of their experiences, and by using open-ended questions it made it more likely for GPs to express their priorities.

The purpose of the interviews was to gain a deeper insight and understanding of GPs' experiences in childhood asthma management. I had good background knowledge of childhood asthma management approaches and was familiar with the technical terms. It was important to obtain attributes of open-mindedness, sensitivity and confidence to enable me to conduct the interviews with the GPs. My communication style with GPs was in a relaxed manner. I empathised with the GPs, and this allowed them the opportunity to share their experiences quite freely. At the same time, I was able to maintain control of the interview and obtain a rich and detailed account of their experiences.

After each interview, I coded the tapes and locked them in a safe place.

Data analysis

I personally transcribed all interview tapes into a word processor package on a personal computer verbatim to preserve the exact quotations (Patton 1980). The typing of each transcript took about three days and averaged 4-5 pages per respondent. All typing was completed within two weeks. A numerical code was used to conceal each respondent's identity from the transcript, and only I was aware of this linkage. I made four copies of each of the five transcripts, with the master copies locked away in a cabinet for safekeeping. One copy of the transcript was for writing on, while the remainder copies were used for cutting and pasting of similar coded information onto blank flip chart paper.

The two main themes were preordained by the research questions: GPs perceptions of barriers and their perceptions of barriers encountered by parents/ caregivers in the management of childhood asthma, were used to categorise the data. After reading each transcript, I identified and made a list of emerging sub-themes (table 5.1). The categorisations of emerging themes ranged from diagnosis, drug therapy, external constraints, sensitive issues, financial limitations, time limitations, lack of continuity

of care and lack of adherence to preventive measures. I coded each category alphabetically in the margin directly on the relevant data passage for every paragraph. I did the coding twice (blinded, that is on unmarked copy) to ensure that I maintained a consistent pattern for similar themes identified in each interview transcript. There was slight variation in coding for three sub-themes, and after discussions with the principal investigator, we reached consensus on identifying appropriate categories for each of them. Common themes and concepts were cut and pasted into each of the relevant categories (Patton 1980). Since many passages served several different patterns or themes, multiple copies facilitated the cutting and pasting of the data onto blank flip-chart paper.

Table 5.1 Illustration of coding a paragraph from an interview transcript to identify barriers encountered by GPs in their management of children with asthma

Paragraph from interview transcript (GP 3)	Code: Drug treatment
<p>A: Dr.... What are your views on inhaler therapy for children?</p> <p>GP: The inhaler has actually fallen into disrepute for two reasons. One is, people have the idea that they get addicted to this- even adults don't want their children to use inhalers because they say you get addicted to it. There has also been some studies on this thing of whether people do get addicted to it or not. Then they say people use this [the inhaler] and become dependent on it. Any little cough they have then ..'puff'.. 'puff'. The one is addiction that people are afraid of and the other is co-ordination. I think in many instances children and even grown-ups, don't co-ordinate inhalers properly. Even children round about 10 to12 years..I ask "How do you use it home?". "Mummy showed it to me" and they show it...You know they press down the canister and don't co-ordinate the breath. And I can appreciate it's difficult. It's not that easy at all. So, in children I rather recommend them to use the spacer if they can afford it.</p>	<p>Sub-heading: Inhaler therapy</p> <p>-Misconceptions associated with inhalers: -addiction -dependence</p> <p>Use of inhaler: -poor co-ordination</p> <p>Spacer therapy -problem of affordability</p>

When all paragraphs from each transcript were coded, it was cut out and all items of similar codes were collated. Similar coded sections were cut and pasted onto blank poster size (flip-chart) sheets, and provided with appropriate headings and sub-headings in accordance with the identified categories. The principal investigator checked the validity of this categorisation by conducting an independent evaluation (Burnard 1991). He reviewed the patterns, categories and themes at various stages before the coded data were completely analysed.

From the subcategory of themes relating to barriers perceived on diagnosis, treatment, and overall management, a confirmatory prevalence survey was designed.

Quantitative study: questionnaire survey

If a barrier identified in the qualitative study was found to be common (mentioned frequently and by almost all GPs) in a representative GP sample, then it was important that the intervention address it. If however, a barrier identified in the qualitative work was rare in our sample survey (determined from proportion of responses) then it was less likely to be considered for inclusion into the proposed intervention.

The questionnaire survey was conducted from February to April 1998.

Setting

GPs interviewed in the qualitative study were excluded from the sample identified for the survey.

As no regional medical register is available, the Cape Town city telephone directory (1997-1998) was used to identify a sample of private sector GPs in sixteen suburbs: Athlone, Ravensmead, Ottery, Rylands, Mannenberg, Retreat, Grassy Park, Gatesville, Belhar, Bishop Lavis, Bonteheuwel, Elsies River, Eerste Rivier, Hanover Park, Heathfield and Heideveld. Preference was given to practices serving the lower middle and working class coloured communities located in both the northern and southern suburbs of Cape Town. Telephonic confirmations of their practice address were obtained to ensure delivery of the questionnaire to the correct address. We excluded from the survey (after a check with the receptionist) those GPs having multiple practices and serving the Mitchell's Plain suburb.

Sample size and selection

For the areas we planned to study we generated a list of the total population of 141 private-sector GPs. We estimated the required sample size for our survey by assuming that the barriers occurred in 50%, specifying an error range of 10% points on either side. We used Epi-Info 6 (1997) for the calculation which generated a sample size recommendation of 60 GPs. We wanted a point estimate prevalence with a 95 % confidence interval of 10% points on either side and selected 63 GPs from the numbered computer printout of our list to obtain a representative sample. Names and

other identifying features of the random GP sample were only known to myself (AB), and these were kept confidential and locked in a safe place.

Likert scale

In this questionnaire survey we used an even-numbered Likert scale framed on an agree-disagree continuum to note GPs' responses to barriers encountered in childhood asthma. The even-numbered scale (Lim 1996) was used to prevent GPs from fence sitting and to obtain more definitive answers. The 4-point Likert scale had ranged from strongly agree and agree, to disagree and strongly disagree.

We employed various strategies to improve response rates. The layout, presentation and graphic design of the questionnaire aimed to compete with pharmaceutical promotional material arriving at practices (Appendix 2). We selected a blue and white theme common to both the organisations, MRC and NAEP. While the colour blue is used by most pharmaceutical companies to designate 'reliever' aerosol to help asthmatic patients distinguish it from the brown 'preventer' therapies, the white tint further denoted a 'breath of air' type of feeling. The envelopes matched the appearance of the questionnaire with regard to its borders, background colours and logos to retain uniformity (Cartwright 1968). The names of the two supporting organisations, the Medical Research Council (MRC) and the National Asthma Education Programme (NAEP) were highlighted on the front page and along the dark blue border of the questionnaire. The questionnaire was enclosed in an A4 envelope containing a matching but smaller A5 self-addressed pre-paid envelope with CHAMP's principal investigator's address to enable return of the questionnaire upon completion. The envelopes were addressed and posted to 63 randomly selected GPs.

Strategies to improve response rates

Additional strategies to improve GP response rates to this postal survey were used in a stepped manner. These included telephone reminders, a hand-written thank you note, a R60.00 incentive and finally a personal visit to non-respondent GPs at their practices with offer of a R60.00 consultation fee. These strategies were used because they were simple and have been found to be effective. None of these strategies has ever been used in the study of childhood asthma in South Africa. Because of our small sample size, we needed a high response rate (as near as 100%) to arrive at some precise

enough evidence about the prevalence of perceived barriers to verify the findings in the exploratory qualitative study.

Contents of the questionnaire

We aimed to conduct the survey with no disruption to GPs' practice routine, with minimal time and effort required on their part. The questionnaire consisted of a letter followed by forty-nine questions about perceived barriers to childhood asthma. We estimated that it would take ten minutes to complete the questionnaire.

The letter printed on the front page of each questionnaire (Appendix 2) informed GPs about the purpose of the survey. The letter stated that after we had consulted with GPs in Cape Town numerous barriers to the provision of care for childhood asthma were identified. Further that the MRC and NAEP would like to enquire from individual GPs their own perceptions of the barriers to optimal childhood asthma care. GPs were assured of their anonymity and the confidentiality of their responses to the questions.

Themes identified in the initial in-depth interviews on perceived barriers in the diagnosis, treatment and overall management were phrased as open-ended and closed questions. Each barrier identified from the initial in-depth interviews, served to provide ideas and wording for the questionnaire. Explicit answers were required and the questions were formulated to specifically ascertain the recipient GPs' knowledge, attitude and perceptions relating to specific issues to the practice. All sentences were phrased in the first person to obtain answers based on GPs' personal experiences; and as short closed questions to illicit definitive answers as quickly as possible. All except two questions required GPs to respond to the relevant question based on a single option that best agreed with their view in a agree-disagree continuum. Because of perceived time constraints to questionnaires amongst GPs, not all barriers that were identified were included as items for the survey instrument. Barriers that could not be addressed through an educational approach, such as those identified as structural, regulatory or organisational in nature, were excluded as items for the survey. A total of 29 questions were deemed relevant for this study.

The questionnaire was divided into 4 major sections. The first section focused on GPs' perceptions when diagnosing asthma, the second on GPs' perceptions to drug

treatment, the third on whether GPs perceived problems among parents / care-givers; and in the fourth section questions related to GPs' perceptions of treatment of asthmatic children by their care-givers/ parents. After each section open-ended questions were also included to obtain additional information from the GPs.

Examples of barriers perceived by GPs in the interviews and the corresponding question phrased for the follow-up survey are:

GP reluctance to use oral steroids for asthma in children:

GP: I don't really initiate steroids in children ..I don't usually do that..I am uncomfortable with using oral steroids because of the side-effects... .

Follow-up question: In my opinion short-term (one week) oral steroids should be used in children with acute exacerbations of asthma.

GP's use of antibiotics for asthma in children:

GP: One is not keen to use antibiotics, but in areas where there's overcrowding and dampness, we may be use antibiotics more often than we should... .

Follow-up question: In my practice I find that antibiotics improve an episode of asthma in children.

GP perceptions of parent's insensitivity to asthma symptoms:

GP: ...So a lot of the times I think children are running around fairly distressed, getting used to the symptoms the state of distress they have, their limitations, and they'd just live around it ...

Follow-up question: I find that parents/care-givers are aware of the severity of breathing problems in children.

Using the same format, the first section of the questionnaire centred on perceived GP barriers while the second section centred on GPs' perceptions of barriers encountered by parents and care-givers in the management of childhood asthma.

Each questionnaire was numbered on the right corner of the last page before it was posted to GPs to identify and keep track of non-respondents. These numbers, which could be used to breach anonymity were combined with keys in only a single copy, securely locked in the author's filing cabinet. The link to the GP was destroyed as soon as the response rate was considered adequate. At this point, the survey was closed.

Data analysis

Demographic details of GPs were obtained from the 1998 South African Medical and Dental Council register. The number of years of practice experience for each GP was calculated from the year of registration to the year of the survey, adding 25 years, that being the mean age of first registration (Zwarenstein 1989). Gender was derived from the first names listed in the medical register, a similar approach used to identify smoking habits among UK doctors (Doll 1976). Since it is a legal requirement for GPs in South Africa to update their contact and personal details when renewing their registration with the Health Professions Council (Act 1974), the use of the medical register has high validity.

I coded GPs' responses to the questionnaire and entered them into the Epi-Info database. The total number of responses noted for "strongly agree and agree" (agreed) and "disagree and strongly disagree" (disagreed) categories were calculated we aggregated the 2 positive and the two negative categories to create a dichotomous outcome variable for each question and the proportion of responses to each question was determined. Where possible themes having an association were cross-tabulated. A p-value of <0.05 was considered significant and the goodness-of-fit test was used to determine the pattern of association/ for certain questions. As these cross-tabulations were not generated *a priori*, the results should be interpreted as exploratory only.

Data obtained from both the qualitative and quantitative studies were used in the design and development of the outreach intervention.

Evaluation of GPs' subjective responses to educational outreach intervention

The educational outreach intervention aimed to change GP adherence to guideline- and evidence-based approaches to diagnosis, treatment and preventive measures for children with asthma. The intervention consisted of visits by a trained pharmacist to practices, and interactive discussions supplemented by printed materials to highlight key management principles for childhood asthma. The intervention was tailored to address barriers identified in the GP barriers studies (chapter 6), and the dialogue adapted in each visit to meet the needs of the particular practitioner. In the second

visit I informed GPs that we would conduct an evaluation of the intervention, but the method was not made known to them.

A:We would be evaluating this programme [intervention] to see whether it's been effective or not, and once that phase is completed we'd like to inform you of the outcome.

I discuss below the approaches that we had considered to evaluate acceptability of the intervention amongst the GP sample.

Firstly, we had initially planned to evaluate GPs' adoption of the key primary care messages for childhood asthma using a patient simulated intervention (Madden 1997). In this method researchers or their assistants play the role of clients seeking health services, while GPs are unaware that these particular clients are mimicking illness and are evaluating their practices. The simulated patient intervention involves recruiting three or four mothers with children who have asthma, training them how to take an episode to a GP and how to record the GP's response on a number of key issues. This type of intervention is conducted on both intervention and control groups, avoids bias and the evaluation would have the same effect on both groups. After discussion with the key informant whom we had consulted for the barriers qualitative study (in-depth interview), we concluded that the patient simulated intervention was not a feasible approach to evaluate the outreach intervention. In the event a doctor detected a simulated patient, such an approach it would likely have been perceived as deception and would be viewed as "intrusion". Further, since GPs working in isolation feel alienated they could lose trust of the research team. It was also perceived that this could jeopardise a future working relationship with the GPs.

Secondly, we had considered conducting either a telephone or face-to-face questionnaire survey with GPs to assess their acceptance of intervention. Since such approaches would increase GPs' awareness of an ongoing evaluation, it would bias the results (Hawthorne effect). Further, such an approach would neither provide insight into GPs' actual practice pattern nor provide a true reflection of their knowledge, attitude and perceptions of the intervention.

We had concluded that an unobtrusive research method was a feasible approach to evaluate the outreach intervention. We used a combined interviewer /evaluator approach to keep GPs' responses realistic, otherwise knowledge of a formal evaluation would change their responses too much.

I conducted unobtrusive in-depth interviews with GPs during both practice meetings to assess GPs responses. These interviews were conducted during the course of the outreach intervention visits. I therefore had two roles, one as a participant in the social marketing interaction (academic detailer) and one as an observer of the response to the detailing. The mode of the research was therefore participant observation and adopted the usual methods of low impact data collection.

Sampling

The sampling for the intervention was unusual. A very large representative GP sample was identified from a 1993 study (Ehrlich 1995), and from the CHAMP baseline school questionnaire surveys (Zwarenstein 1999). Since the practice behaviour of these GPs was being tested in the context of the CHAMP cluster randomised controlled trial, all thirty-two GPs were evaluated qualitatively. Such a large sample enabled us to assess the range and depth of GPs' views and attitude towards the academic detailing intervention.

In-depth interview

The purpose of the first outreach visit to practices was to introduce the CHAMP intervention and to explore GPs' knowledge, attitude and perceptions to the key messages. Furthermore, the first visit aimed to identify the recipient GPs' personal barriers to improved asthma care for children, and evaluate their responses to the outreach educator and the educational materials.

The purpose of the second visit to each of the practices was to evaluate GPs' perception of the intervention based on their experiences with the use of the key messages and printed materials supplied to them in the first visit. In addition, the second visit aimed to explore residual barriers to improved care and to selectively reinforce adoption of the key messages.

The purpose of the in-depth interviews was to assess GPs' responses to the outreach intervention as a guideline implementation strategy. We needed to explore detailed GP responses to the intervention from its introduction in the first visit to its degree of acceptance in the second visit. Unobtrusive qualitative evaluation of this implementation study aimed to answer the research question:

'What did the intervention mean to the GPs'.

The outreach intervention consisted of two face-to-face visits to practice settings by a trained detailer, myself, using printed educational material to highlight key primary care messages for childhood asthma. GPs were informed about the proposed visit to practices via a letter (Appendix 4) accompanied by a list of key messages for childhood asthma. The letter informed GPs that a member of the research team would be visiting the practice to discuss the eight key messages with the GP.

Prior to the first detailing visit GPs were informed via a letter (Appendix 4) about the intended visit as a strategy to improve access to practices. Appointments with GPs were made either telephonically or personally visiting the receptionist at the practice, allowing for flexibility when approaching practices or receptionists. For example, when practices were busy preference was given to patient needs. For both visits we decided not to inform GPs about the intended unobtrusive in-depth interviews and participatory observation was used for the data collection. During the second visit I informed GPs of an intended evaluation of the intervention, but the technique was not made known to them.

I specifically attached the commonly used word 'programme' to the intervention to safeguard its exposure as a research activity and to ensure that it would be less intimidating to the GPs. Therefore, the presentation style and the language used during the detailing were important in gaining access to practice settings. I adopted a social marketing technique similar to that used by pharmaceutical company representatives to gain entry into practices when meeting with the receptionist and when detailing to GPs (chapter 7).

Since the first few minutes on entry are crucial to the success of an outreach visit, I ensured that GPs were fully aware of the nature and purpose of the visit. I adopted the

IDEALS approach (Chapter 7) to conduct the academic detailing visits at the practices. In the first visit I aimed to identify GPs needs by asking an open-ended exploratory question:

A: Dr _____, I'd like to know about your experiences in the management of childhood asthma?

As the interviews progressed the detailer highlighted each of the key messages using the printed folder and the poster. An atmosphere conducive to learning and interactive participation was necessary to allow for mutual exchange of ideas, concepts and understanding between the GP and myself.

In the second detailing visit three months later, I asked an open-ended exploratory question to ascertain each GP's experience with the printed materials that were supplied in the first visit:

A: What were your experiences with the printed material [folder and the poster] ?

GPs' responses to the educator, the key messages, printed material and additional aspects of the visit were noted mentally. These were immediately written down away from the practice site in the privacy of my car or in a nearby shopping mall.

Consent

We were unable to use the conventional method of obtaining informed consent before randomising because awareness of the study could have influenced GP practice behaviour and resulted in cross-contamination between the intervention and control groups.

We used Zelen's design to obtain implicit/ partial/ indirect consent by randomising GPs before obtaining their consent to participate in the intervention (Zelen 1979; Pocock 1983; Torgerson 1998). GPs assigned to the control group received the guideline in the same manner as if they were not in the trial (usual treatment), with no apparent need to seek their consent. A letter (Appendix 7), accompanied by a copy of the standard guidelines was hand-delivered to each control group GP, informing them that a copy of the guidelines for childhood asthma (Appendix 8) was enclosed.

If GPs assigned to receiving the intervention declined to participate, they would remain in the intervention group for analysis of outcomes but their responses could

obviously not be included in the qualitative study. In fact no refusals means that this resulted in no bias.

Unobtrusive participant observation

The language used during the meeting had to be shared equally between the GPs and myself, and I had to have an awareness to sensitive issues and perceived terms that would undermine the research process. It was important not to sensitize GPs to the evaluation of the outreach evaluation process and I adopted an unobtrusive participant observation technique to help overcome this dilemma.

I observed GPs' verbal and non-verbal responses to the outreach educator, the intervention materials and to the visits as a whole. I observed GPs' receptivity towards the educator from the point of entry, during and when concluding the meeting at the practice. I paid attention to the tone of their voices, hand and bodily gestures, facial expressions and whether they made eye contact during our discussions. I intended to capture a wide range of GPs' responses. For example, even when GPs showed signs of confusion or raised suspicion relating to the purpose of my visit, I allowed them the opportunity to express their feelings or views. This enabled me to provide a realistic account of GPs' perceptions to elements of the intervention.

In addition, we planned to explore their experiences with the key messages based on their use of the printed and support materials provided to them in the first visit. I observed GPs' responses and interactions relating to the key messages, as well as GPs' attitude, expressions and feelings regarding use and non-use of the printed material.

Consent

We obtained general/ indirect consent from GPs. At the first visit I informed GPs of a follow-up visit to the practice and used the following phrases:

- A: I would like to meet with you ...to in a few weeks time to find out about your experiences with use of these [printed] materials ... We would also be conducting an evaluation of the programme. You will be informed about the outcome of this programme once all phases have been analysed.

A: I'd like to meet with you again ... and find out what your experiences of the programme. We will conduct an evaluation of the programme and once all phases have been completed you will be informed of the outcome

In the second visit, I observed GPs' attitude towards the educator and their experiences with use or non-use of the educational materials.

Data collection and analysis

Central to the unobtrusive methods is the collection of data in the form of field notes/research diary (Patton 1980; Riley 1990).

We decided not to tape record or take notes during visits to the practice as it would be intrusive, and influence GPs' natural behaviour, thus restricting my freedom to explore. I took mental notes on how GPs reacted to each facet of the materials during both visits and immediately after each encounter recorded them in a field diary. I recorded my notes in context and in intense detail after each meeting, away from the practice site as it seemed a most feasible and practical approach.

I made notes on each GP's interactions, attitude and perceptions to the intervention. I focused on their responses to the educator, key messages as well as problems encountered in adoption of the messages. Once the visits were completed, I transcribed these detailed field notes into text and each interaction between the GP and educator was coded. I categorised GPs' responses in context with each of the visits and these were summarised into emerging themes. Notes from these focused GP observations were descriptive. An uninvolved health systems researcher with expertise in qualitative methodology checked for biased reporting and interpretation of the data.

In the first visit GPs' responses were categorised into three: those ranging from negativity, confusion and suspicion towards the educator; those who agree but are passive, and those who are enthusiastic in their intentions. In addition, I noted GPs' responses to contents of the key messages. For the second visit the categories consisted of attitudes of GPs and practice staff, non-user's responses and user's responses to the intervention. Further, concluding comments from GPs were also noted.

Approval to conduct the studies was received from the ethics committees of the Medical Research Council and the University of the Western Cape.

References

- Alderson M. An introduction to epidemiology. London: MacMillan Press: 1976
- Bauman LJ, Greenberg Adair E. The use of ethnographic interviewing to inform questionnaire construction. *Health Educ Quart* 1992; 19; 9-23.
- Burnard P. A method of analysing interview transcripts in qualitative research. *Nurse Education Today* 1991; 11: 461- 466.
- Cartwright A, Ward AWM. Variations in general practitioners' response to postal questionnaires. *Br J Prev Soc Med* 1968; 22: 199-205.
- Dawson S, Sutherland K, Dopson S, Miller R. Changing clinical practice: views about the management of adult asthma. *Quality in Health Care* 1999; 8: 253-61.
- Doll R, Peto R. Mortality in relation to smoking: 20 years' observations on male British doctors. *Br Med J* 1976; 2: 1525-1536.
- Ehrlich RI, Du Toit D, Jordaan E, Volmink JA, Weinberg EG, Zwarenstein M. Prevalence and reliability of asthma symptoms in primary school children in Cape Town. *Int J Epidemiol* 1995; 24: 1139-1146.
- Epi-Info. A word processing database and statistics program for public health. Version 6.04b January Centers for Disease Control and Prevention (CDC). USA. WHO, Geneva, Switzerland. 1997.
- Fernandez LAL, Martin JMJ, Del Castillo JDL, Gaspar OS, Millan JIM, Lozano MJP et al. Sources of influence on medical practice. *J Epidemiol Community Health* 2000; 54: 623-30.
- Fontana A, Frey JH. Interviewing: the art of science. In: Denzin NK, Lincoln YS, (eds). *Handbook of qualitative research*. London: Sage, 1994: 361-76.
- Health Professions Council of South Africa. (Act 1974). Updating of Council's database. Acting registrar Rode HL. Pretoria, 2000.
- Madden JM, Quick JD, Ross-Degnan D, Kafle KK. Undercover careseekers: simulated clients in the study of health provider behaviour in developing countries. *Soc Sci Med* 1997; 45: 1465-82.
- Meulenberg- Buskens I. Manual for free attitude interview technique. Unpublished notes. Research for the Future, Cape Town. 1997.
- Patton MQ. *Qualitative evaluation methods*. California: Sage publications, 1980.
- Pocock SJ. Ethical issues. In: *Clinical trials. A practical approach*. Chichester: John Wiley & Sons, 1983; 100-109.
- Riley J. *Getting the most from your data. A handbook of practical ideas on how to analyse qualitative data*. Bristol, UK: Billing & Sons, 1990.
- Streiner DL, Norman GR. *Health measurement scales. A practical guide to their development and use*. Oxford. Oxford University Press: 1989.
- Torgerson DJ, Roland M. Understanding controlled trials. What is Zelen's design. *Br Med J* 1998; 316: 606.

Zelen M. A new design for randomised clinical trials. *N Engl J Med* 1979; 300: 1242-45.

Zwarenstein M, Youngelson M, Botha JL. Validity of the register of medical practitioners for manpower planning. *S Afr Med J* 1989; 76: 105-108.

Zwarenstein M, Adams J, Bheekie A, Swingler G, Ehrlich E, Lombard C, Pather S, Sladden M, Eccles M, with the National Asthma Education Programme. Chestiness and asthma in Mitchell's Plain (CHAMP): cluster randomised controlled trial of academic outreach demonstrates improved health status of asthmatic children attending private practitioners in a poor urban community in South Africa. *Int J Tubercule and Lung Dis.* 1999; 3(9): suppl 1. 30th International Union Against Tuberculosis and Lung Disease (IUATLD) World conference. Abstract book (Poster) 641-PD.p S76.



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CHAPTER 6: RESULTS (Part 1)

PRIMARY CARE PRACTITIONER BARRIERS TO OPTIMAL CARE OF CHILDHOOD ASTHMA

This chapter deals with the barriers perceived by private sector GPs and their perceptions of barriers encountered by parents to optimal care of childhood asthma. The first section reports the results of the in-depth interview study and the identified barriers. The second section describes the construction of a quantitative survey instrument based upon the identified barriers from the interviews. The third section describes the results of this survey. The fourth section provides a discussion of the findings of the in-depth interviews and the survey studies and their implications for the design of interventions to improve childhood asthma in primary care.

In-depth interviews: results

Four interviews were conducted in the consulting rooms while one was conducted in a small meeting room in the practice. Overall, each interview averaged around 35 minutes, and two of the interviews were interrupted by 1-2 telephone calls.

I provide a description of the practices and characteristics of GPs who were interviewed.

Description of private sector general practitioners

Five GPs, four males and a female, with a wide range of characteristics were interviewed. The GP sample consisted of Asian and coloured origin, ranged from young (<35 years) to old (>55 years), and they were recognised as well known and not so well known figures of the community. The GPs were employed in busy and in quiet practices, attached to a small shopping complex that formed part of a medical suite or were independently located in residential areas in the suburbs of Elsie's River, Grassy Park and Wynberg. A part-time nursing sister assisted in 2 of the 5 practices. From these variations we were provided with a wide and rich experience of barriers in the diagnosis, treatment and preventive care for asthma in children.

Inability to make a clear cut and immediate diagnosis

All GPs expressed concern at their frequent inability to make a clear cut, let alone immediate diagnosis.

Uncertainty about symptom of wheeze

GPs found that the symptom of a wheeze was very important, and yet they were unclear about how to interpret wheezing or its absence in children. A number of adages were quoted- “Everything that wheezes isn’t asthma” (implying that the presence of wheeze is not a reliable indicator for asthma) seemed to be believed by most respondents. Another respondent said “often you don’t get the child who wheezes, you get the child who comes in with a periodic cough”. The absence of a wheeze made GPs reluctant to diagnose asthma. Their uncertainty was expressed in the convoluted description by one GP when faced with a suspected asthmatic who was not wheezing: “(just) because a patient doesn’t wheeze, that doesn’t mean he’s OK (not asthmatic)”. GPs’ views about the symptom of wheeze seemed to underlie barriers associated with the variable nature of the disease, as none had a clear sense of how to interpret wheeze, and how to interpret its’ absence.

Masking by other disorders of the respiratory tract

Disorders of the respiratory tract usually mask the symptoms of asthma and GPs found that they could lead to an initial incorrect diagnosis. Patients presenting with asthma like symptoms often also had symptoms of a cough, “respiratory infection”, “cold” or “bronchitis”. While these are acknowledged trigger factors, at the same time they may mask underlying long-term chronic asthma, existing in the absence of the trigger. The uncertainty of whether the disease is longstanding and present in the absence of respiratory infections, or whether it is a one off occurrence, brief, and triggered only during the few days of respiratory infection symptoms made GPs reluctant to diagnose “asthma” during the course of a respiratory infection. In this situation, they felt the diagnosis should not be made immediately, but follow-up visits would be needed to confirm the diagnosis. As we shall see shortly, follow up visits are not a well-organised easily achievable aim, and so many asthmatic children with longstanding symptoms may not be diagnosed as such. Since infections are the most common reason for presentation at the GP surgery, the most common opportunity for diagnosing asthma may well be missed.

Variable nature of asthma

GPs reliance on trying to establish a pattern would lead to delaying or perhaps missing the diagnosis. The variable nature of asthma makes it difficult for GPs to see a pattern before a diagnosis could be made. “ I say that asthma varies in intensity and the pattern varies”. One of the indicators that are used to diagnose asthma is positive response to a bronchodilator, but one respondent found difficulty in confirming the diagnosis at the time when asked by the parent about the child’s condition. “ It is difficult to say right now, I would have to see how the pattern develops – whether the child is going to respond to the medication he’s getting right now, whether it happens again... because you can’t say in children”. Even though GPs use bronchodilator therapy in children with respiratory problems they seem unable to use it as an indicator to confirm the diagnosis of asthma. Furthermore, GPs seem reluctant to confirm the diagnosis because of the perceived stigma.

Masking of symptoms through inappropriate use of asthma medication

GPs perceived that parents use medication incorrectly such as bronchodilator syrups which mask the symptoms of asthma and lead to the diagnosis of asthma being overlooked. “They (parents) constantly medicate the child with Venteze® (a bronchodilator syrup), as a result the diagnosis gets missed”. Constant use and perhaps over-use of bronchodilators indicates severe asthma and could be due to their easy availability from other health care facilities. GPs’ perceived that inappropriate supply of asthma drug therapy was also provided at pharmacies and at day hospitals while another mentioned that patients who were prescribed nebuliser therapy tended to overuse it.

Discontinuity of care

Discontinuity of care prevented GPs from making a proper diagnosis. GPs’ reliance on the child’s repeat visit(s) to obtain and confirm a diagnosis may not be feasible for those from the lower socio-economic communities who would also frequent public sector day hospitals for more affordable and possibly free care. “The diagnosis gets missed because you don’t see the child often... and the child gets taken to another doctor at the day hospital”. GPs’ inability to diagnose asthma during the consultation

may be delayed and often they could miss the diagnosis if a proper clinical and medical history cannot be obtained. The child is often accompanied by different caregivers who provide insufficient clinical information during consultation. "The child is taken to a doctor by someone else who isn't aware (of the condition), so you're seeing different people all the time."

Problems perceived in the treatment of children

Reluctance to prescribe inhaled and oral steroid therapy in children

GPs' reluctance to prescribe steroids in children is largely due to the side-effects associated with chronic use and possibly their inability to titrate a correct dose relative to asthma severity. When asked about the use of inhaled steroid therapy most of the respondents were reluctant to prescribe steroids in children. One respondent replied that "I don't readily initiate steroids in children under 2. I don't usually do that, I usually refer for further investigation". GP's inherent fear of steroids could delay initiation of inhaled prophylactic treatment in children. This could lead to GPs' opting for prescribing of the easier oral rather than the inhaled route of administration with some reservation because of the side-effects associated with oral steroids. "I'm uncomfortable with using oral steroids in children because of the side-effects obviously." The added problem is titrating the correct dose in children where one respondent expressed his "difficulty in obtaining the correct (oral) dose in children". Even though GPs' are aware of the side-effects of oral steroids they would tend to prescribe it for children without a proper dosing regimen.

Over-use of antibiotics

The prescribing of antibiotics to asthmatic children was brought to the fore. GPs felt that children living in damp conditions may be predisposed to infection which could trigger their asthma and they realised that antibiotics are used very often, but they had reasons to do so. Respondents felt that patients from lower socio-economic areas could not afford follow-up care and that in parental pressure prompted them to use antibiotics. "One is not keen to use antibiotics but in areas where there's overcrowding and dampness ...we maybe use antibiotics more often than we should. Again, there is the cost factor between nebulising the patient, and the parent having to come back with the child.. saying " my child is still coughing". Another GP felt that because of parental pressure antibiotics were "unnecessarily prescribed" and their use had a

psychological effect on the well-being of the patient. "Now, psychologically I think, not giving them (their children) an antibiotic, they're (the children) not going to get better." Even though GPs seemed aware that antibiotics are inappropriate in the treatment of asthma, they seemed to succumb to parental pressure to satisfy their psychological need.

Lack of consistent care

GPs expressed the view that inappropriate self-treatment by patients led to the lack of provision of consistent medical care. All respondents were aware that bronchodilator syrups which were easily available from pharmacies and from nearby day hospitals were over-used by patients. When asked which type of syrup was commonly used, GPs claimed that patients replied that "the 'rooi medisyne (red oral theophylline-containing syrup) is very good". Over-use of bronchodilators is an indication of severe and worsening asthma requiring additional anti-inflammatory therapy. The easy availability of oral bronchodilators at pharmacies and the lack of consistent / continual care due to doctor hopping undermines care provided by private sector GPs.

Lack of organisational structure

Lack of structure in the private health-care sector inhibited GPs from offering follow-up care. "The fact that they don't have follow-up care is an oversight on the part of the doctor..." "In private (practice) it is very rarely a structured thing where you say to the patient "you're coming back to me every month"....It isn't like the hospital where you structure an appointment every 3 months." Another respondent found that people are not aware of the need for continual care in asthma. "I think the public, and this may be a fault on our part, is that the public doesn't always understand the reasons for continuing or rather for long-term care that's required for asthma." For a community with a high prevalence of asthma, reliance on consistent medical care from either the public (day hospitals) or private sector is essential. Lack of GP involvement in encouraging continuity of care could be one factor leading to poor organisational structure and lack of parental/ care-giver awareness towards the promotion of preventive measures for asthma in children.

Time constraints

All GPs expressed concern for children being constantly exposed to a smoking environment and during consultation there was inadequate time to educate parents about it. Passive smoking is one of the major trigger factors for asthma in children and constant reminders from GPs are necessary especially in a community having very high smoking rates. However, with GPs' perceiving time constraints during times of increased patient load at the practice, their efforts to repeatedly advise parents against exposure to cigarette smoke are limited. "Passive smoking is a problem among children...in general practice one doesn't have time to explain all these things". As we shall see later (section on GPs' perceptions of barriers encountered by parents/ care-givers: poor adherence to preventive measures), parents themselves do not give heed to smoking avoidance and GPs' efforts in providing preventive care during consultation time seems to be undermined.

Lack of social support

GPs' perceived that in addition to the provision of medical care, social support is needed for overall management of childhood asthma. One respondent felt strongly that current therapy failed to attend to the patient's emotional needs and which itself may have caused the asthma. "An asthmatic may have a particular reason to be so. It involves genetic, may involve the environment and emotion. How many times are we actually tackling the emotional issue? ..family history of children with asthma are very bad .. divorce, separation .. are related to social pressures and family situations.... We treat the symptom, we don't treat the patient". GPs believed that lack of social support prevents them from providing adequate care for asthmatic children.

GPs' perceptions of barriers encountered by parents/care-givers

GPs believed that there were numerous barriers encountered by asthmatic patients and their care-givers. These ranged from tolerance of symptoms, poor adherence to prescribed medication, poor adherence to preventive measures and time constraints were barriers that GPs perceived to be experienced by patients.

Patient's tolerance of symptoms

GPs expressed the view that care-givers were generally insensitive to the presence of asthma symptoms and were reluctant to accept the diagnosis of asthma.

Insensitivity to asthma symptoms

Poor perception and acceptance of physical limitations due to asthma severity seem to be barriers to care in general practice. GPs perceived that asthmatic children as well as their parents were not aware of the severity of breathing problems. "I've seen a chappie whose not bad...moderate. He's comfortable and he's walking around and he's not too distressed. And when I listen to his lungs one actually gets a fright". Parental acceptance of asthma morbidity would most likely lead to inappropriate and perhaps overuse of reliever medication. "He's mother says .. 'Oh, I wouldn't put him on the nebuliser now, because he's not bad' ... So, a lot of the times I think the kids are running around fairly distressed, getting used to the state of distress they have, their limitations, and they just live around it".

GPs' perceived that children seem to accept symptoms of shortness of breath while parents' lack awareness of the severity of nocturnal cough associated with asthma. They felt that asthmatic patients would overlook their symptom of "shortness of breath" and accept it as being "unfit" at the time. Another GP found that parents would generally ignore the subtle symptoms of "night coughs or coughs after exercise" in children. All GPs found that care-givers consulted with them if the child's condition was 'bad' and only when they could afford to do so. Poor perception of the variable nature of shortness of breath and nocturnal cough, both of which are typical of asthma, could delay parents seeking a medical consultation. If such a consultation is unaffordable, many families may not obtain timeous medical care.

Reluctance to accept diagnosis of asthma

All respondents mentioned that patients were reluctant to accept the diagnosis of asthma. "There is still a certain amount of resistance on the part of parents to accept the diagnosis of asthma. Asthma carries a stigma unfortunately with a lot of people". Reluctance to accept the diagnosis of asthma could mean that parents are not informed that symptoms can be controlled with appropriate drug therapies and preventive

measures. Poor communication about the diagnosis between care-givers and GPs led to use of other inappropriate terms. One GP found that parents felt quite happy to use the term “bronchitis”. Inappropriate use of the terms to label a child as asthmatic could lead to underdiagnosis and undertreatment.

Poor adherence to prescribed medication

All GPs felt that poor adherence to prescribed asthma medication was a common barrier encountered by care-givers. “ They (patients) don’t always follow your advice. It is very difficult to get them to comply.” All respondents were aware that patients fail to take medicines regularly and that adherence was especially poor when they felt well “ ... people just don’t take medicines when they’re well”. Different aspects of poor adherence among patients were inappropriate use of medicines, incorrect inhaler technique, poor image of the inhaler and the high cost of asthma medicines and inhaler devices. Such factors lead to undertreatment of childhood asthma.

Inappropriate use of medication

GPs believed that patients could not easily differentiate between “preventer” and “reliever” medications. One GP mentioned that there are so many different inhalers and that they haven’t really been standardized to help make it easier for parents to understand their role. From a manufacturing point of view, one GP felt that medication should help care-givers and patients differentiate the function of different types of drugs “the medication bears the company logo, rather the fact that this is a “preventer” and this is a “reliever”. The situation is extended when GPs perceive that parents institute an array of over-the-counter remedies like “Borstol” and “Chamberlains” as their therapeutic effects in the treatment of asthmatic children have not yet been documented. Further, continual use of nebulisers results in parents underestimating the severity of asthma. “The danger of the nebuliser is that parents can underestimate the severity of the asthma, and continue using it”. While continual use of nebulisers is an indication that the child’s asthma is worsening, GPs seemed unaware of the efficacy of alternative drug delivery devices such as spacers which have been shown to just as effective as nebulisers.

* unscheduled anti-tussives and expectorants available from supermarkets

Incorrect inhalation technique

When asked about reasons for poor adherence the GPs responded that children did not know “how to use the medicines”, as treatment depended largely upon their parents. All GPs expressed concern about the poor inhalation technique among asthmatic patients and perceived that it was difficult to co-ordinate activation and inhalation of the contents of the aerosol. “..children particularly don’t co-ordinate inhalers properly. .. they press down the canister and they don’t co-ordinate the breath, and I can appreciate that it’s difficult. It’s not that easy at all”. Even though GPs are aware of the difficulties in co-ordinating inhaler use with inspiration, their lack of active involvement may be due to GPs themselves lacking the skill or the time to encourage proper inhalation technique.

Fear of the inhaler

All respondents recognized that inhaler therapy was poorly accepted especially among the lower socio-economic communities. GPs felt that parents “don’t take well to the child using the inhaler ... “nee die pompie nie” (not the pump)”. Reluctance to use the inhaler was based on fear that the child would become “addicted” and further “weaken the heart”. GPs reiterated that “they (patients) feel that they (patients) won’t be able to do without it.... They’ll need it all the time ... if they stop it the chest is going to get tight.. they won’t be able to manage without it” . Such fears led to parents accepting and administering oral forms of therapy (eg. syrup) as opposed to inhaled medication. “Parents would much rather go for that (a syrup) than an inhaler”. GPs’ perception that fear and misconceptions associated with the use of the inhaler, results in parents opting for easier, though more costly and less efficacious oral routes of drug administration. Furthermore, any attempts to discourage the use of oral medication for asthma in children requires time, skill and patience on the part of the GP.

High cost of preventive medicines and drug delivery devices

GPs realized that asthmatic patients failed to use regular preventive therapy because of the high cost involved. “We don’t expect them to take medicines regularly – it’s economically not feasible.” The cost of drug therapy for asthma depends on the severity and consequently on the frequency of use. Respondents emphatically agreed

that because regular maintenance therapy was expensive, patients complied poorly and which led to ineffective care “ .. a lot of preventive medicines are expensive. They have to be given regularly, and if not given regularly of course, they lose their effect and the necessary thrust of the treatment”. GPs’ seemed to lack awareness to the cost-effectiveness of inhaled steroid therapy for management of chronic asthma.

Although spacers were encouraged to promote better drug delivery with inhaler therapy, GPs perceived that they were expensive. “If you’ve got to start using spacers, I’ve got a super one here that costs R96.00 and the drugs themselves are quite expensive.” Another GP found that the use of the spacer was limited because it fitted the mouth-piece of only one particular inhaler. “ We find that one company makes a spacer which fits only his product, so that a patient can’t use a cheaper product, he’s got to go and buy the original product.” GPs perceived that lack of a standardised mouth-piece for different spacer devices and lack of lowly-priced spacers were barriers to improving drug delivery in children. GPs did not seem to refer to the use of alternative low-cost home-made spacer therapy for asthma in children.

Poor adherence to preventive measures

GPs found that parents of asthmatic children displayed resistance to modifying their behaviour as part of a preventive measure. GPs perceived that parents could not easily take heed to advice on smoking avoidance. In one instance when a parent was asked not to smoke in the presence of the child, the GP realised that the situation resulted in a domestic problem. “I tried to advise them (parents) that they (parents) should smoke outside, it ended up causing a major problem between the man and his wife”. Another GP found that parents don’t take heed to preventive measures seriously. “ Imagine me telling every child that comes here about the issues of smoking, and even if I have to tell the parent once, about not smoking he’s going to forget about it”. All GPs mentioned that there was a lack of preventive measures in the community and stressed that the need for “preventive medicine” had been “unfortunately overlooked ”. GPs’ awareness of parental disagreement and their lack of commitment towards smoking avoidance could contribute to GPs’ poor involvement in health promotion strategies for asthma in children. Although GPs seemed aware that preventive measures were not adequate, their efforts are inhibited because of poor parental co-operation.

Time constraints

GPs found that one of the problems associated with lack of follow-up care was that parents could not obtain time off from their workplace to bring the child for a medical consultation. "In an area like this.. it is not always possible for them to take time off work to get their kids to the doctor ". Parents would generally arrange with other household care-givers to take the child to the doctor. Lack of consistent care among parents adds to the problem of continuity of care for asthma as was mentioned earlier.

There are a range of barriers encountered by primary care practitioners in the management of asthma in children (table 6.1). GP barriers consisted of a range of diagnostic and pharmacotherapeutic approaches to care, as well as organisational and structural constraints. Barriers encountered by parents and asthmatic children centred on tolerance to symptoms and on poor adherence to prescribed medication and preventive measures for asthma.

The logo of the University of the Western Cape, featuring a stylized classical building with six columns and a pediment.

UNIVERSITY *of the*
WESTERN CAPE

Table 6.1 Summary of barriers perceived by private sector GPs in childhood asthma

<i>GP barriers in the clinical management of childhood asthma</i>	
Inability to make a clear-cut and immediate diagnosis	GPs uncertain about the symptom of wheeze Masking by other disorders of the respiratory tract Variable nature of asthma Masking of symptoms through inappropriate use of asthma medication
Problems encountered in the treatment of asthmatic children	GPs reluctant to prescribe inhaled and oral steroids in children Over-use of antibiotics Lack of consistent care
Lack of organisational structure in practice setting	No system for follow-up appointment Lack of patient awareness to follow-up care
Time constraints to provision of preventive care	Requires GPs time and effort when offering advice on preventive approaches for asthma
Lack of social support	Lack of emotional support for patients and families Lack of holistic approach to asthma care
<i>Barriers encountered by parents in the management of asthma in children</i>	
Tolerance to symptoms	Parents and children insensitive to asthma symptoms Parents reluctant to accept the diagnosis of asthma
Poor adherence to prescribed medication	Inappropriate use of medication in children Incorrect inhalation technique Fear of the use of the inhaler in children
High cost of preventive care and drug delivery devices	Regular use of preventive therapy is unaffordable to poor families Spacer devices are expensive and they are specifically suited for use in one particular inhaler
Poor adherence to preventive measures	Poor parental co-operation to advice on smoking avoidance Time constraints and difficulty for parents' to obtain leave from work for regular follow-up care for asthmatic children

Design of content items for questionnaire

The intervention aimed to address barriers that GPs encounter in their routine practice setting through an educational approach. Many of these were structural, regulatory or organisational barriers identified in the qualitative study and could not be addressed through an educational approach. These barriers were excluded from the intervention and therefore from the quantitative survey as well. Items for the follow-up questionnaire survey were aimed at assessing the prevalence of educational barriers that were identified from the qualitative study.

The questionnaire survey for this study was secondary to and aimed to confirm findings that were obtained from the initial qualitative study. We used the standard process of questionnaire development described in chapter 4 of this thesis. We specifically designed the questionnaire to measure prevalence of barriers in a random small sample of GPs providing care to a lower middle class working community.

Themes previously identified from the initial qualitative part of the barriers study were phrased into a three-page questionnaire format for completion by a representative sample of private-sector GPs. The questionnaire was divided into four major categories and questions posed to GPs focused on problems perceived in the diagnosis and treatment, and their perceptions of barriers encountered by parents/ care-givers in the management of asthmatic children. GPs were asked to respond to questions using a Likert scale framed on an agree-disagree continuum (Streiner 1989). We chose an even 4-point Likert scale ranging from strongly agree, agree, disagree to strongly disagree as has often been done (Coleman 1996), to avoid an anti-fence sitting strategy and to obtain more definitive responses to barriers in primary care childhood asthma. In addition, a few multiple-choice questions were phrased in three of the four sections to prevent predetermined or automatic answering and to permit greater variety of responses. We identified appropriate variables for each these questions.

I describe the rationale for items in the questionnaire survey. For each question reference is made to the findings obtained from the initial in-depth interviews, where necessary supported from findings in the literature. We wanted to prevent GPs from automatic answering therefore questions relating to similar themes were scattered across sections of the questionnaire. Below the tick-boxes we provided an open space for additional information that GPs might want to share.

I explain below how we derived items for the survey and follow the format that we presented to the GPs. The first part of the questionnaire deals with GPs' barriers when diagnosing asthma in children.

Diagnosing asthma in children

Uncertainty about wheeze as a diagnostic indicator

When diagnosing asthma in children GPs seemed uncertain about “wheeze” as an indicator. The presence or absence of wheeze seemed confusing to GPs when making a diagnosis of asthma. Wheeze is also associated with bronchitis or respiratory infection, which causes difficulty in making a diagnosis of asthma in children. Other studies also indicate that parents do not seem to use the term ‘wheeze’ when describing their child’s asthma (Jones 2000; Ehrlich 1998). The question we designed for this survey focused on assessing GPs’ knowledge that the absence of wheeze did not exclude a diagnosis of asthma in children. We designed the following sentence:

In my view children presenting with recurrent cough and current shortness of breath but no wheeze have asthma.

Reversibility as a diagnostic indicator for asthma

GPs believed that because of the variable nature of symptoms they are often unable to confirm the diagnosis of asthma at the time of consultation. They felt that they needed to see a pattern of the symptoms before actually confirming asthma in children. However, the qualitative study did not reveal how GPs’ actually use this knowledge to confirm the diagnosis of asthma in children. Given that a positive response to a bronchodilator is one of the indicators used to diagnose asthma, we designed a question to assess whether GPs who prescribe bronchodilators assess response to such therapy as a potential diagnostic indicator.

In my practice I prescribe bronchodilators if I am unable to confirm the diagnosis of asthma in children.

Delay in diagnosing asthma

GPs believed that to diagnose asthma in children necessitated several consultations. However, the qualitative findings did not explicitly state the number of consultations that GPs actually require to make the diagnosis of asthma in children. Given the contradiction between drawn out diagnosis and doctor shopping, we wanted to see how many doctors would delay the diagnosis to the extent that they were unlikely to ever make it, because the patient had moved on. We arbitrarily assigned a cut-off point of three consultations and phrased the question:

In my practice I usually need more than 3 consultations to make the diagnosis of asthma in children.

Substitute labels for asthma

GPs believed that parents were reluctant to accept the diagnosis of “asthma” and there is evidence locally and internationally that other inappropriate labels are substituted to describe the disease in children. Consequently this has led to underdiagnosis and the provision of inappropriate and sub-optimal care. We wanted not only to identify the commonly used substitute labels that GPs use when communicating the diagnosis of asthma to parents but more importantly, we believed from the qualitative study that absence of the label “asthma” might reduce the chances of getting proper treatment. Since substitute labels allow the doctor and patient alike to ignore the fact that asthma needs ongoing care, we designed the question:

When informing parents that their child has asthma, I prefer making use of the term (please tick as many options as necessary)

“asthma”
‘tight-chest’
“bronchial” or “broncho-chest”
“bronchitis”
or other term “ _____ ”

The second section of the questionnaire deals with GPs’ barriers to the treatment of asthma in children.

Barriers to the treatment of asthma

Underuse of inhaler therapy in children

GPs prescribe oral bronchodilators for asthma. Findings from the qualitative study showed GPs’ lack of awareness of drug treatment based on changing asthma severity. Since guideline treatment for mild symptoms of wheeze, cough and/ or night wakening is an inhaled beta-2 stimulant, we aimed to assess GPs’ specific pharmacotherapeutic approach in children by asking the question:

For children with mild wheeze, cough and/ or night waking which single drug do you usually prescribe first ...

oral β_2 stimulant eg. salbutamol or fenoterol

oral theophylline

inhaled β_2 stimulant eg. salbutamol, fenoterol, terbutaline

inhaled steroid eg. beclomethasone, fluticasone, budesonide

GPs' main reason for prescribing oral theophylline in children

In the qualitative study GPs mentioned that they prescribed oral bronchodilators, especially theophylline and had various reasons for doing so: parental pressure, effective therapy, low cost and ease of administration. In this survey, we specifically aimed to quantify the distribution of main reasons prompting GPs' to prescribe oral theophylline for children with asthma.

The single main reason I prescribe oral theophylline preparations in children is because...

**parents ask me to do so
parents find it very effective
it is cheaper than other bronchodilators
it is easy to administer**

Oral steroids for acute asthma

GPs seemed reluctant to prescribe steroids because of the side-effects associated with long-term use. However, findings from the qualitative study did not clarify whether GPs' experienced similar reservations with oral steroids for acute severe asthma. Short course oral steroids are recommended for such attacks in children. In view of GPs' reluctance to use oral steroid therapy, the question was phrased to determine their opinion regarding the use of a short course for acute asthma in children:

In my opinion short-term (one week) oral steroids should be used in children with acute exacerbations of asthma.

Economic constraints for anti-inflammatory therapy

GPs believed that regular anti-inflammatory therapy was unaffordable to many poor families seeking care for asthma in children. Steroids have been found to be cost-effective in the treatment of chronic asthma (Rutten-Van Molken 1995), a finding which is of special significance to developing country situations (Perera 1995) and of great relevance to primary care practitioners. We thus aimed to ascertain whether GPs experience such socio-economic limitations in their routine practice, and phrased the question:

In my practice the cost of anti-inflammatory / steroid therapy is a limiting factor when treating asthmatic children.

Side-effects from inhaled steroids for chronic asthma

GPs seemed reluctant to consider long-term oral steroid therapy in children because of the side-effects associated with it. However, it was not clear from the interviews

whether GPs were aware that the side-effects of inhaled steroids are minimal relative to oral steroids. A recent systematic review concluded that there is decrease in linear growth [$-1.54\text{cm per year (95\% CI } -1.15, -1.94)$] but the authors were unclear whether such decrease is sustained (Sharek 2000). Swedish researchers found that decrease in height is probably undetectable in adulthood with long-term use of inhaled steroids (Agtertoft 2000).

The question for this survey focused on assessing GPs' awareness to side-effects resulting from long term inhaled steroid therapy for asthmatic children. We designed the question:

In my opinion the use of long term inhaled steroids in asthmatic children has side-effects.

Over-use of oral bronchodilator therapy

GPs believed that parents preferred the use of oral bronchodilator therapy, such as theophylline, for asthma in children. Although it was clear that parents preferred this mode of therapy, none of the GPs made mention of the side-effects associated with its long-term use. GPs themselves might not have been aware of the side-effects of oral bronchodilators and might not have been able to discourage its use among parents and patients. We therefore specifically phrased the question to assess GPs' awareness to side-effects associated with oral bronchodilator therapy for children with asthma.

In my opinion the use of oral bronchodilators like salbutamol and theophylline in asthmatic children causes side-effects.

Awareness of efficacy of spacer therapy

GPs mentioned that they provide nebuliser therapy for acute asthma at their practices. An evidence-based finding has shown that spacers are as good as nebulisers (Parkin 1995; Cates 1998). Most GPs in the qualitative study seemed unaware of this. Spacers are cheaper, easily portable and are an easier mode of administration when compared to nebuliser therapy. Since it was not feasible to ask GPs about their awareness to the effectiveness of spacer therapy in drug delivery during the interviews, this was assessed in the survey. The question aimed to assess GPs' knowledge of spacers relative to that of nebuliser therapy for children with asthma.

**In my practice I find that ...
nebulisers are more effective than spacers**

nebulisers are as good as spacers
nebulisers are less effective than spacers
I don't use spacers and/or nebulisers

Inappropriate use of antibiotics for asthma

GPs believed that although they were not keen to use antibiotics but said they did so and their reasons for doing so were related to parental pressure and poor living conditions. Similar findings of overuse of antibiotics have been reported in general practices in the UK (Butler 1998; Fahey 1998; MacFarlane 1997). While respiratory infections can trigger asthma, their use in asthma is not recommended. We wanted to clarify whether GPs' personal experience with prescribing antibiotics led to improving an episode of asthma. We designed the following question to assess GPs' own perception of the clinical efficacy of antibiotics.

In my practice I find that antibiotics improve an episode of asthma in children.

Poor adherence to preventive measures for asthma

GPs mentioned several barriers that prevented them from providing preventive care to children with asthma. During the interviews GPs' actual role in implementing preventive measures for asthma could not be easily identified. Smoking rates are high in the coloured community and passive smoking is a risk factor for asthma. Poor adherence to regular inhaled anti-inflammatory therapy, involvement in physical activity and emotional disturbance are factors that may sometimes trigger patients to asthma episodes (GINA 1995). We designed this lead-in question to quantify the range of preventive measures that GPs promote in their practice setting.

Which of the following preventive measures do you advise parents of asthmatic children. Please tick more than one option if appropriate.

- avoidance of trigger factors eg. smoking around the child**
- regular use of anti-inflammatory medication (eg. inhaled steroids or cromoglycate)**
- care with exercise**
- minimize emotional upset**

Lack of adherence to advice on smoking avoidance

GPs felt that parents adhere poorly to advice on smoking avoidance for children because it may lead to family conflict with a smoker who refuses to smoke outside. In view of the high smoking rates among the coloured community, we aimed to identify

GPs' experience with parental adherence regarding advice about non-exposure of children with asthma to cigarette smoke. We designed the following question to capture this.

In my practice I find that parents/carer-givers heed my advice on exposing their asthmatic children to cigarette smoke.

The third section of the questionnaire deals with GPs' perceptions of parental barriers to identifying and providing care in children with asthma.

GP perceptions of parental barriers

Poor parental perception of asthma severity in children

Some GPs believed that parents are insensitive to asthma symptoms and have poor perception of the severity of breathing problems in children. Since asthma is a variable and unpredictable disease, parents and even children may overlook and underestimate the severity of symptoms of cough and breathlessness. Consequently, this could delay diagnosis and appropriate treatment. The question attempted to assess GPs' beliefs regarding parental perception of asthma severity in children.

I find that parents/care-givers are aware of the severity of breathing problems in children.

Consultation when asthma is severe

GPs felt that parents would ignore more subtle symptoms of cough and wheeze, and this would cause a delay in seeking a medical consultation and a predominance of severe presentations. GPs added that children with asthma would attend only when severely affected. We aimed to quantify this.

In my practice most parents consult with me when the child's breathing problems are ...

**very severe
severe
moderate
mild**

Reluctance to accept the diagnosis of asthma

GPs felt that parents were reluctant to accept the diagnosis of "asthma" as parents preferred using other inappropriate terms to describe the condition in children. The question was phrased to explore GPs' personal experiences with parental reluctance to accepting the diagnosis of asthma in children.

I find that parents don't easily accept the diagnosis of "asthma" in children.

Antibiotics for acute asthma

GPs felt that parental pressure was one of the reasons that they tended to prescribe antibiotics for asthma in children. However, it was not clear from the interviews whether GPs would tend to prescribe antibiotics in children with acute asthma. In general practices in the UK, antibiotic use for acute asthma increased from 32% (489 of 1546 attacks) during 1991/92 to 40% (822 of 2031 attacks) in 1992/93 (OR 1.47, 95% CI 1.28 to 1.69) (Neville 1997). We phrased the question to clarify this with GPs' individual clinical experience.

In my practice I find that parents exert pressure on me to prescribe an antibiotic for children suffering from acute asthma.

Lack of continuity of care for asthma

In the qualitative study GPs felt that continuity of care was lacking for asthma in children. GPs believed that parents did not attend at regular intervals and only did so when the child's asthma was severe or acute. GPs believed that parents may not be able to obtain leave from work, cannot afford repeat consultation fees or they are not aware of the need for continual care. In another local study of private medical practice a similar finding of few repeat visits was obtained (Zwarenstein 1996). However, from the interviews it was not clear if GPs actually communicated with parents the need for follow-up care for asthma. This lead-in question for the survey was phrased to identify whether GPs actually encourage follow-up care among parents either when their child suffers from an asthma exacerbation, or at specified (once, twice, three- or six-) monthly intervals.

In my practice I encourage parents to bring their chronic asthmatic children for follow-up care ...

- whenever there is a flare-up**
- monthly**
- every second or third month**
- every 6 months**

High costs of repeat consultations

GPs believed that the cost for repeat consultations is a barrier to asthmatic children from lower socio-economic areas. The question was phrased to identify GPs' experiences with limitations imposed by costs for asthmatic children requiring continual care.

In my practice I find that the cost of repeat consultation (s) limits asthmatic children from obtaining follow-up care.

Efforts to encourage continuity of care

The high costs of repeat consultations prevented continuity of care especially for children from poor families. One widely accepted medical practice is offering reduced fees for repeat visits. However, findings from the qualitative study did not clearly show whether GPs communicated with parents the possibility of reducing fees as a strategy to encourage follow-up care at practices. The following question focused on identifying whether GPs encourage follow-up care by offering a reduced consultation fee especially to poor patients attending their practice.

If a patient with asthma is poor and I felt they needed regular visits I would ask the patient to return and charge a reduced (50% or less) consultation fee.

The fourth section deals with the rationale for GPs' perceptions of barriers encountered by parents when providing treatment to asthmatic children.

Parental and patient barriers when providing treatment

Poor adherence to prescribed medication

GPs believed that poor adherence to prescribed drug therapy was commonly encountered among asthmatic children. Their failure to adhere to inhaled asthma medication is a widely reported phenomena (Milgrom 1996; Coutts 1992) and is associated with increasing severity of asthma. It was necessary to assess GPs' experience regarding adherence to prescribed medication among asthmatic children.

In my experience asthmatic children comply with prescribed medication.

Inability to differentiate drug therapies for asthma

GPs believed that parents were unable to differentiate between "preventer" and "reliever" medication for asthma. An Australian study found that GPs also showed deficiencies in distinguishing preventive therapy (18%) from symptom relieving medication (28%) (Henry 1993). This distinction is crucial for optimal care of asthmatic patients. However, findings from the interview did not clearly reveal whether GPs themselves were actively involved in helping patients to differentiate drug therapies. We designed the question specifically to assess this from GPs.

In my practice I find that parents and care-givers of asthmatic children find it useful to differentiate between asthma "preventers" eg. steroids and symptom "relievers" eg. β -2 stimulants.

High costs of inhaler therapy

One of the reasons for under-use of inhaler therapy in asthmatic children is that GPs believed that parents were unable to afford such modes of therapy. Inhaler therapy is recommended above oral modes of drug delivery for asthma. When compared to oral therapy, inhaled therapy is cheaper per, but the unit cost of the inhaler is higher. The question phrased to GPs aimed to quantify their experiences of affordable inhaled medication for children with asthma.

I find that parents can afford inhaled medication when caring for their asthmatic child.

Fear of inhaler use

GPs believed that parents expressed fear and reluctance towards the use of inhaler therapy for asthma in children. This could be one of the causes of undertreatment of asthma in children. The question focused on exploring GPs' personal experience of parental fear / reluctance when prescribing inhaler therapy to asthmatic children.

I find that parents express fear /reluctance when I prescribe inhaled medications to asthmatic children.

Regular preventive therapy for moderate to severe asthma

GPs perceived that one of the barriers to preventive therapy for asthma is poor adherence to regular treatment. Whether GPs themselves actually prescribe regular anti-inflammatory therapy for moderate to severe asthmatic children, was not clear from the interviews. Regular use of anti-inflammatory therapy for moderate to severe asthma is recommended and we designed the following question to quantify GPs adherence to guideline-based care.

In my practice I prescribe regular preventive therapy for moderate and severe asthmatic children.

High cost of preventive drug therapy

GPs perceived that high cost of preventive therapy is one of the factors reducing adherence to asthma medication. Similarly, Green and co-workers (1998) noted the economic burden of asthma in their study of a South African urban private sector health care setting. Preventive drug therapy is the mainstay of asthma treatment and access to and adherence to such treatment is crucial. Preventive anti-inflammatory agents such as inhaled steroids are cost-effective for chronic asthma. Since such

therapy requires regular use to be effective, adherence is a barrier especially among the poorer communities. The question was phrased to quantify whether in GPs opinion, the cost of preventive therapy was a barrier to patient adherence.

In my opinion the cost of preventive therapy eg. steroids, cromoglycate reduces compliance among asthmatic children.

Poor adherence to smoking avoidance

GPs perceived that there is conflict among parents when avoiding exposure of cigarette smoke to asthmatic children. This further supports the finding of high smoking rates in the coloured population. However, the qualitative study did not clarify GPs' role in advising parents against smoking avoidance. We phrased the question to assess whether GPs experience conflict among parents of asthmatic children when advising them about the avoidance of the exposure of cigarette smoke.

I find that there is conflict among parents/care-givers when avoiding exposure of children with asthma to cigarette smoke.

Parental reluctance towards use steroid therapy in children

During the interviews GPs had expressed fear / reluctance towards the use of steroid therapy in asthmatic children. Since long-term use of high dose oral steroids leads to growth retardation, the lowest possible dose is titrated for children with asthma. Although there is evidence of a decrease in growth in children using inhaled steroids (Sharek 2000) its effect on final adult height is unaffected (Agertoft 2000). It is likely that GPs' personal fears and reluctance to use steroid therapy in children could be projected onto parents. However, it was not clear from the interviews whether parents share similar fears / reluctance about using steroid therapy in children. The question was phrased to quantify this from GPs' personal experience:

In my experience parents are afraid/reluctant to use steroid therapy in asthmatic children.

The twenty-nine item questionnaire provided GPs with details of the proposed study which was formatted as a letter on the front-page (Appendix 3). The letter informed GPs of the purpose of the study. It stated that both the Medical Research Council (MRC) and the National Asthma Education Programme (NAEP) were providing support to community-based GPs caring for asthmatic children in Cape Town. The

letter mentioned that after consulting with GPs, various barriers to the provision of care to asthmatic children had emerged. Further, that it would be appreciated if the GP could provide feedback on these findings relating to his/her practice situation. In addition, assurance on confidentiality was provided and that once all phases of the study were completed, GPs would be informed about the outcome. Further, GPs were asked to return the completed questionnaire in a self-addressed prepaid envelope and to contact the principal investigator (who signed the letter) should they have any queries.

The principal and two secondary investigators of the CHAMP team independently checked and judged the content validity of the questionnaire items. They checked the accuracy and completeness of the items, and minor changes were made. Further, an asthma specialist in private practice checked the face validity of the questions, and when no additional changes were made, the questionnaire was handed to a graphic artist for design and layout.

Questionnaire survey: results

We obtained a very high response rate (97%) from the GP sample (Table 6.2). Of the total number of respondents (61/63), the majority were males (85%) and between the ages of 25-44 (57%) years.

Table 6.2 Profile of GPs for the questionnaire survey

	n
GPs identified for the survey	63
Non-respondents	2
GPs who completed questionnaire	61
<i>Gender:</i> Males	52
Females	9
<i>Age (years):</i>	
25-35	18
35-45	17
45-55	18
55-65	5
65+	3

For the survey we used three waves of follow-up (table 6.3). For the first wave, the questionnaire was posted to all GPs (63). Non-responders during the first wave (45/63)

received up to three telephone reminders on alternate days, and a second posting of the questionnaire 3 weeks later. For non-responders to the second wave (26/63), I personally visited them at their practice 2 weeks later, and offered a R60.00 consultation fee for their time to complete the questionnaire.

Table 6.3. GPs' response rates to strategies used to complete questionnaire on problems perceived in childhood asthma management

Wave	# questionnaires returned (%)
1 st posting of questionnaire (n=63)	17 (27)
2 nd posting of questionnaire and telephone reminders (n=45*)	19 (30)
Personal visit and R60.00 consultation fee (n=26**)	25 (40)
Total	61 (97)

Non-respondents:

*1 GP could not be located at the address cited in the local telephone directory.

**1 refusal to meet

The prevalence of barriers perceived by GPs in the diagnosis, treatment and preventive approaches for asthma in children are presented in table 6.4.

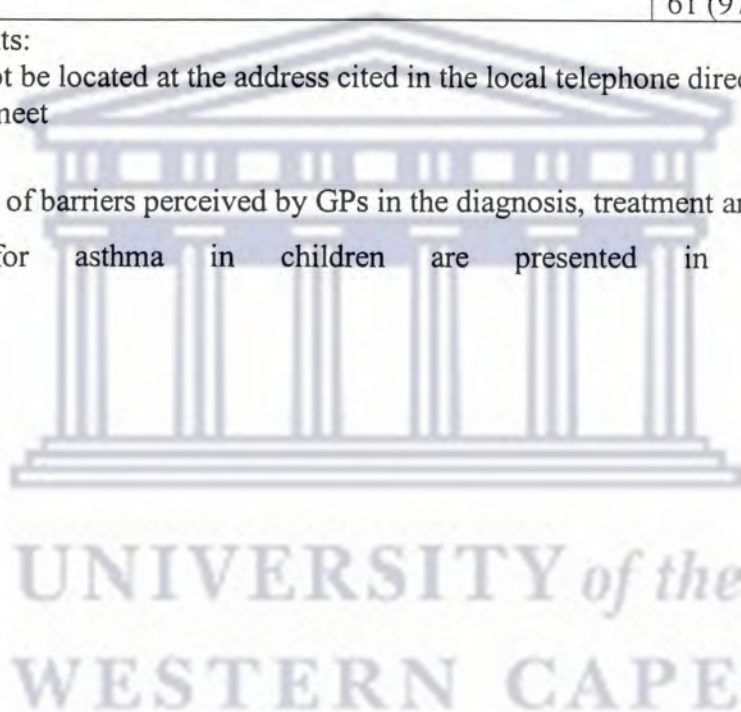


Table 6.4 Prevalence of barriers perceived by GPs in childhood asthma

	Disagree		Agree		n = respondents	% Agreed	95 % CI
A. GPs' problems in diagnosing asthma							
1. Their views that children presenting with recurrent cough and shortness of breath but no wheeze have asthma	18	42	60	70	60	70	56.8-81.2
2. Those who would prescribe bronchodilators if they were unable to confirm the diagnosis of asthma.	20	40	60	67	60	67	53.3 - 78.3
3. Those who usually needed > 3 consultations to make diagnosis of asthma.	27	33	60	55	60	55	41.6 - 67.9
4. When informing parents that their child has asthma, those GPs who preferred to use the term....			60		60		
asthma			55		55		
tight-chest			14		14		
bronchial / broncho-chest			4		4		
bronchitis			1		1		
other term			6		6		
B. GPs' problems in the treatment of asthma							
1. The single drug that GPs' usually prescribed for mild wheeze, cough, night waking			59		59		
oral beta-2's			34		34		
oral theophylline			9		9		
inhaled stimulants			9		9		
inhaled steroid			7		7		
The main reason those GPs prescribed oral preparation in children			51		51		
was on parents' request			3		3		
parents found it very effective			5		5		
it was cheaper than other bronchodilators			28		28		
it was easy to administer			15		15		
3. Those who were of the opinion that short term (1 week) oral steroids should be used in acute exacerbations of asthma.	15	46	61	75	61	75	62.7-85.5
4. Those who found that the cost of anti-inflammatory/steroid therapy was a limiting factor when treating asthmatic children.	20	41	61	67	61	67	54.0-78.7
5. Those who were of the opinion that use of long term inhaled steroids for the treatment of asthma has side-effects.	40	21	61	34	61	34	22.7 - 47.7

6. Those who were of the opinion that use of oral bronchodilators (salbutamol/ theophylline) causes side-effects	41	20	61	67	54.0 - 78.7
7. Those GPs who find that... nebulisers were as good as spacers nebulisers were more effective than spacers nebulisers were less effective than spacers they don't use spacers / nebulisers			59 26 25 6 2		
8. Those who found antibiotics improve an episode of asthma in children.	26	34	60	43	30.6-56.8
9. Those who advised parents on preventive measures.... avoidance of smoking regular use of anti-inflammatory therapy care with exercise minimize emotional upset			61 57 46 20 23		
10. Those who found that parents heeded advice about not exposing their child to cigarette smoke.	29	32	61	48	34.6-60.7
C. GPs' problems experienced by parents when caring for asthmatic children					
1. Those who found that parents are aware of severity of breathing problems.	40	21	61	66	52.3-77.3
2. Those who found that parents consult when child's breathing problems are very severe severe moderate mild			61 6 19 34 2		
3. Those who perceive parents don't easily accept the diagnosis of asthma.	44	17	61	72	59.2-82.9
4. Those who perceive parents exerted pressure to prescribe antibiotics.	33	27	60	55	41.6-67.9
5. Those who encouraged parents to bring children for follow-up care whenever there was a flare-up monthly every 2 nd /3 rd month every 6 months.			54 15 12 24 3		

6.Those who found that cost of repeat consultations limits asthmatic children from obtaining follow-up care.	43	17	60	72	58.6-82.6
7.Those who would charge a reduced consultation fee for poor patients who needed regular medical consultations.	56	4	60	93	83.3-98.2
D. GPs' perceptions of problems experienced by parents in the treatment of asthmatic children					
1.Those who found that children complied with prescribed medication.	36	23	59	61	47.4-73.5
2.Those who found that parents found it useful to differentiate between preventers + relievers	45	16	61	74	60.9-84.2
3.Those who found that parents could afford inhaled medication.	26	35	61	43	30.0-56.0
4.Those who found that parents expressed fear/ reluctance when inhaled medication(s) are prescribed.	43	18	61	70	57.4-81.5
5.Those who prescribed regular preventive therapy for moderate and severe asthmatic children.	56	5	61	92	81.9-97.3
6.Those that were of the opinion that cost of preventive therapy (steroids/ cromoglycate) reduced compliance among asthmatic children.	49	12	61	80	62.8-89.4
7.Those who found that there was conflict among parents when avoiding exposure of cigarette smoke to children.	45	16	61	74	60.9-84.2
8.Those that found that parents are afraid to use steroid therapy in children.	36	25	61	59	45.7-71.5

Diagnosis

GPs' criteria for diagnosing asthma often depart from those of the recommended guidelines tending to result in underdiagnosis. According to the South African guidelines recurrence of cough and/ or wheeze responding to a bronchodilator is indicative of asthma. Wheeze itself is not recommended as a prerequisite of the diagnosis. In this prevalence study a third of the GPs would not diagnose asthma unless the child presented with wheezing. This finding confirms the hesitation which we found in the qualitative study, where none of the GPs had a clear sense of how to interpret either the absence or presence of wheeze.

The quantitative study revealed GPs' hesitation in making an early diagnosis by taking repeated visits, which we didn't capture in the qualitative study. Of GPs who would diagnose asthma in the absence of wheeze, almost three-quarters (74%) would prescribe bronchodilators even if they were unable to confirm the diagnosis in children. To confirm the diagnosis over half the GPs (55%) would need more than 3 consultations. Of the GPs who needed more than 3 consultations to make a diagnosis, the majority (78%) would prescribe bronchodilators even if they were unable to confirm the diagnosis of asthma in children, suggesting that GPs have a category of children whom they are prepared to treat as asthmatic, even though they themselves are uncomfortable calling them that. GPs have the same discomfort lies when informing parents about the diagnosis of asthma.

When informing parents about their child's condition many GPs (41%) would prefer to use terms other than asthma: tight-chest (23%), bronchial/ broncho-chest (6%), bronchitis (2%) or other terms (10%). GPs' reluctance to use the term "asthma" could not be gauged from the qualitative interviews, where GPs believed that parents were largely reluctant in accepting the diagnosis of asthma. This may be linked to the high proportion (almost three-quarters) of GPs who believed that parents would not easily accept the diagnosis of asthma.

Drug treatment -oral therapy

Given GP's definition of asthma, most GPs (73%) would usually prescribe oral bronchodilators as first line therapy for those patients who seem to have mild asthma. The

majority (58%) would prescribe beta-2s and some (15%) theophylline. GPs' prescribing of oral bronchodilators contrasts with that revealed in the qualitative interviews where they believed that such care seemed to be largely provided by care-givers and other health care providers. In this prevalence study GPs preferred to prescribe oral bronchodilators even though the majority (over two-thirds) of GPs were of the opinion that they cause side-effects in children. Such inappropriate use of bronchodilators could imply cognitive dissonance in GP clinical behaviour and that they had reasons for it. GPs' prescribe oral bronchodilators because they are cheaper than inhaled bronchodilators (55%), are an easy mode of drug administration (29%), parents find them to be very effective (10%) and request them (6%). Overall both qualitative and the quantitative studies reveal that GPs seem to prefer oral rather than inhaled medication for asthma care.

Inhaler therapy

Inhaled medication seemed to be under-used in general practices. Few GPs (15 %) would use inhaled stimulants for the treatment of mild symptoms. Reasons for not prescribing guideline recommended inhaler therapy might be fear of use and high costs, problems which are also believed to be encountered with the use of steroid therapy.

Steroid therapy

The majority (almost 60%) of GPs believed that parents were afraid to use steroid therapy. The fear of side-effects associated with steroid therapy is also supported in the qualitative study. In this survey over two-thirds of GPs believed that parents expressed fear and over half the number (57%) believed that parents could not afford such modes of therapy.

The majority of GPs (two-thirds) were of the opinion that the use of long term inhaled steroids causes side-effects. In contrast, the majority of GPs (75%) are content that short-term oral steroid therapy should be used in acute asthma. GPs' awareness of parental fears and misconceptions may limit their adherence to guidelines when providing care to children.

Delivery systems

The relative effectiveness of spacers for acute asthma seemed not to be well understood in both the qualitative and the quantitative studies. In the survey most GPs (45%) believed that spacers were as good as nebulisers, a minority (10%) believed that they were better, while a large number (42%) believed that spacers were worse than nebulisers. A small number (3%) of GPs were not aware of the use of spacers at all.

Preventive care

GPs' feel that adherence to preventive drug treatment, adherence to smoking avoidance, seeking consultation and follow-up care seemed to be lacking.

Compliance with preventive drug therapy

In the qualitative study GPs believed that patients complied poorly with prophylactic drug therapy and high costs were a limiting factor. Even though the majority of GPs (61%) believed that children complied with prescribed medication, there seemed to be lack of adherence with regard to the use of preventive therapy. The majority (over two-thirds) of GPs felt that the cost of preventive therapy (steroid / cromoglycate) was a limiting factor and most GPs (80%) believed that costs would reduce adherence. GPs also reported poor adherence to preventive medication in the qualitative interviews.

Smoking avoidance

Almost all (93%) GPs feel that advice on smoking avoidance is important, but they did not believe (52%) that parents adhere to it. In fact many GPs (74%) believed that such advice may lead to conflict between parents. This ambivalence by GPs on advising against smoking avoidance was also revealed in the qualitative study.

Parents' awareness of asthma severity may affect the timeliness of consultations. Two-thirds of GPs felt that parents were aware of the severity of breathing problems with a few GPs reporting that parents generally consulted when the child was mild (3%), while the majority when their child's breathing problems was moderate (56%). Nevertheless, over a

third (41 %) of GPs do perceive children to be brought rather late when severely asthmatic. Such poor parental perception of asthma severity further supports a similar finding in the qualitative study.

Assessment of asthmatic children

In this survey many GPs claimed to prompt regular assessment of asthmatic children. A substantial 44% of GPs encouraged parents to bring children for follow-up care routinely every 2nd /3rd month, while less than a third (28%) advised parents to return only if there was a flare-up. Almost all (93%) GPs would charge a reduced consultation fee for poor patients who needed regular medical consultations. In contrast, we were not able to capture the GPs' contribution to encouraging follow-up care in the qualitative study because GPs' felt that costs limited the provision of such care. In this survey the majority (three-quarters) of GPs felt that the cost of repeat consultations might prevent children from obtaining regular follow-up care. While GPs are likely to reduce their follow-up consultation fees, parents may not be informed, and were less likely to attend practices for regular care.

Parental education

The majority (three-quarters) of GPs believed that parents would find it useful to differentiate between preventers and relievers. In contrast, information about the inappropriate use of antibiotics in asthmatic children seemed to be poorly implemented. Although many GPs (57%) themselves believe that antibiotics did not improve an episode of asthma in children, parents seem to consider such therapy necessary. The majority of GPs (55%) felt that parents exert pressure on them to prescribe antibiotics. Of GPs who felt that parents exert pressure on them to prescribe antibiotics, almost two-thirds (64%) believed that such therapy does improve an episode of asthma in children. This may suggest that GPs lack knowledge and skill to advise parents on inappropriate use of medication in the care of asthmatic children.

Discussion: qualitative and quantitative barriers studies

Private sector GPs perceived numerous problems in the diagnosis, treatment and when implementing preventive measures, leading to poor adherence to guidelines. I discuss the usefulness of the combination of qualitative and quantitative methods, the identification of private sector practice sites for research and health professional response rates to questionnaires and the generalisability of the study. In addition, I discuss the barriers identified by GPs and their implications for primary care management of childhood asthma.

Combination of qualitative and quantitative methods

Deficiencies in knowledge, fears and misconceptions of private practitioners with respect to asthma treatment need to be identified if efforts to develop and implement health care improvement strategies are to accurately target barriers to quality care. These barriers may be at least partly internal to the practitioner, even when they are based on objective external constraints, or to limitations that lie in the patients' or parents' realm. Efforts to overcome them must be designed to take into account the perspective of the clinicians whose practices are the targets of our proposed interventions. In order to obtain insight into the depth and magnitude of potential barriers to the improvement of childhood asthma in a local primary care setting, the Chestiness and asthma in Mitchell's Plain (CHAMP) research and development team needed to understand the health-care providers' clinical experiences and subjective views.

The combination of qualitative and quantitative methods was useful in identifying the range and prevalence of barriers to optimal asthma care in children. In this study, the qualitative approach proved to be simple, quick, and effective in obtaining in-depth knowledge of practitioner and practitioner-perceived parental barriers in the management of childhood asthma. The follow-up quantitative study measured the prevalence of GP barriers that were identified in the initial qualitative study and confirmed the findings which could not be clearly identified in the initial qualitative study. Thus, the combination of the qualitative and quantitative approaches provided a clear and detailed account of barriers in primary care childhood asthma. Overall, the results obtained from the qualitative and quantitative studies

were similar.

GPs were comfortable and co-operated throughout the interviews. After content analysis of the transcriptions, the results were confirmed by the follow-up questionnaire survey. The complementary quantitative data obtained from this survey helped to identify discrepancies and confirm findings of the preliminary exploratory qualitative study. However, other combinations of integrating qualitative and quantitative methods (Steckler 1992) would not have been appropriate for this study. We identified the barriers based on exploratory findings and the prevalence of these were further assessed in a similar cohort of GPs to design the intervention. Although we did not maintain a logical sequence of the questions for the survey to prevent automatic answering, we linked similar themes when analysing the data. An additional combination of qualitative and quantitative methods was used when evaluating the effectiveness of the intervention. The health outcome of intervention was measured quantitatively in the CHAMP randomised controlled trial, while GPs' acceptability of the intervention was assessed qualitatively. Thus, both qualitative and quantitative methods serve as useful research tools when designing and evaluating interventions to improve clinical practice.

In addition to the obvious purposes, the qualitative interviews conducted at the practice helped to gain insight into GP practice behaviour. It enabled me to improve my communication skills by maintaining focus and clarity on GPs' experiences with asthma management. I perceived that this in-depth interview technique would serve as a prerequisite for implementation of the educational outreach intervention programme as it would provide insight into the interactive communication process with GPs. Such preparation helped to give me insight into and build my confidence for the proposed face-to-face visits with GPs at their practices.

Identification of private practice sites

We used the city provincial telephone directory (1997) to identify practices of the target GP population required for the study. With relocation and mobilisation of GPs, information on

changes within practices is not readily available, and which could lead to wasted efforts and resources (time, and travel costs) when corresponding with GPs. Problems in identifying practice sites seem to be shared in another developing country (Nizami 1996). Even though just one GP could not be located in the small random sample (n=63), an annually up-dated local medical register (Zwarenstein 1989) could help minimise problems in identifying and locating GPs at their practice sites. A regional/ local medical GP register specifying current contact details /practice location(s) would be useful for health-care planners and educators.

Response rates

In this study we obtained a very high response rate of 97%, much higher than that reported in other surveys (67%) of private sector GPs (Volmink 1993). The GP response rates showed similar increasing proportions across each of the three intensities of follow-up: mailing (27 %), mailing and telephone reminders (30%), and the personal visit to practices and cash incentive (40%).

A possible reason for the high response rate in this study was the substantial efforts employed to ensure representativeness of the sample. The questionnaire was attractively designed, the provision of a hand-written thank you note, telephone reminders, repeated mailing of the questionnaire, offer of cash incentive and a personal visit to practices were used to follow-up non-responders. However, it seemed that neither the layout of the questionnaire, the hand-written thank note, nor the cash incentive could have played a substantial role in improving GP response rates. A very high response rate (25/26) was obtained solely from a personal visit to the practice, all but one GP who could not be accessed telephonically. The receptionist (his wife) was sceptical when I mentioned that I represented the MRC, and refused to schedule a meeting for a personal visit to the practice. She added that "Dr is away overseas".

All GPs that had arranged an appointment were willing to meet with me at the practice, and some apologised for not completing the posted questionnaires. During the personal visit to practices some GPs seemed surprised at the offer of a cash payment. Two GPs located in

separate practices specifically requested that the cash be donated to a local asthma clinic, while others had displayed reluctance to accept the money. Even the offer of a Kruger-rand offered as a prize to GPs in a similar setting resulted in a lower response rate (67%) (Volmink 1993). This could suggest that GPs in this community are not likely to be influenced by cash inducements. In contrast, response rates from other studies seemed to have improved through offer of inducements to charity and more especially through cash incentives (Deehan 1997). The lack of interest in financial incentives amongst GPs in this community is an indication of the existence of an obligation towards patient-centredness.

GPs are more likely to pay attention to personalised modes such as telephone and more especially face-to-face meetings than postal delivery when communicating issues relating to their practice patterns. One possible explanation for the lower telephonic follow-up (30%) compared to the personal visits to practices (40%), is that practice receptionists could not easily identify with the activities of the Medical Research Council, and this could have delayed co-operation from the practice. This could mean that communication with private sector GPs is more likely to be successful through a face-to-face meeting. Pharmaceutical companies are known to invest extensively in personal selling and face-to-face meetings with GPs are an important mode of drug promotion. However, personal visits to practices are offset by higher costs compared to telephone surveys (Sibbald 1994). Overall, numerous factors seem to influence GPs' response rates to completion of questionnaire (Cartwright 1968) and cost-effective strategies are needed to improve response rates from private sector GPs as the data are essential in contributing to health service planning and provision.

Problems diagnosing childhood asthma

The absence of a "gold standard" and unresolved methodological issues around the use of objective peak flow measurements (variability or airway responsiveness) (Britten 1998; Barach 1994; Wardlaw 1999), are problems in diagnosing asthma in children. In this study GPs believed that problems in identifying symptoms seemed to be largely attributed to the variable and unpredictable nature of asthma. The symptom of wheeze seemed to be singled out as an unreliable indicator in children as it may not always be present. This finding was

also confirmed from results obtained in the in-depth interviews. Since the symptom of wheeze lacks specificity and sensitivity (Pratter 1983) clinicians need to rely on other diagnostic indicators such as cough, which may be the sole presenting manifestation of asthma (Corra 1979). Therefore, in primary care setting that lacks an objective tool, a more reliable approach would be to use cough and / or wheeze as diagnostic indicator(s), with a positive response to a bronchodilator used to further confirm its presence.

History-taking

History taking remains crucial in making an accurate diagnosis and providing appropriate therapy. However, very short consultation times (Howie 1989; Calnan 1988; Kristiansen 1993; Groenewegen 1991) may preclude GPs from proper history taking. A checklist containing elements of history taking during asthma visits however, seems a useful tool (Crain 1999). It would facilitate more probing from attending clinicians to elicit more specific and relevant information and not only would patients benefit from closer attention of the disease (Tseng 1988), but it would increase in awareness and knowledge of the disease. Clear-cut indicators would improve GPs' history-taking when diagnosing asthma in children.

GPs perceived that a child being labelled as having "asthma" would be associated with a severe grade of illness and debilitation among parents. The use of other descriptions for 'asthma' have also been widely reported locally and abroad (Jones 2000; Ehrlich 1998; Jones 1990; Anderson 1981; Spykerboer 1986, Donnelly 1987). In this study, even though GPs are uncomfortable calling the child "asthmatic" they would tend to prescribe bronchodilators. In contrast, other studies have highlighted that children labelled with 'asthma' are much more likely to be using anti-asthma drugs (Anderson 1981; Speight 1983). Therefore, GPs would need to increase parental awareness to symptoms, address their fears and misconceptions, and promote better understanding and acceptance of asthma and its' treatment, especially in a community associated with high prevalence of the disease.

GPs rely primarily on information from parents to assess the child's symptoms and to make

a diagnosis, but such information may not always be accurate / adequate. Different caregivers accompanying the child during consultations, lack of awareness of asthma severity, insensitivity to the presence of symptoms and reluctance to accept the diagnosis are barriers to making a proper diagnosis. Such problems seem to be also prevalent in developed countries (Wilson 1993). A possible explanation is that in some local dialects no words exist for “asthma” or for “wheezing” (Weinberg 1994), and this is likely for the Afrikaans speaking communities. Therefore, these parents may not be able to communicate the presence of such symptoms in children. Reports of poor communication between GPs and parents have been noted in other asthma studies (Wilson 1993; Reddihough 1978) which could lead to a delay in the diagnosis. Although GPs were unlikely to admit this in the qualitative interviews, we felt it would be too sensitive an issue to probe. GPs need to discuss misconceptions, reassure and improve parental understanding of varying symptom severity in childhood asthma.

GPs may not risk communicating the diagnosis of asthma to parents because of the perceived social stigma associated with the disease. Poor parental acceptance and GPs concern that parents would seek a consultation at another practice prevents GPs from communicating the diagnosis of asthma. Such poor transfer of information would impact negatively on the health of the asthmatic child. The use of appropriate therapy would be delayed, leading to deterioration in lung function and increase in hospital/ clinic visits, increase in school absenteeism and a financial burden for the family (Wissow 1988; Anderson 1983, Barnes 1996).

Problems in the treatment of asthma

Findings from the interviews showed that GPs’ lacked awareness to drug treatment based on changing asthma severity, and that they tended to prescribe oral drug therapy even though it was not first-line. Findings from the survey confirmed the reasons for GPs not adhering to guideline recommendations.

Inhaled medication seemed to be under-used because GPs felt that oral bronchodilators

were cheaper and were an easy mode of administration when treating an asthmatic child. Further, GPs perceived that fear of the use of inhalers was associated with misconceptions that the child would become 'addicted' and that it would 'weaken the heart' especially among the lower socio-economic communities. Parental misconceptions associated with inhaler therapy have been widely reported (Lim 1996; Mesters 1991). GPs perceived that lack of time during consultations and low literacy levels in the community further hindered them from encouraging inhalers. The cost-effectiveness of inhaled therapy for the treatment of chronic childhood asthma needs to be highlighted to GPs and care-givers.

Spacer therapy

The guidelines recommend the use of delivery devices to help children with poor inhaler technique but in the qualitative study, GPs seemed unaware of the evidence for the effectiveness of spacer therapy. The survey confirmed that a large number of GPs were unaware of the effectiveness of these drug delivery devices. Spacers have been found in a systematic review to be as effective as nebulisers for acute asthma (Cates 1998). Spacer therapy is also notably cheaper than nebulisers. The annual cost of simple nebuliser therapy for acute asthma is R1885.00 (Green 1998), and commercially available spacers from local pharmacies range from R60.00 to R80.00 (personal communication 2000). However, commercial spacers may not be affordable to patients from lower income communities and the mouth-piece of some commercial spacers may not be suited for use with certain inhalers. In a recent study Zar and colleagues (1999) found in a randomised trial that a 500ml plastic bottle is an effective alternative to a conventional spacer. The authors found that a 200ml polystyrene cup gave significantly less bronchodilation (median increase in: forced expiratory volume [FEV₁] 0%; peak expiratory flow [PEF] 12%) when compared with a conventional spacer (37%; 59%); sealed 500ml bottle (33%; 36%); unsealed 500ml bottle (18%; 21%) ($p > 0.05$ for difference between groups). An educational message directed to primary care practitioners encouraging the use of spacer therapy in asthmatic children would help to improve adherence to inhaler therapy.

Problems associated with preventive care

The guidelines recommend the early use of anti-inflammatory therapy. However, GPs perceived many barriers to preventive care in asthmatic children. GPs' felt reluctant to prescribe steroid therapy in children because of the side-effects and believed that parental fear and high costs reduce adherence. These findings confirmed those in the interviews.

The safety of long-term inhaled steroid therapy in asthmatic children has been noted with low doses. Agertoft and Pedersen (1994) showed that growth in children with asthma is not stunted in regular daily doses up to 400 μ g and that early intervention with inhaled steroids prevents development of irreversible airway obstruction. The researchers further confirmed their finding that asthmatic children on long-term steroid therapy with a mean average dose of 412 μ g attain normal height in adulthood (1996).

Inhaled steroids for long-term treatment of chronic asthma have been shown to be cost-effective. Rutten-van Molken and colleagues (1995) found that the addition of an inhaled steroid to maintenance beta-2 agonist therapy results in a small but net increase in health care costs of US\$ 201 per patient. This combined therapy is associated with improvements in lung function, hyperresponsiveness and symptom-free days when compared to beta-2 agonist monotherapy. These findings are further supported by Konig and Shaffer (1996) who found that annual emergency department visits and hospitalisations decreased significantly in severe asthmatic children treated with inhaled steroids, relative to mild asthmatic children who had only received bronchodilator therapy as needed ($p < 0.05$). A further similar finding showed that for developing countries inhaled steroids is cost-effective therapy for chronic asthma (Perera 1995). However, in the private sector in South Africa there seems to be relatively low use of generic products and non-conformity with national childhood asthma guidelines (Rothberg 1996). Doctors' knowledge of drug costs are also generally poor (Ryan 1992). Greater awareness to the use of therapeutically equivalent cheaper alternatives is necessary. Evidence on the cost-effectiveness of inhaled corticosteroids (Rutten-van Molken 1995; Perera 1995) for moderate and severe asthma needs to be highlighted.

Smoking

Findings from both the interviews and the survey confirmed that parental adherence to non-exposure of children to passive smoking was poor. There seemed to be ambivalence regarding advice on smoking avoidance as a preventive measure for childhood asthma. GPs' felt that advice on smoking avoidance in children was important. Similarly in a UK study, GPs perceived lack of parental co-operation on smoking avoidance (Coates 1994) and this could be evidenced from the results of a survey which showed that about 50% of parents smoked cigarettes even though 80% knew the deleterious effect of smoking on asthma (Moosa 1997). A systematic review concluded that training health professionals to provide smoking cessation interventions has a measurable effect on professional performance (Lancaster 2000). Reminders issued to parents at clinical practices advising against passive smoking by asthmatic children is needed. GPs' active involvement to promoting parental health education strategies at primary care practices is needed.

Generalisability

The sample appears to be a representative sample of GPs working on the Cape Flats. The local telephone directory provided a reasonably complete sampling frame from which a random sample was selected, and the response rate in this sample achieved a high of 97 %. The precision of the estimates of prevalence of the barriers appears adequate in that the 95 % confidence intervals are narrow enough for the purpose of the survey. Some categories of the perceived barriers could also apply to public sector practitioners, for example the diagnosis and treatment, while other barriers are more specific to private sector-practice settings. The findings of this survey appear generalisable to GPs working in similar setting in developing countries.

Implications for primary care childhood asthma

Our barriers studies indicate that GPs are exposed to several internal and external constraints to clinical practice, findings which are consistent with that identified by Cabana and co-workers (2000). External barriers were associated with non-adherence to preventive measures and poor management of asthma. Even though there was a sense to change the

behaviour of smoking, parental non-adherence were likely to discourage GPs from not counselling and promoting preventive care regularly. GPs did not view asthma as a disease that could be adequately controlled because of its chronic nature, and felt that management of the disease should be considered in context within broader socio-economic constraints. Private sector GPs are likely to resist an involvement of external agency influencing their practice style (Volmink 1993), since it is likely that such an approach could infringe on their clinical autonomy.

Cabana (2000) refers to internal barriers to guideline adherence, which GPs in our study could have alluded to, other than those they had explicitly mentioned. GPs made no mention of the recent national guidelines and many were not familiar with the clinical recommendations and evidence-based practices. Our GPs showed shortage of time to keep updated with the guidelines. There was no visible mechanism for distribution of the guidelines to them and they seemed to have little or no contact with specific academic institutions or support centres. There are no incentives offered to GPs to adhere to guidelines to improve the quality of care. Impotence to patient care and non-adherence to guidelines were likely to lack GP involvement in encouraging follow-up care. GPs may facilitate delaying the diagnosis of asthma because of the stigma associated with it.

Private-sector GPs encounter numerous problems in the diagnosis, treatment, preventive measures for primary care childhood asthma. Educational outreach improvement programmes to address these problems need to be developed and implemented.

Localised clinical practice guidelines that highlight simple diagnostic, pharmacotherapeutic and preventive measures are needed for private sector practitioners. Key primary care messages for asthma in children should focus on useful diagnostic indicators, treatment based on severity, and the early use of preventive drug therapy for moderate to severe asthma and health promotion strategies. Practitioners need to be made aware of cost-effective care such as inhaler and spacer therapies for asthma.

GPs' awareness to guideline recommended approaches to care and those problems that could be addressed by an educational outreach approach formed the basis of the intervention.

References

- Agtertoft L, Pedersen S. Effects of long-term treatment with an inhaled corticosteroid on growth and pulmonary function in asthmatic children. *Respir Med* 1994; 88: 373-381.
- Agtertoft L, Pedersen S. Effect of long-term treatment with inhaled budesonide on adult height in children with asthma. *N Engl J Med* 2000; 343: 1064-1069.
- Anderson HR, Bailey PA, Cooper JS, Palmer JC. Influence of morbidity, illness label, and social, family, and health service factors on drug treatment of childhood asthma. *The Lancet* 1981; ii: 1030-1032.
- Anderson HR, Bailey PA, Cooper JS, Palmer JC, West S. Morbidity and school absence caused by asthma and wheezing illness. *Arch Dis Child* 1983; 58: 777-84.
- Barach EM. Asthma in ambulatory care: use of objective diagnostic criteria. *J Fam Pract* 1994; 38: 161-165.
- Barnes PJ, Jonsson B, Klim JB. The costs of asthma. *Eur Respir J* 1996; 9: 636-42.
- Britten J, Lewis S. Objective measures and the diagnosis of asthma. (editorial) *Br Med J* 1998; 317: 227-8.
- Butler C, Rollnick S, Pill R, Maggs-Rapport F, Stott N. Understanding the culture of prescribing: qualitative study of general practitioners' and patients' perceptions of antibiotics for sore throats. *Br Med J* 1998; 317: 637-642.
- Cabana MD, Ebel BE, Cooper-Patrick L, Powe NR, Rubin HR, Rand CS. Barriers pediatricians face when using asthma practice guidelines. *Arch Pediatr Adolesc Med* 2000; 154: 685-93.
- Calnan M, Butler JR. The economy of time in general practice: an assessment of the influence of list size. *Soc Sci Med* 1988; 26: 435-441.
- Cartwright A, Ward AWM. Variations in general practitioners' response to postal questionnaires. *Br J Prev Soc Med* 1968; 22: 199-205.
- Cates CJ. Comparison of holding chambers and nebulisers for beta-agonists in acute asthma. In: Cates C, Ducharme F, Gibson P, Jones P, Rowe B, Wolf F (eds.). Airways module of the Cochrane Database of Systematic Reviews, Cochrane Library [CDROM and online]. Cochrane Collaboration; issue 1. Oxford: Update Software; 1998.
- Coates JR, Steven ID, Beilby J, Coffy G, Litt JCB, Wagner C. Knowledge of and reported asthma management among South Australian general practitioners. *Br J Gen Pract* 1994; 44: 123-6.
- Coleman T, Wilson A. Anti-smoking advice in general practice consultations: general practitioners' attitudes, reported practice and perceived problems. *Br J Gen Pract* 1996; 46: 87-91.
- Corra WM, Braman SS, Irwin RS. Chronic cough as the sole presenting manifestation of bronchial asthma. *N Engl J Med* 1979; 300: 633-637.
- Coutts JAP, Gibson NA, Paton JY. Measuring compliance with inhaled medication in asthma. *Arch Dis Child* 1992; 67: 332-3.

Crain EF, Mortimer KM, Bauman LJ, Kerckmar CM, Weiss KB, Wissow L, Mitchell H, Rotor D. Pediatric asthma care in the emergency department: measuring the quality of history-taking and discharge planning. *J Asthma* 1999; 36: 129-138.

Deehan A, Templeton L, Taylor C, Drummond C, Strang J. The effect of cash and other financial inducements on the response rate of general practitioners in a national postal study. *Br J Gen Pract* 1997; 47: 87-90.

Donnelly JE, Donnelly WJ, Thong YH. Parental perceptions and attitudes toward asthma and its treatment: a controlled study. *Soc Sci Med* 1987; 24: 431-437.

Ehrlich RI, Du Toit D, Weinberg EG, Jordaan E, Volmink JA, Zwarenstein M. Underrecognition and undertreatment of asthma in Cape Town primary school children. *S Afr Med J* 1998; 88: 986-993.

Fahey T. Antibiotics for respiratory tract symptoms in general practice. (editorial) *Br J Gen Pract* 1998; 48: 1815-1816.

Global Initiative for Asthma (GINA). Global strategy for asthma management and prevention. National Heart, Lung and Blood Institute (NHLBI) / World Health Organisation (WHO) workshop report. National Institutes of Health. NHLBI Publication number 95-3659. January 1995.
<http://www.ginasthma.com/WORKSHOP/DEFAULT.HTML>

Green RJ, Plit M, Plessis du W, Rothberg AD. Asthma in South Africa –a long way to go. *S Afr Med J* 1998; 88: 1389-1393.

Groenewegen PP, Hutten JBF. Workload and job satisfaction among general practitioners: a review of the literature. *Soc Sci Med* 1991; 32: 1111-1119.

Henry RL, Fitzclarence CAB, Henry DA, Cruickshank D. What do health professionals know about childhood asthma? *J Paediatric Child Health* 1993; 29: 32-5.

Howie JGR, Porter AMD, Forbes JF. Quality and the use of time in general practice: widening the discussion. *Br Med J* 1989; 298: 1008-10.

Jones A, Sykes A. The effect of symptom presentation on delay in asthma diagnosis in children in a general practice. *Respir Med* 1990; 84: 139-142.

Jones SL, Weinberg M, Ehrlich RI, Roberts K. Knowledge, attitude and practices amongst parents of children with asthma/wheeze in Cape Town. *J Asthma* 2000; 37: 519-28.

Konig P, Shaffer J. The effect of drug therapy on long-term outcome of childhood asthma: a possible preview of the international guidelines. *J Allergy Clin Immunol* 1996; 98: 1103-11.

Kristiansen IS, Mooney G. The general practitioner's use of time: is it influenced by the remuneration system? *Soc Sci Med* 1993; 37: 393-399.

Lancaster T, Silagy C, Fowler G. Training health professionals in smoking cessation (Cochrane Review). In *The Cochrane Library*, issue 3, 2000. Oxford: Update Software.

Lim SH, Goh DYT, Tan AYS, Lee BW. Parent perceptions towards their child's use of inhaled medications for asthma therapy. *J Pediatr Child Health* 1996; 32: 306-309.

MacFarlane J, Holmes W, Macfarlane R, Britten N. Influence of patients' expectations on antibiotic management of acute lower respiratory tract illness in general practice: a questionnaire study. *Br Med J* 1997; 315: 1211-1214.

Mesters I, Pieterse M, Meertens R. Pediatric asthma, a qualitative and quantitative approach to needs assessment. *Pat Educ Counsel* 1991; 17: 23-34.

Milgrom H, Bender B, Ackerson L, Bowry P, Smith B, Rand C. Noncompliance and treatment failure in children with asthma. *J Allergy Clin Immunol* 1996; 98: 1051-7.

Moosa SEI, Henley LD. An evaluation of parental knowledge of childhood asthma in a family practice setting. *S Afr Med J* 1997; 87: 42-45.

Neville RG, Hoskins G, Smith B, Clark RA. How general practitioners manage acute asthma attacks. *Thorax* 1997; 52: 153-6.

Nizami SQ, Khan IA, Bhutta ZA. Drug prescribing practices of general practitioners and paediatricians for childhood diarrhoea in Karachi, Pakistan. *Soc Sci Med* 1996; 42: 1133-9.

Parkin PC, Saunders NR, Diamond SA, Winders PM, Macarthur C. Randomised trial spacer v nebuliser for acute asthma. *Arch Dis Child* 1995; 72: 239-240.

Perera BJC. Efficacy and cost effectiveness of inhaled steroids in asthma in a developing country. *Arch Dis Child* 1995; 72: 312-316.

Pratter MR, Hingston DM, Irwin RS. Diagnosis of bronchial asthma by clinical evaluation. *Chest* 1983; 84: 42-47.

Reddihough DS, Landau L, Jones HJ, Rickards WS. Asthma: the doctor's failure in communication. *N Z Med J* 1978; 88: 322-325.

Rothberg AD, Walters L, Van Schoor J, Green R. Analysis of pediatric prescribing profiles in two health-funding systems. *S Afr Med J* 1996; 86: 672-674.

Rutten-van Molken MPMH, Van Doorslaer EKA, Jansen MCC, Kerstjens HAM, Rutten FFH. Costs and effects of inhaled corticosteroids and bronchodilators in asthma and chronic obstructive pulmonary disease. *Am J Respir Crit Care Med* 1995; 151: 975-82.

Ryan M, Yule B, Bond C, Taylor R. Knowledge of drug costs: a comparison of general practitioners in Scotland and England. *Br J Gen Pract* 1992; 42: 6-9.

Sharek PJ, Bergman DA. Beclomethasone for asthma in children: effects on linear growth. *Cochrane Review*. In: *The Cochrane Library*, issue 1. Oxford: Update Software 2000.

Sibbald B, Addington-Hall J, Brennehan D, Freeling P. Telephone versus postal surveys of general practitioners: methodological considerations. *Br J Gen Pract* 1994; 44: 297-300.

Speight ANP, Lee DA, Hey EN. Underdiagnosis and undertreatment of asthma in childhood. *Br Med J* 1983; 286: 1253-6.

Spykerboer JE, Donnelly WJ, Thong YH. Parental knowledge and misconceptions about asthma: a controlled study. *Soc Sci Med* 1986; 22: 553-558.

Steckler A, McLeroy KR, Goodman RM, Bird ST, McCormick L. Toward integrating qualitative and quantitative methods: an introduction. *Health Educ Quart* 1992; 19: 1-18.

Streiner DL, Norman GR. *Health measurement scales. A practical guide to their development and use.* Oxford. Oxford University Press: 1989.

Tseng RYM. Self-directed learning of history taking in childhood asthma. *Medical Teacher* 1988; 10: 351-53.

Volmink JA, Metcalfe CA, Zwarenstein M, Heath S, Laubscher JA. Attitudes of private general practitioners towards health care in South Africa. *S Afr Med J* 1993; 83: 827-833.

Wardlaw AJ, Pavord ID. Clinicians should be proactive in testing for asthma. *Br Med J* 1999; 318:258.

Weinberg EG. Problems of childhood asthma in a developing society. *Cont Med Educ* 1994; 12: 17-27.

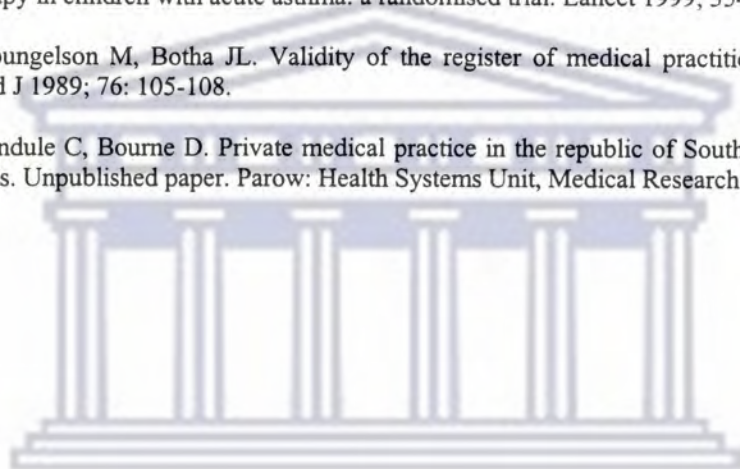
Wisow LS, Gittlesohn AM, Szklo M, Starfield B, Mussman M. Poverty, race and hospitalisation for childhood asthma. *Am J Public Health* 1988; 78: 777-82.

Wilson SR, Mitchell JH, Rolnick S, Fish L. Effective and ineffective management behaviours of parents of infants and young children with asthma. *J Ped Psychol* 1993; 18: 63-81.

Zar HJ, Brown G, Donson H, Braithwaite N, Mann MD, Weinberg EG. Home-made spacers for bronchodilator therapy in children with acute asthma: a randomised trial. *Lancet* 1999; 354: 979-82.

Zwarenstein M, Youngelson M, Botha JL. Validity of the register of medical practitioners for manpower planning. *S Afr Med J* 1989; 76: 105-108.

Zwarenstein M, Vundule C, Bourne D. Private medical practice in the republic of South Africa. Description and short term trends. Unpublished paper. Parow: Health Systems Unit, Medical Research Council, 1996.



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CHAPTER 7

THE EDUCATIONAL OUTREACH INTERVENTION TO IMPROVE CARE OF CHILDHOOD ASTHMA

In this chapter I discuss the determinants of the design of the intervention. I summarise the barriers identified in GP determinants studies, and provide a rationale for the contents and script of the key primary care messages for childhood asthma promoted in this intervention. In addition I discuss the design and elements of support used for the intervention.

Determinants of the design of the outreach intervention

The intervention was designed to address as many as possible of the barriers perceived by the GPs and/or identified in my preparatory qualitative and quantitative research. The barriers that were related to knowledge and attitudinal deficiencies on the part of practitioners are clearly easier to address through an educational outreach intervention, than are barriers which are explicitly structural, social or economic. The next section summarises the attitudinal and knowledge deficiencies that were addressed by the intervention. Even though the social, economic and structural barriers to improved asthma health lie outside the realistic reach of this intervention, the section after that describes some of the contextual factors taken into account in the design of the intervention.

Summary of GP knowledge and attitude barriers

Data obtained from both the key informant interviews and the random GP sample survey indicated that GPs perceived numerous barriers in the diagnosis, treatment and overall management of asthma.

Diagnosing asthma

When diagnosing asthma in children GPs seemed uncertain about the use of clear cut-diagnostic indicators. GPs seemed to rely on the presence of only one diagnostic indicator, namely 'wheeze', whose absence does not exclude a diagnosis of asthma. GPs further lacked awareness of the recurrence of symptoms of cough, wheeze and chest-tightness in children. GPs felt that disorders of the respiratory tract masked the symptoms of asthma, but they seemed unaware that recurrent "chestiness" is most

likely asthma. While GPs tended to prescribe bronchodilators, they seemed unable to detect responses to such therapy as indicative of asthma, and would need several consultations to confirm the diagnosis in children. This could be due to GPs lack of proper history taking and/ or poor communication during a consultation because of perceived parental stigma associated with asthma and GPs' lack of confidence to label a child as 'asthmatic'.

Parental inertia and delays

GPs felt that parents were insensitive to and overlooked the severity of symptoms of asthma in children, which would lead to a delay in seeking medical consultation. GPs felt that parents consulted when the child was moderate or severely asthmatic. Further GPs lacked awareness that the treatment algorithm for childhood asthma depended on symptom severity. Therefore, symptom assessment seemed poor in general practice setting.

GP assessment of severity

GPs seemed unaware on how to classify asthma in children and prescribed therapy contrary to guideline recommendations. Their knowledge of how the frequency of symptoms could be used to grade asthma severity was poor and they seemed unaware that this could be used to guide the appropriateness of therapy.

GP resistance to inhaled and steroid therapies

The use of preventive drug therapy seemed inadequate in practice setting. GPs seemed reluctant to prescribe inhaled steroids for children due to perceptions of parental fear, high costs and side-effects associated with such modes of therapy. GPs seemed to lack knowledge of the relative safety of inhaled steroid at doses of less than 400mcg per day and the cost-effectiveness of such therapy in the long-term treatment of children with moderate to severe asthma. In addition, some GPs' reluctance to prescribe short term oral steroids for acute asthma may be attributed to their being unaware of the need to taper the dose.

Adherence to treatment

GPs believed that poor compliance with prescribed medication was a barrier to effective care and seemed to think it was due to lack of parental knowledge about appropriate drug use. GPs believed that parents would find it useful to differentiate between preventers and reliever medication. This could indicate GPs' lack of

successful communication with parents about the different therapeutic roles of each of the drugs recommended, despite GPs' awareness that such information would be useful to parents.

Continuity of care

Lack of follow-up care seemed evident in GP statements. GPs said that they encouraged parents to bring children for follow-up care routinely (every 2nd/3rd month), and many claimed to charge a reduced consultation fee. No specific appointments were made. Even the alternative to regular follow up, i.e. advising parents to return if there was a flare-up, seemed limited to a proportion of patients.

Preventive and promotive measures

GPs believed that adherence to preventive measures was limited and were discouraged by a failure from promoting healthy air around asthmatics. GPs believed that parents did not adhere to advise on smoking avoidance, as this advice caused conflict between parents. Such perceptions appeared to limit GPs' active involvement in promoting preventive care.

Summary of contextual factors modifying the intervention

Multifaceted approach

In view of the large number of barriers and the different barriers influencing each practitioner, the use of a single intervention aimed at a single or narrow range of barriers, would have been unlikely achieve the goal of improved asthma care. A multifaceted approach seemed most suitable as it could deal with different barriers in a single interaction (Wensing 1994). Since GPs are likely to experience different barriers at different times, a multifaceted intervention which can be tailored to the individual practitioners barriers seemed most likely to be effective. We conceived of a multifaceted intervention, which could target a wide range of barriers, but could be tailored to each GP's current need(s).

Solo GP oriented

To address all the barriers perceived by GPs in the determinants studies was not possible in this intervention, which could only address cognitive and attitudinal barriers to behavior change.

The direct structural, social and regulatory constraints to appropriate primary care could not be addressed. These included the unorganised structure of private practice, the need for social support to families with asthmatic dependents, compulsory accreditation for practitioners, assessing the quality of generic medication received from parallel importation. However, some of the indirect effects of these contextual issues were taken into account as modifying factors. For example, the isolated nature of general practice, time constraints, perceived high patient load and the economic constraints to practise were factors borne in mind in the design of the intervention.

GPs in the UK work as part of an organised National Health System (NHS) in group practices, with a longstanding acceptance of NHS efforts to guide their practise. This is not so in South Africa, where GPs work as self employed individual entrepreneurs in the private sector, mainly in solo-practices. South African GPs resist external influence on their practice style (Volmink 1993), view attempts to implement change as threatening, and respond to them adversarially. For example, implementation of the National Drug Policy (1996) led to a furore amongst GPs to protect their "inherent" dispensing right (Gilbert 1998). Significant resistance was also noted from private sector GPs to the idea of a proposed unified national health system (Volmink 1993) and this could be linked to cultural differences (Zwarenstein 1996). In South Africa, the government's efforts to reform the private sector health care have also been received with mixed reactions (Van den Heever 1998).

The isolated and individualistic nature of private practice also had a structurally determining influence on the choice of a mode of interaction with GPs. Clearly if GP's saw themselves exclusively as individual practitioners, with weak or no allegiances to a group, conducting interactive (focus) group discussions to change behaviour would not have been feasible or effective.

Sensitivity to profit oriented practise

GP prescribing patterns, especially in developing countries, are widely thought to be dictated by commercial information and incentives offered by drug companies and distributors (Melrose 1982; Trostle 1996, Yudkin 1980). External regulation and other countervailing forces are weak, and so private-sector medical practices may

well be come extremely profit-oriented. For example, drug company advertising and offers of financial incentives (pricing and profit) have a strong influence on prescribing pattern (Bennett 1994). A large proportion of GPs (75% in Manila; 95% in Pakistan) with irrational prescribing patterns, cited drug company promotional strategies and financial incentives as their source of prescribing information (Lexchin 1992; Melrose 1982). Further reports indicate that private GPs' prescribing regimens in primary care cost three times as much to standard clinical protocols (Garner 1993).

Limited access to unbiased information

Private GPs' easiest access to clinical /drug information is via pharmaceutical company representatives, and access to neutral, scientific and evidence based information is limited.

The educational outreach visits and presentation of the information to GPs in this study was designed using principles of social marketing (Soumerai 1990). Since, GPs would be very familiar with the same technique used by pharmaceutical representatives, our intervention would not be disruptive to their practice setting.

Since our primary aim was to improve the quality of health of asthmatic children, this could lead to a reduced profit margin for the practice if branded drugs (high profit margin) are replaced by generics (low profit margin). Since all GPs provide a dispensing service, increasing GPs' awareness of the range and costs of drugs for childhood asthma would benefit the large number of low-income parents receiving care. In all likelihood, these patients would not have been prescribed inhaled steroids at all. We aimed to increase the number of people on effective therapy but to minimise medical costs by promoting GP's use of cheaper generic drug therapies. GPs in South Africa are accustomed to brand-name prescribing, so we did not explicitly advise GPs to replace brand name drugs with generic drugs. We aimed to compare and highlight cost differences across a wide range of generic and original drug products. We thus aimed to encourage effective care by increasing GPs' awareness to affordable generic steroid and beta-2 stimulant inhaler therapies. This would increase the proportion of patients on appropriate treatment, but without taking too moralistic a stance on the generic versus the brand issue.

Thus, taking the constraints into account we felt that addressing the individual needs of GPs at their practice setting would be most effectively achieved in a multifaceted face-to face educational interaction with individual GPs at their own practices. We specifically selected GP barriers that could be addressed through education, persuasive communication, reminders and prompts, and designed the outreach intervention to focus on these.

Contents and script of key primary care messages for asthma in children

The eight care messages (Appendix 5) aimed to change GP behaviour by addressing barriers identified in the determinants studies. The purpose of the key messages was to provide GPs with a concise, up-to-date relevant and unbiased management principles for childhood asthma. The messages were primarily selected from the childhood asthma guidelines (1994) and from an evidence base. The term “messages” was chosen because it denotes key management principles for childhood asthma (Boissel 1997) Each message aimed to improve performance with respect to one therapeutic objective. The messages were listed in order of priority, in simple concise statements. Each primary care message is quoted and discussed in list order below.

The presentation style of the key messages aimed to draw GPs’ attention. The messages were printed on a shaded blue and white paper, bulleted and in concise statements for quick reference. The list was bordered in dark blue highlighting the names of the two organisations. The key primary care messages formed the foundation upon which the supporting educational material consisting of the 3-part desk folder (below) and the poster (below) were designed.

The key messages were also the foundation of the face-to-face meeting with the GPs. At the beginning of this meeting the key messages were mentioned to introduce and remind GPs about the purpose of my visit.

- A: Dr, pleased to meet you. I’m Angeni Bheekie, a pharmacist, working with the MRC and NAEP [referring to their logos on the key messages]. As you may recall these messages [showing the key messages sheet] were posted to you. Now, I’d

like to show you [referring to folder and poster] to see how we could apply the messages in your practice. Each of these messages are especially formatted for use in primary care practices, to enable practitioners like yourselves to apply them during consultations with children presenting with asthma.

Half way through our discussion I drew the GP's attention to the parent's asthma information card:

A: Let's look at the parent's card. You can use it to clarify parent's fears and misconceptions about the use of the inhaler therapy prescribed for their child.....(script follows, from message to message, and covering all aspects of the folder and poster, in order and with emphases which respond to the practitioner's comments and expressed needs..

Diagnosis

- *In general practice asthma should be diagnosed in the presence of a recurrent cough and/ or wheeze that responds to a bronchodilator. Children under 2 years with these symptoms should be referred.*

Our barriers studies suggested that the GP target group for this intervention was not using, nor open to the use of any lung function tests to diagnose asthma, so our intervention emphasised the use of symptom based diagnostics. As described in the chapter 6 on our barriers study, GPs' appear to rely entirely on current episode symptoms and signs in making the diagnosis. This, at least in part, explains the high proportion of children with probable asthma who remain without a diagnosis (Ehrlich 1998) in spite of their frequent attendance for care of acute episodes. Each of which is treated without a formal diagnosis or a longer-term treatment plan.

GP barriers to diagnosing asthma appear to be related to their uncertainty of the meaning of current signs and symptoms, related to the variable nature of the disease. The physical examination in such children may reveal wheezing (high-pitched whistling sounds when breathing out) at some times but not others, so lack thereof does not exclude asthma. Other indicators should supplement the diagnosis of asthma in children.

Both subjective and objective measurements are recommended when making a clinical diagnosis of asthma in children. (NHLBI 1997). In this intervention, no

attempt was made to urge GP's to use objective peak flow measurements because the determinants studies indicated that they did not place much value on the results of these tests. These interviews made clear that GP's are not willing to use them in their practices largely because time constrains use of a technique for which each patient must be carefully trained and observed. In spite of evidence to the contrary (Ignacio-Garcia 1995) a US study showed that practitioners continue to believe their clinical assessment of diagnosis and severity is adequate, with a limited need for objective measurements (Werk 2000).

A number of further problems exist with the use of objective measurements in diagnosing asthma in children. The most important problem is that a once-off, single PEFr measurement during a consultation is an inaccurate assessment of lung function due to the variability of asthma over time. It is quite possible that at presentation to the doctor, the patients peak flow is within normal range, even if it had been severely reduced earlier. Secondly, PEF is not easy to measure accurately. The rapid exhalation manoeuvre is effort dependent and poses difficulties in training adults, let alone children, to perform it properly. These factors may explain why the accuracy of PEFr measurements have been found to be poor (Sly 1994; Eid 2000) and have low reproducibility (Frischer 1995) in children with asthma. While in theory it would be possible to use the PEFr for a series of measurements, or for frequent self-monitoring at home, neither option is realistic in the setting which we studied. Repeated PEFr measurements might give an accurate measure of lung function, but such a series of visits to the GP are expensive for the patient and time-consuming and would not be feasible in these clinical settings. PEFr home-monitoring would depend on training of the child and family members in its conduct, which would have been time consuming in this setting and unacceptable to GP's. It could also be difficult for caregiver's having low literacy levels, and, given the price of even the cheapest peak flow meter, is an unattractive option.

Several studies have shown that PEFr and symptom histories are equally effective diagnostic tools (Charlton 1990; Grampian 1994; Malo 1993; Turner 1998). We considered that a recommendation for careful symptom history-taking was the most pragmatic approach for GPs in our research setting to make a valid and early diagnosis of asthma in children attending their practices.

A longer term symptom history could help identify a potentially asthmatic child, as the recurrent pattern of attacks is so characteristic of asthma. The intervention aimed to encourage GPs to diagnose asthma in children as early as possible by encouraging them to use historic patterns of symptoms, rather than relying only on symptoms present in the current episode. A recurrent cough was thus the prime indicator.

Substitute labels such as 'recurrent bronchitis' or 'tight chest' are common in the community in which the study was conducted (Jones 2000; Ehrlich 1998) and in another UK study (Jones 1990). In the barrier studies, GPs indicated that parents are resistant to the diagnosis of asthma. The script for this key diagnostic message therefore mentioned that many of the patients with these substitute labels are in fact asthmatic, raised doctors awareness of this alternative label and the need to go beyond it to the actual diagnosis.

The script emphasised reversibility of airway obstruction (relief of shortness of breath and reduction in wheeze upon inhalation of a bronchodilator) as a diagnostic indicator.

To help GPs reach a diagnosis in spite of the inappropriate use of medication that may mask the symptoms the following script was used.

A: Dr, children that do consult with you could most likely be using bronchodilators such as theophylline syrup. These children could be undiagnosed or undertreated asthmatics and by inquiring about their response to and frequency of use of such medication would give you an idea firstly, whether it is asthma (or not) and how severe the condition actually is.

Other indicators contributing to the diagnosis include a patient history of allergy, a family history of asthma or allergies such as atopic dermatitis (NHLBI 1997) and precipitating factors such as infections and irritants. Although each of the indicators is not diagnostic individually, the presence of multiple indicators increases the probability of and helps confirm a diagnosis of asthma (ibid). Multiple indicators were therefore included in the desk folder to aid GPs in diagnosing asthma in children, but were not strongly emphasised in the script.

In infants below the age of 2, the diagnosis of asthma is difficult because of similarity of symptoms occurring in other diseases such as bronchiolitis and pneumonia (ibid), so specialist referral is recommended. We accepted this approach, focussing our key messages on raising GP awareness that asthma exists as a possible diagnosis in young children, and emphasising the need for specialist referral for diagnosis. The goal was to reduce repeat episodic treatment for non-specific diagnoses.

The final aspect of diagnosis promoted in this key message was the need for GP's to make the diagnosis explicit to patients and their carers. In the determinants studies it appeared that GPs were making imprecise diagnoses, postponing diagnosis indefinitely or using unclear terms such as "tight chest" in order to avoid using the term 'asthma'. This was thought to be stigmatising and difficult for parents to deal with. To help address stigma an asthma information card aimed to increase parental acceptance of the diagnosis of "asthma" in their children. The hand-held card offered a reminder to GP's and (during the handover and explanation of the card) for GP's to specifically draw parents' attention to the term asthma.

Cost-effectiveness of inhaled anti-inflammatory therapy

- *Anti-inflammatories prevent symptoms and are the most cost-effective treatment. Regular doses (400µg or less) of inhaled steroids have no significant side-effects in children.*

The barriers studies indicated that GP's were reluctant to use steroids, regarding them with some fear as to their side effect profile. GPs also strongly indicated that patients and parents themselves were fearful of steroid side effects, and that GPs were reluctant to undertake reversing these misconceptions. A key message was used to encourage the use of anti-inflammatory therapy. The evidence base for the effectiveness of steroids, their cost saving consequences and the absence of side effects in children became a very important message in overcoming this barrier.

Inhaled anti-inflammatories such as corticosteroids (steroids) (beclomethasone, budesonide, fluticasone) and the cromolyns are mainstay therapy for the long-term

treatment of childhood asthma (Konig1996). Although cromolyns are very effective, with no reports of major adverse effects in children, they are expensive and their use especially in low- income families paying for their medication would be limited. Therefore, the focus of this was the safety and cost-effectiveness of the early and continuous prophylactic use of inhaled steroids for chronic asthma.

Inhaled steroids are effective prophylactic agents which reduce reduce airway inflammation, bronchial hyper-reactivity and exacerbations, thus improving lung function and asthma symptoms (Bisgaard 1997; Calpin 1997). The early use of inhaled steroids improves airway function and control of asthma, leads to reductions in hospital admissions, and minimises the need for bronchodilator therapy (Rowe 1998; Gerdtham 1996).

The effectiveness and cost-effectiveness of inhaled steroids has been demonstrated in numerous studies. Perera (1995) demonstrated a significant 80 % reduction in family health care expenditure on the patient when treating moderate to severe asthmatic children with prophylactic inhaled steroids. There were reductions in school absenteeism, break-through wheezing, hospitalisations and the frequency of severe attacks. This Sri Lankan study was emphasised because its setting in a developing country was likely to seem relevant to our target GPs, but the same findings are common in developed countries (Donahue 1997; Gerdtham 1996, Campbell 1993; Nankani 1990; Rutten-van Molken 1993).

Effectiveness and cost-effectiveness of steroid inhaler therapies was highlighted to GPs using the following script.

A: Dr _____, with emphasis being placed on preventive care, anti-inflammatories especially inhaled steroids are most cost-effective therapies for the long-term treatment of moderate to severe asthmatic patients.

Inhaled steroids have been found to be cost-effective in the long-term treatment of asthma. It helps to control symptoms, prevent attacks by controlling the inflammation that causes the asthma attacks. It improves lung function, decreases the frequency and severity of attacks. Fewer further courses of oral steroids are required, and minimises the need for bronchodilator use. A study conducted in Sri Lanka, in a developing country setting comparable to ours found that there was a reduction in medical expenditure by at least 80 % (referring to the article).

Although cost effectiveness was important, actual initial price itself was identified as a barrier in this low income setting. We therefore designed the materials to highlight the similar cost of usually ineffective therapies such as theophylline syrups with those of effective inhaled steroid therapies.

A reminder for the use of inhaled anti-inflammatory therapy was provided for GPs in the cover of the desk folder, the prompted record card and in the poster. The messages highlighting the cost of drug therapy for asthma in children was presented in a pharmacoeconomic table formatted in the desk folder to increase GPs awareness of the range of low-cost preparations (Generics Dictionary 98). The tabulated format aimed to offer visual prominence and served as easy reference for GPs during consultation especially to the range of low cost anti-inflammatories. The cost categories ranged in multiples of R10.00 starting from the least expensive (below R20.00) listed at the top through to the most expensive (over R150.00) product (s) at the bottom of the column. The pharmacoeconomic table was formatted for steroids and the cromolyns.

Brand names of anti-inflammatories were categorised into each column according to their cost at a specified monthly dosing frequency. Since GPs generally use brand names when writing prescriptions, the messages for the intervention did not aim to promote a specific brand but aimed to emphasise the cost of a monthly course of inhaled anti-inflammatory therapy administered twice daily $\leq 400\mu\text{g}$ dose. Inhaled steroids administered twice daily is as effective as that administered four times a day and offers improved compliance in patients (Mann 1992).

Anti-inflammatory drug therapy is recommended for long-term treatment of moderate and severe asthma and takes about 2 weeks before a therapeutic effect can be seen. Doses of anti-inflammatories are usually prescribed for a course, a month's treatment usually provides a good indication of its therapeutic effect. After practitioner review and reassessment, depending on the severity of the condition, the lowest effective dose of inhaled anti-inflammatory therapy needed to control asthma is recommended for maintenance therapy (SACAWG 1994). Therefore, a monthly

course would allow for sufficient time to reassess the child's asthma status and for the GP to establish the lowest possible effective dose during follow-up visit(s).

To increase GP's awareness of the cost of anti-inflammatory therapy the monthly treatment cost was calculated on twice daily doses of 100µg (for moderate asthma) and 200µg (for severe asthma) respectively for each preparation. The higher dosing frequency was coded as a darker column indicative of severe asthma, facilitate cost comparisons across the different anti-inflammatory preparations. Calculation based on a month's treatment would provide GPs and parents with a quick estimate of the cost of anti-inflammatory therapy and it would help establish a framework within which to communicate this information to parents. Further, such information would serve as a quick cross comparison for cost of anti-inflammatory therapy based on increasing dose frequency for a range of products.

Example of cost calculation for a monthly treatment with an inhaled steroid:

The cost (rands) of inhaled steroid therapy eg. beclomethasone (trade name of product) prescribed at a dose of 100 µg twice daily for a month (30 days), from a complete metered dose inhaler unit containing 200 inhalations, at 50 µg per puff and having a retail price of R61.10 is:

$$\frac{61.10 \times 2 \times 2 \times 30}{200} = R36.66$$

The following script was used for this purpose.

- A: Here's the range of anti-inflammatories that are available for asthma in children (referring to the table for the cost of drug therapy). As you know many parents cannot afford expensive drugs for long-term therapy like these preparations here (referring to the lower half of the particular column) the inhaled steroids. Depending on the child's asthma severity and the prescribed dose (referring to the two dosing frequencies in the table) one can identify the most affordable treatment regimen. When comparing cost, you can see that inhaled steroids are far cheaper than cromolyns. While cromolyns cost over R70.00 per month [referring to the table in the folder], there are a range of much cheaper steroid preparations....here is a range of lowly-priced steroid inhalers (referring to the upper end of the relevant column) which would be affordable to poorer families. . During your consultations this table will help you to explain the cost of these inhaled steroids to parents to help them understand their importance and affordability in the long-term treatment of asthma.

Because bronchodilators are adjunct therapy for the long-term treatment of moderate to severe asthma, the provision of cost information for bronchodilator therapy was placed below that of anti-inflammatory drug treatment in the cost table of the desk folder.

Chronic use of oral steroid therapy leads to growth suppression, dermal thinning, hypertension, diabetes, Cushings syndrome and cataracts. In contrast, the side-effects of long-term inhaled therapy are localised to the oropharynx namely, cough, dysphonia and oral candidiasis. These side-effects can be prevented with the use of spacer devices and mouth-washing after inhalation, to help reduce systemic absorption of inhaled steroids.

Long-term growth retardation in children has not been reported when treated with inhaled steroid doses of up to 400 μ g (Agertoft 1994; Allen 1994). Although a meta-analysis has found significant decrease in linear growth of -1.54cm per year in mild to moderate asthmatic children using inhaled beclomethasone 200mcg twice daily (Sharek 2000), it has been reported that patients who were exposed to steroid therapy during their childhood, their adult height remained unaffected (Harrison 2000b). However, children with severe uncontrolled asthma and those using inhaled steroid doses greater than 400mcg/day are more likely to be predisposed to growth retardation (NHLBI 1997). To allay GPs' fear and misconception about the side-effects associated with the use of inhaled steroids in children the following script was used:

- A: When using inhaled steroids in children doses of up to 400 μ g for the long-term management of asthma has been found to be safe. No adverse effects have been found. Local effects such as cough and hoarseness are common and these can be overcome with the use of spacers and rinsing the mouth after an inhalation. That's why children should use the steroid inhaler before brushing the teeth in the morning and evening to minimise the effects associated with long-term use of inhaled steroids.

Our barriers study had indicated that GP's felt that parents of asthmatics were deficient on knowledge of several aspects of asthma treatment and prevention, but gave little indication that they were interested or able to provide the necessary health promotion. Other studies supported the finding that parental misunderstanding of

preventive drugs was especially lacking in a family practice setting (Moosa 1997) and supported the need for parental education on preventive care. Studies have also demonstrated that the provision of simplified printed health information to patients or their parents is useful (Estey 1991). Written information supported by verbal instructions from a health care professional have been found to be a more effective educational tool than the provision of counselling only (McIntosh 1994). Parent-held health information material has also been reported to be a useful reference for parents/ patients and has been viewed by physicians as a communication and management tool (Liaw 1993). With these pieces of evidence in mind, and aiming to help improve communication between parents caring for asthmatic children and doctors, we designed a GP-mediated, parent-reminder to address parental misconceptions about drug therapies recommended for asthma in children.

The parent's information card was held in a prominent place in the desk folder, and we aimed to prompt doctors to discuss a number of issues with patients. These were the differentiation of the pharmacological role of the two most cost-effective drug therapies for asthma in children, with the aim of minimising overuse of inhaled bronchodilators ('reliever') and initiating early use of anti-inflammatory ('preventer') therapy. Subsidiary messages were and to encourage greater parental involvement in the care of asthmatic children, smoking avoidance around the patient and higher continuity of care through return visits. We intended that the card be handed over to the parent, and retained by them as a permanent information source. The messages printed on the card were kept short and simple to improve parental understanding. The script to encourage doctors to use the handover of this card as an impetus to give health promotion went as follows:

- A: Here's a card that you could use to help remind parents about the role of the drug therapies for asthma in children. This card explains the function of each drug and it's written in both English and Afrikaans. If you write the name of the prescribed drug then it would be useful for parents and the child to check the information that corresponds to that treatment.

Treatment algorithm based on asthma severity

- *The treatment of asthmatic children depends on the severity of their condition.*

A mild asthmatic child i.e. with occasional attacks should use an inhaled β -2 stimulant such as salbutamol fenoterol, terbutaline as needed.

A moderate asthmatic child i.e. with more frequent attacks should use an inhaled anti-inflammatory agent such as sodium cromoglycate or steroid for a few days with supplementary inhaled β -2 stimulant as needed.

A severe asthmatic child i.e. with daily /continuous attacks should be managed in consultation with specialist care and should use regular anti-inflammatory therapy, and inhaled β -2 stimulant as needed.

Data from the barriers studies showed that GPs seemed unaware on how to classify asthma severity in children and subsequently prescribed incorrect drug therapies. GPs further perceived that parents overlooked the severity of symptoms of asthma in children and subsequently delayed their consultations. The stepwise pharmacologic therapy based on symptom assessments, was a key primary care message that aimed to address these barriers.

The assessment of asthma is reported to vary significantly by physician specialty (Eisener 1998). A stepwise approach to pharmacotherapy is recommended to gain and maintain control of asthma and to assist in clinical decision-making (NHLBI 1997). For mild asthma in children, monotherapy with a short-acting inhaled bronchodilator such as salbutamol or fenoterol is recommended. For moderately asthmatic child, the inhaled bronchodilator is supplemented with inhaled anti-inflammatory therapy such as steroids or cromoglycates. In severe asthma, the inhaled bronchodilator is supplemented with inhaled anti-inflammatory and a short course of oral steroids.

The dosing frequency and type of medication used to control asthma depends on severity of the underlying airway inflammation (NHLBI 1997). Therapy is usually initiated at a higher level than the patient's current severity status, to establish prompt control and then stepped down. During step-wise approach to therapy the dose, number and frequency of prescribed medication(s) are increased or decreased through continual monitoring. This would help achieve control of asthma by suppressing inflammation over the long term, preventing exacerbations and through

minimal medication use minimise the risk of side-effects (ibid). Therapeutic recommendations are based on monitoring of several clinical features to assess asthma severity in adults and children over the age of five years. The stepwise approach to therapy varies with evidence base from literature, experience and opinion (ibid). Since asthma itself is a highly variable condition, therapeutic decisions are tailored to the needs and circumstances of individual patients and the appropriateness of such therapy depends on proper clinical assessment of symptoms and lung function measurements.

Symptoms of asthma vary during the day and at night and these two symptom parameters also form part of the parameters in assessing severity. Mortality from asthma rises at night, caused mainly by increased airway hyperresponsiveness due to higher reactivity to inhaled bronchoconstrictors and allergens, and enhanced late asthmatic response (Macdonald 1992). One study identified nocturnal symptom as a single dominant determinant when assessing overall asthma severity (Colice 1999). As seen in a more recent study of Latino children from low-income families with language and educational barriers, clinicians assessed the severity and degree of control of asthma by obtaining information on the frequency of their symptoms (Lara 2000). GPs participating in this intervention could similarly assess the severity of asthma symptoms in urban children having a similar type of socio-economic background.

An accurate assessment of asthma severity in children depends on parental and patient recall of clinical information. While parental recall of asthma symptoms diminishes after 12 months, obtaining information on nocturnal cough in children has also been found to be unreliable (Peat 1992). Therefore, the more recent the period for which clinical information is sought, the more reliable is asthma information provided by close acquaintances (Campbell 1993). We therefore considered a recall period of a month to assess severity when using the nocturnal symptom parameter for this intervention.

While a 4-tiered severity classification (mild intermittent, mild persistent, moderate and severe) is used in the United States (NHLBI 1997), a 3-tiered (mild, moderate and severe) grading is used in South Africa (1994). Both these guidelines consider

the frequency of symptoms, lung function measurements and the need for emergency care as parameters to help identify and categorise asthma severity.

The 3-tiered treatment algorithm was retained because of its simplicity to enable GPs to assess asthma severity in children. A modified symptom parameter (NHLBI 1997) was selected as it provides a brief, simple assessment. Since this intervention focused on symptom history to diagnose asthma, information on the frequency of day-time and nocturnal symptom could be obtainable from care-givers/ parents at the time of history taking during a consultation. The symptom severity was tabulated to enable GPs to tick the column that reflects the child's current asthma status and this was indicated to GPs using the following script.

A: Here's a simple table to help you make a quick assessment of the child's severity status. By simply inquiring about the child's frequency of day-time and night-time symptoms [referring to the symptom table on patient record card], you would be able to grade the child's asthma severity by placing a tick on that column. The treatment algorithm on this side [referring to the drug treatment algorithm printed on the left inner coverleaf] of the folder recommends the most appropriate therapy corresponding to the child's status. For example, let's say a child suffers from frequent nocturnal symptoms, say... more than three awakening due to asthma per month, he/she would be moderately asthmatic and therefore [referring to the folder] the recommended treatment is an anti-inflammatory therapy plus a beta-2 stimulant.

Treatment algorithms with a set of prompts have found to be an efficient strategy for improving clinical care (Schoenbaum 1990). GPs' adoption of algorithms when setting clinical standards for common childhood conditions resulted in improved prescribing and follow-up care (North of England study of standards and performance in general practice 1992). Further, reports indicate that health providers using algorithms have demonstrated improvements in medical record keeping, reductions in unnecessary laboratory tests with substantial cost-saving for both health facilities and families (Orient 1983). Physicians use of a symptom-oriented protocol has also led to a more precise diagnostic and therapeutic decision-making (Grimm 1975). Avorn and colleagues (1988) used a structured educational order form consisting of messages and graphic reminders to reduce incorrect antibiotic in hospitals that resulted in a substantial annual saving of US \$76 000. A more recent study has however, shown that an asthma care algorithm for pediatric status

asthmaticus significantly reduced the hospital length of stay and costs without increasing relapse (McDowell 1998). However, the use of a treatment algorithm for the primary care management of chronic asthma in children for use by local private sector GPs has not yet been evaluated.

Inhaler therapy

- *Inhaled medication is safe and effective for asthma. Oral bronchodilators have many side-effects and in long-term therapy are expensive.*

GPs seemed to under-use inhaler drug therapies and prescribed inappropriate oral bronchodilators to children with asthma. GPs perceived that high costs of inhaler medication and parental preference for oral therapy were barriers to the provision of optimal care in children. Evidence from the literature on the cost-effectiveness and efficacy of inhaler therapies was a key message aimed at addressing these barriers with GPs during the intervention.

The inhaled route of drug administration is preferred to the oral route in the treatment of asthma. Inhaled drugs act directly at the site of action i.e. bronchial air passages of the lungs, have a faster onset of action, require lower doses and produce minimal side-effects when compared to orally administered drugs.

Inhaled bronchodilators provide symptomatic relief by relaxing the smooth muscles of the air passages, but, have no effect on the inflammatory process of asthma. These drugs are taken only when needed (prn). Short-acting inhaled bronchodilators, namely beta-2 stimulants such as salbutamol and fenoterol, are commonly used in the treatment of chronic asthma in children. Longer-acting inhaled bronchodilators such as salmeterol or formoterol, were not recommended as monotherapy because of the limited data for their use in pediatric asthma (Verberne 1997) and are expensive. These drug therapies were subsequently excluded from this intervention. Adjunct inhaled bronchodilators, namely, the anticholinergic agents for example, ipratropium bromide (Kerstjens 1992; Plotnick, Ducharme 1998) and the newer leukotriene antagonist for example, montelukast (Anon. 1999) are expensive. Their effectiveness for chronic asthma in children has not yet been

fully evaluated therefore, these supplementary agents were not included in the treatment algorithm. In addition, the message aimed to discourage polypharmacy.

Oral bronchodilators such as theophylline are not recommended as first line therapy for moderate to severe asthma in children (SACAWG 1993). This commonly used elixir contains 20 % ethanol, which increases the incidence of side-effects and promotes physical dependency (ibid). Further, theophylline has a narrow therapeutic index and constant use cause side-effects such as headache, irritability, insomnia, vomiting and diarrhoea in children. Regular theophylline serum monitoring is required to prevent the drug from reaching toxic levels. However, such procedures are expensive and are not likely to be performed in primary care practices. Theophylline's emerging role as anti-inflammatory agent has not yet been fully evaluated (Morris 1996). Therefore, the use of oral theophylline was not included as a key message for this intervention.

Overuse of bronchodilator therapy masks the underlying severity of asthma leading to underdiagnosis and undertreatment in children (Ehrlich 1998; Speight 1983, Bauman 1992). The use of more than one canister per month of an inhaled bronchodilator is indicative of poor control of asthma (Spitzer 1992) that requires additional anti-inflammatory therapy. GPs' attention was drawn to the overuse of bronchodilator therapy using this script.

A: As you know...bronchodilators only provide symptomatic relief for the treatment of asthma and have no anti-inflammatory action. The use of more than 1 canister of bronchodilator therapy indicates severe asthma, and such long-term treatment would lead to deterioration of symptoms, frequent hospital admissions and increase in absence from school. The side-effects associated with overuse of inhaled bronchodilators such as beta 2's are tremor and palpitations and these can be reversed with early use of supplementary anti-inflammatory therapy. Overuse with oral bronchodilators is also a problem, and it is necessary to find out about the child's frequency of use and to advise the use of more appropriate anti-inflammatory therapy.

GPs were provided with evidence on the cost-effectiveness of inhaled beta-2 stimulants by comparing costs of a commonly used oral bronchodilator, theophylline syrup when treating chronic asthma in children.

A: As you know.... Dr...., many asthmatic children are treated with ineffective oral bronchodilators which are relatively expensive therapies. Theophylline syrup for example, costs around 75 cents for a 5ml dose, while, a puff of an inhaled bronchodilator is only 10-20 cents [referring to the pharmacoeconomic table for inhaled beta-2 stimulants (second box) in the inner right coverleaf of the folder]. If a child takes two puffs from an inhaler, the cost of therapy is two times less than that offered by a single dose of oral theophylline. By increasing parents' awareness to such cost differences between inhaled and oral therapies for asthma in children and informing them that an inhaled bronchodilator reaches the airways of the lungs more quickly, has a rapid onset of action, and that fewer doses are required when compared to the oral route. Oral bronchodilators on the other hand are associated with side-effects because of systemic absorption, and regular monitoring is required to prevent reaching toxic levels when treating chronic asthma in a child. Therefore, this valuable piece of information would help encourage parents to opt for cost-effective inhaler therapies when providing care to their children with chronic asthma.

Both the poster and folder repeatedly highlighted the use of inhaled therapy. A visual presentation shadowed its watermark, of a child inhaling the contents from an aerosol, aimed to capture the GP's attention on the use of inhaled therapy in the outer left coverleaf of the folder. Reminders were printed for each of the three asthma severity grades under the general checklist section on the left and right coverleaves of the folder, serving as a quick reference for GPs during consultation. Further, the practice record card aimed to prompt the prescribing of inhaled medication by prompting reference to the tabulated range and cost of inhaled therapies on the opposite side of the folder (details on cost calculation refer below). Further, a GP-mediated parent oriented asthma information card aimed to reinforce the use of inhaled medication with care-givers of asthmatic children. GPs were asked to write the name(s) of the child's prescribed inhaler therapy in the appropriate space to enable parents to differentiate its' pharmacological role(s).

A pharmacoeconomic table helped to draw GPs attention to the range and cost of inhaled and oral drugs recommended for use in children with asthma. One of the main aims of the messages was to minimise the frequency of use of bronchodilator therapies (oral and or inhaled) and to initiate early use of inhaled anti-inflammatory therapy especially for moderate to severe asthmatic patients. The

pharmacoeconomic table for inhaled bronchodilators was secondary to and therefore presented as a smaller table below that of inhaled anti-inflammatory agents. The cost of bronchodilator therapy was calculated on a single dose (per puff) because treatment varies with the changing needs of the child's asthma severity status.

Example of cost calculation for a puff from a bronchodilator inhaler:

The cost per puff of bronchodilator therapy was presented in 10 cent multiples (rands (R) =R0.10) to accommodate the range of available products (Generics Dictionary 2/98). A dose of 100 µg per puff from a complete bronchodilator (trade name) inhaler unit of 200 inhalations, with a retail price of R 60.09, the cost (rands) per puff is:

$$\frac{R60.09}{200} = R0.30$$

Metered dose inhaler (MDI) preparations are cheaper than dry powder inhaler preparations such as turbuhalers and rotahalers. These preparations were therefore excluded from this message and the intervention. However, a commonly encountered problem with MDIs is that they are effort-dependent and children below the age of 7 years fail to co-ordinate simultaneous depression of the aerosol canister with inspiration, thereby losing drug(s) to the lungs. Since knowledge about the proper use of MDIs among medical personnel is found to be limited (Guidry 1992; Burton 1984) this could further add to under-treatment. This problem can, be reduced with the use of drug delivery devices such as spacers.

Efficacy of spacer therapy

- *Spacers are as effective and safe as nebulisers even in young children. Spacers are good even if they are home-made.*

The determinants studies indicated that GPs' knowledge about the efficacy of spacer therapy seemed to be limited. The intervention aimed to overcome this barrier by increasing GPs' awareness to the efficacy of commercially produced and home-made spacer devices. The evidence base for the efficacy of spacer therapy, the provision of precise and explicit instructions to parents to improve delivery from plastic spacers, and the efficacy of the 500ml home-made spacer were communicated by the outreach educator to GPs.

The amount of drug that actually reaches the lungs when administered from a MDI is as low as 7% -9% (Jackson 1995) which is further reduced when patients co-ordinate poorly during actuation and inhalation. Although a spacer is aimed at improving drug delivery, and a recent study showed that many asthma patients have poor spacer technique (Harrison 2000a). This could be attributed to poor health professional knowledge and provision of incorrect instructions on inhalation technique for the range of drug delivery systems (Cockcroft 1993)

Spacers are elongated plastic extension tubes/ devices (also known as holding chamber) that are attached to the mouth-piece of a MDI to facilitate drug delivery to the lungs. The spacer provides a reservoir for the aerosol from which the child may breathe, making the co-ordination of actuation and inhalation much easier (O' Callaghan 1997). Furthermore, spacers increases drug deposition in the airways and at the same time decreases the amount of drug that impacts on the oropharynx, minimising the local and systemic side-effects (Newman 1981) caused by unwanted deposition of inhaled steroids. Spacers are especially effective in minimising the incidence of oral candidiasis (Toogood 1984; Selroos 1991) and also prevent dysphonia and cough (NHLBI 1997) caused by regular use of inhaled steroids. Spacers are essential in children below the age of 5 years, and a mask is added to spacers for use in infants.

Spacers are as effective as nebulisers for acute and even in the long-term treatment of severe asthma. Spacers have been found to be as effective as nebulisers for drug delivery in acute asthma in children (Kerem 1993; Chou 1995; Parkin 1995) and in infants (Hickey 1994). A meta-analysis showed that when comparing the efficacy of MDI and spacer versus nebuliser therapy for acute asthma in children, there was less time spent in emergency departments, less deterioration in blood gases and lower pulse rate (Cates 1998). In another study, optimal treatment for severe chronic asthma increased MDI efficiency with the use of a Nebuhaler spacer (O'Driscoll 1992). Spacers are therefore cost-effective in the treatment of asthma in children. However, commercially produced spacers are expensive and lack of availability limits their use in developing countries (Zar 1998). Furthermore, pharmaceutical companies producing spacers lack information on the amount of drug that the patient is likely to receive when using the particular device (O'Callaghan 1999).

Some factors that affect the dose delivered through a spacer are the static charge of the drug particles, design of spacer and the type of drug being inhaled (O' Callaghan 1997). When drug particles are produced by the MDI they become charged. Since static charge accumulates on the walls of many plastic spacers, it attracts the drug to the spacer wall and reduces drug availability for inhalation. A simple way of reducing charge is to wash the spacer monthly in household detergent and allow it to drip-dry without water rinsing (Pierart 1999). This simple and practical method of detergent-coating of the spacer significantly improved drug delivery ($p < 0.001$) to the lungs. Another factor such as multiple actuations of the aerosol into a spacer decreases the delivery of respirable particles (Jackson 1995; O'Callaghan 1997). Therefore, precise instructions on the use of spacer therapy were provided to enable GPs to optimise drug delivery in children using this script:

A: The proper use of spacers is vital, when trying to improve drug delivery in children. Many plastic spacers are electrostatically charged, which attracts drug particles from the inhaler to the walls of the spacer, thereby limiting the number of respirable particles from inhalation. This can be overcome by informing parents to wash the spacer with a household detergent, allowing it to drip-dry and *not* rinsing it. This detergent coating prevents drug build-up in the spacer.This should be done monthly.

It is also important that only a *single* puff from the MDI is allowed into the spacer at a time as multiple inhalations decrease the amount of drug available to the patient. The child should inhale from the spacer immediately after a single inhalation.

Alternative home-made spacers such as the polystyrene cup and the one litre plastic bottle are widely recommended (GINA 1995) as drug delivery devices. A recently developed 500ml plastic bottle home-made spacer proved to be an effective drug delivery device for bronchodilator therapy (Zar 1998). The sealed 500ml home-made spacer produced bronchodilation similar to that of a conventional spacer (aerochamber), while an unsealed bottle gave intermediate improvement in lung function. The polystyrene cup was reported to be the least effective home-made spacer for children with moderate to severe airway obstruction. This relatively low deposition may be due to drug leakage at the open end where the cup interfaces with the patient's face (ibid). The disadvantage with one litre home-made spacer is that

its large size limits portability. Therefore, the 500 ml home-made spacer was included for this intervention.

GPs were provided with a practical demonstration of use of the MDI with a home-made spacer. This demonstration aimed to encourage GPs to optimise drug delivery in asthmatic children using MDIs and the script reinforced this message.

A: Dr, you are perhaps familiar with the use of home-made spacers such as the polystyrene cup and the 1 litre plastic bottle. This 500 ml home-made spacer here [pointing to it] has been tested and has found to be an efficient alternate home-made spacer for use in children. The delivery of drugs to the lungs from an MDI and this 500ml home-made spacer was shown to be 3 times higher than that from a polystyrene cup. When using the cup there is leakage from the mouth and cup interface. The advantages of this 500ml homemade spacer is that it is easy to make, inexpensive and is an alternative to the other conventional spacers. It can be used in children > 5years who have poor co-ordination.

Short course oral steroids for acute asthma

- *Short course oral steroids (5 days) are useful for severe exacerbations, prevents admission for status asthmaticus, have no systematic side-effects and can be stopped without tapering. Refer to specialist if exacerbations are very severe, frequent or poorly controlled.*

GPs seemed reluctant to prescribe short term oral steroids for acute asthma in children. Further, their fear of side-effects and their lack of awareness to not having to taper the course of steroids were barriers that the intervention aimed to address. Evidence on the cost-effectiveness of the early intervention with oral steroids and the effectiveness of a short 5-day course(s) of oral steroids for acute asthma in children were components of this key primary care message for the GPs.

Acute asthma is characterised by sudden severe bronchial hyperreactivity causing severe bronchoconstriction and increase in airway inflammation that requires emergency care. The drug treatment is comprised primarily of bronchodilators, corticosteroids and oxygen. The purpose of the bronchodilator in acute asthma is to reverse any bronchial smooth muscle spasm, in order to buy time until the anti-inflammatory effect of the corticosteroid begins to work after 6-12 hours (Lipworth 1997). The rationale for the administration of systematic corticosteroids

(prednisone, prednisolone) in acute asthma is to reverse the anti-inflammation, which will not be ameliorated by bronchodilator therapy. The therapeutic effect of intravenous and oral steroid has been found to be equivalent (Ratto 1988). The advantage of using oral prednisone is that it has no direct effect on the gastric mucosa because it is the inert precursor of the active metabolite methylprednisolone, and is therefore safe for use in children.

Early detection of acute asthma and subsequent intervention with oral steroids in a primary care setting can prevent hospitalisation of patients. In an overview, Lipworth (1997) noted that there was a 34-fold price difference using an inhaled steroid compared with daily oral steroids. The message provided to GPs in this study focused on the cost-effectiveness of short course(s) of oral steroids, in ambulatory children with acute asthma.

The early use of prednisone in asthmatic patients showed a relatively high rate of progressive resolution after acute exacerbations that did not respond fully to bronchodilators and prevented the need for emergency care or hospitalisation (Harris 1987). The authors further found no clinically important adverse effects from prednisone. A meta-analysis further revealed that a short course of oral steroids significantly reduced the number of relapses to additional care and decreased beta-agonist use without an apparent increase in side-effects (Rowe 1998). The steroid course significantly reduced time on oxygen therapy, reduced the incidence of emergency visits, accelerated recovery of airflow and reduced dyspnoea (Rowe 1998; Spahn 1996).

Guidelines recommend that when terminating therapy for acute or severe asthma the dose of oral steroids should be gradually tapered. Steroid tapering is intended to prevent the metabolic and physiological abnormalities associated with suppression of the hypothalamic-pituitary-adrenal function (adrenal suppression/ insufficiency) due to exogenous steroids. However, recent studies have shown that when controlling asthma no adverse (rebound) effects have been reported with short courses of oral steroids that have not been tapered (Hatton 1995; O' Driscoll 1993). The advantage in not tapering oral steroids is that compliance would improve, and

the shorter course would be cost-effective. This message was communicated to GPs using the script:

A: A short 5-day course of oral steroids is recommended for use in acute asthma in children. Studies have shown that it is safe and effective. There have been significant reductions in the number of relapses and the need for additional emergency care. There are reports of significant reductions in time on oxygen therapy, reductions in emergency visits, acceleration in recovery of airflow and reduction in dyspnoea. Further, short 5-day steroid course has been found to decrease beta-stimulant use.

While the South African consensus (1994) stipulated a 2 weeks (or less) course, shorter courses lasting 7-days of oral steroids was found to be effective (Dolan 1987). In other studies a 5-day course in children (Zora 1986) and in adults (Streck 1979) reported no adverse effects from adrenal insufficiency. A 5-day short course of oral steroid tablets is cheaper than its equivalent syrup formulation (Generics Dictionary 1998). For this intervention, the early use of steroid tablets was recommended at a dose of 1-2mg/kg/day to treat acute asthma in children using the following script for this message.

A: When treating acute asthma in children, studies have shown that a short 5-day course of oral steroids has no serious adverse effects. This short course of steroids is affordable to most patients if administered in the tablet formulation. Let's compare costs for a 5-day steroid course between tablets and the syrup [referring to the last pharmacoeconomic table on the right inner coverleaf of the folder]. As you can see... a 5-day course of the tablet preparations [referring to the range of tablet formulations in the lower cost (rands) range at the top of the table] costs far less than the syrup formulation [referring to the preparation on the lower end of the table]. You can see that there's a huge difference in cost for the patient. The other advantage with using oral steroids such as prednisone, for example... is that it is inert and consequently has no direct effect on the gastric mucosa.

Example of calculation for a 5-day steroid course using tablet and syrup formulations:

The number of 5mg tablets prescribed for a 15kg child at 2mg/ kg / day is = 30 mg per day, therefore 6 x 5mg tablets daily, = 30 tablets for 5 days.

The volume of 15mg/ 5ml syrup prescribed for a 15kg child at 2mg/ kg /day is = 30 mg per day, therefore 10ml daily = 50ml for 5 days.

Regular follow-up care

- *Asthma can vary with time and regular assessment is necessary to individualise therapy. In general practice assessment of asthmatic children should occur at 3-monthly intervals including peak flow measurements where feasible, and patients should attend where there is a flare-up.*

Data from the barriers studies indicated that provision of routine follow-up care for asthmatic children was limited. Evidence to promote follow-up care and the parameters used to monitor asthma were the messages provided to GPs in this intervention.

Regular assessment helps to determine whether the goals of therapy are being met. Assessment includes monitoring of signs and symptoms, pulmonary function, functional status, history of exacerbations, pharmacotherapy, patient-provider communication and patient-satisfaction (NHLBI 1997). To ensure the effectiveness of drug therapy, it is essential that the drug regimen be monitored continually. More recently, a written appointment for follow-up has been shown to increase compliance among patients (Kiefe 1999).

The NHLBI (1997) follow-up assessment and monitoring was adapted for this intervention. The structured format aimed to provide a concise simple assessment and to prompt GPs in initiating inhaled anti-inflammatory therapy as early as possible in moderate to severe asthma. An Australian study showed that a patient-held medication record card is unlikely to succeed unless patients believe that their doctors want them to use such a device (Atkin 1995). Therefore, the practice record card for monitoring asthma in children for this study was designed for use by GPs.

Subjective and objective parameters are used to monitor asthma. Symptom monitoring is one parameter that enables the clinician to recognise patterns that indicate inadequate asthma control and helps to determine the need for additional medication. Detailed patient recall of symptoms decreases over time, therefore symptom history is based on a short 4 weeks recall period (NHLBI 1997). In addition, reliability of clinical information obtained from close acquaintances depends on the visibility of the asthma manifestation (need for hospital / emergency

care, limitations in daily activities) and how recently it occurred (Campbell 1993). Further, asthma exacerbations are characterised by periods of increased symptoms, with reduced lung function resulting in diminished ability to perform routine school activities. Therefore clinicians inquiring about the frequency of exacerbations as determined by the need for emergency care and a history of nocturnal awakening due to asthma are good indicators of asthma severity.

Patient adherence to the prescribed regimen, inhaler technique, frequency of use of inhaled short-acting beta-2 stimulant, changes in doses of inhaled anti-inflammatory medications, and the need for short course oral steroids are some parameters that are monitored. For example severity of asthma can be assessed from increases in use of bronchodilator, anti-inflammatory or the need for oral steroid therapy.

In this intervention the practice record card for provision of follow-up care aimed to prompt GPs for an appointment date. Further, monthly assessments for nocturnal symptoms, absence from school and need for emergency care were used as parameters to monitor childhood asthma. Weekly use of reliever medication as a parameter aimed to help GPs recognise the deterioration of symptoms as early as possible. Symptom monitoring was considered a simple parameter, while PEFr monitoring was considered less important for follow-up assessments for the intervention. Data from the determinant's studies indicated that the taking of PEFr measurements was lacking and/or that GPs did not make use of them rigorously at their practices. A probable reason is that PEFr monitoring is effort dependent and requires time during consultations. Further, evidence on the effectiveness of PEFr monitoring in moderate to severe asthma is limited (Kendrick 1993) and single PEFr readings are unreliable (Sly 1994).

The prompt for follow-up care formed part of the structured record card which aimed to stimulate open and unrestricted communication between the child, parent and the GP towards optimal self-management. Follow-up visits were designed to stimulate greater involvement and to establish a partnership between GPs and parents. GPs could help improve parental knowledge about asthma by helping them to differentiate the pharmacological roles of asthma medications; check their child's skills on inhaler technique and encourage the use of spacer therapy for improved

drug delivery. In addition, the GP could offer advice on when and how parents could respond to the onset of acute asthma episodes.

A: Chronic disease such as asthma requires constant monitoring. It is necessary to encourage patients to return for follow-up care and to keep a record of the child's status during each visit. Some indicators that one can assess the child's asthma during follow-up (looking at the record card) are bronchodilator usage, nocturnal symptoms, absence from school and need for emergency care. The frequencies supplied in the card reflect the minimum for each parameter.

Smoking avoidance

- *Smoking around asthmatic children aggravates their asthma. Studies have shown that when doctors advise parents on smoking avoidance the parents usually act on this advice.*

The barriers studies indicated that GPs were of the opinion that promotion of a smoke free environment for children with asthma was poor and they further felt that parents did not adhere to advice on cigarette smoking avoidance. In this intervention, we provided a message to parents on smoking avoidance, mediated via the GP.

Smoking rates in South Africa are highest in the coloured population (Yach 1988; Reddy 1996). Among women attending private practices 27.6% reported smoking in pregnancy. Exposure of environmental tobacco smoke is associated with pulmonary morbidity (Chilmonczyk 1993) and appears to increase asthma prevalence in children (Gergen 1998). Passive smoking increases the risk of severe respiratory illness (Chen 1986; Ferguson 1985) and there is growing evidence that maternal smoking is a risk factor for asthma and wheezing illness in childhood (Ehrlich 1993).

The promotion of smoking avoidance rests on co-operation between both the health professional and the parent. Smoking parents are less likely to attend an education program, are more likely to deny that their child has asthma and comply poorly with advice on smoking avoidance (Fish 1996). Although smoking cessation advice from a physician is widely promoted (Silagy 1998), numerous factors influence behaviour change. Advice from health professionals to parents to reduce passive smoke

exposure was found to be nonspecific (Burnett 1999), while advice to children was found to be ineffective (Irvine 1999). Physicians' attitude towards counselling about smoking depends on their motivations, perceptions, skills, benefits and costs (Wells 1984).

Effective physician-mediated educational intervention strategies aimed at smoking cessation include three-hour training programmes (Ockene 1988), the use of supplementary office materials (Cummings 1989) and the use of a manual (Janz 1987). However, a more simpler approach, using both a printed leaflet and a follow-up oral warning was found to be effective in general practice settings (Russell 1979). Since a training programme would be time consuming it would not be feasible for GPs in this intervention. Therefore, a written reminder was used as a prompt for GPs to offer verbal advice to parents/ care-givers against the exposure of passive cigarette smoke.

Advice from doctors have been reported to be a cost-effective intervention (Liu 1998), and tailoring the advice should also be encouraged (Butler 1998). GP reminders for use during consultation aimed to promote smoking avoidance among parents/care-givers in the presence asthmatic children. The information was provided as part of a general checklist item and as a prompted parent's asthma information card located in the plastic pocket in the centre of the folder. This allowed for easy access during a consultation. GPs received the message using the following script:

- A: A common problem encountered by doctors is poor compliance from parents on smoking avoidance to children with asthma. Passive smoking is a risk factor for asthma and parents need to be made aware of this through repeated advice. During consultations, parents need to be constantly reminded about the risks of passive smoking. The parents' asthma information card is designed to especially inform parents to help them to heed to your advice on smoking avoidance. Providing materials to individuals has been shown to improve advice from GPs.

Implementation of educational outreach intervention

Approaches used to implement outreach interventions are based on the principles of educational, personal and social psychology (Yeo 1993) and adult education

(Soumerai 1990). The educational approach involves attentive listening to identify GPs' views and opinions, interest and management principles, followed by introduction of the educational package which the outreach educator uses to highlight areas of special interest. The principle of personal psychology relates to entry into GPs' territory to negotiate a time frame. Conducting the outreach visits entails using a trained co-professional and discussing patient management according to GPs' time and needs, it should not be threatening to GPs. The principle of social psychology takes into consideration that general practice is individual medicine, where treatment is appropriate for the individual patient. Since GPs are individualistic, that is even in group practices, they function professionally as individuals, and awareness to this is necessary when planning interventions to change professional practice.

Educational outreach interventions aimed at changing the behaviour of medical practitioners remains to be implemented in South Africa. For the design of this intervention, I held preliminary discussions with well-known researchers who had pioneered educational outreach programmes. They were located at the Department of Ambulatory Care and Prevention, Harvard Medical School (1997) in Boston, Massachusetts. The researchers provided me with an insight into the planning processes that are essential for outreach interventions and highlighted the importance of having a sound knowledge of the target practitioners' behaviour.

While most of outreach interventions focus on changing prescribing habits, the outreach intervention designed for the CHAMP study aimed to focus on key management principles for childhood asthma management. The researchers further advised that the use of supplementary printed material to reinforce adoption of the key messages and good communication skills were essential for the successful implementation of an outreach programme.

I discuss the outreach educator's training programme and the planning of the visits to the GPs, which form part of the design for this tailored outreach intervention.

The outreach educator

In this study, a trained pharmacist (myself) conducted the detailing visits. As discussed in the chapter on these methods, the messages could in theory, be delivered by almost anyone with commercial pharmaceutical marketing training. Drug company representatives may often have little previous health care training or background (Lexchin 1989). As a fellow health care professional, an interprofessional rapport was expected to exist between the GPs and myself. This would reduce the individual practitioners' resistance to the messages, and increase their level of trust in these messages and the agent delivering them. This would be in contrast to the intrinsic suspicion of a non-health care professional, whose messages might be more likely to be distrusted and ascribed to a purely commercial motive.

Successful implementation of an educational outreach intervention depends on the educator's knowledge, skills and attitude. I was to be the outreach educator, a pharmacist, female and of Asian origin, which is a minority population group, in South Africa. Along with practice experience in hospital and community pharmacies, I had knowledge of asthma management programmes through my research experience (Bheekie 1996).

An outreach intervention also depends on the educator's communication skills with the target audience and is crucial for its' successful implementation, therefore for this intervention I found a number of useful educational programmes, and assembled these into a training programme. This programme is similar to that used by outreach educators (academic detailers) in other academic outreach programmes (Avorn 1983; Stalsby Lundborg 1997; Gomel 1994; Wyatt 1998)

My training included formal workshop attendance: in-depth qualitative interviewing techniques (conducted by Meulenberg Buskens, an anthropologist) in October 1997; and pharmaceutical sales technique (Innovex, a widely used company providing sales training to many pharmaceutical companies) in February 1998. The two day sales training course designed for pharmaceutical representatives, aims to improve listening and questioning abilities through role playing techniques in preparation for interactive discussion with the GP during the outreach visits. The *IDEALS* approach was used to implement educational outreach (Table 7.1).

While a marketing / sales interaction focuses on the features and benefits of a visible and tangible product, an educational outreach programme emphasizes few key management concepts/ principles. The social marketing approach highlights and personalizes benefits of the key concepts aimed at changing current practice behaviour.

Table 7.1 Summary of IDEALS approach used for educational outreach

Introduction	An appreciation to GP for agreeing to meet with the outreach educator and personal introduction <i>Thank you for your time doctor. I am a pharmacist working with MRC and NAEP.</i> Attract GPs attention. <i>We are providing support to GPs in the care of asthmatic children. You received a set of these primary care messages, which I'd like to discuss.</i>
Discover	Discover GPs concerns/ needs/ protocols / problems on the disease / treatment <i>What is your experience with asthma in children in the community?</i> <i>How does the cost of drugs affect the care you provide?</i> <i>What are your views to parental resisting the use inhalers?</i> <i>Is there lack of adherence to preventive measures in the community?</i>
Explain	Explain the problem area by exploring GPs' misconceptions/ fears Explain use of key primary care messages for childhood asthma and compare them with GP's approach. <i>Why is a particular message superior? For example explain benefits of inhalers, steroids are cost-effective treatment, use of spacers to improve drug delivery</i>
Ask	Ask if GP is in agreement with key messages <i>Do you agree with the message promoting the early use of inhaled steroids?</i> Address any doubts/ fears/ misconceptions <i>Eg. Demonstrate use of inhaler and home-made spacer</i>
Leave	Leave desk folder, poster, homemade-spacer with GP.
Seek	Seek commitment from GP to adopt key messages. <i>These materials contain all the messages that we've been talking about. Would you be able to apply these messages/ use the materials in your practice?</i> Seek agreement for 2 nd visit. <i>I would like to meet with you again so that we could discuss your experiences with use of the materials/ messages</i>

In addition, I role-played as an outreach educator in a few mock presentations of GP-educator interactions with practitioners before conducting the individual practice visits to further develop my interactive communications skills and to prepare a detailing script.

I accompanied pharmaceutical representatives to their practice sites to gain insight into the interaction between the GP and the pharmaceutical representative. A was

letter addressed to two product managers from respective drug companies that specialise in asthma products, requesting their permission to accompany one of their pharmaceutical representatives on their sales promotional visits to observe a GP-detailer interaction. The managers were assured of the confidentiality of our intended visits and after receiving verbal consent, visits to practices were arranged telephonically with an assigned representative.

I describe my experiences when accompanying the drug company representatives during their assigned detailing visits to clinical practices.

I accompanied two pharmaceutical representatives from two different companies respectively for almost half the day. Five visits were conducted between the two drug detailers and each visit lasted for an average of 10-15 minutes per practitioner. As gauged from the social chatter between the receptionist and the drug company representatives, all practitioners seemed to have a high patient load. While two of the paediatricians were located at separate private medical centres, the remaining three GPs were independent office-based practitioners located in areas demographically similar to that of Mitchell's Plain. Two of these practices were attached to mini-shopping centres. The visits were scheduled from around 9.30am through to lunch break (1.00pm). The waiting times at the practice averaged 20 minutes before meeting with the GPs.

A friendly rapport seemed to have been already established between the practitioners and the drug detailers. After some preliminary social chatter, the detailers introduced the drug product(s) to the practitioners. The detailing interactions between the two representatives seem to vary. Representative 1 (rep 1) seemed to adopt a more relaxed posture, held somewhat less interactive discussions accompanied by less persuasiveness compared with the detailing interactions for representative 2 (rep 2). Rep 1 did not use printed or graphic detailing aids to inform practitioners of the product's features and benefits. This rep further provided the practice with samples and notepads. Rep 2 used graphic and printed detailing aids, quoted clinical studies to highlight the product's efficacy. This rep did not provide the practice with product samples or notepads. Rep 1 detailed a range of at least three pharmaceutical products to each of the practitioners. Rep 2 detailed the same

product to each of the GPs that we had visited and maintained the same presentation style. In response to both detailers' short presentations, practitioners responded by nodding and clarified a few product features. Side-effect profiles of the products were not mentioned by either of the drug representatives.

During these commercial drug detailing only some aspects of the IDEALS approach was applied. GP's barriers, fears or misconceptions were not fully explored and this type of detailing lacked interactive discussions between the GP and the detailer.

Principles learnt from the sales techniques workshop and from observations of GP-detailer interactions, helped me to prepare an academically-based 'detailing' script for use during outreach visits to practices.

Conveniencing and respecting the practitioner

All visits were conducted at the practice, in order to minimise inconvenience for the practitioner, thus increasing the chances of obtaining time and the opportunity to influence him or her. We felt also that being "on home ground" would increase their comfort levels and reduce any sense of threat related to receiving potentially new or challenging information. Taking the effort to see the practitioner in his or her own setting would be interpreted (and was intended) as a mark of respect for their work, and the scarcity of their time.

I planned to dress in neat professional attire and carry the printed materials and a diary in a briefcase during the visits to the practice. I recorded my appointments with GPs and captured detailed accounts of the GP-educator interactions after each visit in my diary. During visits to the practice, I provided a business card to the practice receptionist and /or the GP for purposes of identification.

Duration

The outreach visits were planned to fit into a fifteen-minute slot, which would be a long but not atypical consultation time in local practice settings to highlight the key messages. The visits were designed to minimise disruption to the practice. When scheduling visits with receptionists, priority was offered to patient consultations and the official practice hours in accordance with their mosque attendance times.

The appointment process and introduction

Scheduling appointments with receptionists

The regional telephone directory (1997-1998) was used to locate practices and to confirm the GP's contact details at Mitchell's Plain with each receptionist. In instances where a practice could not be contacted/ located personal visits to identify and to confirm an appointment were necessary.

All access to GPs was controlled and went through a practice receptionist who scheduled drug company visits. Where GPs could not be contacted/ located, the educator visited practices personally to schedule an appointment.

My intended visit to the practices was a new concept for both practice staff and GP, therefore my language of communication had to be simple, easily understood and professional. In order to access the GPs, there would have to be minimal disruption to patient consultation times and I realised that it would be much easier to adopt the mannerism of a 'drug rep', and that gaining the receptionist's confidence was essential before meeting with the GP. The telephone script to the receptionist to schedule an appointment with the GP was:

A: Good day, I'm Angeni Bheekie from the National Asthma Education Programme (NAEP) and the Medical Research Council (MRC). About 2 weeks ago Dr ____ received a letter from our programme informing him about a meeting. I would like to make an appointment with Dr ____ at a quiet time for about 10-15 minutes.

When scheduling visits to practices I planned to offer extreme flexibility with regard to meeting times. The flexibility with GP meeting times would be needed to adapt to their patient load and the practice consultation times, often linked, for the many Muslim doctors in the area, to mosque attendance.

Practices assigned specific days, usually midweek from Tuesdays to Thursdays either at 9.00am or at 3.30-4.00pm to meet with drug company representatives and a similar pattern was adopted to schedule the visits. Mondays were generally perceived to be a 'busy day'. On Fridays many practices observed mosque attendance and either opened for half the day, or employed sessional GPs. I personally visited practices to schedule an appointment with the receptionist either

on Monday afternoon or during intervals between visits to other practices. Once at the practice reception counter, I made direct eye contact, and introduced myself to the receptionist. I used the telephonic introductory script and this time I referred to the intervention materials

A: Our programme is aimed at providing support to GPs in the management of childhood asthma. I have some educational material [refers to material] that I would like to discuss with Dr __. I would like to schedule an appointment at a quiet time to meet with Dr __.

R: Doctor usually meets with reps from Tuesdays to Thursdays at either 9.00am or at 4.00pm.

A: (notes a mutually convenient time in diary in the presence of the receptionist). Thank you. We will meet again on Thursday.

Initial announcement of the visit to the GPs was to be done by means of a letter (Appendix 4) with a list of the eight key messages (Appendix 5). This was to be addressed to the principal GP by name, and hand delivered to the practice location to increase the chances that it would reach the recipients personally and be read by them. Based on our experience with the survey to doctors, we expected that many would not read this letter. Nevertheless, it was felt to be important to start the series of communications in a formal, well recognised fashion, such as with an official letter. The letter informed GPs that an appointment would be scheduled at their practices to discuss the attached list of eight key primary care messages (Appendix 5), which were a subset of the national childhood asthma guidelines (1994). GPs were further asked to direct their inquiries to the principal investigator (of the CHAMP trial), who had signed the letter to maintain an open collegial and professional relationship. This list of messages was used as a 'detailing aid' to initiate interactive discussion during the face-to-face visits.

The visit: content and context

I routinely initiated the conversation by introducing myself, the two organisations supporting implementation of the programme and by describing the purpose of my visit: to discuss key primary care messages for asthma in children. When introducing GPs to the programme, I referred to the list of key primary care messages. The investigators believed that GPs would be sensitive to the term 'research' and so in my dialogue I replaced it with the word 'programme'.

A: Thank you, Dr _____ for meeting with me. I am a pharmacist working with the [referring to their respective logos in the detailing material] MRC [Medical Research Council] and NAEP [National Asthma Education Programme]. We're providing support to primary care practitioners [GPs] like yourself caring for asthmatic children. We randomly selected practices to receive this support programme. Each practice received by direct delivery a copy of these [referring to them] key primary care messages for childhood asthma management a few weeks ago. These messages have been especially formatted for practice use. We'd like to test the applicability of these materials [referring to printed material] and once all phases of the programme are completed, we will be conducting surveys at schools to assess the usefulness of the programme in terms of impact on asthma health. But before we talk about these I would like to find out about your experiences with asthma in children at this practice.

Flexibility of content and order

Aside from the timing of the visit, the actual content and ordering of the elements of the visit were also done in a flexible fashion. I responded to cues from the practitioner, identifying his/her individual problems and emphasising the relevant key message(s) to address that problem in the management of childhood asthma.

GPs involvement in the intervention was voluntary. They were free to withdraw or discontinue their participation whenever they wished to do so.

Repeat visits with different purposes

The visits were conducted the first in May (autumn) and followed-up three months later in September (spring) of 1998 to target GP barriers during the seasonal asthma peaks in the Western Cape (Roux 1993). The outreach visits were tailored to address individual GP's needs. The first visit aimed to introduce the key messages by identifying problems in childhood asthma management, and acknowledging GP's fears and misconceptions. In addition, the visit aimed to identify knowledge barriers and helped GPs to overcome this by encouraging adoption of the key messages through use of the printed materials. The second visit aimed to reinforce and maintain adoption of the messages, and to identify GPs' experiences with adoption of the key messages in practice situations. At the second visit, we intended the discussion to focus on barriers identified by the doctor that prevented him implementing the key messages, since the first visit.

Organisational umbrella for the intervention

The outreach visits were conducted under the auspices of Medical Research Council (MRC) and the National Asthma Education Programme (NAEP). Recognised as credible organisations, both NAEP and the MRC are aimed at improving the health-care of the community and are supported by well-known academic figures. One of NAEP's primary goals is to help educate health-care providers and carers on the proper management of childhood asthma.

The Medical Research Council, a para-statal organisation, aims at improving the nation's health status and quality of life through relevant and excellent health research. One of MRC's goals is to create health innovations through transdisciplinary research (Annual report 1998/9). Further, the Health Systems unit of the MRC aims to improve the quality of healthcare service provision in both public and private sectors by assessing and improving the effectiveness of health care interventions through randomised controlled trials.

NAEP (<http://www.asthma.co.za/mission.htm>) is a five year old non-governmental organisation committed to improving the quality of care and quality of life of all asthmatics by educating patients and care providers. NAEP's patient and public objectives include increasing awareness of signs and symptoms of asthma, improving knowledge and attitude of patients about detection, treatment and control of asthma and promoting the development and dissemination of patient and family educational materials. In designing the intervention we aimed to fulfil most of NAEP's objectives for health professionals. These objectives are to improve the knowledge, attitudes and skills regarding the signs, symptoms and management strategies for asthma improvement. Further, to assist and encourage continuing educational programmes on up-to-date accurate information on the diagnosis, pathogenesis and treatment, to promote and encourage the concept of active patient participation with the physician. The members of NAEP consist mainly of academics and practitioners.

Both the National Asthma Education Programme (NAEP) and the Medical Research Council (MRC) of South Africa formed a partnership to facilitate implementation of the intervention. This was done because the MRC as a research institution would

have been viewed with skepticism and this study would have been looked upon as an academic exercise.

The eight tailored key messages for management of asthma in children used in this intervention were selected in consultation with a multidisciplinary team. The members consisted of a healthcare researcher, an epidemiologist, a paediatrician, a pulmonologist (and chairperson of NAEP 1998), a private sector general practitioner located in Mitchell's Plain and a social scientist. After consensus on the content of the key messages was obtained, a graphic artist was consulted on the professional layout of the printed materials.

Printed and support materials for the outreach intervention

The eight key primary care messages (the contents of which are discussed in detail below) were formatted into materials that could be used by the GPs when consulting a child with asthma.

The printed materials aimed to reinforce the key primary care messages for childhood asthma. The written information was explicit, concise, unbiased, relevant, and up-to-date. The presentation style of the printed information adopted that of sales promotional/ marketing technique to draw GPs' attention and encourage its' adoption in their practice setting. Clinical evidence from the literature was further used to highlight the management principles. I highlight the design and content of each printed material in relation the key primary care messages.

The layout of the materials was designed in consultation with a graphic artistic to achieve a professional appearance and to compete with pharmaceutical sales promotional materials arriving at practices. The blue and white theme was chosen to symbolise a 'breath of air' feeling that was reflected in all the materials. Both MRC and NAEP logos were printed on all materials to highlight the involvement of neutral organisations in support of the intervention. The MRC logo itself would have sensitised the GPs to the intervention being part of a research study, and which would have consequently affected the outcome of the study. However, by including the NAEP logo the educational focus of the intervention was underlined.

The key messages and management principles were incorporated into a 3-part folder and a poster, with three extra elements inserted into the folder. These were a patient record card for use in the practise for their child asthmatics, a credit card sized set of messages aimed at carers of asthmatics, and a pen printed with the main diagnostic message, intended for the doctors use on the record cards. .

Three -part desk folder

The three-part desk folder contained reminders to the GP on the diagnosis, treatment and preventive strategies for the overall management of childhood asthma (Appendix 6). The folder was designed to be placed on the desk for easy access during consultation. It consisted of a centre-piece with two folding outer coverleaves to left and right. It was made of sturdy plastic laminated material, offering both durability and a glossy professional appearance.

The centre-piece had two plastic pockets filled with cards. The one set was a pack (30) of structured practice record cards and the other was a pack (30) of parent's asthma information card. There was also a loop holding a pen for the GP to use.

The inner face of the left coverleaf contained point form information on treatment by level of severity, and preventive measures for asthma in children. The inner face of the right coverleaf contained pharmacoeconomic table containing the cost of a whole range of alternative drug treatments.

The front and back leaves would be folded left and right, out of the way when a GP was filling in a practice record card for a patient during a consultation, or drawing out a parents asthma information card, both of which are attached to the centre piece. When so placed, these leaves display the information of their inside faces, i.e. the severity level treatment and other treatment and prevention key messages on the left, and the cost comparison table on the right.

The folder contained printed information consisting of a general checklist, treatment algorithm, acute asthma, treatment of acute asthma, a pharmacoeconomic table, and diagnostic indicators. In addition, to reinforce adoption of the messages, additional

props were attached to the folder. These consisted of a structured record card and a GP-mediated parent asthma information card.

Photograph and outside front cover of folder

The photograph on the outside front cover was intended to encourage early use of anti-inflammatory drugs in moderate to severe asthma, and the use of inhaler therapy.

The use of inhaled anti-inflammatory (steroid) therapy was highlighted prominently on the front cover. A large colour photograph of a young (five year old) child inhaling the contents from an inhaler colour-coded brown, indicating that it contained an anti-inflammatory agent. Written permission to photograph the child was obtained from her father.

Anti-inflammatory (“preventer”) and bronchodilator (“reliever”) inhalers are colour-coded brown and blue respectively by major pharmaceutical companies to differentiate between the two modes of therapy. If we had used an anti-inflammatory inhaler which was easily recognisable as having been manufactured by any particular pharmaceutical company we could have misled GPs into perceiving the message as being part of a company-specific marketing campaign or sales promotion strategy.

In order to create an unrecognisable inhaler which nevertheless looked typical, we asked a graphic artistic to spray paint the shell of a placebo with two contrasting shades of brown. This closely resembled an anti-inflammatory inhaler presented by the pharmaceutical industry. Because the physical shape of the shell was different from the normally used real inhalers, and the colours we chose were different from the exact shades used by any company, our inhaler was not identifiable with any particular company. Thus, we avoided the problem of non-neutrality.

Although a turbuhaler is an easier mode of drug delivery for young children than aerosol, it is more expensive. Therefore, a metered dose (aerosol) inhaler (MDI) was used as the visual prompt.

Structured record card

Computer-based patient records and reminder systems are not in use in the GP practices in Mitchells Plain, although they are sometimes used for generating billing information. Manual filing systems using patient cards of size (25cm x 12.5cm) are most commonly used to store clinical information at these practices. The preliminary design of this record card was based on a pharmaceutical company's printed asthma symptoms score card intended for use by practice receptionists to assess patients before consulting with their GP (Adams 1998).

The purpose of the structured record card was to establish an effective consultation through co-ordinated clear communication and formal information keeping, all forming an essential part of clinical practice (Rigby 1998). The card enabled relevant clinical information to be gathered into a single record and to effectively guide GPs through systematic clinical decision-making in the care of asthmatic children. The elements of the record card were designed to assess and plan therapy (ibid) according to the changing needs of asthma severity. This was established through symptom monitoring, regular evaluation of inhaler technique and need for spacer therapy, preventive drug therapy and lung function (PEFR).

Medical communication is aimed at promoting the exchange of information between the doctor and the patient (Ong 1995). Once GPs completed the structured card, they were asked to refer to the parents' asthma information card mounted directly below. The record card aimed to prompt GPs to obtain a clinical history, prescribe therapy based on severity and response to therapy, to assess functional status and drug use during follow-up visits.

The record card had a severity diagnosis section on the front of the card, which aimed to prompt the doctor into classifying the patient by level of severity and prescribing the appropriate level of treatment (Appendix 6). On the reverse side the card had space for three follow up visits, with a space for the booked date for each visit. The intention of this was to prompt the doctor to book follow up visits, thus increasing continuity of care. For each of the visits there were tickboxes to prompt the GP to check that symptom control was adequate, and that no step-up of the drug(s) was needed.

After completion, GPs were asked to attach the record card to the patient's pre-existing medical records to serve as a reference for follow-up consultations. The length and breadth of the card was intended to match the size of existing medical record cards to minimise change in practice record keeping.

Parents' asthma information card

The primary aim of the intervention was to improve health care of asthmatic children, by changing the practice behaviour of their GPs. However, simply changing the behaviour of GPs without extending the involvement of care-givers would limit the effectiveness of this intervention, since health care provision is also dependent on involvement from parents/ care-giver (Mesters 1993; Taggart 1991; Hindi-Alexander 1984).

The purpose of the parents' asthma information card was to reinforce the desired change in GP behaviour through a GP-mediated parent oriented intervention (Appendix 6). The presence of the card in the folder was itself a reminder to the GP that certain health promotion and asthma care information should be given to the patient. This information was on the card serving to remind parents about preventive measures and to strengthen implementation of the key messages. Further, the card aimed to establish a GP-patient partnership by increasing communication, and especially encourage the GP to discuss the nature of the different asthma drugs, and stimulate parental involvement in the management of asthma.

The credit-card design of the parents' asthma information card was an adaptation of a self-management plan (D' Souza 1994). The small size (length 10.5cm; breadth 5.7 cm) offered portability and accessibility of information, while the sturdy plastic material on which the information was printed offered durability. The language was simple and kept short to improve parental understanding. The information was written in English and Afrikaans, listed in order of priority to address some of the perceived parental barriers.

The card aimed to encourage parental acceptance of the diagnosis of asthma, awareness of non-drug preventive measures, recognition of symptoms of acute asthma and ability to differentiate between the drug therapies. Further, GPs were

asked to write the names of the 'reliever' and 'preventer' drugs prescribed to the child in the space provided on the plastic card to personalise the information (Nightingale 1995).

Pen

GPs are inundated with pharmaceutical promotional material arriving at practices. These include a wide range of gifts, the provision product samples, writing material and literature articles (Chren 1989). A position paper by the American College of Physicians (1990) stated that the provision of trivial gifts such as pens, calendars and inexpensive educational books to physicians from pharmaceutical companies have an educational purpose and are rated as acceptable.

In this intervention the provision of a white pen, served as a gift incentive similar to sales promotional material provided by drug companies to GPs (Appendix 6). An inscription on the pen: "*Recurrent chestiness → ? asthma*" served as a reminder for this prime diagnostic indicator. This reminder was also repeated in the outer left folder coverleaf, and was expected to be triggered each time the GPs used the pen to think of asthma before using the record card. The pen was attached to the inner left central coverleaf of the desk folder.

Poster

Posters or wall charts are widely used as educational aids in health care facilities to serve as a reminder (Wigton 1981; Harvey 1986). The poster highlighted the diagnostic indicators, treatment algorithm based on asthma severity and the treatment of acute asthma. Further, the mounted poster served to remind GPs about the use of the folder during a consultation.

Spacer reminder

A spacer reminder was provided to the GP and the practice receptionist. Each received a softdrink packed in a 500ml plastic bottle, which served as an incentive and a token of appreciation for their time and to remind them about the use of a home-made spacer therapy. The home-made spacer was recommended as an alternative to families who are unable to afford an ideal/ drug company spacer devices.

In designing the home-spacer we considered the 500ml plastic bottle for use as a spacer because of its efficiency, ease in availability and affordability to families in low-income areas. However, construction of the spacer required a more practical approach. The 500ml home-made spacer is constructed from a heated steel wire mould that is used to melt a hole in the base of the bottle to fit the mouth-piece of the MDI (Zar 1999). This procedure would be impractical in a typical household situation and could pose a problem for GPs when communicating with parents. Instead, we successfully used an alternate approach, by cutting off one of the ridges at the base of the bottle using a knife or scissors to approximate the size of the MDI mouth-piece. We also attached a specially prepared label onto the modified spacer which served as a reminder (Appendix 6).

Summary

When designing the outreach intervention numerous practice factors were considered. The intervention was designed to fit into GPs' routine clinical practice setting, it was to be conducted in a professional manner for at least for fifteen minutes, or more if permitted. The intervention aimed to be unthreatening and allow GPs to retain their clinical autonomy. The intervention was flexible in order to respond to the different barriers affecting individual GP's needs. The key messages for asthma in children intended for GP adoption were designed to be concise, neutral, evidence-based, up-to-date and practical and realistically implementable in private sector primary care practices.

The intervention had elements aimed to address GP barriers in the diagnosis, provision of cost-effective care and preventive care. Both oral and written messages were used to help reinforce GPs' adoption of the key management principles for childhood asthma. The printed materials contained additional information to add coherence to the overall management principles for childhood asthma, while the basic eight key messages remained the main focus of the intervention.

The results of the CHAMP trial indicated that this intervention appeared to have clinically and significantly improved the health outcome. Children attending GPs who had received this outreach intervention had lower asthma symptom scores

compared to those children whose GPs had received the standard mode of guideline implementation (Zwarenstein 1999). However, a qualitative assessment of this implementation study would provide a more in-depth analysis of GPs' acceptability of this multifaceted outreach intervention in their clinical setting.

References

- Adams B. Glaxo Wellcome (now Glaxo SmithKline). 1998.
- Agertoft L, Pedersen S. Effects of long-term treatment with an inhaled corticosteroid on growth and pulmonary function in asthmatic children. *Respir Med* 1994; 88: 373-381.
- Allen DB, Mullen M, Mullen B. A meta-analysis of the effect of oral and inhaled corticosteroids *J Allergy Clin Immunol* 1994; 93: 967-976.
- American College of Physicians. Physicians and the pharmaceutical industry. *Ann Intern Med* 1990; 112: 624-6.
- Anonymous. Montelukast. No current use in asthma. *Prescrire International* 1999; 8: 131-133.
- Atkin PA, Finnegan TP, Ogle SJ, Shenfield GM. Are medication record cards really useful? *Med J Aust* 1995; 162: 300-301.
- Avorn J, Soumerai SB. Improving drug therapy decisions through educational outreach: a randomised controlled trial of academically based "detailing". *N Engl J Med* 1983; 308: 1457-63.
- Avorn J, Soumerai SB, Taylor W, Wessels MR, Janousek J, Weiner M. Reduction of incorrect antibiotic dosing through a structured educational order form. *Arch Intern Med* 1988; 148: 1720-1724.
- Bauman A, Hunt J, Young L, Larkin P, Peat JK. Asthma under-recognition and under-treatment in an Australian community. *Aust N Z J Med* 1992; 22: 36-40.
- Bennett S, Dakpallah G, Garner P, Gilson L, Nittayaramphong S, Zurita B, Zwi A. Carrot and stick: state mechanisms to influence private provider behaviour. *Health Policy Planning* 1994; 9: 1-13.
- Bheekie A. Screening and monitoring of asthmatic patients at community pharmacies [M Pharm thesis] Bellville, South Africa: University of Western Cape, 1996.
- Bisgaard H. Use of inhaled corticosteroids in pediatric asthma. *Pediatr Pulmonol* 1997; suppl 15: 27-33.
- Boissel JP, Nony P, Gueyffier F, Cucherat M. Differences between messages and guidelines. Second international conference. Scientific basis of health services and 5th annual Cochrane colloquium. (Poster P260). Abstract book 1997; 279.
- Burnett KF, Young PC. Ask, advise, assist: Pediatricians and passive smoke exposure. *Clin Pediatr* 1999; 38: 339-345.
- Burton AJ. Asthma inhalation devices: what do we know. *Br Med J* 1984; 288: 1650-1651.
- Butler CC, Pill R, Stott NCH. Qualitative study of patients' perceptions of doctors' advice to quit smoking: implications for opportunistic health promotion. *Br Med J* 1998; 316: 1878-1881.

Calpin C, Macarthur C, Stephens D, Feldman W, Parkin PC. Effectiveness of prophylactic inhaled steroids in childhood asthma: a systematic review of the literature. *J Allergy Clin Immunol* 1997; 100 (4): 452-457.

Campbell DA, McLennan G, Coates JR, Frith PA, Gluyas PA, Latimer KM, Martin AJ, Roder DM, Ruffin RE, Scarce D, Yellowlees PM. Near fatal asthma attacks: the reliability of descriptive information collected from close acquaintances. *Thorax* 1993; 48: 1099-1104.

Campbell LM, Simpson RJ, ML Turbitt, Richardson PDI. A comparison of the cost-effectiveness of budesonide 400µg/ day and 800 µg/ day in the management of mild-to-moderate asthma in general practice. *Br J Med Econ* 1993; 6: 67-74.

Cates CJ. Comparison of holding chambers and nebulisers for beta-agonists in acute asthma. In Cates C, Durcharme F, Gibson P, Jones P, Rowe B, Wolf F(eds.) Airways module of the Cochrane database of systematic reviews, [updated 02 December 1997]. Available in the Cochrane Library [database on disk and CDROM]. The Cochrane Collaboration ; Issue 1. Oxford: Update software; 1998.

Charlton I, Charlton G, Broomfield J, Mullee MA. Evaluation of peak flow and symptoms only self-management plans for control of asthma in general practice. *Br Med J* 1990; 301: 1355-9.

Chen Y, Wanxian L, Shunzhang YU. Influence of passive smoking on admissions for respiratory illness in early childhood. *Br Med J* 1986; 293: 303-306.

Chilmonczyk BA, Salmun LM, Megathlin KN, Neveux LM, Palmomaki GE, Knight GJ, Pulkkinen AJ, Haddow JE. Association between exposure to environmental tobacco smoke and exacerbations of asthma in children. *N Engl J Med* 1993; 328: 1665-1669.

Chou KJ, Cunningham SJ, Crain EF. Metered-dose inhalers with spacers vs nebulisers for pediatric asthma. *Arch Pediatr Adolesc Med* 1995; 149: 201-205.

Colice GL, Vanden Burgt J, Song J, Stampone P, Thompson PJ. Categorizing asthma severity. *Am J Respir Crit Care Med* 1999; 160: 1962-1967.

Cockcroft DW. Practical issues in asthma management. (editorial) *Annals of Allergy* 1993; 71: 83-84.

Chren MM, Landefeld CS, Murray TH. Doctors, drug companies and gifts. *JAMA* 1989; 262: 3448-51.

Cummings SR, Coates TJ, Richard RJ, Hansen B, Zahnd EG, Vander Martin R, Duncan C, Gerbert B, Martin A, Stein MJ. Training physicians in counselling about smoking cessation. *Annals Int Med* 1989; 110: 640-647.

Dolan LM, Kesarwala HH, Holroyde JC, Fischer TJ. Short-term, high-dose, systematic steroids in children with asthma: the effect on the hypothalamic-pituitary-adrenal axis. *J Allergy Clin Immunol* 1987; 80: 81-87.

Donahue JG, Weiss ST, Livingston JM, Goetsch MA, Greinder DK, Platt R. Inhaled steroids and the risk of hospitalization for asthma. *JAMA* 1997; 277: 887-891.

D' Souza W, Crane J, Burgess C, Te Karu H, Fox C, Harper M, Robson B, Howden-Chapman P, Crossland L, Woodman K, Pearce N, Pomare E, Beasley R. Community-based asthma care: trial of a "credit card" asthma self-management plan. *Eur Respir J* 1994; 7: 1260-1265.

Ehrlich RI, Du Toit D, Weinberg EG, Jordaan E, Volmink JA, Zwarenstein M. Underrecognition and undertreatment of asthma in Cape Town primary school children. *S Afr Med J* 1998; 88: 986-993.

Ehrlich R, Kattan M, Lilienfeld D. Is passive smoking a cause of asthma in childhood? *J Smoking-Related Dis* 1993; 4(2): 91-99.

Eid N, Yandell B, Howell L, Eddy M, Sheik S. Can peak expiratory flow predict airflow obstruction in children with asthma. *Pediatrics* 2000; 105: 354-358.

Eisener MD, Katz PP, Yelin E, Henke J, Smith S, Blanc PD. Assessment of asthma severity in adults with asthma treated by family practitioners, allergists and pulmonologists. *Med Care* 1998;36:1567-7.

Estey A, Musseau A, Keehn L. Comprehension levels of patients reading health information. *Pat Educ Counsel* 1991; 18: 165-169.

Ferguson DM, Horwood LJ. Parental smoking and respiratory illness during early childhood. *Pediatr Pulmonol* 1985; 1: 99-106.

Fish L, Wilson SR, Latini DM, Starr NJ. An education program for parents of children with asthma: differences in attendance between smoking and nonsmoking parents. *Am J Public Health* 1996; 86: 246-248.

Frischer T, Meinert R, Urbanek R, Keuhr J. Variability of peak flow rate in children: short and long term reproducibility. *Thorax* 1995; 50: 35-39.

Garner P, Thaver I. Urban slums and primary health care. The private doctor's role. *Br Med J* 1993; 306: 667-8.

Generics Dictionary. Anley J (ed). Hout Bay. 1998; 3(1) February. Paramedical supplies.

Gergen P, Fowler J, Maurer KR, Davis W, Overpeck MD. The burden of environmental tobacco smoke exposure on the respiratory health of children 2 months through 5 years of age in the United States: third national health and nutrition examination survey, 1988 to 1994. *Pediatrics* 1998; 101(2):E8.

Gerdtham U-G, Hertzman P, Jonsson B, Boman G. Impact of inhaled corticosteroids on acute asthma hospitalization in Sweden. *Med Care* 1996; 34: 1188-1198.

Gilbert L. Dispensing doctors and prescribing pharmacists: A South African perspective. *Soc Sci Med* 1998; 46: 83-95.

Global Initiative for Asthma (GINA). Global strategy for asthma management and prevention. National Heart, Lung and Blood Institute (NHLBI) / World Health Organisation (WHO) workshop report. National Institutes of Health. NHLBI Publication number 95-3659. January 1995.
<http://www.ginasthma.com/WORKSHOP/DEFAULT.HTML>

Gomel MK, Saunders JB, Burns L, Hardcastle D, Sumich M. Dissemination of early intervention for harmful alcohol consumption in general practice. *Health Promotion J Aust* 1994; 4: 65-9.

Grampian Asthma Study of Integrated Care (GRASSIC). Effectiveness of routine self-monitoring of peak flow in patients with asthma. *Br Med J* 1994; 308: 564-7.

Grimm RH, Shimoni K, Harlan WR, Estes EH. Evaluation of patient—care protocol use by various providers. *N Engl J Med* 1975; 292: 507-511.

Guidry GG, Brown DW, Stogner SW, George RB. Incorrect use of metered dose inhalers by medical personnel. *Chest* 1992; 101: 31-33.

Harris JB, Weinberger MW, Nassif E, Smith G, Milavetz G, Stillerman A. Early intervention with short courses of prednisone to prevent progression of asthma in ambulatory patients incompletely responsive to bronchodilators. *J Pediatr* 1987; 110: 627-633.

Harvard Medical School, Department of Ambulatory Care and Prevention, Drug Policy Group. Professors SB Soumerai, D Ross-Degnan, TJ McLaughlin. 1997. (Personal communication).

- Harvey KJ, Stewart R, Hemming M, Naismith N, Moulds RFW. Educational antibiotic prescribing. *Med J Aust* 1986; 145: 28-32.
- Harrison P. (2000a) Spacer use does not often correct faulty metered dose inhaler technique. Medscape electronic mail. <http://primarycare.medscape.com/reuters/prof/2000/05/05.17/20000517clin006.html>
- Harrison P. (2000b). Adult height unaffected by steroid use in childhood. Medscape electronic mail <http://primarycare.medscape.com/reuters/prof/2000/05/05.16/20000516clin004.html>.
- Hatton MQF, Vathenen AS, Allen MJ, Croke NJ. A comparison of 'abruptly stopping' with 'tailing off' oral steroids in acute asthma. *Respir Med* 1995; 89: 101-104.
- Hickey RW, Gochman RF, Chande V, Davis HW. Albuterol delivered via metered-dose inhaler with Spacer for outpatient treatment of young children with wheezing. *Arch Pediatr Adolesc Med* 1994; 148: 189-194.
- Hindi-Alexander MC, Cropp GJA. Evaluation of a family asthma program. *J Allergy Clin Immunol* 1984; 74: 505-510.
- Ingnacio-Garcia JM, Gonzalez-Santos. Asthma self-management education program by home monitoring of peak expiratory flow. *Am J Respir Crit Care Med* 1995; 151: 748-55.
- Innovex sales training for pharmaceutical representatives. Handbook. Johannesburg. 1998; February.
- Irvine L, Crombie IK, Clark RA, Slane PW, feyerabend C, Goodman KE, Cater IC. Advising parents of asthmatic children on passive smoking: randomised controlled trial. *Br Med J* 1999; 318: 1456-1459.
- Jackson C, Lipworth B. Optimising inhaled drug delivery in patients with asthma. *Br J Gen Pract* 1995; 45: 683-687.
- Janz NK, Becker MH, Kirscht JP, Eraker SA, Billi JE, Woolliscroft JO. Evaluation of a minimal-contact smoking cessation intervention in an outpatient setting. *Am J Public Health* 1987; 77: 805-809.
- Jones A, Sykes A. The effect of symptom presentation on delay in asthma diagnosis in children in a general practice. *Respiratory Medicine* 1990; 84: 139-142.
- Jones SL, Weinberg M, Ehrlich RI, Roberts K. Knowledge, attitude and practices amongst parents of children with asthma/wheeze in Cape Town. *J Asthma* 2000; 37: 519-28.
- Kerem E, Levinson H, Schuh S, O' Brodovich H, Reisman J, Bentur L, Canny GJ. Efficacy of albuterol administered by nebuliser versus spacer device in children with acute asthma. *J Pediatr* 1993; 123: 313-317.
- Kendrick AH, Higgs CM, Whitfield MJ, Laszlo G. Accuracy of perception of severity of asthma: patients treated in general practice. *Br Med J* 1993; 307: 422-424.
- Kerstjens HAM, Brand PLP, Hughes MD, Robinson NJ, Postma DS, Sluiter HJ, Bleecker ER, Dekhuijzen PNR, De Jong PM, Mengelers HJJ, Overbeek SE, Schoonbrood DFME, Dutch chronic non-specific lung disease study group. A comparison of bronchodilator therapy with or without inhaled corticosteroid therapy for obstructive airways disease. *N Engl J Med* 1992; 327: 1413-1419.
- Kiefe CI, Heudebert G, Box Brent, Farmer RM, Michael M, Clancy CM. Compliance with post-hospitalisation follow-up visits: rationing by inconvenience? *Ethn Dis* 1999; 9: 387-395.
- Konig P, Shaffer J. The effect of drug therapy on long-term outcome of childhood asthma: a possible preview of the international guidelines. *J Allergy Clin Immunol* 1996; 98: 1103-1111.

- Lara M, Sherbourne C, Duan N, Morales L, Gergen P, Brook R. An English and Spanish asthma symptom scale. *Med Care* 2000; 38: 342-350.
- Lipworth BJ. Treatment of acute asthma. *Lancet* 1997; 350: (suppl II): sII 18-23.
- Lexchin J. Pharmaceutical promotion in the third world. *J Drug Issues* 1992; 22(2): 417-53.
- Lexchin J. Doctors and detailers: therapeutic education or pharmaceutical promotion? *Intl J Health Serv* 1989; 19: 663-79.
- Liaw ST. Patient and general practitioner perceptions of patient-held health records. *Family Practice* 1993; 10: 406-415.
- Liu JLY, Tang J-L. Doctors are ethically obliged to advise patients to quit smoking. (letter). *Br Med J* 1998; 317: 1588.
- Macdonald JB. Nocturnal asthma. What happens to the airways at night? *Br Med J* 1992; 304: 998-999.
- Malo JL, L'Archeveque J, Trudeau C, d' Aquino C, Cartier A. Should we monitor peak expiratory flow rates or record symptoms with a simple diary in the management of asthma? *J Allergy Clin Immunol* 1993; 91: 702-9.
- Mann M, Eliasson O, Patel K, ZuWallack R. A comparison of the effects of *bid* and *qid* dosing on compliance with inhaled flunisolide. *Chest* 1992; 101:496-499.
- McDowell KM, Chatburn RR, Myers TR, O'Riordan MA, Kerckmar CM. A cost-saving algorithm for children hospitalised for status asthmaticus. *Arch Pediatr Adolesc Med* 1998; 152: 977-984.
- McIntosh NA, Clark NM, Howatt W F. Reducing tobacco smoke in the environment of the child with asthma: a cotinine-assisted, minimal contact intervention. *J Asthma* 1994; 31: 453-462.
- Medical Research Council (MRC) mission statement. <http://www.mrc.ac.za/hoof.htm>
- Medical Research Council. Annual report. Parow: 1998/9.
- Melrose D (ed). *Bitter pills. Medicines and the third world.* Oxford: Oxfam 1982.
- Mesters EPE. *Infants with asthma. Towards a multidisciplinary education protocol for primary care.* [Doctoral thesis]. Netherlands: University of Maastricht, 1993.
- Meulenberg-Buskens I. *The Free Attitude Interview.* Unpublished paper. Grabouw: Research for the Future, 1997.
- Moosa SEI, Henley LD. An evaluation of parental knowledge of childhood asthma in a family practice setting. *S Afr Med J* 1997; 87: 42-45.
- Morris A. The emerging anti-inflammatory role of theophylline in the treatment of asthma. *S Afr Fam Prac* 1996; June: 280-284.
- Nankani JN, Northfield M, Beran YM, Richardson PDI. Changes in asthmatic patients' symptoms and lifestyles on institution of inhaled budesonide therapy. *Curr Med Res Opin* 1990; 12: 198-206.
- National Asthma Education Programme (NAEP) mission statement: <http://www.asthma.co.za/mission.htm>
- National Heart, Lung and Blood Institute. National Institute of Health (NHLBI). National Asthma Education and Prevention Program. Expert Panel Report 2. Guidelines for the diagnosis and management of asthma. Clinical practice guidelines. NIH publication no. 974051. April 1997.

Newman SP, Moren F, Pavia D, Little F, Clarke SW. Deposition of pressurized suspension aerosols inhaled through extension devices. *Am Rev Respir Dis* 1981; 124: 317-320.

Nightingale SL. Written information on prescription drugs. *Intl J Tech Assess Health Care* 1995;11:399-409.

North of England study of Standards and performance in general practice. Medical audit in general practice. I: Effect on doctors' clinical behaviour for common childhood conditions. *Br Med J* 1992; 304: 1480-4.

O' Callaghan C, Barry P. Delivering inhaled steroids to patients. (editorial). *Br Med J* 1999; 318:410-11.

O' Callaghan C. Delivery systems: the science. *Pediatr Pulmonol* 1997; suppl 15: 51-54.

Ockene JK, Quirk ME, Goldberg RJ, Kristellar JL, Donnelly G, Kalan KL, Gould B, Greene HL, Harrison-Atlas R, Pease J, Pickens J, Williams JW. A residents' training program for the development of smoking intervention skills. *Arch Intern Med* 1988; 148: 1039-1045.

O' Driscoll, Kay EA, Taylor RJ, Weatherby H, Chetty MCP, Bernstein A. A long-term prospective assessment of home nebuliser treatment. *Respir Med* 1992; 86: 317-325.

O' Driscoll BR, Kalra S, Wilson M, Pickering CAC, Carroll KB, Woodcock AA. Double-blind trial of steroid tapering in acute asthma. *Lancet* 1993; 341: 324-327.

Ong LML, De Haes JCJM, Hoos AM, Lammes FB. Doctor-patient communication: a review of the literature. *Soc Sci Med* 1995; 40: 903-918.

Orient JM, Kettle LJ, Sox HC, Sox CH, Berggren HJ, Woods AH, Brown BW, Lebowitz M. The effect of algorithms on the cost and quality of patient care. *Med Care* 1983; XXI: 157-167.

Parkin PC, Saunders NR, Diamond SA, Winders PM, Macarthur C. Randomised trial spacer versus nebuliser for acute asthma. *Arch Dis Child* 1995; 72: 239-240.

Peat JK, Salome CM, Toelle BG, Bauman A, Woolcock AJ. Reliability of a respiratory history questionnaire and effect of mode of administration on classification of asthma in children. *Chest* 1992; 102: 153-157.

Perera BJC. Efficacy and cost effectiveness of inhaled steroids in asthma in a developing country. *Arch Dis Child* 1995; 72: 312-316.

Pierart F, Wildhaber JH, Vrancken I, Devadason SG, Le Souef PN. Washing plastic spacers in household detergent reduces electrostatic charge and greatly improves delivery. *Eur Respir J* 1999; 13: 673-678.

Plotnick LH, Durcharme FM. Should inhaled anticholinergics be added to β_2 agonists for treating acute childhood and adolescent asthma? A systematic review. *Br Med J* 1998; 317: 971-977.

Ratto D, Alfaro C, Sipse J, Glovsky MM, Sharma OP. Are intravenous corticosteroids required in status asthmaticus? *JAMA* 1988; 260:527-529.

Rowe BH, Spooner CH, Durcharme FM, Bretzlaff JA, Bota GW. The effectiveness of corticosteroids in the treatment of acute asthma exacerbations of asthma: a meta-analysis of their effect on relapse following acute assessment. In Cates C, Durcharme F, Gibson P, Jones P, Rowe B, Wolf F (eds.) Airways module of the Cochrane database of systematic reviews, [updated 02 December 1997]. Available in the Cochrane Library [database on disk and CDROM]. The Cochrane collaboration; issue 1. Oxford: Update software; 1998.

Reddy P, Meyer-Weitz A, Yach D. Smoking status, knowledge of health effects and attitudes towards tobacco control in South Africa. *S Afr Med J* 1996; 1389-1393.

- Rigby M, Roberts R, Williams J, Clark J, Savill A, Lervy B, Mooney G. Integrated record keeping as an essential aspect of primary care led health service. *Br Med J* 1998; 317: 579-582.
- Roux P, Smit M, Weinberg EG. Seasonal and recurrent intensive care unit admissions for acute severe asthma in children. *S Afr Med J* 1993; 83: 177-179.
- Russell MAH, Wilson C, Taylor C, Baker CD. Effect of general practitioners' advice against smoking. *Br Med J* 1979; 2: 231-235.
- Rutten-van Molken MPMH, Van Doorslaer EKA, Jansen MCC, Kerstjens HAM, Rutten FFH. Costs and effects of inhaled corticosteroids and bronchodilators in asthma and chronic obstructive disease. *Am J Respir Crit Care Med* 1995; 151: 975-982.
- Schoenbaum SC, Gottlieb LK. Algorithm based improvement of clinical quality. *Br Med J* 1990; 301: 1374-1376.
- Selroos O, Halme M. Effect of a volumatic spacer and mouth rinsing on systemic absorption of inhaled corticosteroids from a metered dose inhaler and dry powder inhaler. *Thorax* 1991; 46: 891-894.
- Sharek PJ, Bergman DA. Beclomethasone for asthma in children: effects on linear growth (Cochrane review). In: *The Cochrane Library*, issue 1, 2000. Oxford: Update software.
- Silagy C, Ketteridge S. Physician advice for smoking cessation. (Cochrane review). In: *The Cochrane Library*, issue 3, 1998. Oxford: Update software.
- Sly PD, Cahill P, Willet K, Burton P. Accuracy of mini peak flow meters in indicating changes in lung function in children with asthma. *Br Med J* 1994; 308: 572-574.
- Soumerai SB, Avorn J. Principles of educational outreach ('academic detailing') to improve clinical decision making. *JAMA* 1990; 263: 549-56.
- South African Childhood Asthma Working Group (SACAWG). Use of theophylline in childhood and adolescent asthma. *S Afr Med J* 1993; 83: 913-914.
- South African Childhood Asthma Working Group (SACAWG). Management of childhood and adolescent asthma. 1994 consensus clinical guidelines. *S Afr Med J* 1994; 84 (12): 862-866.
- Spahn JD, Leung DYM. The role of glucocorticoids in the management of asthma. *Allergy and Asthma Proc* 1996; 17: 341-50.
- Speight ANP, Lee DA, Hey EN. Underdiagnosis and undertreatment of asthma in childhood. *Br Med J* 1983; 286: 1253-6.
- Spitzer WO, Sussia S, Ernst P, Horwitz RI, Habbick B, Cockcroft D, Boivin J-F, McNutt M, Buist S, Rebeck AS. The use of β -agonists and the risk of death and near death from asthma. *N Engl J Med* 1992; 326: 501-506.
- Stalsby Lundborg C, Hensjo LO, Gustafsson LL. "Academic drug-detailing": from project to practice in a Swedish urban area. *Eur J Clin Pharmacol* 1997; 52: 167-172.
- Streck WF, Lockwood DH. Pituitary adrenal recovery following short-term suppression with corticosteroids. *Am J Med* 1979; 66: 910-914.
- Taggart VS, Zukerman AE, Sly RM, Steinmuller C, Newman G, O' Brien RW, Schneider S, Bellanti JA. You can control asthma: evaluation of an asthma education program for hospitalised inner-city children. *Patient Educ Counsel* 1991; 17: 35-47.
- Toogood JH, Baskerville J, Jennings B, Lefcoe NM, Johansson S. Use of spacers to facilitate inhaled corticosteroid treatment of asthma. *Am Rev Respir Dis* 1984; 129: 723-729.

Trostle J. Inappropriate distribution of medicines by professionals in developing countries. *Soc Sci Med* 1996; 42: 1117-20.

Turner MO, Taylor D, Bennett R, Fitzgerald JM. A randomised trial comparing peak expiratory flow and symptom self-management plans for patients with asthma attending a primary care clinic. *Am J Respir Crit Care Med* 1998; 157: 540-546.

Van den Heever. Private sector health reform in South Africa. *Health Economics* 1998; 7: 281-89.

Verberne AAPH. Managing symptoms and exacerbations in pediatric asthma. *Pediatr Pulmonol* 1997; suppl 15: 46-50.

Volmink JA, Metcalfe CA, Zwarenstein M, Heath S, Laubscher JA. Attitudes of private general practitioners towards health care in South Africa. *S Afr Med J* 1993; 83: 827-833.

Wells KB, Ware JE, Lewis CE. Physicians' attitudes in counseling patients about smoking. *Med Care* 1984; 22: 360-365.

Wensing M, Grol R. Single and combined strategies for implementing changes in primary care: a literature review. *Intl J Qual Health Care* 1994; 6: 115-32.

Werk LN, Steinbach S, Adams WG, Bauchner H. Beliefs about diagnosing asthma in young children. *Pediatrics* 2000; 105: 585-90.

Wigton RS, Zimmer JL, Wigton JH, Patil KD. Chart reminders in the diagnosis of anemia. *JAMA* 1981; 245: 1745-1747.

Wyatt JC, Patterson-Brown S, Johanson R, Altman DG, Bradburn MJ, Fisk NM. Randomised trial of educational visits to enhance use of systematic reviews in 25 obstetric units. *Br Med J* 1998; 317:1041-6.

Yach D, Townsend GS. Smoking and health in South Africa. *S Afr Med J* 1988; 73: 391-399.

Yeo GT. Assessing the impact of an educational intervention on prescribing of hypnotic drugs in general practice settings. *Aust Prescriber* 1993; 16: 44-45.

Yudkin JS. The economics of pharmaceutical supply in Tanzania. *Intl J Health Serv* 1980; 10: 455-477.

Zar HJ, Liebenberg M, Weinberg E, Binns HJ, Mann MD. The efficacy of alternative spacer devices for delivery of aerosol therapy to children with asthma. *Ann Trop Paed* 1998; 18: 75-79.

Zar HJ, Green C, Mann MD, Weinberg EG. A novel method for constructing an alternative spacer for patients with asthma. *S Afr Med J* 1999; 89: 40-42

Zwarenstein M, Adams J, Bheekie A, Swingler G, Ehrlich E, Lombard C, Pather S, Sladden M, Eccles M, with the National Asthma Education Programme. Chestiness and asthma in Mitchell's Plain (CHAMP): Cluster randomised controlled trial of academic outreach demonstrates improved health status of asthmatic children attending private practitioners in poor urban community in South Africa. *Int J Tubercule and Lung Dis.* 1999; 3(9): suppl 1. S76. 30th International Union of Against Tuberculosis and Lung Disease (IUATLD) World conference. Abstract book (Poster) 641-PD.

Zwarenstein M, Vundule C, Bourne D. Private medical practice in the republic of South Africa. Description and short term trends. Unpublished paper. Health Systems Unit, Medical Research Council, 1996.

Zora JA, Zimmerman D, Carey TL, O'Connell EJ, Yunginger JW. Hypothalamic-pituitary- adrenal axis suppression after short-term, high-dose glucocorticoid therapy in children with asthma. *J Allergy Clin Immunol* 1986;77: 9-13.

CHAPTER 8: RESULTS (Part 2)

GPs' RESPONSES TO EDUCATIONAL OUTREACH VISITS TO PRACTICES

Introduction

The purpose of this chapter is to describe the results of the study I conducted to explore GPs' perceptions and responses to the CHAMP intervention, specifically the key messages, outreach educator and educational materials. This study aimed to answer the research question:

“What did the intervention mean to the GPs?”

In this chapter I report on GPs' responses to my visits to their practice, starting with responses to the first visit, then briefly indicating similar themes in the second visit and lastly describing in detail new issues arising at the second visit.

The intervention consisted of two visits by the educator to random practices (see overall design in chapter 4). The first visit to each practice aimed to:

- introduce the programme and discuss the recipient GPs' personal barriers to improved asthma care for children visiting the practice
- review the primary care messages jointly with each GP
- explain the use of various elements of the printed material and
- observe GPs' responses to the detailer and printed material

This first set of visits to all thirty-one intervention GPs took place over a three-week period in May 1998.

The second visit to each of these practices was designed to reinforce the key messages, and consisted of another face-to-face discussion with each GP. During that discussion GPs' experiences with use of the printed material since the first visit were elicited and residual barriers to improved care explored. Support was demonstrated for these barriers by selectively reinforcing the key messages, as well as offering evidence from other studies to support any of the key recommendations. This set of visits took place three months later, during September 1998.

Description of private practices and demographic profile of GPs in CHAMP intervention

Twenty-two practices were randomised to receive the intervention. Parent-administered questionnaire surveys were used to identify and assess children with asthma (using a modified ISAAC definition) and to establish names of their usual GP (Zwarenstein 1999). This allowed us to link asthma health status with GPs. We stratified our randomisation by the number of patients from our list per practice.

Most practices for the intervention were located in Mitchell's Plain Town centre, some in the suburbs of Lentegour, Eastridge, Tafelsig and Woodlands, and the remainder in Weltevreden Valley, Strandfontein, Colorado, Portlands, Beacon Valley and Westridge (Table 8.1). Most practices are attached to or situated nearby a shopping centre, while others were located independently in the residential area.

Thirty-two GPs received the intervention, of which most (24/32) were males. The age of GPs was calculated from year of first registration as a surrogate measure of age, the average age at basic medical graduation being 25 years (Zwarenstein 1989).

Most GPs were in the 25-45 age range (78%) , some between 45-55 years (15%) and a few below the age of 65 years (6 %) (Table 8.1). GPs' qualifications were identified from the South African Medical and Dental register (1997; 1998). Most GPs obtained their undergraduate training in South Africa, some in India and a few in Ireland. Few GPs had obtained additional qualifications. Most GPs were solo-practitioners, some sessional GPs and a few were full-time employees. Few GPs had more than one practice.

Table 8.1 Location of private sector practices and demographic profile of GPs in CHAMP outreach intervention

Number of practices	22
<i>Suburb</i>	<i>number of practice(s)</i>
Town centre	7
Lentegour	3
Eastridge	2
Tafelsig	2
Woodlands	2

Weltevreden valley	1
Strandfontein	1
Colorado	1
Portlands	1
Beacon Valley	1
Westridge	1
Number of practices attached to or near a shopping centre	14
Number of practices located in residential areas	8
Number of GPs who received the outreach intervention	32
<i>Gender</i>	
Males	24
Females	8
<i>Age range</i>	
25-35	15
35-45	10
45-55	5
55-65	2
<i>Country at which undergraduate training was received</i>	
South Africa	26
India	5
Ireland	1
GPs with additional qualifications	3
GPs with more than 1 practice	3
<i>Employment status</i>	
Solo-practitioners	21
Full-time employees	2
Sessional GPs	9

The first outreach visit to practices

I describe receptionists' responses when scheduling appointments telephonically and when visiting practices.

Receptionists' response

All receptionists perceived the outreach educator as a drug company representative and responded positively when scheduling an appointment. Before an appointment could be made, receptionists at first seemed unfamiliar with the two umbrella organisations involved in the programme and further inquired about the 'company' that the educator had represented.

R: Which company... is this?

A: I represent the Medical Research Council and the National Asthma Programme

After I had reiterated the names of the two umbrella organisations, there was silence for a few seconds, and thereafter the receptionists responded positively in making the appointment with the GP.

Telephonic responses depended on how busy the practice was perceived at the time the telephone call was made. In most quiet practices receptionists were able to schedule a meeting without hesitation, and encouraged a meeting either the very same or suggested alternative suitable days. In a few busier practices, the receptionists further carefully screened the call.

R: What is the asthma programme about?

A: Our programme involves meeting with the doctor and provide him/her with educational materials for use at the practice in the management of asthma in children. We'd like to discuss these messages with Dr _____.

R: ..and how long will this meeting be ?

A: About 10-15 minutes....

Few receptionists either asked me to call again at a time they perceived to be quiet, while others transferred me directly to the GP to schedule an appointment. If more than three calls were made to make contact with the receptionist, I visited practices personally to schedule an appointment at the practice.

In adopting the social marketing technique (Chapter 7) practice staff perceived the educator as a drug company representative. The educator's professional appearance mimicked that of a drug representative. This frame of reference seemed to have facilitated access to the practices. At the same time, this preliminary visit helped the educator to absorb the practice environment.

Receptionists responded positively. They were friendly, cordial and co-operated with the educator to schedule an appointment with the GP. Receptionists acknowledged my presence by either a smile or a nod and our conversation usually lasted less than 2-3 minutes. As it was the first visit to the practice, some receptionists needed to further clarify my identity:

R: Which 'asthma programme' is this... ?

A personal visit seems to have facilitated a meeting with the GP and largely depended on the length of the patient queue at the practice.

Receptionists working in quieter practices having a small patient queue (<5) accommodated me for a meeting instantly without any prior confirmation or consultation with the GP. However, in

busier practices receptionists adhered strictly to the proposed meeting times assigned for drug representatives and some receptionists checked with the GP before confirming the appointment. Receptionists working for 'panel doctors' carefully screened the purpose of my visit and emphasized that the meeting be kept short due to an influx of patients from the municipal and clothing industry. In one practice, even after securing an appointment, the receptionist asked me to reschedule the meeting with the GP because of a long queue (> 15) of patients awaiting consultation. I agreed, to avoid a rushed meeting.

Length of waiting times at practices

The waiting times usually ranged from 15 minutes to just over 3 hours. GPs' who had failed to meet at the appointed time, apologised prior to our meeting. The longest waiting time occurred at a practice where the one GP (2) is a full time employee at a public sector health-care centre who manages his private practice on a part-time basis. The practice does not have a telephone and access to this GP is made via a butchery or by visiting the practice at 5.30pm when a receptionist is present.

Meetings took place in the doctor's usual working hours between 9am and 5.30 pm at their practice, and usually in the practice consulting room. I met with thirty-two GPs from twenty-two practices on my first round of educational visits. I was usually shown to the patient's chair at the doctor's desk. He (or she) occupied their usual consulting position, seated across the corner of the desk from me.

In the next section I have presented GPs' responses to my initial opening address, categorised according to my analysis of their receptiveness.

Negative responses, confusion and suspicion

Several GPs' initial response to my role as outreach educator with some confusion, although this was usually quickly and easily clarified. The confusion took one of four forms. GPs seemed to view me as a drug company representative; as a representative of an MRC-NAEP referral centre for asthma patients; a representative from the health-care ministry or as having links with an asthma expert working in a nearby public sector academic hospital.

Just before I took my seat opposite one GP he asked:

- GP 1: So you're a rep.. Is Mitchell's Plain your area?
A: No [smiling] ... I'm working at the MRC with NAEP on this programme ...
GP 1: OK

Another GP understood my role within a framework of understanding of the public service goal of the two organisations but with some residual doubts, which he expressed in a lighter way. Just after introducing myself and in referring to the MRC and NAEP organisations, he inquired if I was a representative of the health minister.

- GP 3a: I hope ...you're not one of Zuma's [then Minister of Health] people..[smiling]
A: No ... I'm from the MRC and NAEP.

Some GPs presumed that the organisations under whose umbrella the programme was being delivered (MRC and NAEP) were offering to serve as referral centres for care of asthmatic children from GP practices.

- GP 4: I've got patients....that have problems in managing their asthma...Can I refer them to you?
GP 13b: Yes....I can think of four patients right now ...I'll refer them to you.

Some GPs seemed to want to identify this programme with a specific prominent local named specialist in asthma, the professor of paediatrics at the medical school from which most interviewees graduated.

- GP 5: Are you working with professor [name of professor] ?
A: No...I'm actually working at the MRC with NAEP on this joint programme.
GP 5: [nodding and smiling]

While most GPs could immediately or quite quickly identify the MRC and NAEP as organisations involved in the programme, some GPs perceived me as a drug representative having a commercial motive. The visit was a novel experience for both the GPs and myself. Since the visit adopted a social marketing technique similar to those used by drug company representatives when they promote prescription drugs directly to doctors, it was inevitable that some GPs would initially understand my role within a familiar frame of reference.

- GP 16d: Which [drug] company.. you're working for?
GP 8: Shall I sign your [company's] card? [GP reaching out towards the detailer]

Some of these GPs further believed that either a 'drug company' or a commercial 'sponsoring agent' must be benefitting by covertly supporting implementation of this programme despite my repeated attempts in referring them to the printed MRC and NAEP logos on the folder and poster. These GPs became frustrated as a commercial (drug) company marketing goal could not be identified.

GP 2: Which drug company is promoting this [programme]? Tell me...who is sponsoring this [programme]?.. Tell me... why are you doing this?

Some GP's seemed to have a defensive position, and were suspicious about the purpose of the programme.

GP2: Do they [MRC/ NAEP] think that we're [GPs] not doing enough..... about the management of asthmatic children] ?.....

Although most GPs welcomed me by extending a friendly handshake, some seemed reluctant to spend much of their time in a meeting. These GP's contributed very little to the discussion initially.

When I entered the room, the GP who was seated with folded arms, leaned backwards and adopted a piercing look. This defensive posture created in me a sense of urgency so as to get done with the meeting. Even before I was able to introduce myself and the nature of the programme he asked:

GP 10a: 'What do you have?... You've just got 2 minutes!'

Few GPs assuming that I was associated in some way with the department of health, used the opportunity to air their frustrations about the perceived nation-wide health-care crisis and their lack of involvement in community improvement programmes. One GP (16c) was impatient to discuss the then minister's numerous health policy changes.

GP 16c: Let me first detail to you!

His frustration centred on the conditions and services at public-sector hospitals that he perceived as appalling and showed me recent local newspaper clippings highlighting the deterioration in health-care delivery in provincial hospitals. He added that GPs were 'losing confidence' in the government's strategies for health-care provision and quoted the 'Sarafina debacle' where funds were misused. He further questioned the quality of cheaper generic medicines obtained through parallel importation another recent government policy, and its long-term impact on health care. Other GPs felt that removing of doctors' dispensing rights would affect many families who could not afford 'buying their medicines from pharmacies'. These GPs added that writing an examination to apply for a license/ permit to dispense was

not 'feasible that their age' and that implementation of compulsory continuing education programme would also pose a problem.

A: It does seem quite a challenge... I understand it must be difficult for you ... with all these [regulatory] changes taking place.

A feeling of despondency seemed to arise from one GPs' previous unsuccessful attempts to collaborate with health care authorities to help improve the provision of asthma care in the community. This unrewarding experience seemed to have created a lack of interest and contribute to his non-involvement in subsequent health care improvement programmes.

GP 19: Asthma [in children] is a problem in our community...I've tried to work with the health authorities ...but there were too many problems..there's so much red tape and poor-communication...that I've lost interest...to [help] become involved [in this programme].

GPs who agree but are passive

Some GPs seemed to agree with the messages in principle, but in my attempts to get commitment from them to the actions flowing from these key messages in their own management of childhood asthma.

One GP seemed to want to facilitate asthma improvement programmes aimed directly at parents and/or patients through involvement of their employers. He felt that drug companies could supply lower-priced inhalers to either GPs or employees which could then be made easily accessible to asthmatic patients /families/ dependents. He believed that this would increase community awareness to promote greater acceptability for inhaler therapy. Alternatively, he felt that the MRC / NAEP should provide free inhaler therapies at GP practices for distribution to patients.

GP 17: ...what would be helpful is ..if employers who aware of their asthmatic employees could also facilitate asthma improvement programmes at their places of employment...this would save their employees taking time off from work to come and see a GP....It is rather unfortunate that you (MRC /NAEP) are unable to leave inhalers... as samples you know ...I could give them to some of my patients... I could wean them [asthmatic children] off oral therapy and I could introduce them to inhaler therapy.

When I highlighted the need for concise, relevant, up-to-date, practical information by referring to the key management principles for childhood asthma in primary care

setting, some GPs felt the need to share guidelines that they claimed to use at their practices. None of these were the current national guidelines for childhood asthma.

One GP (12), who had been quiet and passive when half-way through the discussion spontaneously produced a drug company-sponsored pocket-sized algorithm for management of asthma for adults.

GP 12: Here's the guidelines [referring to an algorithm (drug-company) for asthma management] I'm using ...

A: Thank you for sharing these with me. You may perhaps want to supplement the guidelines you're using with these key messages and see if there's a difference.

A few GPs seemed to prefer their own management principles for childhood asthma management.

A: I'd like to share the key messages that appear on these printed materials with you ...

GP 8: This [referring to the key messages in the desk folder] is not new to me ...I follow the guidelines ... and I've got no problem with them

GP11: I use my own set of notes ...I have my own summaries ..they are quite helpful. I read the BMJ to up-date myselfand I am quite happy with that.

A: That's fine Dr _____. We're highlighting key messages for childhood asthma.

GP's preference to use his/her own notes and resisting the offer of external support may underlie a perceived threat towards changing their clinical autonomy.

Others felt that the key messages did not seem suited for care of asthmatic children from a 'developing country' like South Africa. Because of the numerous socio-economic barriers, some GPs felt unable to apply the key messages in their practice settings.

GP 11: It's not for what we [GPs] experience out here...These [referring to the key messages] are suited for use in 1st world countries and not for 3rd world countries. ...Here we are treating patients in a third world situation.....this [programme] should have been more realistic.....rather the approach should be practical....the contents of the folder are not practical. ... This [folder] is about 20 years ahead of time for practice in South Africa....It is too big and cumbersome for use on the desk top and ...it's too wordy.As GPs we just don't have time to writewriting takes too much effort. I just like putting ticks...and this [folder] should be half its' size. It [folder].. seems very expensive... and the resources should have been used towards benefit of the patient.

A: I understand that there are numerous constraints in the poor communities...and that GPs like yourselves need to be supported in the services you're providing to these communities. As this is an initial phase [referring to the folder]...when planning future programmes of this nature we will take your suggestions into account.

GP 17: You know ...this [referring to the key messages] is fine for people who are literate and can afford such therapies – like you and I ...We know what this therapy means and we can afford it. But ... for the poor patients it is difficult. As a PLAN [PLAN doctor is one contracted on a fee-for-service basis to employees at municipal departments and clothing industries] doctor I see many asthmatics from the lower socio-economic areas. These patients don't budget for medical expenses ... and parents can't afford treatment on a long-term basis ...the medicines are expensive...As undergraduates we are trained to use therapies suited for first world countries, but.. out here in practice ... it is quite different ... it's a third world situation.

A: (nodding) ... I realise that it must difficult... facing such problems ...

Some GPs felt that priority should be given to patient-mediated programmes to help overcome such barriers. They want to disseminate educational materials from their practice to patients/ parents, but expressed their concern about illiteracy in the community. Nevertheless, they felt that educational programmes could help promote awareness of asthma and should be aimed directly at patients/ parents using local media (TV, newsletters, radio) or by dissemination of educational materials from asthma clinics at nearby day hospitals.

One GP (16d) felt that an educational kit directed for use by the family of asthmatic children rather than GPs would be more useful. He referred to a 'diabetic kit' consisting of an educational brochure and a radio cassette supplied by a pharmaceutical company. Further he added that if similar strategies could be adopted it would reinforce self-management of asthmatic children through involvement of their family members. Another GP (14) asked for posters containing cartoons.

GP 14: Having posters ... patients must be able to understand them.. I would like to put this one in the waiting room, but not many patients would understand it... one needs to use caricatures to help parents/ patients understand...those that are unable to read/ write don't know what's asthma....

GPs who agree and are enthusiastic in their intentions

Most GPs reacted positively to the intervention. They seemed relaxed when identifying with the role of the educator, perceived the visit as a break and expressed the need for the intervention at practices. They established rapport with the educator, made positive responses to the printed material and seemed enthusiastic about adoption of the key messages at their practice and their intention to participate in the programme. One GP (15) used the opportunity to take a break from routine clinical duties.

After ushering me into the small consulting room, empty of patients, he (GP 15) resumed a relaxed position back in his chair and lit a cigarette. After I introduced the purpose of my visit, he nodded in agreement and fully supported use of the key management principles.

By encouraging a social atmosphere in my approach, I engaged in interactive and meaningful discussions with the GP.

Most GPs seemed to accept the key principles for management of childhood asthma, one GP specifically supported the need for regular up-dates.

GP 14: You know...I've been a GP for some time now....when I get patients coming to me.. I see that patients are not properly managed ... even GPs don't know much about asthmait is not surprising what's going onthey [GPs] need to be informed too ...

A: [nodding]

Some GPs seemed enthusiastic about the key messages and eager to share and compare the guideline and educational approaches used to manage asthma in their practice. This sharing seemed to display trust and rapport with the educator in contrast to some other GPs who demonstrated their current guidelines as an alternative to the key messages I was presenting.

GP 13a: This [referring to an algorithm for asthma management] is what I' m following [smiling]..

A: Here's a few simple [key asthma] messages that you could also use ...

GP 13a: Yes, yes...I 'd like to use these [key messages] too.....

Some GPs felt that the educator was validating their own approaches to asthma care, and used the opportunity to discuss these approaches. One GP (21) was eager to demonstrate his educational approach that he adopts to improve parental understanding of asthma in children. He had devised a small practical demonstration

which helped to promote visual awareness of changes taking place in the airways of the lungs during asthma. When explaining to parents, he encircles his fingers to his thumb and plugs the central space with cotton wool (representing inflammation in the air passages).

GP 21: I spend at least an hour with my patients I adopt an open channel of communication with them .. this helps parents keep a positive and open mind. I use word pictures so that parents/children are able to grasp the underlying concepts of asthma .. this helps them visualise the changes taking place in the airways... for example .. I demonstrate the concept of bronchoconstriction and inflammatory changes occurring in the airways during asthma by plugging this [the cotton wool] between my encircled fingers.

This GP dispels fears and misconceptions associated with asthma by stimulating self-management and trained his reception staff to offer health promotion strategies for the patient and the family.

GP 21: I ask the child.. 'Who is your favourite sport star/ hero? Would you like to be like your hero _____ one day?well...you can be ... if only you control your asthma ... ' This motivates them to become physically active....and it enables them to work towards it...I've also trained my receptionists... so they help to counsel parents on preventive care ... they spend time teaching them on a more personal level.

GPs reiterated that a stigma was associated with inhaled medication and that oral therapy was more acceptable to the community. However, one GP seemed confident to implement inhaler therapy and shared his educational approach with the detailer in initiating inhaled therapy in children. He had summarised the importance of inhaled medication on a small drawing board mounted in his consulting room by highlighting the route, dose and the therapeutic effect of the drug in asthmatic children, which he used to show to parents. He demonstrated it to me:

GP 21: If the recommended therapy is 100-200mcg then I demonstrate this to parents:

Inhaled route	100mcg / puff	→	no side-effects
Oral route	2000mcg /tablet	→	side-effects : tremor, headache, etc.

He further highlighted the cost-effective and safety profile of inhaled compared to oral route. In addition, he mentioned that parents were not aware of the importance of drug delivery devices and asked for a visual demonstration of a poster highlighting this message.

GP 21: A poster that could demonstrate how much of the drug is lost when inhaling from an inhaler would be useful for parents ...

The GP reiterated that by allowing parents to make informed decisions, compliance improves.

Levels of enthusiasm were sometimes high, both for the information and approach I was bringing, and for their own efforts towards children with asthma. One GP seemed not only to display an earlier keenness towards patient / parent health education, but also used the visit as an opportunity to educate his practice staff.

When I referred GP (3a) to the parent's asthma information card, he drew my attention to a neat stack of brochures, and booklets that he regularly provides to patients/ parents. He referred me to a childrens' book written by a renowned asthma expert on asthma management and also inquired whether educational booklets could be provided to practices for distribution to parents/ patients.

GP 3a: Do you have something like this [referring to the childrens' book]... you know parents /patients find this useful.... this...will help improve their understanding. I provide parents with a lot of educational material so that they understand what is happening... If you have pictures of lungs it would help...in teaching and explaining to parents what's happening on the inside... in asthma...

When concluding the visit this GP (3a) had thanked me for my efforts and further inquired if I could provide a lecture to the staff at his practice. I agreed as I wanted to assess the flexibility of the intervention and to use the opportunity to learn further about experiences from non-medical practice staff.

GP3a:This is a good programmeI would like you to provide a lecture to the practice staff as well...as it would be useful for my staff that they would have a better understanding of drug therapy that we prescribe for asthma. They are aware of the names of the asthma drugs ...but they need to know why they're prescribed.

I briefly outlined the pathophysiology of asthma, drug treatment and preventive measures and reinforced the key management principles to the three practice staff members. Further, I increased their awareness to active involvement towards parental/ patient education of asthma symptoms, checking frequency of medication use and inhaler technique, giving advice on smoking avoidance and encouraging follow-up care.

The room permeated with enthusiasm as staff queried the functions of the drug therapies used in the care of asthmatic children. Even though their knowledge about symptoms of childhood asthma was limited, the staff could identify numerous problems ranging from poor patient compliance and parental inquiries about medication use. The staff's eagerness to participate seemed to emanate from the GP's own enthusiasm towards the programme. My visit seemed to have added to this.

The printed materials that were provided to GPs consisted of a list of key primary care messages, a desk folder and poster. The key messages were hand-delivered to the GPs before the visit. The meeting with GPs aimed to further discuss and draw their attention towards adoption of the messages at their practices through use of the desk folder and poster. At the start of our meeting at the practice, when I briefly referred GPs to the list of primary care messages, most of them replied that they had seen these.

A: These simple, concise and up-to-date messages were selected from the national guidelines and have been especially designed (referring to the poster and the 3-part folder) for use in practice settings. We're would like to see if these key messages are applicable for primary care practice.

GP 1: I have read it [key messages]....[looks around on the table containing a pile of papers]

GP 12: Yes.... I 've seen it [key messages] ...[nods in agreement].

Most GPs responded positively to the printed educational material agreeing on the need for concise and standardised protocols.

GPs claimed to be familiar with the material and either smiled, nodded or leaned forwards towards the educator during the discussion. Some rested their elbows on the desk and with raised eyebrows indicating their curiosity, asked questions on aspects of the folder and poster. Many felt that these short key messages were suited for use in primary care. One locum GP (13 b) added that she does not have time to read detailed guidelines, while another GP (20) felt that the key messages were a good way to achieve uniformity in practices.

GP 13b: You know... this is so great... a few short sentences and that is just one needs [concise messages / statements]...I don't have the time to read lengthy guidelines.

GP 20: It 's good ...a way of standardising therapy ...[nodded with a smile and a friendly look].

Another GP (21) expressed his disappointment at the treatment his asthma patients received in public sector tertiary hospitals. Other GPs agreed that the therapy severely asthmatic patients received after referral seemed inappropriate to guideline-based care and that specialists would also need up-dating on the key principles.

GP 21: I've had many problems when I refer my patients and .. when you see what therapy they come back with ... it's not what you'd expect ... there's no change in the child's condition. .Even specialists would need to up-date.... you know... it's important...

Support to use printed educational materials

Most GPs responded more enthusiastically towards the printed desk folder than to the poster intended for wall mounting. Most GPs were impressed with the layout and contents, which they felt was clear, easy to follow and attractive. With raised brows and expressive smiles, GPs eagerly followed my explanations about various indicators for asthma management and expressed their delight in receiving a copy of the printed folder and agreed to use it.

GP1: I see a lot of hard work has gone into this [printed folder]... it is an excellent...idea.

GP5: This is great...it sounds very interesting and exciting. It's all we really need to know for childhood asthma...it's all here ...we don't need to look elsewhere [for information].

GP16b: I think this kit [printed folder] is necessary and important for practice. ...It is simple, practical... and ...straight forward. I really like having everything together..

A: Would you be able to use these materials [printed folder and poster]?

GP(1,5,16b) Yes...[nodding]

After I had discussed the diagnostic indicators and treatment algorithm, one GP (3a) immediately took the poster and mounted it on the wall close by his desk.

Although the programme and accompanying materials were intended only for use at private practices at this stage, several sessional GPs whose full-time employment was at day hospitals were enthusiastic to use the materials at their places of employment.

In some practices GPs worked as full-time employees at public sector (day) hospitals and worked part-time in private practices sector as 'locums'. This moonlighting relation that these session GPs had to the practice seemed to have a positive effect on their acceptance of the intervention. These GPs especially felt that the programme would be of maximum benefit to them if the printed materials could be used at the day hospitals where they worked. They expressed their delight that both folder and the poster could benefit themselves and the day hospital nursing staff.

GP 16d: When could I use this at my other practices where I work?

GP 16b: When would this [folder and poster] be implemented at the day hospitals? ... even the nursing staff could benefit from it [folder and the poster] .. they could use it too..

GP 10b: You know ... working at the [day] hospital ... this programme would be of benefit to all staff there ... not only GPs. I would like to have this kit [folder and poster]... at the day hospitals. ..and would like to use it there ...as let me know [when to do so].

GPs were eager to obtain feedback on the outcome of this implementation programme because they wanted to continue using the materials at other practice settings.

GP 16b: I would like to know about the outcome of the programme..... because ..I would like to use it [folder] at other practices where I work. It's useful to have this kind of info with you...it's all what you need to have.

In drawing GPs to the use of the record card, one GP felt strongly that the record card could have a twofold purpose in bridging the care of asthmatic children. She felt that the record card could be extended for use at day hospitals to monitor asthmatic patients who oscillate between public and private health-care clinics.

GP16d: This .. would help us ... with patients attending day hospitals and come to us [seek private care]. We could use this [record] card to check the type of therapy patients' receive... and this would prevent duplication.

Many GPs who were very complimentary further expressed their need for similar folders and posters for management of other chronic diseases.

GP16d: It would be useful if you had this [folder] for management of diabetes.

GP13b: This [folder and poster] would be really useful for chronic diseases ... like diabetes....

GP 13a: You know... we see a lot of diabetics.... A kit like this with all the diet info, treatment...like you have here.. would help us a lot.

Although most GP's were enthusiastic from the start, one was initially negative and warmed up as the interview progressed.

GP (10a)...He replied in monosyllabic answers or shrugged his shoulders when asked about his experiences in the care of asthmatic children. I realised that a relaxed atmosphere was needed and inquired, using open-ended questions about problems he perceived in initiating inhaler therapy in children. Furthermore by referring to and probing into common problems encountered in childhood asthma management the GP seemed to relax and adopt a more engaging posture.

He seemed to agree with the high cost of asthma medication and poor compliance rates with prescribed treatment. As the discussion progressed, he placed his elbows on the table, leaned forwards and focused his attention as I highlighted key messages from the poster and folder. He expressed his concern about the high smoking rates in the community and later showed me the range of generic products on his shelves. From a rather uncertain start, the meeting seemed to have progressed into a two-way interactive process.

GPs' responses to contents of the key primary care messages for childhood asthma

During the course of my discussions with GPs, I referred them to the key primary care messages for childhood asthma that was hand-delivered to the practice (Appendix 5).

A: As you may recall, these key primary care messages for asthma [referring to the list of key messages] were delivered to your practice 2 weeks ago. Now, these materials [folder and poster] in front of us, incorporated each of these key messages into a format that you could use when providing care to children with asthma. I'd like to show you how you could use these materials.

GP 5 : [looking at the materials and nodding]

I felt that it was essential to capture GP's attitude and perceptions on a more focused topic, the key messages. To obtain a wide range of views on these messages, I included responses from all GPs in the study. Such an approach enabled me to understand whether GPs' acceptance of the key messages could lead to possible integration into their routine practice.

In this section I discuss responses to each of the key primary care messages for childhood asthma from all the GPs who had received the intervention.

Diagnosis

Asthma is an unpredictable disease, therefore several diagnostic indicators are used. A commonly used diagnostic indicator for asthma is a positive response to a bronchodilator. GPs were aware that childhood asthma was underdiagnosed, and were aware of the indicators used when diagnosing asthma in children. GPs were familiar with the family history and presence of nocturnal cough when diagnosing asthma in children.

GP 19: Asthma [in children] is a problem in our community...I know a lot of asthma is underdiagnosed...it is a problem..

GP 13a: Family history ...that tells me lot... then I know it's asthma ...

GP 14: I know that if the child coughs ... then we have a problem.. and especially at night ..then I know it is asthma....

A: Great, I see that you are familiar with the diagnostic indicators ...so we can perhaps move on to the next message.

I did not introduce other diagnostic indicators and continued my discussions with GPs around the remaining key asthma messages. The flexibility in my approach allowed me to tailor the asthma messages according to practice needs, and at the same time, allowed me the time to focus on other key messages that would need more in-depth discussions with GPs. This flexibility further offered clinical autonomy to the GPs.

Assessment of asthma severity

After I reinforced the message that nocturnal symptoms and frequency of bronchodilator use serve to assess asthma severity and guide use of appropriate therapy, most GPs seemed unaware of the indicators used. Few were surprised, and listened to my up-date.

A: In order to provide appropriate therapy, one would need to assess the child's asthma severity. For example, if the frequency of occurrence of nocturnal symptoms [referring to the record card] ... if the child awakens at night due to asthma.... and this occurs more than 4 times a month, then the child has severe asthma.

GP1: I didn't know ..that [the frequency of]nocturnal symptoms is used to assess [asthma] severity ...

A: Yes, it's one of the indicators used ...and its frequency gives an indication of the severity of asthma .

GP3a: mm...I was not aware of this[referring to record card to highlight frequency of bronchodilator use an indicator to assess asthma severity in children]. I didn't realise that frequent use of bronchodilators is *severe*... asthma..

Drug therapy

GPs used the interaction to inquire or clarify appropriate drug use when treating asthma in children. Although GPs' seemed familiar with the drug therapy for childhood asthma, during the meeting GPs inquired about the pharmacological action of the therapies. Further, they felt that GPs themselves needed to be up-dated about drug treatment for childhood asthma. One GP inquired about differences in pharmacological action between two types of anti-inflammatory therapies and between preventers and relievers.

GP 1: What is the difference between Lomudal [sodium cromoglycate] and steroids?

A: Lomudal contains the active ingredient sodium cromoglycate – it stabilises and prevents release of mediators from mast cells. Steroids prevent activation of inflammatory cells and they have been found to be effective in asthma when inhaled. The main advantage with the cromoglycates is that little or no side-effects have been reported, an occasional cough – making it very safe for use in children. Inhaled steroids reduce the need for oral therapy, but adverse effects of inhaled steroids range from throat irritation - coughing , hoarseness and oropharyngeal candidiasis. However, these may be overcome with the use of spacer devices.

After I highlighted the pharmacological differences between 'preventers and relievers' to emphasise the early use of anti-inflammatory therapy for management of childhood asthma, GP (14) endorsed the provision of such information. She added that GPs were in need of an up-date as she felt that they lacked this knowledge. She supported the programme in this regard.

A: As you know...Dr ____, asthma is an inflammatory disorder, and while relievers [bronchodilators] only provide symptomatic relief, it does not reduce the inflammation. We would therefore need early use of prophylactic anti-inflammatory therapy such as your preventers [referring to inhaled anti-inflammatory list in folder]... has been found most effective.

GP 14: The differences between preventers and relievers... you know.. this is not known by GPs....they don't even know how the drugs work....yes..it's good to know this difference....

Steroid therapy

GPs seemed to want to clarify their doubts and inhibitions relating to use of steroid therapy and inquired about its' use for childhood asthma management.

GP 3b: How is oral steroids 'tapered'?

A: There is no need to taper steroids for asthma in children. A short 5-day course has been found to be effective. Furthermore, it's cost-effective and compliance would improve.

GP 9b: Can antibiotics and steroid therapies be administered concurrently?

A: If the child has a bacterial infection then an antibiotic and steroids can be use concurrently.

When I highlighted that a short (5-day) course of oral steroids without tapering has been proven to be effective for the management of acute attacks in children one GP (10b) felt that, sublingual administration of a steroid tablet seemed to 'work' . However, sublingual administration of steroid tablets for the treatment of childhood asthma is unlikely.

A: Dr____, what has your experience been with giving children oral steroids for the treatment of acute asthma?

GP 10: yes...what I find ...is that giving a steroid tablet sublingually works ...I've even told the other GPs [at the day hospital]about it... and there's no problem... in giving it like that.

A: [surprised- raised eyebrows] .. I'm not aware of steroids being given sublingually ... and you say ..it works....

GP 10: [nodding].. I've had no problem so far.....

When referring GPs to the cost of anti-inflammatory therapy a few GPs found a strategy to minimise costs for parents who could not afford syrups. They mentioned that 'crushing steroid tablets seemed to work well' as a substitute for syrups.

A: GPs find that parents can't afford steroid syrups and prescribe tablets [interrupted]..

GP5: I just crush the tablets if children can't swallowit works..

GP2: Yeah...crushing the tablet helps especially if parents can't afford syrups

A slightly different approach seemed to be adopted by GP 13(b) who mentioned that the principal GP and herself provide 'stat doses of steroid syrups to the children' during the time of consultation and then prescribe the tablets to reduce costs for the family.

GP 13b: When children come around [to the practice]...and they're severe asthmatic... we usually give them a stat dose of the [trade name steroid]syrup...they're [steroid syrup] expensive ...then we ask parents to crush the [steroid] tablets..

Spacer therapy

GPs' knowledge and use of spacer therapy seemed to be limited. GPs seemed not to know that spacers improve the effectiveness of inhalation of drugs, and thus the treatments, that are highly recommended for children with asthma (6). When drawing GPs' attention to use of spacers in young children having poor coordination with inhaler therapy either during chronic asthma or during exacerbations, older GPs seemed to constantly refer to nebuliser therapy, and lacked awareness to use of spacer therapy.

GP 7: I tend to nebulise children ... who come in with asthma.... parents bring children in when they're severe and acute ...so they require nebulisation immediately ... it provides relief you know ...

GP 6: The nebuliser works and ... I use it often in my practice ...

A: Spacers have been found to be as effective as nebulisers ..and are cheaper too!

When highlighting the effectiveness of spacer therapy for asthmatic children, some GPs claimed to be unaware that spacers were as effective as nebulisers for drug delivery.

GP 16c: I did not know this [spacers were as effective as nebulisers] ...

Further, one GP (22) added that he was not aware of one of the advantages of spacers in helping to reduce susceptibility to oral candidiasis associated with chronic inhaled steroid therapy.

A: Spacers have been found to minimise oral candidiasis, due to chronic use of inhaled steroids.

GP 22: Is that so? I'm not aware that spacers ... reduce oral [fungal] infections [when treating patients with inhaled steroids].

Some GPs' explained that they used nebulisers at practices because of parental preference for such modes of therapy. GPs reiterated that 'parents prefer nebuliser therapy' because they perceived it to be 'better' than spacers especially during acute asthma, implying that GPs know that they not as good, but would yield to parental preferences.

One GP (15) seemed to encourage use of spacers. He recalled a patient with whom he was able to gradually discourage nebuliser therapy and to initiate the use of a spacer, against parental perception that nebulisers provide a greater therapeutic effect than spacers.

GP 15: Parents say that the nebuliser 'provides oxygen' and they feel that it is better than spacers.. and they seem to depend on it. I try to convince them that this is not so...
Eventually ...after some persistence I've managed to have this patient change from using a nebuliser to a spacer. It's great ...he seems to be doing well.

GPs used the opportunity to inquire about management principles for childhood asthma management. They seemed unaware of the indicators used to assess asthma severity and inquired about the pharmacological actions of different drug therapies, use of delivery devices for management of chronic and acute childhood asthma.

Home-made spacer

After I explained the design and demonstrated use of a 500ml home-made spacer for delivery of inhaled medication, GPs referred to use of the 2 litre plastic bottle and polystyrene cup which GPs were familiar with. They were awed with the introduction of the 500ml home-made spacer. Leaning forward and focusing on the demonstration of the home-made spacer, GPs expressed their delight at the innovation and the room ignited with enthusiasm.

GP 1: This is wonderful! it's easily portable...

GP 5: ...this is great... patients' would find it easy to make

GP 13a: What an excellent idea !...

The enthusiasm seems to have been extended when GPs themselves suggested other approaches to make the home-made spacer.

GP 5: If parents have difficulty in cutting the base of the bottle, then the tip of a flame could be used ... to first soften and then to carve a hole at the bottom of the bottle....obviously close supervision is needed.....

A: That could also be an alternative method ..

Two days after the 1st visit a GP (21) telephoned the detailer to acknowledge usefulness and fully supported of the 500ml plastic bottle as a home-made spacer. He further inquired about use of smaller bottles as potential home-made spacers. This interactive process seemed to establish a mutual learning environment through sharing of ideas and experiences.

GP 21: Thank you for sharing the idea of the home-made spacer with us.... It is great it works really well .. You know ... one could perhaps look at using smaller bottles ..say the 250ml one ...

A: Thanks for the suggestion ...One would need test it first, to see if it works..

As the discussion progressed with GPs sharing their personal experiences in the management of childhood asthma, the atmosphere felt relaxed to me. GPs engaged in friendly conversation with a softer audible tone and responded less formally. In allowing the GPs to reflect on their practice behaviour, it created a platform for more meaningful discussions with an open channel of communication with those who felt alienated, despondent and suspicious of the visit.

Lack of awareness to drug costs

When highlighting the advantages of inhaled therapy for management of asthma in children, GPs' awareness to cost of drug therapies seemed limited. They nodded in agreement about the high cost of drug therapies for asthma in children and most GPs perceived that oral drug treatment for chronic asthma was cost-effective when compared to inhaled therapy. After referring GPs' to the visual and printed material in the 3-part folder, the higher costs of oral compared to inhaled bronchodilator therapies were brought to their attention. I highlighted the cost-effectiveness of inhaled steroids (Perera 1995). I referred them to the cost information of the wide range of inhaled steroid and bronchodilator therapies.

A: I'd like to draw your attention to the cost-effectiveness of inhaled therapy [referring to the cost information in the folder]....As you can see when treating a moderate asthmatic child on regular bd dose, an estimated cost of around R20.00 steroid therapy a month would be affordable to most families Even an inhaled bronchodilator therapy is far cheaper than an oral one. For example, a teaspoon of salbutamol syrup costs around R1.40; a puff from an inhaler between 20-30cents. [Pointing to the inhaled salbutamol preparation] As you can see that inhaler therapy is more cost-effective than oral therapy.

GPs seemed very surprised by the cost-effectiveness of inhaled (including steroid) therapy, which even led one GP (16d) using her calculator to further verify the cost of the inhaled preparations.

GP 16d: Yes... you're right...I didn't realise that inhalers were so reasonably priced....I was not aware of *that* difference in price...[between the oral and inhaled bronchodilator therapies]

GP3a: .Ja,this is a... *big* difference [in cost between inhaled and oral bronchodilator therapies]

GPs' lack awareness of cost of drug therapies for asthma would increase the financial burden for families and lead to unnecessary referral to the public sector. GP prescribing may be dependent on pharmaceutical promotion based rather than the provision of cost-effective care.

Discussion: visit 1

I discuss the main themes that were identified in the first visit based on. GPs' perceptions of the educator and to elements of the intervention GPs' responses were categorised into those who were confused and suspicious, those who agreed but were passive and those who agree and are enthusiastic in their intentions. I conclude the discussion with my perceptions as an educator.

All GPs met with the educator. Most GPs were fairly comfortable and relaxed during the face-to-face meeting, and some even interpreted the visit as a social break. The social marketing approach generated hospitality and friendliness with almost all GPs and created an environment of learning through interactive discussions and rapport building. However, the role of the educator in the outreach intervention seemed to have led to confusion with some GPs reacting with skepticism.

In not being able to fully identify with the outreach educator's role, GPs started perceiving the visit as a threat ('do they think that we're not doing enough') and perhaps an intrusion in their practice. Few GPs had initially perceived that the outreach educator was a representative from a governmental health care programme and this led to some GPs perceiving the visit as a threat to their clinical autonomy. This finding supports that obtained by Volmink and co-workers (1993) who found that private sector GPs would resist involvement of an external funding agency to influence their practice style. A few GP's initial preference for their own set of notes over our externally provided key messages and materials could indicate a general feeling of alienation from outside agencies and to some extent, a need for territorial control. Substantial insecurity and anger may be due to the extensive national

health-care restructuring and potential threats mentioned by the GPs were identified primarily as regulatory barriers.

Although many GPs agreed with the objectives of the outreach programme, their commitment to actually implement the messages were divided. Some GPs in this category were reluctant in becoming actively involved and preferred to mediate the passive dissemination of educational materials to patients. They felt that government efforts are needed to improve primary care services because of the socio-economic constraints. These GPs felt that until such barriers could be addressed, GPs would not be able to adhere to the guideline-based care.

GPs' passive responses to the outreach programme may be linked to their usual responses to drug company detailing. Firstly, the printed materials supplied to GPs were designed along the detailing aids used by drug company representatives. Secondly, GPs' insistence to identify a particular drug company 'sponsoring' this programme, their use of drug-company sponsored guidelines, their suggestion to supply practices with free inhalers and their reference to promotional aids for patient home use, may largely originate from the sales strategies used by drug company representatives. GPs' reliance on pharmaceutical promotional strategies could be attributed to a large extent to their passivity towards changing their clinical practice. While GPs in this group were ambivalent in actively adopting the key messages and willing only to disseminate prepared educational material to families, others were proactive.

The group of GPs who agreed and displayed keenness towards the intervention seemed uninhibited by the uncertainties experienced by others towards the educator's role. A light-hearted, even humorous and relaxed atmosphere prevailed throughout the meeting with even one GP perceiving the visit as a break. Some GPs seem to identify the need for the outreach as indicated by expressing the need for regular up-date, extending the educational intervention to non-medical practice staff and expressing their support to use the printed material. These GPs seemed proactive and were confident to learn and even share their approach to health care provision. Many GPs in this category seemed younger than those GPs who were passive to the outreach approach.

Most GP's recognised the sheet showing the eight key messages on asthma as soon as I displayed it to them in the first visit. It is surprising that simply circulating this single sheet some weeks before should result in the majority of GP's being familiar with the message sheet. We are however unable to know whether it is content or appearance that was familiar. This suggests that short, single sheet guidelines might be rather more important than we currently believe as I GP replied 'I don't have time to read lengthy guidelines'. Our use of the same sheet of messages again in the detailing visit (first and second) and in the folder itself could be acting as a series of reminders, another well known strategy for implementing professional practice change and one for which there is some evidence of success (Cummings 1982).

Sessional GPs and some full-time private practitioners were open-minded and about the intervention. Sessional GPs who were also full-time employees in the public sector, were more likely to be less exposed to influence from drug company representatives than those in the private sector. Practice and prescribing behaviours of GPs employed in the public sector are governed largely by regulatory and pharmaceutical codes where generic, cost-effective treatment is widely advocated. The key primary care messages for childhood asthma were generic, and which mimicked the recommendations of the standard treatment guidelines with which these public sector sessional GPs may have been already familiar. These GPs easily accepted the messages and fully endorsed the programme for implementation in the public sector. Since sessional GPs had no doubts about the role of the outreach educator, they used the opportunity to inquire and to further clarify the key messages for childhood asthma. This could imply that institutionalising the outreach intervention could be viewed favourably.

This first outreach visit to practices proved to be acceptable to most GPs as there was broad approval of both the presentation of the messages in the form of the desk folder, and of the contents of the messages. Most GPs responded positively to both the educator and the printed material. A follow-up visit would help confirm change in GPs' behaviour in respect of this multifaceted outreach approach.

The second outreach visit to GPs

The purpose of the second detailing visit was to:

- explore GPs' experiences and perceptions of the key messages as reflected through use of the printed material supplied in the first visit,
- identify GPs' problems when adopting the key primary care messages which been introduced and promoted in the first visit and
- reinforce adoption of these key messages (see Appendix 5).

In this part of the chapter I report on:

- reception at the practice by the receptionist and GPs and
- themes emanating from GPs' responses to the detailer and the key messages for management of childhood asthma and to the printed materials especially changes in knowledge, practice and feelings of confidence since the first visit.

The IDEALS approach (Chapter 7) used in the first visit was also used in this second outreach visit. I retained the formal and professional approach used in the first visit during these repeat discussions with the GPs.

As in the first detailing visit, meeting times depended largely on GPs availability at the practice. Most visits to practices were conducted from Mondays to Fridays, with the exception of one practice (20) where the doctor perceived that the practice would be busy at the proposed time, and our meeting was rescheduled for a Saturday morning.

One locum GP had resigned from the practice, and the second detailing visit for the substitute sessional GP was conducted four weeks later, within the assigned time frame in September 1998. Meetings usually lasted for up to 15-20 minutes with most GPs contributing actively towards various aspects of the preceding discussion.

Initial response from practice staff and GPs

Meetings with the GPs were scheduled either telephonically or by paying a personal visit to practices similar to that of the first detailing visit. For either approach I used the same detailing script to initiate the conversation and to confirm an appointment with the receptionist.

A: Good day. I'm Angeni Bheekie from the MRC/ NAEP asthma programme. I met with Dr. _____ a few weeks ago. We've planned to meet again, and I'd like to schedule an appointment at a quiet time for 10 -15 minutes.

Both receptionists and GPs warmly welcomed me on the second visit. At most practices a relaxed atmosphere prevailed amongst the GPs. They adopted a more relaxed posture and smiled often compared to our first visit meeting. They were already seated, and either smiled or nodded when I entered the room. GPs responded less formally and were more receptive and light-hearted than in the first visit. It seemed that my visits were becoming a familiar part of the practice environment and which seemed to establish rapport between the receptionists, the GPs and myself.

When visiting practices for this second time, I retained my formal professional image, and in spite of this, I felt more a more relaxed atmosphere prevailed in my relation to the practice than in the previous visit. After we exchanged greetings, most receptionists recalled my first visit with ease, responded less formally than previously and with greater cooperation. When scheduling an appointment, receptionists could easily recall the purpose of my visit and accommodated a meeting with no hesitation. On this second visit, the receptionists seemed to identify my role synonymously using the term 'asthma programme'.

R6: Oh yes! I remember. You're the lady from the asthma programme. It's OK [to meet with doctor] it won't be long....you can go in [the consulting room].

R16: You're from the asthma programme. It's fine ..you can go in after this patient [referring to patient awaiting consultation in the waiting room]. Doctor won't be too long now.....

R21: Is it... Ms Bheekie? from the asthma programme? Doctor's expecting you. Please take a seat.

Since the receptionist is the main gate-keeper for making appointments with GPs, a personal visit to the practice beforehand may be necessary to secure a meeting with the GP. This visit should aim to introduce the practice receptionist to the purpose of meeting, and to enable the outreach educator to familiarise him/herself with the clinical setting and practice style.

In this visit I posed an open-ended exploratory question inquiring about GPs' experiences with adoption of the key messages, which we believed would be

indicated by their use with the components of the folder (chapter 7). I started by greeting and thanking GPs for their willingness to implement the key messages by using the folder and their time to meet with me. After some social chatter, I drew GPs' attention to use of the printed educational materials (Appendix 6) provided to them in the first visit.

A: Thank you for your time Dr _____. As you may recall, in our first meeting, we discussed the key messages for childhood asthma and these materials [referring to folder and poster] helped highlight these messages. Today, I'd like to know what were your experiences with the use of any of these messages/ materials?

In concluding the visit I thanked GPs for their time and inquired if additional practice or patient record cards (an element in the folder) were required for the practice. I also informed GPs that once all phases of the programme were evaluated, they would be up-dated about the outcome of this programme.

All except one GP (17) had agreed to meet with me for the second outreach visit at their practice site. Almost all GPs extended a friendly handshake and spoke with a much softer casual tone than at the first visit.

GP 1: Hi, [nodding].. it's good to see you...

GP 15: Sorry, to keep you waiting....it's nice to see you.

GP 16b: Hi [smiling] ...it hasn't been long since we last met.

GP 21: Hello, Ms ...Nice to see you again.

In this visit I started by greeting and thanking GPs for their willingness to implement the key messages by using the folder and their time to meet with me. I drew GPs' attention to use of the printed educational materials (Appendix 6) provided to them in the first visit. I posed an open-ended exploratory question inquiring about GPs' experiences with adoption of the key messages, which we believed would be indicated by their use with the components of the folder.

A: Thank you for your time Dr _____. As you may recall, in our first meeting, we discussed the key messages for childhood asthma and these materials [referring to folder and poster] helped highlight these messages. Today, I'd like to know what were your experiences with the use of any of these messages/ materials?

While most GPs seemed pleased to meet with the outreach educator, one GP (2) challenged the educational outreach framework, as he believed that a commercial motive incentive was associated with it. Even after informing this GP that the desk folder and poster were being tested for use in private practices and not in the public

sector, that this was not a commercial initiative - with no profit motive, he persisted in his attempts to further identify a 'sponsoring agent' for this programme. In this second visit when I extended my handshake, he refused, deliberately folded his arms, frowned and looked sternly in my direction.

GP(2): I am not shaking your hand... you haven't as yet told me who's sponsoring this [programme]...

I smiled and handed him my business card containing the principal investigator's contact details.

A: Here's the principal investigator's details. ...you're welcome to find out more on this programme....

This GP did not make contact for more information. He remained non-cooperative and contributed minimally during the discussions.

GPs' responses to the second visit were categorised broadly into those that were users of the kit, users of the messages but not the kit, and non-users. Non-users were identified as those GPs who neither applied the key messages, nor used the printed material in their practice setting.

Non-user's responses

The first visit concluded with an agreement between the GP and myself, the final element in the IDEALS structuring. Although almost all GPs had agreed to apply the key messages by using the material supplied in the first visit some it seemed some were unable to fulfill this commitment in their practice. These GPs did not change their practice behaviour as demonstrated by both non-adoption of the key messages and non-use of the printed materials. GPs in this category seemed reluctant to meet with the outreach educator for the second visit, provided excuses about their part-time involvement and the practice barriers. Some whom I met with argued that the socio-economic barriers and parental barriers to the provision of care were factors contributing to their non-use of the key messages. Some of these GPs also expressed their feeling of guilt about their non-involvement of this outreach initiative.

Reluctance to meet with the outreach educator

Some GPs (3a, 4, 16c 6, 7) initially seemed hesitant to meet with me for the second visit because they claimed to have forgotten to use the folder at their practices. This self-confession and the fact that the folder was not visible anywhere on the desk confirmed GPs' non-adoption of the key messages.

When the receptionist informed the GP of our proposed meeting, some GPs seemed evasive and defensive. The conversation between the GP and myself was mediated via the receptionists (R6; R10a) who informed GPs of my presence in the waiting room. They replied via the receptionists that they had not used the folder and did not feel it was necessary to meet. I informed receptionists that this short visit aimed to provide GPs with further supporting documents to highlight the key messages and to identify potential problems in childhood asthma management.

R 6, R10a: Doctor says that... he did not use it [folder]

A: That's fine. I'm providing additional information [referring to the journal articles] that support the key messages in our programme. .. and I'd like to discuss them with doctor. And to discuss any problems that he may have encountered.

After receptionists conferred with GPs for the second time, they then had agreed to meet with me.

R 6, R10a: It's fine....doctor will see [meet with] you now. You can go in [the consulting room].

These GPs seemed to show minimal interest through their body postures, non-verbal and verbal responses. When inquiring about their experiences with folder, GP (6) rested his elbow on the table and supported his chin with the palm of his hand and he shrugged his shoulders and gave no verbal reply. Another GP (10a) agreed to give me 'half a minute' for the meeting. This GP's defensive style similar to that adopted by him in the first meeting prevailed throughout this meeting as he sat with folded arms and with a stern look on his face.

Admission of guilt /Embarrassment /Remorse

GPs openly admitted they forgot to use the folder in their practice at the start of our meeting but were apologetic about it and felt remorseful. When asked about their experiences with the key messages in this visit, a few GPs admitted that they did not achieve this commitment, apologised and pledged their commitment for the second time.

At the start of our second meeting, one principal GP (16c) who vented his frustrations about the health-care crisis in the first visit (section 6.1), and who had then hardly given me the opportunity to detail to him, seemed to be more open in the second visit. He spoke in a softer tone, apologised for not using the folder and allowed me the space to communicate.

A: Since our last visit, what were your experiences with these ...? [referring to the folder and poster].

GP 16c: I don't know where it [folder] is] looking through a pile of papers from under his desk and pulls out the folder...]. I'm sorry, I did not use it ...

A: About 3 months back We discussed key messages in this folder ...And that poster that you have mounted there [pointing to the poster mounted on the wall]

GP16 c: I don't rememberwhen was this ... I'm sorry, I did not use the folder I will use the folder] from now on ...and I'll tell the others [GPs] too....

A: Let's talk about these key messages for asthma in children [referring to the folder]....

These GPs who did not adopt the key messages since the first visit were remorseful and expressed their need to recommit at this second detailing visit. GP's (16c) initial volatile expression in the first visit, contrasted with a more controlled and calmer disposition in the second outreach visit. GPs' pre-occupation with organisational and structural barriers, or, perhaps simply having a 'bad day' at the practice, could have led to initial resistance.

Another principal GP (3a) who also forgot to use the folder, apologised and paid attention when I reinforced the key messages. He acknowledged the usefulness of the programme and in concluding the second outreach visit I inquired about his commitment towards adoption of the management principles.

GP3a: I'm sorryI did not use the folder.

This is an excellent programme. .. you've done your bit ... now we[GPs] must do ours!.

A: Thank you. I'm glad to hear that you're planning to use them [the key messages] in the practice.

The self-confession, apology and the need to inform other practitioners in the second visit denotes this GP's embarrassment and admission of guilt in not adopting the key messages. GPs' feeling of remorse and renewing their commitment

underlies the need for reinforcement of the key management principles during outreach visits to practice settings.

Part-time involvement in practices

While some GPs were reluctant to meet with me, others displayed minimal interest throughout the discussions. These GPs seemed not to become active participants because of their part-time involvement in the practice. One GP (18b) felt that because her weekly session at the practice was to primarily provide a gynaecological service and that her role in using the folder was limited.

GP 18b: I just come in on Wednesdays ... I don't see many asthmatic children.... I see mainly the gynaecological cases ...

A: The programme is extended to private GPs in each practice, and your involvement is just as important ...when providing care to children with asthma.

GP18b: I 'd share the material that you've provided, with my brother [principal practitioner].

Few principal GPs also admitted to not having used the folder because they felt that their partners were more involved in the care of asthmatic children than themselves. These principal GPs seemed to prefer active involvement from their full-time partner GPs, rather than principals themselves changing their own practice pattern(s).

GP 9a: I haven't been around the practice lately My partner has been attending to the clinic, I've been busy with circumcisions ... she's the best one to talk to [about the folder]...

GP 3a: My partner would be able to tell you more ... Lately, she's been around more in the practice than I've been

Socio-economic barriers

Few GPs mentioned that the poor socio-economic status of the community and lack of education seemed major barriers to adopting the key messages in practice situations.

GP 4: My son would find this programme useful He would like this for his practice . In this area [lower socio-economic area]there is a high level of violence here ... and parents simply can't afford asthma medication that's recommended here[referring to the treatment algorithm]. They have low comprehension levels ..and it makes it difficult..for implementing this kind of therapy.

A: I understand [nodding] ...that it must be difficult in your practice... being faced with numerous socio-economic problems in the community...

One GP (17) had telephoned a week after the first visit informing me that he was unable to apply the key messages or use the printed material because of the numerous socio-economic barriers that faced the community he served. As a PLAN doctor he provides care to mainly municipal and factory employees who have limited access to medical care and who are poorly educated. He apologised and refused a second meeting at the practice.

GP17: I 'm sorry ... I'm unable to use the material [folder] you've given me. I've tried to ... but it's not possible...I'm really sorry. I am unable to prescribe the inhaled medication to children... because of the numerous socio-economic problems ... and as a PLAN doctor it's very difficult for me...

A: That's fine Dr _____ we understand that it may not be easy in your practice situation. We appreciate you calling us about it.

In addition, he suggested ways on how the programme could be further modified.

Perceived parental preference for white health care providers

GPs found that their attempts in trying to communicate the diagnosis with parents were unsuccessful. They felt that parents seemed more willing if a child is diagnosed by public sector hospital-based practitioners or specialists rather than by private sector GPs. Further, GPs perceived that parents favoured the diagnosis being made by 'white' health care providers over GPs of similar ethnic or cultural backgrounds.

A few GPs believed that parents tended to view care received from public sector health-care institutions (hospitals), and especially care offered by white health-care professionals, with higher regard than that from coloured GPs in the private sector.

GP 18b: I find that parents ... feel more satisfied if they receive treatment from a hospital .. Red Cross or Groote Schuur ...it's like they're not being treated well here ...

A: What makes them [parents] feel that treatment from a hospital is better ...

GP18b: It's ... probably because ...they receive care from whites and ... think that the care they're receiving from them is superior to what we [coloured GPs] offer.....

One GP (16d) added that parents' revered and viewed white GPs with a higher esteem, and that their services seem to be accepted with a greater feeling of superiority than those from coloured GPs.

A: Some GPs have found that follow-up care for asthma in children is poor ...

GP 16d:they [parents] go to other doctors.... Parents still prefer going to a 'white doctor' ...they think that the white doctor gives them better treatment...and they feel that we're [coloured GPs] not good enough... that we're just not providing good care to them ..and so they don't come back.

One GP (18a) perceived that parents seem to accept the diagnosis of asthma more easily if it is made known to them by white specialists located at public sector hospitals rather than their local GPs.

GP 18a: ... When a child has asthma.....I know it's asthma .. then I refer the child ...so that .. when the specialist says 'it's asthma'they [parents] are OK with it [the diagnosis]. And they would accept the diagnosis easily if it is made by a white.....

A: What you're saying is that .. parents would accept the diagnosis more easily if it comes from a white specialist rather than [coloured] GPs.

GP18a: That seems to be the case.

GPs believed that parental perception that poor quality care was offered by coloured and private sector GPs, seemed to deter GPs from adhering to the key messages in their practice and providing optimal care to children with asthma.

Nature of patient profile at the practice

GPs lack of involvement towards adoption of the key messages seemed to vary according to their perceived nature of low and high patient attendance at the practice. Few GPs working in quieter practices complained of infrequent attendance of asthmatic children and were therefore unable to use the folder. They felt that this 'was an exceptionally quiet time' compared to previous years and one of the reasons was that children below six years receive free care at public-sector hospitals.

GP 7: You know... I'm hardly seeing asthmatic children nowadays Either they're all well controlled and don't need medical attention..... Also, you know with free care for children below the age of six, many of them go to the day hospitals ...And the other reason may be that the Port Jackson trees were felled recently... there may be less allergens around [to trigger asthma]...

A: I understand ...other GPs seem to feel the same way too....

GP6: I used to see many children ... not anymore They go the day hospital now.

A: [nodding]

GPs working in busy practices felt that the meeting and adoption of the key messages were not priority issues and that as they were satisfied with their own practice behaviour. GP (19) whose practice is situated in the overcrowded medical centre seemed evasive when asked about his experiences when diagnosing asthma. He mentioned that since our first meeting he had 'nothing new to say to me', and that his time was limited as he was in a hurry to return to consulting with his patients. He constantly looked away from the direction that I was seated. In spite of his awareness of the high incidence and underdiagnosis of asthma in children, he said he could not use the printed material because of limited consultation time.

GP 19: I know that asthma is underdiagnosed especially in children. ...and there's a lot of it [asthma] out here ... I've seen that... even if a child with bronchitis ... would end up with asthma..... I would say thatjust in Mitchell's Plain alone ... around 40% of children... would have asthma which isn't diagnosed....

A: Were you able to apply any of these [referring to the diagnostic indicators in the folder and poster]?

GP19: The practice is quite busy I just don't have the time to look at these[printed material]. There is too much paperwork

Even knowledge of underdiagnosis for asthma in children does not seem to prompt behaviour change to adopt the key messages in practice. There seems to be a gap between GPs' belief and their actual practice behaviour.

Doubts about the efficacy of generic inhaler therapy

Some doctors challenged the key messages for childhood asthma by remaining skeptical about the safety of inhaled steroids in children, raising unlikely explanations for differences in steroid effectiveness. One GP (10 b) inquired about the effect of humidity on asthma prevalence and inquired if potential differences in humidity between Cape Town and Ceylon could affect the efficacy of inhaled steroids in the two countries.

GP 10b: Since the study was done in Ceylon... one would need to look at how the geographical location and perhaps differences in humidity compare with that of

Cape Town ...as to how do these affect the efficacy of inhaled steroids? ... the effect of humidity when treating asthmatic patients ... perhaps other studies on this topic would be useful....

A: You're right... these factors do play a role in affecting the efficacy of drug therapyOther studies would have to be looked up for this type of evidence.

One GP (11) ignored the evidence supporting generic prescribing, rather agreeing with what he reported as patients' experiences. He believed that patients who received generic inhalers from day hospitals were dissatisfied, and that they would buy the branded inhaler from his practice at cost price.

GP 11: When patients go to day hospitals They 're not happy ...especially when they receive these generic inhalerspatients just don't seem to like it. So they come to me ... and I supply the [trade name] inhalers at cost [price] to them.

A: Although it's been scientifically proven to have the same therapeutic effect, you find that patients feel otherwise...

GP 11: These generics ..you know.. one never knows the quality of these [generic inhalers]. Certain patients insist on using the original [inhaler] because they're unhappy with the generic.....

A: Dr _____ what would cause patients' unhappiness when using the generic inhalers.

GP11: ...Well, I've had patients... and they say that they're just not getting the same [therapeutic] effect [when compared to the branded inhaler]. They say 'it's just not as good as the other [original] one' and they feel it's not the same when compared to the original [inhaler]...They[patients] say that 'it [generic inhaler] doesn't seem to work' as well...it's 'weak'..

A: One would need to look at the chemical composition of the different inhalers more closely ...and see how the different propellants might effect drug delivery and perhaps the therapeutic outcome

GP11: ..and there may be differences in bioavailability between the preparations too...

One GP (20) further asked to differentiate between the pharmacological action between original and generic steroid inhalers. He felt that patients were 'not satisfied with generic [steroid] inhalers' as they perceived that such therapy was therapeutically 'less effective' than the original product. He inquired further about studies comparing the efficacy of different generic and original inhaled steroid preparations.

GP 20: I've been prescribing [generic] steroid inhalers for my patients.. and many of them who have been using [name of generic steroid inhaler] complain about it ...I've actually stopped prescribing generic steroids [inhalers] because patients are not happy with it. I'm looking for information comparing [the therapeutic efficacy] different generic steroid [inhaler] preparations.

A: Dr_____ that's interesting. Yes, comparative studies have been done ...and it's been scientifically proven that the generic and the branded products are equivalent. However, there may be differences in steroid potencies. I'm sorry, I don't have that kind of information with me right here.

GPs further believed that patients were dissatisfied when being treated with a generic bronchodilator inhaler. GP (11) felt that patients seemed to prefer the original product and that differences in drug bioavailability could influence efficacy of the generic inhaler.

Some GP's were negative towards the home-made spacer design. One session GP (16b) further inquired about the effectiveness of home-made spacers. She believed that a lot of the drug is lost because of build-up of electrostatic charge on the interior of the spacer bottle and she preferred the use of anti-static spacers.

GP16 b: What I find ... is that with these plastic home-made spacers ... there is build-up of electrostatic charge on the inside of the bottle which reduces drug delivery to the lungs... because of a lot of the drug is actually lost in the bottle ...

A: After washing the bottle it should be allowed to drip-dry as wiping would increase static charge inside the bottle. Further, priming the spacer with repeated puffs from the aerosol would minimise charge build-up.

GP16: I still think that this may not solve the problem completely. There is a new anti-static spacer [from a drug company] which seems to be a more effective spacer.

A: Yes... I agree, this homemade spacer would be helpful to those patients who may not be able to afford the ideal spacer from pharmaceutical companies.

In concluding my visit, I extended my handshake to the GPs and thanked them for their time.

Despite GPs' inability to implement the key messages most concluded the visit on a positive note. On departing some GPs' interests towards implementing this programme at public sector day hospitals seemed unabated. These GPs were primarily those who were full-time employees at these hospitals.

Implementation in public sector day hospitals

GP (2) a part-time private practitioner, who is also a senior medical officer at the day hospital, keenly inquired whether the programme would be continued at both private and public health care sectors.

A: What are your views about the programme?

GP 2: I think it's useful and .. what I'd like to know is ...is this programme going to be extended to the day hospitals?

GP16b: It would be wonderful to have this [programme] at the day hospital too ... When can we use it there?

GP10b: I would like to use it [the programme] at the day hospital too

A: As you are aware, this is a trial phase of the programme. Once all phases have been completed, the results analysed; and if the outcome is positive, various stakeholders would be informed and appropriate steps taken to have the programme implemented on a much wider scale.

One GP's interest was extended to long term maintenance of the programme in private practices.

GP 2: Would this programme be continued [at private practices]?..or is this just a once off thing?.

Other GPs, one a principal (9a) and the other a solo-practitioner (19) provided suggestions on how to modify the programme. They felt that receptionists should be involved in the programme and further suggested that the printed material be integrated as a software programme.

Receptionists' could screen children for asthma

Some GPs seemed to want to delegate duties to non-medical practice personnel by suggesting their involvement in the programme, for example, to use the opportunity to upskill their receptionists. They felt that by allowing receptionists to complete the record card prior to GPs consulting with the patient, it would help lessen the perceived practice work-load.

GP 19: I don't have time for paperwork ...it takes a lot of time... especially when you're in a busy practice. Receptionists could fill this [referring to the record card] in... I have a receptionist here that can get these details from patients ..it would save me time ...

A: Dr _____ you feel that the record card can be completed by a receptionist and then handed to you.

GP 19: Ja, ...and one doesn't need much training. I've got a receptionist ... she's been working here for years and has no medical training ... but she can identify these symptoms quite well..... and make a note of it, it would help before consulting ...

GP 9a: Receptionists should fill these [record] cards This could be done while patients are waiting .. it saves time ... so all this information is at hand before attending to the patient.

Suggestions for the parent's asthma card

The parent's asthma information card highlighted important preventive strategies for the management of childhood asthma. GP (9a) felt that providing parents with 'personalised cards' would help self-management of their child's condition.

GP 9a: and it would be useful if the cards could be personalised – where the patient's name is written on the card ... it would help if there was space for that...parents like to see their [child's]names ...then they would take a greater interest in the child's condition.

User's responses

GPs who were identified as having applied the key messages either used the printed materials or did not feel the need to do so in their routine practice. Since the first visit, GPs' adoption of the key messages was evident from their eagerness to relate most of their experiences to me during the second outreach visit. These GPs were positive and expressed relevance of the key messages for use in their practice.

I report on GPs experiences with each of the primary key messages.

Diagnosis of childhood asthma

GPs experiences with the diagnostic indicators for childhood asthma were varied. Even though few GPs said that the indicators had helped, their experiences seemed limited and lacked clarity on how they could have been helpful in actual practice settings. Some GPs said that they had 'no problems' and that the indicators 'were quite straightforward to use' but most GPs seemed unable to relate experiences and did not elaborate further. One GP (18a) further felt that making a differential diagnosis was difficult, and that he would often refer infants, according to the key messages of our kit.

GP 18a: The infants I see ...I find it difficult, as one can't specifically say that it's asthma... and that's where I have to refer.. It's not easy to see it [the diagnosis] in infants ...

A: Yes... I agree in infants the symptoms of asthma could mimic that of other diseases ... it is best to refer..

Assessment of asthma severity in children

GPs commented that their experiences mainly focused on how the contents of the printed desk folder helped in assessing asthma severity in children.

GP 5: I 've used the cards ...here [showing the record cards to me] ...it's quite straightforward. I've just treated a severe [asthmatic] patient. I've given her [oral] steroids and a bronchodilator.

A: That's great ...you have been able to follow these key messages... and that you could provide treatment based on asthma severity.

GP 22: When I used the [record] card ...and asked the [parent] questions [about the symptoms] ...I found that the child was actually severe ..even though she looked OK! [with raised eyebrows and high-pitched tone suggesting surprise].

A: These indicators [referring to parameters used to assess symptom severity] have helped you to identify severe symptoms at an early stage... and you've been able to provide treatment for that severity status. This would help prevent the onset of an acute attack.

GP22: [nodding].

GPs found day-time and nocturnal symptoms serving as useful indicators of severity, which allowed tailoring of drugs for primary care management of asthma in children. With increasing awareness to the frequency of symptom occurrence a few GPs could assess asthma severity and initiate appropriate therapy early, revealing their positive attitude and self-confidence when providing care in accordance with the key recommendations.

Cost-effectiveness and safety of anti-inflammatory therapies

One of the main aims of the programme was to underline the cost-effectiveness and safety of inhaled preventive therapy (usually with steroids) in childhood asthma. In this second visit I highlighted the range of anti-inflammatory therapies reflected in the folder and specifically referred to and provided GPs with evidence from journal publications. I referred GPs to a Sri Lankan study which illustrated that early use of inhaled steroids that proved to be very cost-effective (Perera 1995). A meta-analysis

was used to further demonstrate its lack of effect on growth at doses of up to 400µg, and to reassure practitioners of its safety in childhood asthma.

A: I 'd like to highlight this study [referring to article] which illustrates the cost-effectiveness of inhaled steroids in asthma. In this trial children who had received prophylactic inhaled steroid therapy had fewer asthma symptoms, improved school attendance and had fewer hospitalisation - all this resulting in a very significant reduction in expenditure for the family by at least 80%.

GP 21: [nodding in agreement]. I find that it's alright ...my patients who are on it [inhaled steroids] seem to control their asthma very well...

GP 13b: It's the best so far... I use [trade name of inhaled steroid] and I haven't had any problems...they [patients] are stabilised on this treatment...

A: And not only are inhaled cost-effective but they are also safe in children. This meta-analysis by Allen and co-workers - shows us that inhaled steroids are safe in children, with doses up to 400 micrograms having little or no effects on growth.

GP 13a: Yes...yes.. I haven't had any complaints.

Efficacy of generic inhaler therapy

Our key primary care messages explicitly encouraged the provision of cost-effective care in both the verbal exchanges and the printed material. GPs were specifically made aware of low-cost generic inhaler steroid and bronchodilator therapies reflected in the pharmacoeconomic table of the desk folder. However, GPs experiences with the use of generic inhaler therapy seemed to vary. While most GPs accepted the generic inhalers and felt that patients did not seem to encounter problems as they 'generally felt OK', other GPs (10b, 11, 20 see above) were concerned about the therapeutic efficacy of generic inhalers.

A: What experiences have you had ...when prescribing [generic] inhalers for asthma?

GP 5: Patients at my practice haven't mentioned any problemsso I feel it's going OK

GP 22: I don't have any problems .. the children whom I see are controlled..so there's been nothing to worry about...

GP 9b: Ja....it's been alright.. patients haven't mentioned any problems ...

Home-made spacer therapy

Spacers help to improve drug delivery to the lungs and are recommended for children who co-ordinate poorly when using inhaler therapy. While commercial spacers have been found to be as effective as nebulisers in asthma (Cates 1998),

alternative cost-saving home-made spacers such as the 500ml plastic bottle are effective (Zar 1998) and easily available. While introduction of the home-made spacer added flavour to the visit, GPs also expressed their acknowledgement, adopted a proactive approach towards patient education and requested educational information and the supply of home-made spacers.

During the outreach visits we provided a full 500ml soft-drink bottle to GPs. It served as a token of appreciation to GPs and staff for their co-operation in the first visit and added a humorous flavour to the educational visits. GPs greatly welcomed the introduction of the 500ml alternative home-made spacer, proving to be a simple pragmatic approach to drug delivery in the care of asthmatic children. Not only were GPs enthused, receptionists were also alerted to this innovative approach to care making the adoption of this key message much easier. A light-hearted and friendly atmosphere prevailed when handing out the soft-drinks to GPs and receptionists. They complimented the home-made spacer and at the same time this topic seemed to be one of jest as GPs supported the innovation with one GP buying 500ml soft drinks packed in plastic bottles for lunch.

R18: You know... thank you for the telling doctor about this spacer ... it's such a great help for the asthmatic children... that even now ... for lunch doctor buys soft-drinks filled in these bottles [laughing].. so we collect them ... and he uses them for his patients ..

A: Well done.. it's [referring to full 500ml soft-drink bottle] it's a good reminder [laughing].

It seemed that even receptionists became aware about the use of spacers for drug delivery in asthmatic children highlighting this simple pragmatic approach to care.

All GPs were enthused and expressed their acknowledgement to learn about the 500ml home-made spacer. Most were familiar with the use of the 2 litre plastic bottle, but introduction of the 500ml home-made spacer aroused greater enthusiasm because of its simple construction, easy availability and portability. This dialogue is included here because a week after the first detailing visit, one GP (21) phoned to us to share his enthusiastic appreciation about use of the smaller 500ml spacer as a drug delivery device for inhaled asthma medication.

GP 21: I'd like to thank you for sharing the idea about the use of the home-made spacer (500ml) with me. It's much easier compared to the big two litre bottle..... that's awkward to carry around...This spacer is simple..and parents can make it easily ...

A: It's my pleasure I'm glad that we could be of service to you.

GP21: I have another suggestionperhaps one could also look at the use of the smaller 250 ml plastic bottle that's available

A: Thanks for sharing the idea. One would need to conduct tests to determine its' efficacy as a drug delivery device before it can be used .

Other GPs expressed their enthusiasm in becoming aware of this simple innovation again at this, in the 2nd visit.

A: What were your experiences with the home-made spacer?

GP 13a: It's been wonderful....I've just been showing it to parents ..It's a great idea

GP 1: I've some children using it... a relief especially for families who can't afford those spacers [supplied] from drug companies ...

Follow-up care

The key message suggesting monthly follow-up care for asthmatic children aimed to help prevent the onset of acute asthma by regular monitoring of symptoms, of drug use, inhaler technique and providing GPs with the opportunity to adjust the treatment accordingly.

Since GPs usually prescribe a month's treatment for moderate to severe asthma, the usual duration of treatment for a patient would last a month. In this study it seemed that GPs were not able to continue with provision of follow-up care. Some GPs mentioned further that it was difficult to assess follow-up care as they did not receive feedback from parents/ children who had attended. Such poor compliance did not make it possible to monitor children on a regular basis.

A: What were your experiences with the provision of follow-up care?

GP14: I can't say much on this now...parents don't [bring their child to] attend regularly after a monthly... or even at 3-6 monthly intervals...children are well..and they just would not come around ...it's too soon to say anything yet.

GP 9b: I haven't had any follow-up....

GP3b: Patients [asthmatic children] comply poorly with any regular follow-up that is needed..

A: Yes.. one would need to constantly motivate parents about the importance of regular attendance and preventive care.

One GP seemed to anticipate lack of follow-up and further asked parents to become involved in self-management by encouraging them to monitor their child's condition using the record card as an educational tool for home use.

GP2: You know...I gave the parents the [record] card ...so that they can also monitor the child.. it will make them more aware [about asthma symptoms] too.

Smoking avoidance

The parent's asthma information card (Appendix 6) served as a doctor-mediated parent educational tool and one of the priority messages on the card was smoking avoidance. In the first visit GPs were asked to write the names of the prescribed therapy onto the card to enable parents familiarise themselves with the drugs. Most GPs reiterated that the parent's information on the card served as 'useful' prompts during consultation and that it was believed to be of 'benefit to the patient'. However, since GPs received no feedback from parents and that they could not comment further about this message.

A: The incidence of smoking remains one the highest in this community, and parental compliance with smoking avoidance around asthmatic children is a problem....What were your experiences in alerting parents about this? .

GP 16 b: This [parent's asthma information card] is a useful, simple reminder....parents can have it with them all the time.

GP 13a: Yes.. I've card to the care-giver who accompanies the child, I've mentioned it ...but one doesn't really know the outcome....

Components of the educational materials

Some GPs complimented the format of the folder and the relevance of information to primary care management of childhood asthma and expressed their enthusiasm for use of the printed folder at their practice settings. GPs using the folder had it placed within easy reach either placed on the desk besides the GP or visible to the GP even when tucked away beneath a pile of papers. Some GPs (1, 3b, 5, 9b,12, 13a, 13b, 15, 22) had the folder on the desk, smiled and openly discussed their experiences even before I could inquire about them. GP (15) further hugged the folder and smiled:

GP 15: I hope you' re not going to take it [the folder] away from me [smiling].

The GP's spontaneous reaction in hugging the folder and claiming ownership embodies enthusiasm and adoption towards the key management principles.

Few GPs had their folders lying beneath a pile of papers on the desk, which they then retrieved and referred to during the course of our discussion (18a, 20). Although most session GPs (10b, 16b, 16d, 16e, 13b) did not have the folders with them at the time of the second detailing visit, they vividly related their experiences to me when using them at the time of consultation. Discussions with these GPs were interactive and they seemed eager to share their varied experiences when using the messages.

One GP (1) found that he could not write legibly on the plastic card. When writing the name of the prescribed drug therapy on the plastic card, it was poorly visible. He suggested that a different surface to improve legibility be used, and that more writing space be provided in the card.

A: Dr _____ how did you find the parents' asthma information card?

GP 1: I found the information useful to help parents in their understanding of asthma. But ...I found difficulty writing on the card ...I could not write legibly on it. Perhaps one would need to look at material that would be easy to write onto....And the writing space is too small...it should be increased.

Triggering cost awareness / Pharmacoeconomic information

One of the key messages was to highlight the cost-effectiveness of inhaled therapy in the treatment of chronic childhood asthma. We designed a tabular cost information format for anti-inflammatories and bronchodilators for quick reference during consultation (Appendix 6). Most of the GPs showed keen interest in drug costs as they were unaware of the range that was available. They felt that such information was 'essential and useful' for management of childhood asthma in private practice, as the economic status of the family had to be considered when providing care. I agreed with the GPs and emphasised the cost-effectiveness of inhaled therapy for chronic asthma and demonstrated cost differences between an oral bronchodilator versus an inhaled one. GPs were awed by this evidence and silence prevailed in the room when detailing this topic.

A: Dr _____, as you may know cost of asthma drug therapies is of concern to poor communities. If one compares oral to inhaled therapy ... for example.. let's look the bronchodilators - a teaspoon of a theophylline costs around 75-80 cents; , while a puff from an inhaler costs less than 20 cents – four times less. Also.. you know that the inhaled route is more efficacious than the oral route –faster onset of action,

lower doses are used, minimal side-effects ... [looking at the doctor for a response]

GP12, GP 5:[silence, raised eyebrows and nodding in agreement]

In the first visit GP (8) seemed aloof and participated minimally in discussions. He was familiar with the key messages, and showed minimal interest towards the printed material because he 'followed the guidelines and claimed to be 'aware of the costs of medicines' for childhood asthma management. However, during the second visit to the practice, when asked about his experiences with the use of the printed materials he specifically highlighted the usefulness of the folder and complimented the tabulated cost information. He was able to refer to the information when explaining cost of therapy to parents. Further, he not only acknowledged its application in practice but, suggested that prices for newer longer-acting bronchodilators (formoterol, salmetrol) and theophyllines be included in the list of drug therapies for childhood asthma.

A: Dr _____, what were your experiences with the folder?

GP 8: I found the cost of drugs very useful....it helps me explain to the patient the different costs of therapies that are available.....I see the longer acting bronchodilators have been omitted. One also needs to consider the use of newer long acting bronchodilators.. it would be useful to have it listed here..[referring to the table]

A: Thanks for your suggestion.

Acknowledgement of programme

In concluding the 2nd visit GPs who had accepted and /or adopted the key primary care messages expressed their approval and acknowledgement for use in clinical settings. A few GPs (1, 21, 3a, 13a) specifically thanked me for my efforts and the majority felt that it was a worthwhile initiative.

Presentation to GP organisation

One GP who seemed quite enthused, expressed his appreciation of the programme as indicated from responses to the visits and to the printed material. Further, he extended an invitation to the detailer to present the programme to the local professional organisation (Dispensing Family Practitioners Association). He felt that

by informing the DFPA it would help to facilitate implementation of the programme to other practices and to 'up-date GPs' about childhood management.

GP 1: This [programme] is very useful, informative, and needed I would like you to do a presentation [of the programme] to the DFPA.... other GPs would become aware of it it's very important and relevant to our practice. You know ... it [programme] would help to up-date them.

A: Thank you. Once all phases of the programme have been completed and evaluated, we will form relevant authorities, like the DFPA about its' outcome.

Request for feedback of the programme

GP 16b: Could you let us know ...what's the outcome of the programme. I would like to know... it's a good programme and should be continued.

GP 10b: It would be wonderful to hear whether this programme's been effective. ...Would you let me know..when you've completed it....

GP5: I'd like to know if this programme's had any effect

A: Yesyou will be informed about the outcome once all phases of the of the programme have been completed.

After completing the second outreach visit, one principal GP (3a) who expressed his satisfaction with the programme extended an invitation to me to participate in an asthma clinic day workshop for parents and children which was being planned at his practice.

GP 3a: We'll be having an asthma clinic day at the practice. I would like you to participate in the workshop...At the moment we're planning it...we'll let you know when it is.

A: [nodding] Thank you for your invitation.

Discussion: visit 2

The second outreach visit aimed to explore GPs' experiences and perceptions with the key primary care messages for childhood asthma. In addition the visit aimed to identify problems and to reinforce adoption of the messages in practice setting. I discuss GPs' responses to the outreach educator and materials based on main themes identified from the second visit. GPs' responses to the intervention have been broadly categorised into those who had used the messages (user responses) and those who did not (non-user responses). I conclude with the outreach educator's

journey, the strategies that were used to protect against a biased outcome, lack of a gender effect and acceptability of the intervention.

All except one GP agreed to meet with the outreach educator for the second visit. This could perhaps indicate that private-sector GPs favour personal visits to their practice setting. The social marketing approach may have facilitated the meeting because of its flexibility in accommodating individual practice styles. Even though GPs had agreed to meet, some were reluctant to hold discussions with the educator and these were identified as 'non-users'.

The 'non-user' GPs displayed non-co-operation through passivity/ aloofness while some felt guilty/ remorseful for not being able to adopt the key messages in their practice. One GP (2) maintained his suspicious behaviour towards the outreach educator possibly because he was unable to identify a frame of reference to the educator apart from that of a drug company representative. He claimed a position of authority and displayed defiance throughout the meeting. It seemed as if his uncertainty (suspicion) about the alliances of the outreach educator led to him breaking down his contact.

GPs felt disempowered with some parental barriers. They believed that parents prefer accepting the diagnosis of asthma in children from white practitioners and/or from specialists. Further, GPs felt inhibited by not communicating the label of 'asthma' explicitly to parents. In addition, the perceived loss of patients through doctor hopping could further widen the credibility gap between primary care providers and parents/carers. Similar feelings of disempowerment were also been noted amongst in a study of public sector primary care 'coloured' nurse practitioners in Cape Town (Van der Walt 1998). Educational strategies aimed at dismantling the stigma associated with the disease in the community would be needed to enable GPs to openly communicate with parents.

Most principal GPs were identified as passive recipients and were unlikely to use the messages as they viewed themselves as practice managers. They were more inclined to encourage changing the practice behaviour of either the medical partners or practice staff, rather than their own practice pattern. During the visit the

principals displayed minimal interest and did not use the printed materials but discussed at length structural/ organisational problems in the private sector that could not be addressed in this programme. They felt that they 'had no time for filling in cards' or doing 'paperwork' because of the perceived practice load. These findings concur with that obtained from other outreach interventions (Gomel 1996).

Non-user GPs concluded the visit by admitting that the programme was a useful initiative, and this study suggested that receptionists could be included to help screen patients while waiting for the doctor. Future studies should consider receptionists in improvement programmes at private sector facilities.

'User' GPs were identified as those who had applied the key messages in their practice setting and held more interactive discussions with the outreach educator. In contrast to non-users, 'user' GPs were eager to share their experiences with the educator, indicating good acceptance of this outreach programme and myself as its agent. GPs within this group applied the messages by either not using the printed material that was supplied to them, or had used them in the practice setting.

One possible explanation for GPs not using the material is because we created a compulsory link between the folder and the messages. It seemed that the folder may not have been required when meeting GPs for the second visit or even in the first, as many of the key messages were components of the guidelines (1994) that GPs were already familiar with. This means that our key primary care messages may simply have been a re-organisation of what GPs already know and had already internalised. The intervention may simply have reinforced or reaffirmed GPs' previous knowledge of the existing guidelines. This could also perhaps explain their initial passive responses observed in the first visit.

GPs' increased awareness to appropriate pharmacotherapeutic approaches was evident from use of the printed materials. They welcomed various facets of the printed folder and offered suggestions to modify its use in clinical situations. When using the folder, even those GPs who were passive in the first visit were eager to share their use of the record with the educator. They were confident in assessing asthma severity using the simple symptom parameter and one GP even extended its

use as an educational or self-monitoring tool for use by parents/ care-givers. Although it was intended that GPs attach the record card to the existing patient file at the practice, they had them lying on the desk beside them. A possible reason is that GPs may have wanted easy access to the completed cards, which they could refer to during the educator's follow-up visit.

GPs' enthusiasm about the home-made spacer therapy was evident since the first visit. Not only were GPs enthused, receptionists were also alerted to these simple pragmatic approaches to improving the quality of care. For GPs working in isolated conditions, the provision of this up-to-date practical information accompanied by a visual demonstration was clearly relevant to their practice setting, especially where adherence was a perceived problem. GPs response to this delivery device was most eagerly welcomed, thus making the adoption of this key message much easier.

Although information on the cost of drugs alerted GPs to cost-effective care, patient insistence for branded products was perceived as a barrier. GPs' experiences when prescribing generic inhalers, based on feedback from parents/ patients about the efficacy of such medications, were contrary to findings from the literature. Such anecdotal differences should be viewed with caution, since clinical equivalence between the generic and branded inhaler preparations has been established objectively (Williamson 1997). GPs seemed unable to communicate the concept of bioequivalence between generic and branded products to parents, and therefore needed more information. Simply supplying GPs with an evidence-base to promote cost-effective care is not enough, regular reminders about the efficacy of generic products are needed as tools to facilitate communication between GPs and patients.

GPs were not responsive to other elements of the intervention materials. They did not mention the pen, the visual reminder for inhaled (anti-inflammatory) therapy printed on the folder or the poster being useful reminders. Even though most practices had mounted the poster in the consulting room, GPs did not seem to make reference to it as a reminder of the key messages. Sessional GPs were however unable to mount their posters at the practice because they were part-time employees and inquired if they could use them at their full-time employment facility, mainly public -sector day hospitals. Most GPs requested copies of each of the journal

articles, the evidence base for the key messages, but it was not possible to assess whether GPs had actually read them because a follow-up visit was not planned.

In concluding the second visit, GPs acknowledged and suggested that the intervention should be implemented widely. GPs' strong interest towards having the programme implemented at public-sector hospitals was evident during both visits. Since GPs in private sector were more likely to feel isolated compared to their counter-parts in the public sector, the strong feeling to continue with the programme could indicate that permanently institutionalising such a service may be welcomed. The invitation to the educator to make a presentation to the local GP organisation perhaps highlights GPs' enthusiasm to increase awareness of the programme to the other GPs. Alternatively, it could mean a need to obtain and sustain endorsement from peers about the programme. Health care professionals are known to seek advice and collaborate closely within an established social network (Fernandez 2000). GPs' enthusiasm of the programme seems to be related to interactions with the outreach educator and from use of the printed material both of which may have played an equally important role. This may explain the positive health outcomes of children with asthma who attended intervention GPs (Zwarenstein 1999).

The journey for the outreach educator was indeed a challenging and a learning experience. The qualitative research training, communication in sales techniques, observations of GP-drug detailer interactions and the role playing technique formed a stable and concrete ground-work for the face-to-face meeting with the GPs. In addition, thorough knowledge of the disease and awareness of the characteristics of the GP community were vital in understanding GP behaviour. Although the first few visits were a challenge, consecutive visits were less demanding because of the familiarity of the detailing process and increase in confidence. The second visit was an easier task to accomplish as GPs were familiar with the objective of the visits and were receptive of the intervention.

In this study, I had a dual role: I was an intervention agent aiming to understand a range of practitioner behaviour and a member of an evaluation team aiming to understand the impact of an outreach intervention. Some would argue that the approach to accomplish these two roles would lead to a problem of bias. The

strategy I used was based upon splitting these two functions and I did this very consciously at all times. In my part as evaluator, I did not have a vested interest in favouring positive responses, because as a team our long-term view is to support this programme and incorporate important/relevant suggestions from GPs. The decision to abandon the programme would not have been based on the qualitative research, but on the RCT, which was not subject to my biases. This position is similar to that of a clinical trial investigator who is uncertain about the efficacy, not convinced or does not believe that there is sufficient evidence, that a particular intervention is effective (or ineffective). An RCT would help him/her to avoid bias in an investigation.

In a clinical trial the outcome is protected against bias by randomisation (Weijer 2000) and similarly, in our study, the participants were randomised to receive the intervention. We compiled a list of GP names from parent-completed questionnaire surveys, and used a numbered computer printout to obtain a representative sample for the outreach intervention (Zwarenstein 1999).

We used in-depth interviews and participant observation which, are very common approaches in qualitative research, and which were themselves conducted in ways to reduce bias. My formal training in qualitative technique enabled me to develop an attitude of open-mindedness and unconditional positive regard. Aside from these, the opening question was refined several times to ensure that it was non-leading and did not contain a suggestion. The question was phrased and delivered in the same words and tone to all GPs and done in a way of consciously stimulating participation. I used reflective summaries and clarifying questions to confirm the information. The prompts that were used to elicit or extract information, were also not leading.

Extensive role-playing sessions offered consistency, and my neutral presentation style was not intended to promote a positive outcome. By aligning myself with the objectives of the programme as outreach educator, I allowed GPs' to express both their negative and positive responses. Since I noted my experiences with each GP immediately in my field diary, I captured the events as closely as possible, to

resemble that of the real situation. I transcribed the field notes in detail within 2-3 days.

The principal investigator checked contents of the transcriptions for clarity. I coded the paragraphs of each transcript twice, 10 weeks apart, to ensure consistency. Two experienced qualitative health researchers, uninvolved in the study, independently checked the interim and final versions of data analysis and interpretation, respectively. There were minor differences and we reached a consensus for the final analysis and evaluation.

As a female outreach educator for the CHAMP study, there were no obvious instances in which gender issues occurred in my experiences with the GPs. A few possible reasons were that none of the GPs knew me prior to the study, and my meetings with them were conducted within a short time (15 minutes). My communication with GPs was conducted professionally, and at a highly proficient level. Since my intention at each visit was task – and content – oriented, my professional demeanor, conservative attire and lack of familiarity prevented any flirtatious behaviour. It is not likely that gender issues would be expressed through flirtation, because the participants were mainly conservative Muslim and Christian doctors, with very traditional values on moral and ethical codes of conduct. The only possible sign of gender issue might have been a power dynamic, although there were no specific signs of it being gender related: one GP refused to shake my hand because of his frustration in not being able to identify a ‘sponsoring agent’ for the programme.

Pharmaceutical companies commonly employ attractive women as drug detailers, as a strategy to promote sales with mainly male doctors, suggesting that they believe there are gender issues. However, there does not seem to be evidence in the guideline implementation literature of the effect of gender of an outreach worker on practitioner behaviour.

The findings of this guideline implementation study offered insight into physician attitude and perceptions. GPs were receptive to the tailored multifaceted outreach intervention, which paved the way for a mutual learning process that underlined the

need for active dissemination of neutral, unbiased, practical and up-to-date information at clinical practices from academically based sources to improve guideline adherence.

References

Cates CJ. Comparison of holding chambers and nebulisers for beta-agonists in acute asthma. In Cates C, Durcharme F, Gibson P, Jones P, Rowe B, Wolf F(eds.) Airways module of the Cochrane database of systematic reviews, [updated December 1997]. Available in the Cochrane Library [database on disk and CDROM]. The Cochrane Collaboration; Issue 1. Oxford: Update software; 1998.

Cummings KM, Frisof KB, Long MJ, Hrynkiwicz G. The effects of price information on physicians' test-ordering behaviour. *Med Care* 1982; XX (3): 293-301.

Fernandez LAL, Martin JMJ, Del Castillo JDL, Gaspar OS, Millan JIM, Lozano MJP et al. Sources of influence on medical practice. *J Epidemiol Community Health* 2000; 54: 623-30.

Gomel MK, Saunders JB, Wutzke, Hardcastle DM, Carnegie MA. Implementation of an early intervention for hazardous alcohol consumption in general practice. Final report for Research into Drug Abuse Program. Sydney, Australia: Department of Human Services and Health. July 1996.

Perera BJC. Efficacy and cost effectiveness of inhaled steroids in asthma in a developing country. *Arch Dis Child* 1995; 72: 312-316.

South African Childhood Asthma Working Group. Management of childhood and adolescent asthma. 1994 consensus clinical guidelines. *S Afr Med J* 1994; 84 (12): 862-866.

South African Medical and Dental Council. Register of medical practitioners, interns and dentists for the Republic of South Africa as at 30 June 1997. Pretoria: Interim National Medical and Dental Council, section 21, Medical, Dental and Supplementary Health Service Professions Act (56), 1974.

South African Medical and Dental Council. Register of medical practitioners, interns and dentists for the Republic of South Africa as at 30 June 1998. Pretoria: Interim National Medical and Dental Council, section 21, Medical, Dental and Supplementary Health Service Professions Act 56, 1974.

Van der Walt H. Nurses and their work in tuberculosis control in the Western Cape [PhD thesis]. University of Cape Town; 1998.

Volmink JA, Metcalfe CA, Zwarenstein M, Heath S, Laubscher JA. Attitudes of private general practitioners towards health care in South Africa. *S Afr Med J* 1993; 83: 827-833.

Weijer C, Shapiro S, Glass K, Enkin M. For and against: clinical equipoise and not the uncertainty principle is the moral underpinning of a randomised controlled trial. *Br Med J* 2000; 321: 756-8.

Williamson IJ, Reid A, Monie RDH, Fennerty AG, Rimmer EM. Generic inhaled salbutamol versus branded salbutamol. A randomised double-blind study. *Postgrad Med J* 1997; 73: 156-158.

Zar HR, Liebenberg M, Weinberg E, Binns HJ, Mann MD. The efficacy of alternative spacer devices for delivery of aerosol therapy to children with asthma. *Ann Trop Paediatr* 1998; 18: 75-79.

Zwarenstein M, Adams J, Bheekie A, Swingler G, Ehrlich E, Lombard C, Pather S, Sladden M, Eccles M, with the National Asthma Education Programme. Chestiness and asthma in Mitchell's Plain (CHAMP): Cluster randomised controlled trial of academic outreach demonstrates improved health status of asthmatic children attending private practitioners in poor urban community in South Africa. *Int J Tubercule and Lung Dis.* 1999; 3(9): suppl 1 S76. 30th International Union of Against Tuberculosis and Lung Disease (IUATLD) World conference. Abstract book (Poster) 641-PD.

Zwarenstein M, Youngelson M, Botha JL. Validity of the register of medical practitioners for manpower planning. *S Afr Med J* 1989; 76: 105-108.

CHAPTER 9

DISCUSSION

In the first section of this chapter I discuss the research methods used to design and to evaluate the CHAMP intervention. I discuss the combining of qualitative and quantitative methods, and unobtrusive methods. The second section deals with the difficulties encountered in the clinical management of children with asthma in South Africa and I highlight the choice of a behaviour change intervention for private practitioners. The third section focuses on the characteristics of outreach intervention and the pharmacist as a potential change agent to improve adherence to guideline recommendations.

Research methods

Combining qualitative and quantitative research methods for development of the intervention

The combination of qualitative and quantitative methods helped us to identify the range and prevalence of barriers preventing GPs from appropriately managing asthma in children. The key informant interviews were feasible and informative. They provided an in-depth account of GP behaviour in a private sector primary care setting, from a GP perspective, and detailed accounts of possible areas for improvement and barriers to such improvement. An alternative approach to our key informant studies using individual in-depth interviews with GPs would have been to use focus group discussions with the same GPs in groups. Our chosen solution, the individual interview seems to be preferable as it matches the individual and isolated setting of GPs in Mitchell's Plain with little or no professional interaction.

One possible role for focus groups in development of the intervention might have been to test a proposed outreach role-played to a focus group. For this purpose, interaction between GPs might spark more suggestions. We will consider using this approach to test a proposed outreach intervention among public sector practitioners to improve clinical decision-making.

The random sample survey measured the prevalence of the barriers identified in the

initial key informant interviews. It did no more than confirm the expected prominence of the findings from the qualitative study, and so the need for surveys in future barrier identification studies is questionable. The results of this survey are not generalisable to all general practitioners because of the specifics of our sampling frame. However the results may be generalisable to private sector solo-practitioners and to primary care of asthma in children in urban areas of developing countries.

Resources used for the quantitative survey could alternatively have been directed towards obtaining qualitative data from parents and their asthmatic children. The qualitative approach could be used to explore possible gaps and misconceptions between doctor perceptions of patient and parent attitudes, and the knowledge, barriers and attitudes of patient and parents themselves, as was done by (Mesters 1991). Conducting qualitative approaches with parents and with their children who have asthma would have provided additional views of barriers to asthma care provision.

We should bear in mind that the barrier is the one in the mind of the target practitioner irrespective of how true or false it is. It might be possible to feed the new information obtained from parents and patients to GPs so that they can help patients overcome barriers. Further studies are needed for understanding patient and parent perceptions, and were we to do our study again, now we might collect such data.

At the evaluation stage, qualitative methods also helped to assess acceptability of the CHAMP intervention to the target GP population. This qualitative evaluation was nested within a quantitative study, randomised controlled trial (RCT), (not reported in this thesis) to assess effectiveness of the intervention.

Methods to evaluate acceptability of the intervention

We used unobtrusive qualitative methods to evaluate the acceptability of the CHAMP intervention among the target GPs. We felt a need to go beyond the “black box” approach in the CHAMP randomised trial which assess its success largely by measuring the health of patients and understanding how GPs perceive and respond to our intervention. “Black box” studies, in which practice change is measured but

the detailed mechanisms of the target group responses are not studied, have been conducted in developed countries. We wanted, in this study, to explore GPs' attitudes and perceptions of the CHAMP intervention in their practice setting. Such information would help us modify elements of the intervention for future guideline implementation studies.

There are no studies published of rigorous qualitative evaluations of GPs' responses to outreach visits. Qualitative studies were vital in obtaining an understanding of GP participants' attitude to and perceptions of our outreach intervention and to each of its' elements.

Implementation studies have used quantitative evaluations of process measures and occasionally of health outcomes to assess effectiveness. Postal questionnaires have been occasionally used to assess GPs' acceptance of outreach interventions (Gomel 1998), but these structured, short response questionnaires may not fully reflect their views. Given the concerted efforts needed to obtain sufficiently high response rates, and the limited data provided would not be worth that intense effort.

One major factor that determined the choice of unobtrusive research methods to evaluate the CHAMP intervention was the individualistic nature of private-sector practitioners. Although GPs have a close social and political network related to negotiations with medical insurers and other material issues, they operate independently, with little or no peer discussion of care provision. In our attempt to understand GPs' acceptance of the intervention, we found that a personal face-to-face informal discussion, in their own setting, tailored and ordered in immediate response to their individual concerns and experiences was successful. We obtained a detailed, emotionally rich and internally consistent account of their use of and response to our intervention. This approach fitted well into their routine clinical activity and provided GPs with an empathic and interested listener who encouraged them to share their unique experiences openly and without the fear of criticism. Thus, we were able to capture a wide range and depth of GPs' views and experiences relating to the intervention.

Unobtrusive participant observation provided direct first-hand insight into GP

responses to implementing outreach interventions in routine private sector primary care practice settings. For the CHAMP intervention, GPs were asked in the second visit about their opinions and experiences with application of the key messages, but they were not made self-conscious about their recollections.

Since the outreach educator formed part of the CHAMP outreach intervention, employing any external independent evaluation would not have offered an in-depth insight into actual practice behaviour. The presence of a non-participant observer during the outreach visits would most likely have sensitised GPs to an evaluation, and interfered with their responses to the detailing process. Alternatively, telephonic interviews with GPs would not have captured their non-verbal responses, which helped to reinforce their responses and assessment of the CHAMP intervention.

We avoided the use of visible data collection instruments such as a tape-recorder and manual note-taking in the GPs' presence, as this would have jeopardised the natural flow of events and raised suspicion, thus defeating the process of naturalistic inquiry. The outreach educator made mental notes of GPs' responses as our intention was not to accentuate the evaluation. Thus, we deliberately reduced GPs' self-consciousness to capture realistic, spontaneous and uninhibited responses relating to various elements of the intervention.

In our study we intervened in a randomly chosen representative sample of GPs serving a typical working class South African suburb. Neither the suburb nor the GPs have received any other interventions aimed at improving the quality of healthcare of asthmatic children. Our GPs are therefore typical South African private sector practitioners, and we believe that our results are highly relevant to real world policy decision making in South Africa. In contrast, GPs in other outreach intervention studies were volunteers (Veninga 2000) who were fully aware of the nature of the study, and both their volunteer status and this foreknowledge could easily have influenced their behaviour.

The ethical implications of not providing full informed consent to the target audience whose behaviour is being studied, remains an on-going debate (Doyal 1998). It is a grey area for health services researchers undertaking guideline

implementation interventions within complex pragmatic trials.

For the CHAMP intervention, the outreach educator informed GPs that “an evaluation would be conducted”, but the exact method was not mentioned to them. This deliberate lack of information may be viewed as violating the principle of full informed consent to research participants. Our main aim for this intervention was the well-being of the patient and improving the quality of care he/she receives from GPs. We believed that a detailed explanation of the way in which each practitioners’ responses to the intervention were to be transformed into an evaluation would lead to increased self consciousness when asked their views of the intervention. Further, their responses could falsely inflate the effect of our intervention, as disclosing the full nature of the evaluation to the target audience might have led to actual behaviour change. This would have defeated the purpose of this evaluation, to test acceptability and effectiveness of the CHAMP intervention within real world constraints. Our approach, obtaining general consent from individual practitioners appears ethically more sound than that of previous researchers, who gained face-to-face information on reported behaviour from physicians. In these examples the physicians were unaware that a study was being conducted, as unobtrusive participant observation (chapter 5) was used to evaluate their motivation for prescribing target drugs (Schwartz 1989) and their interactions with a drug detailer (Hemminki 1977). Diwan and colleagues (1995) conducted pharmacist outreach visits aimed at improving the management of hyperlipidaemia in Swedish primary care centres, but did not inform doctors that they were participants for that study. In a recent study, Winkens and colleagues (1997) assessed the effects feedback on test-ordering without obtaining informed consent from family physicians who were unaware of the trial. The researchers found that even after the trial when physicians were informed about the study, relations had remained unaffected. The unobtrusive methods used in these studies were acceptable to the respective international review board (IRB)/ ethics committees. For the CHAMP intervention, we protected the anonymity of our participants, as the outreach educator was the only person who could identify individual GPs.

We feel that our preservation of confidentiality, our obtaining of verbal consent for every interview, our lack of power over the GPs and our general description to them

of the intended evaluation constituted sufficient information to allow practitioners to make a free decision to consent to participate in the intervention. Indeed, only one practitioner refused consent, a decision we respected.

The unobtrusive methods used for the evaluating the CHAMP intervention provided valuable insight into GPs' attitude and perceptions and served as an important tool to assess acceptance of a guideline implementation strategy in a routine practice setting.

Pragmatic trials take into consideration the costs of health care delivery, which is of special importance to developing countries. One approach commonly used to reduce costs in developing country trials is monitoring GP prescribing behaviour rather than health outcomes. We did not review prescribing data for several reasons. Firstly, we knew from the CHAMP baseline and follow-up surveys that not all patients attending private sector practices were members of a health insurance scheme. Therefore, we would not have been able to access prescribing data for cash-paying patients attending the target practices. Secondly, reviewing of prescribing data would possibly have had ethical implications and thus make our chosen approach to consent less acceptable. We could in principle have reviewed the practice medical records, but this would have been intrusive, may have influenced GPs' behaviour, and would likely have reduced participation. It was not feasible to undertake any prospective drug prescribing evaluation using our own practice record cards as not all GPs actually used them. Practice level data such as prescription and medical record reviews would have provided data on process measures. We preferred to focus on health outcomes for patients in our RCT and to use qualitative methods to assess acceptability of the intervention and our understanding of how we could improve it.

An alternative unobtrusive approach for evaluating the CHAMP outreach intervention would have been a simulated patient evaluation. The advantage of this method is that it is the only way to measure actual practice. A literature review on this method has concluded that information gathered through simulated patients in developing countries is feasible and offers essential data on actual health provider practice (Madden 1997). However, we found that such an approach would not have

been feasible and we abandoned this method.

In this study the combination of qualitative and quantitative approaches provided us with valuable insight into barriers experienced in primary care childhood asthma in a developing country. The qualitative evaluation have increased our understanding of the attitudes and perceptions of South African private sector practitioners to our intervention. These findings can form the basis of further implementation interventions in South African public sector health care settings.

Primary care for childhood asthma

Selecting messages for a difficult primary care disease

Asthma is a difficult disease to manage. The disease is highly prevalent in primary care and the provision of effective treatment and management could make a major impact on quality of life for asthmatics. However, the complexity of the disease makes decision-making difficult.

Asthma is aetiologically heterogeneous. Trigger factors for asthma are identifiable in some, but not in others. Further, a precise definition of asthma is elusive. There is evidence that a recognised hypersensitivity reaction is absent in an important proportion of patients. Asthmatics may have wide variations in lung function. Exacerbations are acute, and they can be rapid in onset or they can occur gradually. The disease may be progressive, stable or even go into remission and disappear. Further, there is no clear distinction between two different levels of asthma severity. There is little information about milder episodes of asthma, the stage at which a clinical diagnosis should be made, and which is identified as a common presentation in primary care.

Notwithstanding these complexities asthma is a common but potentially serious disease, that should be managed in most cases by the general practitioner. This implies that the disease is not suited to a passive and automatic style of management, the common approach in high volume primary care in South Africa (Ehrlich 1998). Following guidelines limits both flexibility and a proactive involvement from GPs to improving service delivery. GPs need an active stance with a high index of suspicion for the diagnosis and for severity of asthma. While

this can suggest that GPs should be adhering routinely to evidence-based guidelines, our review of these guidelines suggested that these were too long (chapter 2), and did not emphasise the highest priority barriers which we had detected (chapter 6).

Selecting implementation strategies for a difficult primary care setting

We chose an implementation strategy for CHAMP based upon practicality and evidence from the literature that it would be effective. To ascertain whether such an approach works in a local primary care setting, we set up the CHAMP intervention as a RCT. It has proved possible to develop and evaluate the intervention using qualitative methods within the context of this RCT.

A tailored multifaceted educational outreach intervention was preferred for the CHAMP study when compared to other behaviour change strategies. In the private sector clinical record systems are poorly developed, therefore an audit and feedback system would not have been feasible. Further, conducting a practice-based record review in the private sector is perceived to be a sensitive issue, and would have created organisational problems. Continuing medical educational (CME) meetings have been found to have little direct impact on improving professional practice (Davis 1995) and such an approach was not considered.

Since the main thrust of this implementation study was to adapt the intervention to daily practice constraints and to promote behaviour change in GPs' routine activity, we did not attempt to change the organisational / structural setting of private sector clinical practice. Since private sector GPs in South Africa work independently and in isolated setting it would not be feasible to implement such quality improvement programmes. Such facilitation is far more resource intensive, and in our opinion, it can be excluded from guideline implementation in developing countries. GPs would likely view the involvement of an external agency with resistance (Volmink 1993) and changing the practice setting would require concerted efforts from the practice staff and from the sponsoring agent to facilitate the implementation process. In contrast, nurse facilitators employed in general practices in the Netherlands (Hulsher 1997) work well. However, an overview of continuous quality improvement (CQI) programmes found that the results from the studies were inconclusive due to the

varied study designs. The reviewers found that in uncontrolled and cross sectional studies CQI was effective, whereas in RCTs, CQI showed no effect (NHS 1999).

Even the use of opinion leader would not be suitable for transferring research into private sector primary care practices in South Africa. Many of the key figures recognised as “experts” are academically based, and studies have shown that opinion leaders work well in a hospital setting (Stross 1983; Hong 1990) but their effects in changing professional practice in office-based primary care general practice settings seems limited (Flottorp 1998).

Our behaviour change strategy was directed to primary care private-sector GPs, whose primary source of influence and clinical information were pharmaceutical company representatives. Since most GPs in this sector work singlehandedly, this means greater isolation from clinical updates when compared to their public sector counterparts. GPs network with numerous professional and community organisations, their interests in keeping abreast with advancements in professional practice and improving their skills towards quality health care services is shaped by experiences of patients, peers, seniors and multidisciplinary team members (Dawson 1999). Further private sector GPs have an independent practice style when compared to those in the public sector. In attempt to fully understand and change their individual practice styles, a personalised approach was needed, and this entailed a tailored approach similar to that adopted by pharmaceutical company representatives. Further, in view of time constraints experienced by singlehanded practices, it would not have been feasible for all target GP participants to engage in a group detailing / meeting. Thus, a face-to-face visit aimed to respect GPs’ time, professional autonomy, and to cause no interference within their routine practice activities. GPs’ familiarity with the social marketing approach used by pharmaceutical company representatives facilitated the choice of the CHAMP intervention, and some GPs initially perceived the educational outreach visit to be that of a drug-detailing visit. The intervention proved to be an appropriate vehicle to influence the behaviour of South African private sector primary care practitioners.

Commercial detailing by drug representatives is regarded as one of the major information sources influencing GP prescribing patterns (Stross 1987; Stinson

1980). In developed countries the average doctor receives 4 weekly visits from drug company representatives (Siegal-Itzkovick 1999) occupying 2 hours per week (8 visits lasting 10-20 minutes), 22 hours per month and 100 hours each year (Maestri 1999). Furthermore, they have been considered the first choice for drug information in 60 % - 70 % of practitioners (Anon 1995). Although no such detailed data are available for developing countries, visits by representatives to private sector GPs vary according to their prescribing volume (Kamat 1997). However, the quality of information provided by drug representatives to health care providers has been found to be inaccurate, biased, and unreliable (Lexchin 1997, 1987; Shaughnessy 1996; Griffith 1999).

In developing countries drug detailing has a major influence in GP behaviour (Lexchin 1992). Companies know that drug detailers are their most effective vehicle for promotion, with some devoting about 50% of their sales budget to detailing (Lexchin 1989). In Australia, Roughead and co-workers (1998) analysed 16 audiotaped recording of detailing encounters between medical practitioners and pharmaceutical representatives and they identified several types of influence techniques used by representatives when detailing. The most common was the provision of promotional gifts and printed material (100%); reference to authority figures (14%) and peer groups (41%), and acts of commitment by appealing to clinical situation (s), economic considerations or the practitioner's emotions to prescribe the detailed drug (39%). A similar finding was obtained in an earlier Finnish study, which also showed that in almost half of the presentations pharmaceutical representatives often neglected providing information on side-effects and contraindications (Hemminki 1977). The marketing strategy used by pharmaceutical companies are largely driven by commercial incentives (Hemminki 1977; Chren 1989; Chren 1994; McKinney 1990) leading to unscientific and inappropriate prescribing.

Little is known about the behaviour of pharmaceutical representatives in South Africa. The evidence for such information is vital and health care practitioners should be educated about the influential nature of commercial detailers and acquire skills to critically appraise the clinical information they provide. Qualitative and quantitative evaluations of drug detailing visits within South African primary care

setting would offer greater understanding into how pharmaceutical company representatives influence local practitioners.

One possible factor that contributed to GPs' acceptance of the CHAMP intervention was the simple and practical nature of the key messages. These were developed by a multidisciplinary team: a community health specialist, an epidemiologist, a paediatrician, a private-sector general practitioner and a pharmacist. Regular bi-monthly discussions centred on varied personal clinical experiences, thorough knowledge of the disease, awareness of barriers to care provision, and understanding the constraints of the GP community. Further, the team's thorough planning ensured that the implementation process was conducted within the timeframe, prior to the two asthma peaks. In addition, the messages were explicit, concise, evidence-based and which could be integrated into GPs' routine practice.

Our reduction of the guidelines to a set of eight key messages, written in concise format, contributed to the positive findings obtained in our study. We selected a set of key messages that addressed GP barriers to optimal health care provision. The messages emphasised individual GPs' priorities and needs in practice and, by addressing these in our intervention, we stimulated a more focused behaviour change in the GPs. It is likely that GPs may have used some of the eight key messages, as they were free to choose those that suited the obvious barriers that they experienced as individual practitioners. We therefore believe that GPs' broad acceptance of our intervention and the consequent improved health outcomes of asthmatic children, are due to the use of key, tailored and explicit primary care messages.

Although clinical nurse practitioners were not included as part of the CHAMP team, future guideline implementation studies should involve them in the research decision-making process. When designing interventions for pragmatic trials the development and implementation of guidelines requires input from a range of experienced healthcare professionals.

GPs' acceptance of the outreach intervention helped to explain the positive result obtained quantitatively from the CHAMP trial. At follow-up (one year later, six

months post-intervention), there was a clinically and statistically significant reduction in mean asthma symptom scores in children attending intervention practices compared to those attending control practices ($p=0.03$) (Zwarenstein 1999).

It has proven possible to develop and evaluate an intervention using qualitative methods within the context of a RCT. This is an approach we recommend as researchers and decision-makers need reliable evidence. There has been little information of health care interventions provided to enable practitioners undertake implementation suited at local applicability, cost-effectiveness and feasibility (Irwig 1998).

Changing professional practice

The successful implementation of the CHAMP outreach intervention depended on numerous factors. These included understanding and addressing needs of the target audience and the design of a multifaceted intervention.

Increasing involvement from private sector practitioners in health service delivery

The private sector is an established component of health service delivery, yet there is little documentation in South Africa of the quality of care provided by private practitioners. In Mitchell's Plain the majority of children with asthma symptoms (59%) receive care from private practitioners (Ehrlich 1998). Further, the growing need for private sector care underlies the increasing acknowledgement by government and researchers of the important role of private sector practitioners in health service delivery. It seems important that government efforts are directed towards improving quality and increasing private practitioner involvement in the delivery of important public health interventions (Swan 1997). This would help close the gap between public and private providers, reduce the isolation of private sector practitioners, and move towards an integrated and coordinated health care system. Government efforts to set up a social health insurance scheme within the private sector should aim to ensure that private practitioner behaviour is consistent with and conforms to national programmes (ibid). This requires a thorough knowledge of current behaviour of private sector practitioners.

The CHAMP study is one of the few rigorous studies aimed at evaluating efforts to improve the quality of private sector care for a relatively poor community of South Africa. Dartnell and co-workers (1997) conducted a national evaluation of sexually transmitted diseases (STDs) among private sector GPs and found that management of the disease is inadequate. This may be a major contributing factor to the continued spread of HIV in South Africa. The researchers found that there was a need for clear guidelines and ongoing support for private sector GPs whose, strong willingness to collaborate and participate in collective efforts were evident to reduce the burden of STDs in South Africa. These findings and that of our CHAMP study clearly indicate the need for rigorous guideline implementation studies within private sector primary care health facilities to achieve optimal management of acute and chronic diseases. We believe that the CHAMP outreach intervention is an effective model aimed for improving care, one that is acceptable to primary care practitioners. It could form the basis for a model for government involvement in improving quality of private health care for poorer South Africans.

Gaining access

Gaining access to primary care settings and obtaining the voluntary physician participation is a pre-requisite for implementation research, involving the establishment of personal contact. Canadian researchers showed that high physician participation rates (91%) is achieved if a personal approach is made and by one who is known to potential participants (Borgiel 1989). Another study found that most physicians (69 %) cited personalised feedback as the reason to participate in research (Levinson 1998).

Physicians refuse to participate in research that involves a clinical audit, disruption of office routine, time commitment, completion of patient questionnaire and interference with professional autonomy (Borgiel 1989). In order to achieve high participation rates for the CHAMP intervention, the strategies that we used to access primary care practitioners were similar to those adopted by Murphy and her co-workers (1992). These involved identifying and contacting stakeholders and gatekeepers, supplying appropriate information to GPs, negotiating, asking for co-operation and making practical arrangements. This approach led to a high level of responsiveness among the GPs. In the first visit all GPs consented to meet with the

outreach educator, while in the second visit all but one GP met with the educator. Further, GPs expressed their enthusiasm to institutionalise the intervention, to have it presented to colleagues at a local GP organisation and both active and passive GP participants offered suggestions on how to modify elements of the CHAMP intervention.

Multifacetedness

Since clinical problems in primary care are broad-based, have many facets, are complex and take into account, science, sociology and psychology. Therefore multiple intervention strategies were needed to encourage and promote adherence to guideline-based care. One possible explanation for the success of the CHAMP implementation was the fact that it was multifaceted.

One major characteristic of the multifacetedness of the CHAMP intervention was the repetitive messages via multiple channels. The same key messages were provided orally, by visual demonstration, by materials such as wall chart, pen, desk-folder with structured prompts and interactive doctor-mediated parent reminders, and a gift (bottle of cool-drink). These elements could have appealed to individual GPs' needs and could explain their broad acceptance of a small number of compact messages.

Other researchers also arrived at positive findings when using multifaceted outreach interventions. In US health maintenance organisations (HMOs) a social marketing approach used in outreach visits improved physician's awareness of evidence-based clinically appropriate, cost-effective drug therapy which led to a cost saving of \$56,124 (Sweet 1996). In a Dutch study, the multifaceted educational programme consisting of individualised feedback and support, written materials for guideline-based care showed large improvements in drug treatment for asthma and urinary tract infection (Veninga 2000). The use of oral steroids for asthma exacerbations increased by 17%, and the duration for short courses of antibiotics decreased by 1.8 days for urinary tract infection. Further numerous reviews support the finding that multifaceted approaches lead to improvements in professional practice (Wensing 1998; Grol 1992). Because of limited time in a clinical setting, GPs favour concise, explicit messages that can translate easily into simple clinical action(s).

Each component of our intervention promoted greater awareness and aimed to reinforce adoption of the key message(s). A single strategy such as a list of key messages is unlikely to have created any impact because of the varied and disorganised nature of general practice. In a multifaceted intervention it is not possible to determine which particular element actually promoted greatest receptivity and adoption in practice. This creates difficulties in the evaluation. For the CHAMP intervention, different GPs seemed to favour different facets/components of the intervention. Most GPs reacted favourably towards elements of the intervention that offered information closely associated with patient-care decisions, and which offered great relevance to their individual practice setting. For example, most GPs readily accepted the pharmacoeconomic information relating to the cost of drug therapies for asthma, patient information card and the home-made spacer.

The CHAMP trial results showed that a higher number of children attending intervention practices were receiving inhaler therapy than those who attended control practices. Although there were many inhaler-related aspects of the intervention that could have contributed to this positive outcome, one possible explanation might be the detailer's visual demonstration of an inhaler with an easily available, affordable and portable 500 ml home-made spacer. In contrast, other elements of the intervention, for example the poster and the pen did not elicit much response among GPs, and a possible reason is that these elements form part of the common promotional stationary offered by pharmaceutical companies. GPs may have been accustomed to this type of promotion, and instead engaged their interests in other elements of the desk folder. Overall, a multifaceted approach highlighting simple, novel and attention-grabbing practical evidence-based messages is likely to be favoured in primary care general practice settings.

Although there was no obvious difference in responses between sessional and full-time GPs to the CHAMP intervention, sessional GPs were less likely to use the practice record card. They did not display or relate their experiences to the outreach educator. A possible reason is that these GPs had taken their kits away from the practices and they had forgotten to bring them around for their sessions at the

practices. Further, they may not have wanted to introduce changes to record-keeping within the practice, until such a system was already in existence at the practice. This may perhaps explain the sessional GPs' urgency to have the outreach intervention implemented at the public sector hospitals where most were full-time employees.

Responsiveness to GPs' needs

In the CHAMP study the personal visits to GPs were unstructured and tailored according to their needs. The CHAMP messages were tailored to individual GPs' needs, and this meant that we respected their needs as the outreach educator only offered message(s) that she perceived to be necessary for each GPs' use. Findings obtained in our first outreach visit, were similar to that received by an Australian hospital-based Drug and Therapeutics Information outreach Service (DATIS) (Chapman 1996). It was found that GP responses had ranged from "disbelief and skepticism; having fallen asleep; greeting the outreach educator with open arms; asking detailed and justifiable questions, and displaying antagonism". Further, the DATIS service team found that it was necessary to explore fully the purpose of the service amongst the GPs and to identify how this could benefit their practice. The high response rate of 85% for the DATIS service has been attributed to GPs' responsiveness to the unstructured and varied duration of the visits. The similarity in presentation styles could explain the high success rate of DATIS and the broad acceptance of the CHAMP outreach visits.

Cockburn and colleagues (1993) used a questionnaire to subjectively assess GPs' perceptions of the acceptability of the delivery of an academic detailing programme aimed at smoking cessation. The researchers found that GPs who met with the detailer were more likely than GPs in other conditions to feel motivated to use a promotional kit supplied to them. Further, there was a strong trend towards GPs who had received the detailing being more likely to use the kit at least once, and for long-term use.

Few subjective assessments of GPs' acceptability of outreach visits to practitioners have been published by Australian researchers. Reports have shown positive findings from GPs (Yeo 1993) similar to that obtained from the CHAMP evaluation. Feedback reports obtained from telephone interviews have shown efforts towards

GPs changing their prescribing pattern: "...since you've taken the effort to visit me, I decided to make the effort to review 'benzo' (benzodiazepine) prescribing in those patients I inherited". Further, the report showed that GPs mentioned having "enjoyed the chatting". Others had seen the visit as a service, with one GP who summed it as "it's nice to talk about management problems with someone who understands". A suggestion from another GP related on how to improve the visits: "visit more doctors". In addition, the feedback report in that study showed that GPs took the opportunity to talk about issues facing general practice such as specific patient and practice management problems, and to vent their feelings about the health system. Similarly, feedback reports from CHAMP include a telephonic acknowledgement from a GP to the outreach educator for providing information on the 500 ml home-made spacer, "thank you for providing the information about the spacer". Further, extending an invitation to the educator to conduct a presentation of the outreach intervention to the local GP organisation, "would you like to present this programme to the GP organisation?"; to have it institutionalised, "when will this programme be extended to the day hospitals?...I'd like to use these materials there"; and to become proactive "you've done your bit now we (GPs) must do ours!" Such subjective assessments offer invaluable insight into acceptance of a multifaceted outreach intervention in routine clinical setting.

Sustainability of the CHAMP intervention

During implementation of the CHAMP intervention, GPs responses in the first and second visits were used as indicators to measure its acceptability (qualitatively) and its effect on health outcomes (quantitatively) in actual practice setting. GPs' subjective acceptance of the intervention over the three months, between the first and second visits, showed some evidence of short term sustainability, and this was later supported quantitatively, three months after the second intervention visit, with positive health outcomes in children with moderate to severe asthma. We do not know how long after this the effect was sustained.

US researchers conducted a pharmacist outreach intervention to improve anti-ulcer prescribing and, found that the effect of the educational visits tapered off in the second month, after the last visit (Raisch 1990). They added that individualised feedback to practitioners would have produced a sustained change in their

prescribing pattern. In contrast, Ray and colleagues (1985) obtained a longer two-year sustainability of reduced inappropriate prescribing after implementation. Regular qualitative and quantitative evaluations are needed to check sustainability of outreach interventions within practice settings, and were we to do the study again, we would use a larger sample, and follow-up for longer.

Acceptance of the outreach intervention may not reflect actual GP behaviour. Other strategies, such as regulatory requirements could help ensure sustained effects. One incentive likely to encourage long-lasting active practitioner participation in outreach programmes is enrollment in continuing professional development (CPD) courses aimed at guideline implementation. CPD is a regulatory requirement in South Africa, aimed at maintaining and enhancing professional competence and standards of practice among service providers towards improved health care. A not-for-profit academic institution should be responsible for offering CPD accreditation courses to practitioners to facilitate guideline-based care at their practices. GPs who receive outreach visits should be awarded points as part of their continuing medical education. In addition, rigorous evaluations of outreach CPD courses would provide health care decision-makers and planners with strategies on how to develop appropriate interventions to improve the quality primary care service delivery.

Training of outreach educator

Training of the outreach educator is essential when undertaking individualised visits to practice setting. A thorough knowledge of the target disease and the pharmacotherapeutic approaches not only improves the educator's confidence and communication skills but stimulates a two-way interactive learning process. For implementation of the CHAMP intervention, a sales training course similar to that attended by pharmaceutical company representatives helped to improve the educator's communication skills during the practitioner-educator meeting. Aspects of the training included maintaining of eye contact during communication, improving listening skills, developing empathy, providing prompt, courteous and helpful service. Such training is similar to that of commercial marketing (Kotler 1984) but without financial incentives.

Training for social marketing includes improving interpersonal skills and an understanding of both verbal and non-verbal responses. An essential component that should be added to the outreach training is in-depth interview technique. This would help fine-tune interactions between the practitioner and the outreach educator. The in-depth interview technique would help to create a relaxed learning environment, where the educator is encouraged to maintain an open body posture and eye contact with the practitioner during the face-to-face discussions. Further, the in-depth interview would encourage the educator to use open-ended questions allowing GPs to converse more freely within the framework of the topic under discussion, encourage the use of reflective summaries and clarifying questions to focus the meeting and understand fully the practitioners' world. The importance of taking control of the interview is crucial during outreach visits because of time limitations and role-playing techniques offer good insight into perfecting this (La Trobe University 1993). Role-playing forms an integral part of the training, and the sessions should be video-taped to tailor and perfect communication and presentation styles (Shashinduran 1995).

Looking forward: the pharmacist as change agent

The pharmacist is an important health care provider within the primary care team. The pharmacist is knowledgeable in pharmacotherapy, an essential component of health delivery. With increasing emphasis on primary care in South Africa, the pharmacists' role as merely dispensing agents is being channeled towards rational and cost-effective drug use not only among patients but more importantly among health care practitioners. As I show below pharmacists can form part of a collaborative effort to embrace the growing concept of "pharmaceutical care" within the primary health care team.

According to Hepler and Strand (1990) pharmaceutical care involves identifying, resolving and preventing drug-related problems by working directly with patients and with other health care professionals. This warrants a more active role of pharmacists towards the establishment of a transdisciplinary approach to care, where health practitioners from various disciplines converge towards a common goal to improve patient health outcomes. Pharmaceutical care is increasingly becoming an essential service, aimed at utilizing the full potential of the pharmacist.

The expanded role of the pharmacist through close collaboration with health practitioners can offer care based on sound clinical, pharmaceutical and pharmacotherapeutic decisions. The expanded role of the outpatient pharmacist is defined as any role beyond drug formulation and dispensing (Bero 1998). One such example is the educational outreach service to practitioners at their healthcare setting. In a systematic review Bero and colleagues (1998) examined the effect of expanding outpatient pharmacists' roles on health services utilisation, the costs of health services and patient outcomes. The reviewers identified six studies in which decreases in drug prescribing were attributed to pharmacist services targeting health professionals versus no intervention, but found that none of the studies had assessed their effect(s) on patient health outcomes.

Outreach pharmacy services have shown reductions in inappropriate prescribing and drug costs. For example one-month post pharmacist visits showed inappropriate prescribing in the intervention group (<32%) significantly lower than the control (80%) group ($p<0.01$); and the mean cost of prescriptions per control practitioner for inappropriate prescribing ($p<0.01$) was \$31 compared with <\$12 for the intervention practitioner (Raisch 1990). In another study the group receiving the face-to-face visits ($\$4.93 \pm 0.70$) from clinical pharmacists achieved significantly lower average prescription costs than the control group ($\$6.43 \pm 2.41$) during seven of eight months ($p=0.05$); the face-to-face-meeting was cost-effective, saving \$478 per physician (Steele et al 1989). In addition, pharmacist outreach interventions have also shown increases in the prescribing of lipid lowering drugs (27 % to 50%) in Sweden where the prevalence of hypercholesterolaemia is high (Diwan 1995).

A leading UK initiative devised by the Department of Pharmacy and Policy at Keele University mirrors educational outreach interventions in the USA and Australia (Chapman 1996). The initiative called IMPACT aims at giving family doctors independent information and advice on prescribing by a team of trained community pharmacists. IMPACT pharmacists work with 20-25 practices within a particular health authority area delivering key messages. Support and promotional materials developed jointly by the University and a health authority aid the communication between pharmacist and GP during the visits. A preliminary analysis of the

IMPACT project (Warnett 1996) has shown that in addition to enormous cost-saving, GPs regard the pharmacists as "important members of the healthcare team". Further the report indicates that GPs regard the service not only as useful in providing information on cost-effective prescribing, but as saving much time with clinical literature searches, prescribing analysis and patient information. GPs have requested ongoing support from the IMAPCT pharmacists. Based on similar findings from the CHAMP model, such a service could also be established and conducted as part of a pharmacy programme at a South African university.

The behavioural science literature indicates that several important principles derived from adult learning and persuasive communication theories support pharmacists' interventions to improve the quality of healthcare delivery (Soumerai 1990). These theories suggest that behaviour change is likely to occur when the agent of change has credibility as an expert consultant and one who can: present both sides of a controversial issue, provide two-way active involvement of the learner, sustain learning and reduce the probability of errors due to oversight (Lipton 1995). Pharmacists are credible sources of drug information as evident from their intensive training in pharmacology and clinical therapeutics. Pharmacists have the opportunity to discuss pharmacotherapeutic decisions with practitioners and patients, stimulate their participation in educational interactions, suggest alternative behaviours, correct knowledge deficits and provide individualised information on specific problems (ibid).

In South Africa most pharmacists (85 %) are employed in the private sector which could be attributed to better working conditions and higher salaries than in the public sector (Söderland 1998). Community pharmacists working in private-sector hospitals or in retail outlets are involved primarily in dispensing, and have minimal direct involvement in the provision of clinical services. An outreach role may seem a possible alternative for pharmacists interested in becoming an integral part of a multidisciplinary health care improvement programme.

Outreach educators employed in intervention studies consist mainly of clinical pharmacists. In South Africa, there is no clear-cut definition of a "clinical pharmacist" and only two specialities, pharmacokinetics and radio-pharmacy, are

recognised clinical services which are approved by the South African Pharmacy Council (1974). While such specialities are typically conducted in a hospital setting, emphasis should be placed on the outreach role of pharmacists in primary care setting, which is increasingly becoming the cornerstone for rational and cost-effective health care delivery. A generic outreach role for pharmacists aimed at providing a clinical and pharmaceutical service in both private and public primary health care sectors would encourage the delivery of optimal health care and utilize the full potential of pharmacists.

We regard the CHAMP intervention as a successful model and would like to test its applicability on a larger scale. We are planning a module on evidence-based guideline implementation for postgraduate pharmacy students at historically disadvantaged universities. The implementation module will be based on the CHAMP intervention. The training would include qualitative research methods and marketing. Interactive communication, listening skills, interviewing and observation skills, and approaches for preparing educational materials would form the main components of the training and development programme for outreach visits. Postgraduate students will be selected and trained because implementation is most likely to succeed with an experienced health care professional. Trained postgraduate pharmacy students will take part in a guideline implementation project aimed at improving the quality of care of common respiratory diseases encountered in primary care facilities in the public sector. In addition, we plan to conduct outreach visits to control GPs when results of the CHAMP trial (quantitative) results are in the final stages of the analysis.

The use of multiple outreach educators will help us answer the unanswered questions emanating from the CHAMP model:

Is the effectiveness of an outreach pharmacist generic or related to an individual's personality?

Can skills or methods for guideline implementation be transferred through training?

A cost-estimate of a generic pharmacist outreach improvement programme would provide insight into the feasibility of a pharmacist outreach intervention for private sector primary care facilities in a developing country (Appendix 1).

Conclusions

Qualitative and quantitative methods can be combined to design complex interventions for pragmatic trials. There seems to have been broad acceptance of the outreach intervention among primary care private sector GPs leading to improved health outcomes in children with asthma. Thorough training of the outreach educator, identifying and addressing needs of GPs, the provision of simple, specific and practical messages are key to successful guideline implementation. Pharmacist outreach interventions are acceptable to primary care practitioners. Further studies are needed to assess the effectiveness of pharmacist outreach interventions in public sector primary care facilities.

References

- Anonymous. Visits from medical representatives: fine principles poor practice. *Prescrire International* 1995; 4(18) 120-122.
- Bero LA, Mays NB, Barjesteh K, Bond C. Expanding outpatient pharmacists' roles and health services utilisation, costs and patient outcomes (Cochrane review). In: *The Cochrane Library*, issue 1, 2000. Oxford: Update software.
- Borgiel AEM, Dunn EV, Lamont CT, Macdonald PJ, Evensen MK, Bass MJ, Spasoff RA, Williams JI. Recruiting family physicians as participants in research. *Fam Pract* 1989; 6: 168-172.
- Chapman S. Community pharmacists have a positive IMPACT. *VFM Update Primary Focus* 1996; issue 2: 8-9.
- Chren MM, Landefeld CS, Murray TH. Doctors, drug companies and gifts. *JAMA* 1989; 262: 3448-3451.
- Chren MM, Landefeld CS. Physicians' behaviour and their interactions with drug companies. A controlled study of physicians who requested additions to a hospital drug formulary. *JAMA* 1994; 271: 684-689.
- Cockburn J. Using academic detailing to market a smoking cessation program for general practitioners *Aust Presr* 1993; 16: 41-43.
- Dartnell E, Schneider H, Hlatshwayo Z, Clews F. STD management in the private sector: a national evaluation. Report submitted to the HIV/ AIDS and STD Directorate, Department of National Health. Johannesburg. Centre for Health Policy, University of Witswatersrand. August 1997. Paper no: TK31.
- Davis DA, Thomson MA, Oxman AD, Haynes RB. Changing physician performance: a systematic review of the effect of continuing medical education strategies. *JAMA* 1995; 274: 700-705.
- Dawson S, Sutherland K, Dopson S, Miller R. Changing clinical practice: views about the management of adult asthma. *Quality in Health Care* 1999; 8: 253-261
- Diwan VK, Wahlstrom R, Tomson G, Beerman B, Sterky G, Eriksson B. Effects of group detailing on the prescribing of lipid-lowering drugs: a randomised controlled trial in Swedish primary care. *J Clin Epidemiol* 1995; 48: 705-11.

- Doyal L, Tobias JS, Warnock M, Power L, Goodare H. Informed consent in medical research. *Br Med J* 1998; 316: 1000-5.
- Ehrlich RI, Du Toit D, Weinberg EG, Jordaan E, Volmink JA, Zwarenstein M. Underrecognition and undertreatment of asthma in Cape Town primary school children. *S Afr Med J* 1998; 88: 986-993.
- Flottorp S, Oxman A, Bjorndal A. The limits of leadership: opinion leaders in general practice. *J Health Serv Res Policy* 1998; 3: 197-202.
- Griffith D. Reasons for not seeing drug representatives. (Editorial). *Br Med J* 1999; 319: 69-70.
- Grol R. Implementing guidelines in general practice. *Quality in Health Care* 1992; 1: 184-191.
- Gomel MK, Wutzke SE, Hardcastle D, Lasey H, Reznik RB. Cost-effectiveness of strategies to market and train primary health care physicians in brief intervention techniques for hazardous alcohol use. *Soc Sci Med* 1998; 47: 203-211.
- Hemminki E. Content analysis of drug-detailing by pharmaceutical representatives. *Med Educ* 1977; 11: 210-5.
- Hepler CD, Strand LM. Opportunities and responsibilities in pharmaceutical care. *Am J Hosp Pharm* 1990; 47: 533-543.
- Hong SW, Ching TY, Fung JPM, Seto WL. The employment of ward opinion leaders for continuing education in the hospital. *Med Teacher* 1990; 12: 209-17.
- Hulscher MEJL, Van Drenth BB, Van der Wouden, Mokkink HGA, van Weel C, Grol RPTM. Changing preventive practice: a controlled trial on the effects of outreach visits to organise prevention of cardiovascular disease. *Quality in Health Care* 1997; 6: 19-24.
- Irwig L, Zwarenstein M, Zwi A, Chalmers I. A flow diagram to facilitate selection of interventions and research for health care. *Bull WHO* 1998; 76: 17-24.
- Kamat VR, Nichter M. Monitoring product movement: an ethnographic study of pharmaceutical sales representatives in Bombay, India. In: Bennett S, McPake B, Mills A, eds, *Private health providers in developing countries. Serving the public interest*. London: Zed Books, 1997: p124-140.
- Kotler P. *Marketing management. Analysis, planning and control*. 5th edition. London: Prentice-Hall International, Inc. 1984.
- La Trobe University. *Prescribing rationally not fashionably* –video, duration 12 minutes. La Trobe University, Carlton, NSW, Australia (1993).
- Levinson W, Dull VT, Roter DL, Chaumeton N, Frankel RM. Recruiting physicians for office based research. *Med Care* 1998; 36: 934-7.
- Lexchin J. Pharmaceutical promotion in Canada: convince them or confuse them. *Intl J Health Serv* 1987; 17: 77-89.
- Lexchin J. Doctors and detailers: therapeutic education or pharmaceutical promotion? *Intl J Health Serv* 1989; 19: 663-79.
- Lexchin J. Pharmaceutical promotion in the third world. *J Drug Issues* 1992; 22(2): 417-53.
- Lexchin J. What information do physicians receive from pharmaceutical representatives? *Can Fam Physician* 1997; 43:941-5.
- Lipton HL, Byrns PJ, Soumerai SB, Chrischilles EA. Pharmacists as agents of change for rational drug therapy. *Int J Technol Assessment in Health Care* 1995; 11(3): 485-508.

- Madden JM, Quick JD, Ross-Degnan D, Kafle KK. Undercover careseekers: simulated clients in the study of health provider behaviour in developing countries. *Soc Sci Med* 1997; 45: 1465-82.
- Maestri E, Furlani G, Suzzi F, Campomori A, Formoso G, Magrini N. So much time for so little: pharmaceutical industry and doctors' information needs. (Letter) *Br Med J* 2000; 320: 55.
- Mc Kinney WP, Schiedermayer DL, Lurie N, Simpson DE, Goodman JL, Rich EC. Attitudes of internal medicine faculty and residents toward professional interaction with pharmaceutical sales representatives. *JAMA* 1990; 264: 1693-1697.
- Mesters I, Pieterse M, Meertens R. Pediatric asthma, a qualitative and quantitative approach to needs assessment. *Pat Educ Counsel* 1991; 17: 23-34.
- Murphy E, Spiegel N, Kinmouth AL. 'Will you help me with my research?' Gaining access to primary care settings and subjects. *Br J Gen Pract* 1992; 42: 162-5.
- NHS Centre for reviews and dissemination. Effective health care bulletin. Getting evidence into practice. February 1999; 5 (1).
- Raisch DW, Bootman JL, Larson LN, McGhan WF. Improving antiulcer agent prescribing in a health maintenance organisation. *Am J Hosp Pharm* 1990; 47: 1766-73.
- Ray WA, Schaffner W, Federspiel CF. Persistence of improvement in antibiotic prescribing in office practice. *JAMA* 1985; 253: 1774-6.
- Roughead EE, Harvey KJ, Gilbert AL. Commercial detailing techniques used by pharmaceutical representatives to influence prescribing. *Aust N Z J Med* 1998; 28: 306-10.
- Schwartz RK, Soumerai SB, Avorn J. Physician motivations for nonscientific drug prescribing. *Soc Sci Med* 1989; 28: 577-82.
- Shashinduran CH, Sethuraman KR. Drug promotion: push promote or educate? *Essential Drugs Monitor* 1995; issue 20: 24.
- Shaughnessy AF, Slawson DC. Pharmaceutical representatives. Effective if used with caution. *Br Med J* 1996; 312: 1494 -5.
- Siegal-Itzkovick J. Israeli health insurer curbs activities of drug representatives. *Br Med J* 1999; 319: 1324.
- Söderland N, Schierhout G, Van der Heever A. Private health care in South Africa. Technical report to chapter 13 of South African Health Review 1998. Durban: Health Systems Trust.
- Soumerai SB, Avorn J. Principles of educational outreach ('academic detailing') to improve clinical decision making. *JAMA* 1990; 263:549-56.
- South African Pharmacy Council. Regulations, section 28 Pharmacy Act 1974 (Act 53 of 1974). Regulations relating to the registration of the specialties of pharmacists. 249; 52-68.
- Steele MA, Bess DT, Franse VL, Graber SE. Cost effectiveness of two interventions for reducing outpatient prescribing costs. *DICP* 1989; 23:497-500.
- Stinson ER, Mueller DA. Survey of health professionals' information habits and needs. *JAMA* 1980; 243: 140-14.
- Stross JK, Hiss RG, Watts CM, Davis WK, Macdonald R. Continuing education in pulmonary disease for primary care physicians. *Am Rev Respir Dis* 1983; 127: 739-46.

Swan M, Zwi A. Private practitioners and public health: Close the gap or increase the distance. Department of Public Health and Policy, London School of Hygiene and Tropical Medicine. Publication no: 24. 1997

Sweet B, Patel S, Wellpoint Pharmacy Management. Academic detailing: methods and success stories in IPA-model HMOS. *JMCP* 1996; 2(5): 586-593.

Veninga CCM, Denig P, Zwaagstra R, Haaijer-Ruskamp FM. Improving drug treatment in general practice. *J Clin Epidemiol* 2000; 53: 762-772.

Volmink JA, Metcalfe CA, Zwarenstein M, Heath S, Laubscher JA. Attitudes of private general practitioners towards health care in South Africa. *S Afr Med J* 1993; 83: 827-833.

Wensing M; Van der Weijden T, Grol R. Implementing guidelines and innovations in general practice: which interventions are effective? *Br J Gen Pract* 1998; 48: 991-7.

Winkens RAG, Knottnerus JA, Kester ADM, Grol RPTM, Pop P. Fitting a routine health-care activity into a randomised trial: an experiment possible without informed consent? *J Clin Epidemiol* 1997; 50: 435-9.

Warnett S. Community pharmacists have a positive IMPACT. Case study: Bexley and Greenwich Health. *VFM Update. Primary Focus* 1996 January; issue 2: 8-9.

Yeo GT. Assessing the impact of an educational intervention on prescribing of hypnotic drugs in general practice settings. *Aust Prescriber* 1993;16:44-45.

Zwarenstein M, Adams J, Bheekie A, Swingler G, Ehrlich E, Lombard C, Pather S, Sladden M, Eccles M, with the National Asthma Education Programme. Chestiness and asthma in Mitchell's Plain (CHAMP): cluster randomised controlled trial of academic outreach demonstrates improved health status of asthmatic children attending private practitioners in a poor urban community in South Africa. *Int J Tubercule and Lung Dis.* 1999; 3(9): suppl 1. 30th International Union Against Tuberculosis and Lung Disease (IUATLD) World conference. Abstract book (Poster) 641-PD.p S76.



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Appendix 1

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Appendix 1

Estimated costs for development and implementation of a pharmacist's educational outreach study (CHAMP) extrapolated to national operational scale (12977 private sector general practitioners)

Health care services are driven by concern for cost-effective and quality care. Educational outreach visits to practice sites have been proven to be one of the most effective strategies aimed at changing professional practice towards the provision of improved and cost-effective care (Thomson O' Brien 1998). A trained health care professional often a pharmacist, visits health providers at their practice setting to highlight key management principles. Educational outreach visits, particularly when combined with social marketing strategies have been found to reduce inappropriate practitioner prescribing (Avorn 1983). Such multifaceted approaches consist of interactive discussions and the provision of specially designed educational material (such as written reminders, wall charts, prompted cards) during visit(s) to practitioners.

The aim of this pilot study is to estimate the costs of the CHAMP face-to-face multifaceted outreach intervention directed at private sector primary care practitioners and to use this as a basis for an estimate which gives an initial answer to the following question (Soumerai 1986):

What are the resource costs of an operational programme, including training and deployment, of pharmacists as academically based outreach educators ('detailers')?

Method

The CHAMP intervention was conducted within the context of a randomised controlled trial (RCT). The intervention was randomised to forty-five private-sector practices, of which 23 received a hand-delivered copy of the childhood asthma guidelines (1994) (control practices), while 22 received a tailored multifaceted outreach intervention (intervention practices) which focused on improving the clinical management of childhood asthma. Details of implementation of the CHAMP intervention are presented in Chapter 7 of this thesis.

The CHAMP intervention consisted of two face-to-face visits to GPs, three months apart, by a trained outreach educator, a pharmacist (myself). I was trained in social marketing techniques and used attractive educational materials (detailing aids) which consisted of a list of key messages, desk-top folder, poster, pen, patient record card and a GP-mediated patient reminder. These materials were used to highlight eight key primary care messages for appropriate management of asthma in children. I travelled to practices by car, and met with thirty-two GPs individually to encourage adoption of the key messages.

The first visit to each practice took place between 7 to 25 May 1998; the second took place from 3 to 19 September 1998. The number of days taken to complete each of the outreach sessions for all GPs was 15 days. The total number of days for conducting all outreach visits was 30 days. For the first visit, all 31 GPs received a visit. For the second visit, one GP had left the practice where s/he worked, and a substitute GP received the intervention; while another GP refused to meet for the second visit. For the CHAMP intervention I conducted a total of 61 visits to GPs.

CHAMP: Calculation of resource costs for outreach intervention programme

The costs for the CHAMP intervention shown below includes those for the training programme for the pharmacist, for development and reproduction of the educational materials, for planning and arranging of visits, for travelling to and from practices and for time spent in the meeting with GPs. Unit and total cost estimates for each of these elements are shown below and have been rounded off to the nearest rand (R) value. In calculating the resource costs for the outreach programme we took into account conservative effects and, where necessary, we overestimated rather underestimated the costs. The perspective adopted for this costing is that of the outreach programme, and for that reason costs to visited GPs, of their time both for the visits and for their use of the package during consultations is excluded.

The purpose of the costing is to obtain estimates of the cost of running an operational academic outreach programme, rather than of savings that might accrue. In other words, this is not a cost-effectiveness analysis (CEA). There is no comparative costing, in which we contrast the intervention costs with those of the

control doctors, who would be receiving no equivalent intervention.

The cost is composed of three elements: the detailer including annual retraining, the development of the educational package (kit) for the detailing, and the costs of the implementation, which includes consumables, reproduction of the kit, transport and communication.

Annual training and salary costs estimated for a trained academic outreach pharmacist

In my experiences as an outreach pharmacist for the CHAMP study, a registered pharmacist of at least 3-5 years of practice experience would be most suited. Sound clinical knowledge of the pharmacotherapeutic approaches to health care provision is the basis for guideline implementation in an outreach programme. Further, experience in clinical practice setting, interpersonal communication skills, insight, self-motivation and integrity essentially characterize an outreach educator. Therefore, a salaried pharmacist on long-term employment and trained in in-depth interviewing and marketing techniques, would be equipped to undertake outreach visits to GPs. The Medical Research Council's (MRC) annual total package for a pharmacist with experience in the public sector is estimated at R200 000.00.

For the CHAMP study, a salaried pharmacist was not employed. The pharmacist, a research student, with experience in community-based asthma management, conducted the outreach programme. The salary estimates are based on her personal profile and experiences as a trained detailer (outreach pharmacist), which have been projected to estimate costs in actual setting (CHAMP and extrapolated to a national operational scale). We believe that the training outlined below (table A3) needs to be renewed annually to improve on interviewing skills and content presentation. The cost of a one week training programme (see chapter 7) for a pharmacist to conduct outreach visits is estimated at R6 000.00 (personal communication). These costs are based on commercial training programmes for interviewing and for proprietary drug detailing. No cross-country travel costs to the course or subsistence allowance is included as such courses are run in the nearest city if demand is sufficient. This amount comprises the costs of two separate courses.

In 2000, attendance for a 3-day workshop on qualitative in-depth interview training is R1 000.00, and attendance for a 3-day sales technique training for pharmaceutical representatives is R 5 000.00. These two training programmes are adequate for a pharmacist undertaking educational outreach visits to practices. The in-depth interviewing enables the educator to communicate with GPs in an informal and relaxed manner, while obtaining deep insight into their individual practice patterns. The sales training enables the educator to improve his/ her confidence, tailor the messages and to prompt their adoption among GPs. Both techniques help to improve the educator's listening and communication skills.

The total costs for CHAMP excluded the training required for the topic (or a clinical condition) that the outreach programme was designed to address. For CHAMP, the pharmacist acquired thorough knowledge of the topic during the course of developing the programme. In reality, a programme would include costs for a one-day content/ topic training.

Outreach pharmacist salary and training costs per working day

The annual cost for a trained outreach pharmacist is R 206 390.00. The total number of annual working days is estimated at 250 (excluding leave). Therefore, the daily cost is the annual cost of trained outreach pharmacist (R206 390) ÷ number of working days (250) is R 825.00.

Number of visits per working day, travel costs, and cost per GP (2 visits per GP)

The total number of visits conducted for CHAMP was 61 visits in 30 days. Rounding off the figure of 2.03 visits per day, obtained from the total number of visits (61) ÷ number of days (30), 2 GPs were detailed /day. Of the eight working hours per day, only 70 minutes was spent on detailing, while the remainder can be attributed to travel, waiting time and organising appointments. The time cost for each visit is thus estimated at 4 hours, in a normal 8-hour working day.

Travel costs by car were estimated according to the Medical Research Council's (MRC) rate of R1.30 per kilometre for a sedan with an engine capacity of 1600. The rate includes petrol and depreciation. Distance from MRC to target GPs for a single

trip was 25km. Travel costs for a return visit is 50 km at a rate of R1.30 per kilometre, and is estimated at R65.00. Since 2 GPs could be visited in one trip, and since each GP needs 2 visits, we will cost transport for the detailer at R65.00 per GP.

For the CHAMP intervention 2 GPs were visited per day. Therefore, the cost per GP (2 visits were needed for each GP, see Chapter 5) is the same as the daily cost of a trained outreach pharmacist, ie. R 825 .00

Communication costs

I initially communicated with GPs via a letter and a follow-up telephone call. The purpose of the letter was to inform GPs about the intended visit and it was accompanied by a list of key messages. For purposes of the research project, the letter was hand-delivered to ensure its receipt at the practices. Since travel costs for delivery of this initial communication are relatively small and, because such an approach would not be feasible on a national scale, this estimate is excluded for CHAMP. On a national operational scale, the documents would be mailed to GPs, and these costs have been estimated at R5.00 per envelope.

I called receptionists telephonically to arrange a meeting with the GP at the practice at a mutually convenient time. The practices were located within a 25km radius of the MRC. The cost of a call was calculated on a local rate of R2.00 per 3 minutes. An average of 2 calls, lasting up to 3 minutes each, was made to each GP. The unit cost of telephone calls to arrange visits for meeting GP took on average 6 minutes and is estimated at R 4.00 per GP.

Where GPs could not be contacted telephonically, I personally visited the practices during intervals en route to outreach visits to nearby practitioner(s). This travel cost is excluded as it is small but the time taken is built into the 4-hour period allowed for each GP visit.

Consumables and promotional material

Consumables for CHAMP consisted of stationary and a range of printed promotional elements. Cost estimates were based on the market price (2000).

Stationary items consisted of letters, envelopes and promotional materials used for communication with the GPs.

A letter informing GPs about the programme, and a list of 8 key messages were initially hand-delivered to the GPs. The promotional elements consisted of educational and support materials that were provided to GPs in the first visit. These materials were developed and designed especially for GP use in the practice setting. The educational elements consisted of a list of eight key primary care messages for asthma in children, an attractive three-part desk folder and poster. The desk folder consisted of a pack of structured record cards (30), credit-card size parent asthma information card (30), and a pen with an imprint of a diagnostic indicator. In addition, the folder covers contained visual and written prompts for each of the key messages. A graphic consultant helped to advise on the choice of materials and layout of each of the elements. In addition, 5 copies of journal articles, which served as the evidence base for the key messages, were provided to GPs in the second visit. The educational materials were provided to GPs over the two visits of the outreach programme to reinforce adoption of the key messages.

Cost estimates for each material of CHAMP's educational package are summarised (table A3). Materials for CHAMP were produced in quantities of 100. The unit cost for each item was calculated by dividing the total cost by 100. The annual cost for the total package for was obtained by multiplying the unit cost of each item by 32, and obtaining the sum all items included. The stationary used for designing the package materials and for initial correspondence with the GPs consisted of 10 reams of paper for 100 GPs. The unit cost (500 pages / ream) was R19.02 per ream and for 10 reams the total cost was R190.00. The unit cost is estimated at R1.90. The average unit production cost of the educational package is estimated at R 178.00. The annual production cost for the CHAMP educational material (to 32 GPs) is estimated at (R178.00 x 32) R 5696.00.

Development and preparation of educational material

The CHAMP research team members contributed to assessing the appropriateness of the eight key primary care messages that were identified to address the barriers encountered by GPs for childhood asthma (chapters 6, 7). Further they assisted in planning the mode of delivery of the messages to the GPs. High level of skill was

required to prepare the materials and to optimize its' the mode of implementation. This means that the skills are unlikely to be available within whatever organisation ends up developing these packages. Even if one such team were available, it is likely that their skills would not cover every conceivable clinical area.

Cost estimates are based on MRC's salary rates. The approximate hourly rates (hours) for the CHAMP multidisciplinary personnel was calculated from their individual total package ÷1400 (hours worked per annum, including leave taken, table A1).

Table A 1. Personnel rates estimated from total package for development of CHAMP

	<i>Total package</i>	<i>Rate/ hour</i>	<i>Duration (hours)</i>	<i>Cost(R)</i>
Chief specialist scientist	R 270 000	R193.00	48	9 264.00
Community health specialist	R 270 000	R193.00	8	1 544.00
Paediatrician	R 270 000	R193.00	18	3 474.00
General practitioner	R 200 000	R 143.00	5	715.00
Pharmacist	R 200 000	R 143.00	98	14 014.00
Graphic designer	R 140 000	R 100.00	22	<u>2 200.00</u>
Total				<u>R31 211.00</u>

The average unit cost for CHAMP per GP (detailer, development and implementation costs) is estimated at R 2047.00

Daily outreach pharmacist cost (2 visits/ GP)	R 825.00
Average developmental cost	R1 153.00
Personnel	R 975.00
Educational materials	<u>R 178.00</u>
Average implementation cost	<u>R 69.00</u>
Average cost for pharmacist outreach per GP	<u>R2 047.00</u>

Extrapolation of CHAMP costs to estimate annual cost of national outreach (detailing) programme to all private sector GPs (12 977)

Resource requirements for an outreach programme at national scale, can be projected from CHAMP, with some adaptations to account for changes due to scaling-up. The framework for estimating the extrapolation costs (Koita 1987) includes the annual salary and training costs, the number of visits and cost per GP, transport and communication costs and development and preparation of the educational material.

For a national programme, a large number of GPs would be included. In 1998, 56% of registered medical practitioners were employed in the private sector, 37% in the public sector, and 7% were neither employed in South Africa or the sector of employment was unknown (Söderland 1998). In extrapolating from CHAMP's estimates for a national outreach programme, we accounted for 12 977 registered private sector general practitioners (ibid).

Annual salary and training costs

For a national programme, the pharmacist's annual salary costs would remain unchanged, but the training costs would vary according to the number of diseases/topics that are included in the programme. Training for an outreach pharmacist includes qualitative interviewing (3 days), marketing (3 days) and training on the topic that the programme is designed to address (1 day). For CHAMP, the outreach pharmacist gained thorough knowledge of the topic in the development of the intervention (chapters 4 and 5).

Once a pharmacist has been trained, follow-up training for a day each in presentation skills, ie, qualitative interviewing estimated at (R1000.00 ÷3) R 334.00, and marketing skills (R5000.00 ÷3) costing R1667.00, would be needed. After the first topic and training in presentation skills are completed, each detailer would need one extra day of content training for each extra topic. If a new topic is included in an annual programme, one-day training estimated at R 1000.00, would be included for the detailer. Each succeeding year, 2 days of training are needed for revision of interviewing and marketing skills. Estimates for a national programme detailing one topic is shown below (table 1A).

The inclusion of more GPs in a national programme would reduce both the development and implementation costs, salary costs for each trained pharmacist remains the same but the number of pharmacists increases substantially. To calculate annual training and salary costs, one would need to first estimate the number of outreach pharmacists that would be required for a national programme.

Number of visits per working day and cost per GP (4 visits per day)

If the CHAMP outreach programme were made routine, it is likely that more GPs would become participants. We estimate that the educator would conduct 4 GP visits per day. This figure is lower than the five visits conducted in developed countries, or pharmaceutical company representatives who see an average of six a day (Soumerai 1986). In developing countries the wide range of constraints and the disorganised nature of practices limits the number of GP visits per day. If the educator is unable to visit an appointed GP at a particular time, then another GP in the vicinity would be visited. Therefore in a national programme one round trip would cover 4 GPs which would reduce the travel cost.

Based on findings in CHAMP, practices were located closely from each other, mostly in or around a shopping centre (chapter 6). Since all GPs located within a particular area would be included in the national programme, the outreach educator would, in comparison with CHAMP, be able to conduct visits more efficiently. If 2 GPs are visited a day, then $(12977 \div 2)$ 6489 working days are needed. In a year (250 working days), the number of outreach pharmacists needed would be $(6489 \div 250)$ 26. The average daily cost for 26 detailers @ R825.00 per detailer (2 visits per day) is $(26 \times R825.00)$ R 21 450.00.

For a national programme ($n = 12\ 977$ GPs), consisting of 4 GP visits per day $(12977 \div 4)$, then 3244 working days would be used for detailing visits. In a year, consisting of 250 working days, the number of trained outreach pharmacists would be $(3244 \div 250)$, 13. The average daily cost for a detailer @ R 825.00 per detailer (4 visits per day) is $(13 \times R\ 412.50)$ is R 10 725.00, two times less than that for 2 visits/day. The outreach programme would be more efficient under operational conditions, as more GPs could be visited per day at half the cost of CHAMP.

For CHAMP, the annual training and salary cost was estimated at R206 390.00, and the daily cost of an outreach pharmacist (2 visits per day) is R825.00. In a national outreach programme the average daily cost for a trained pharmacist to each GP is estimated at R412.50, half that for CHAMP (R825.00), because 4 GPs would be visited per day. The annual cost for the trained outreach pharmacist (4 visits a day)

is the daily cost (R412.50) x the number of working days (250), R 103 125.00.

Transport costs

Travel costs to a large number of GPs would be reduced since GPs in an area would be located closely to each other, (less than 5 kilometers apart) and more GPs would be visited per day than CHAMP. This would mean that in a round 50km trip costing R65.00, 2 additional GP visits could be covered, adding a distance of 10 km (R13.00) to a round trip of 50km, estimated at R65.00 (CHAMP). Therefore, a round trip (60km) to an area would be more efficient as twice the number of GPs (compared to CHAMP) would be visited per day. The daily distance traveled by an educator visiting 4 GPs during one round trip, would be (R10.00 + R65.00) R 78.00 per day. Therefore, the travel cost per GP $R78.00 \div 4$ is R19.50. The travel cost for a national programme (2 visits per GP) is estimated at R39.00 per GP.

Communication costs

For a national programme, telephone costs would increase proportionally with an increase in the number of GPs. The annual cost calculated from CHAMP's average unit cost @ R4.00 per GP, is (R4.00 x 12977) R51 908.00.

Mail costs would be included in a national programme because initial communication with GPs would entail an introductory letter informing them about the purpose and objective of the outreach programme. Costs of postage are calculated using postal charges for varying weights (2000). Mail costs for posting of a letter and list of key messages to GPs is estimated at R5.00 per envelope. For a total of 12 977 GPs, annual mail costs was estimated at (R5.00 x 12 977) R64 885.00.

Development and preparation of educational materials

In a national programme average unit costs for development of the educational materials would be reduced. Extrapolating from CHAMP, personnel salary rates (R31211.00) would be shared across all the GPs (12 977) and would be estimated at (R31211.00 \div 12977) R2.50 per GP. The average unit implementation costs would be reduced compared to CHAMP, but there would be variations between individual

items.

Consumables and promotional material

Unit costs for reproduction of materials for the educational package (desk-top folder, poster, pen) would be reduced with increasing quantities. In addition printing costs which forms the bulk of the costs would also be reduced (table A3). In a national operational programme summaries/ abstract of the evidence from journal articles, maximum of 5 pages, would cost R5.25, half that for CHAMP (R10.50), for 5 articles per GP (table A 2).

Table A 2. Estimated unit costs for CHAMP materials with increase in quantity

Quantity	Unit cost (R)			
	<i>Desk-top folders</i>	<i>Printed folder + cards</i>	<i>Pens</i>	<i>Poster laminated</i>
100	R37.00	R112.00	R6.15	R10.02
5000	R13.50	R44.00	R3.80	R3.70
12 977	R13.00	R 41.00	R3.45	R3.30

The average unit cost of CHAMP (2 visits per day) is estimated at R2047.00, and that of a national programme (4 visits per day) is R532.15, four times less than that of CHAMP.

The average unit cost for a national programme (detailer, development and implementation costs) is estimated from:

Daily outreach pharmacist cost (4 visits/ day)	R 412.50
Average developmental cost	R 71.65
Personnel	R 2.50
Educational materials	<u>R 69.15</u>
Average implementation cost	<u>R 48.00</u>
Average cost for pharmacist outreach per GP (2 visits/GP)	<u>R 532.15</u>

A national programme (n= 12 977 GPs), without study constraints, would afford considerable economies of scale for pharmacist outreach visits to health care practices.

Table A 3. Summary of total costs for CHAMP and extrapolation of these costs for a national programme to 12977 private sector GPs for one year of operation.

	CHAMP n=32 GPs		National programme n = 12 977 GPs	
	Average unit cost (R) per GP	Annual cost (R) for 2 visits/day	Average unit cost (R) per GP	Annual cost (R) for 4 visits / day
ANNUAL COST FOR OUTREACH PHARMACIST: TRAINING AND SALARY				
Pharmacist total employment package		200 000.00		
Training costs:		6 000.00		
qualitative techniques (3 days) R 1000.00				
sales training (3 days) R 5000.00				
Travel costs @ R1.30/km (50 km/day)		<u>390.00</u>		
Cost for 250 working days (annual)		<u>206 390.00</u>		
<i>Daily cost for trained outreach pharmacist</i>	<i>R 825.00</i>		412.50	<i>5 353 012.50</i>
DEVELOPMENT COST				
Personnel hourly salary rates				
Chief scientist @ R193.00/ hr (48 hrs)		9 264.00		
Community specialist @ R193.00/ hr (8 hrs)		1 544.00		
Paediatrician @ R193.00/ hr (18 hrs)		3 474.00		
General practitioner @ R143.00/hr (5 hrs)		715.00		
Pharmacist @ R143.00/hr (98 hrs)		14 014.00		
Graphic consultant (22 hrs)		<u>2 200.00</u>		
Total developmental costs		<u>31 211.00</u>		
<i>Average developmental costs</i>	<i>975.00</i>		<i>2.50</i>	<i>15 605.50*</i>
Educational materials				
Desk-top folder	37.00	1 184.00	13.25	171 946.00
Poster (laminated)	10.02	320.64	3.85	49 962.00
Pen	6.15	196.80	3.65	47 366.00
5 Journal articles @ R2.10 each	10.50	336.00	5.25	68 129.50
Stationary @ R19.02/ream	1.90	60.80	0.15	1 902.00
Printing	112.35	<u>3 595.20</u>	43.00	<u>558 011.00</u>
Total cost		<u>5 693.44</u>		<u>897 316.50</u>
<i>Average unit production costs of package</i>	<i>177.92</i>		<i>69.15</i>	<i>448 658.25**</i>
IMPLEMENTATION COSTS				
Telephone costs @ R2.00/3 mins.(6mins)	4.00	128.00	4.00	51 908.00
Travel costs @ R1.30/km (2 visits per 50km)	65.00	2 080.00	39.00	506 103.00
Postage @ R5.00 / envelope /GP		<u>0</u>	5.00	<u>64 885.00</u>
Total implementation costs		<u>2208.00</u>		<u>622 896.00</u>
<i>Average implementation cost per GP</i>	<i>69.00</i>		<i>48.00</i>	<i>6,440 172.30</i>
TOTAL				

*updated every 2 years

** new package every 2 years

The following questions remain to be answered.

Should an educational outreach programme focus on one particular disease and offer services to a large number of GPs? or

Should an educational outreach programme focus on more diseases, and target fewer GPs?

The CHAMP outreach programme targeted one disease (asthma) to a small number of GPs. In a national programme, if more than one disease is included, the outreach programme would increase in size proportionally. There is no saving on adding further diseases to a national outreach programme.

Should the educational outreach package be revised every year?

Production costs for the CHAMP educational package materials were estimated at R178.00 per GP, and for a national programme it would be 2.5 times less, at R69.00 per GP. The cost has been built in, amortised over 1 year.

The content and graphic design of the educational materials would be suited to the needs of a particular topic. We believe that the content and elements of the package would be revised every 2 years, depending on the availability of up-dated evidence, systematic reviews and peer-reviewed publications. Cochrane reviews are up-dated every 2 years.

Conclusion

In running a national operational scale outreach the annual costs for a programme detailing one disease condition to all private sector GPs, by extrapolation from CHAMP, is estimated at R 6 440 172. 00

South Africa's total health care expenditure (1992/1993) was estimated at 30151 million rands, of which 58 % (17541 million rands) was consumed by the private sector (McIntyre 1995). The annual cost for a national pharmacist outreach improvement programme would cost 0.2 % of the total national health care expenditure, and 0.4 % of the private sector health expenditure. This seems a plausible expenditure for an improvement programme. However, if more than one

disease is included, then annual developmental and implementation costs would increase accordingly.

Medical insurers would have a vested interest in implementing such an outreach programme in the private sector, as a strategy to minimise increasing expenditure on health care services. Since the private sector consumes a large percentage of the health care budget to a minority of South Africans, such an outreach programme could serve as a useful initiative aimed at promoting public-private mix in the delivery of health care. This initiative might contribute to curbing expenditure on ineffective care, and promote affordable, equitable and quality health care to all South Africans.

This appendix contains a simplified estimate of CHAMP costs. The extrapolation to national cost is also relatively simplified. Further rigorous and more detailed studies are needed to assess the costs of primary care outreach programmes prior to implementing such a programme in South Africa or in other developing countries. This current work acts merely as a first step in this direction.

References

Avorn J, Soumerai SB. Improving drug-therapy decisions through educational outreach: a randomised controlled trial of academically based "detailing". *N Engl J Med* 1983; 308: 1457-63.

Koita A, Brunet-Jailly J, Choulibaly S, Diarra K. Developing a frame work for projections. In : Abel-Smith B, Creese A (eds.), *Recurrent costs in the health sector-problems and policy options in three countries*. WHO, Geneva; USAID, Washington. 1987; p 60-61.

McIntyre D, Bloom G, Doherty J, Brijlal P. *Health expenditure and finance in South Africa*. Durban: Health Systems Trust; Washington: World Bank 1995. Appendix C p 75-77.

Soumerai SB, Avorn J. Economic and policy analysis of university-based drug "detailing". *Med Care* 1986; 24: 313-331.

South African Childhood Asthma Working Group. Management of childhood and adolescent asthma. 1994 consensus clinical guidelines. *S Afr Med J* 1994; 84 (12): 862-866.

Söderland N, Schierhout G, Van der Heever A. Private health care in South Africa. Technical report to chapter 13 of South African Health Review 1998. Durban: Health Systems Trust.

Thomson O' Brien MA, Oxman AD, Davis DA, Haynes RB, Freemantle N, Harvey EL. Outreach visits to improve health professional practice and health care outcomes. In Bero L, Grilli R, Grimshaw J, Oxman A (eds.). *Collaboration on Effective Practice Module of The Cochrane Database of Systematic Reviews*, Cochrane Library. The Cochrane Collaboration; Issue 1. Oxford: Update software; 1998.

Appendix 2

Health Systems Division

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Medical Research Council
Health Systems Division
Cape Town
Tel: 9380316 / 454

14 /08/97

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Dr.....
Address.....
.....

Dear Dr.....

re: Asthma care improvement program

General practitioners (GP's) like yourself are the main care-givers responsible for the well-being of asthmatic children in the community. The MRC and the National Asthma Education Program (NAEP) is conducting research to help improve the impact of GP care on the health of children with asthma.

The preliminary part of the program consists of interviews with a number of GPs to ascertain problems encountered in practices in the provision of asthma care. I would like to call you to arrange a short interview (15 minutes) to determine your views. Any information you give will be used anonymously and the conclusions drawn from the interview will be relevant to the area in which you practice. Your co-operation and contribution will be much appreciated and wholeheartedly acknowledged.

Yours sincerely

Ms Angeni Bheekie

Dear Doctor

We, the Medical Research Council (MRC) and the National Asthma Education Programme NAEP) are providing support for GPs working in the community and who see the majority of children with asthma in Cape Town. We have spoken to a number of GPs in the Cape Town who have informed us about various difficulties in caring for asthmatic children. We perceive that the following are important questions.

Please may we take a little of your time to find out how you see some of the issues in caring for children with asthma. We will give you feedback on these findings and would like to assure you that they are analysed completely without names.

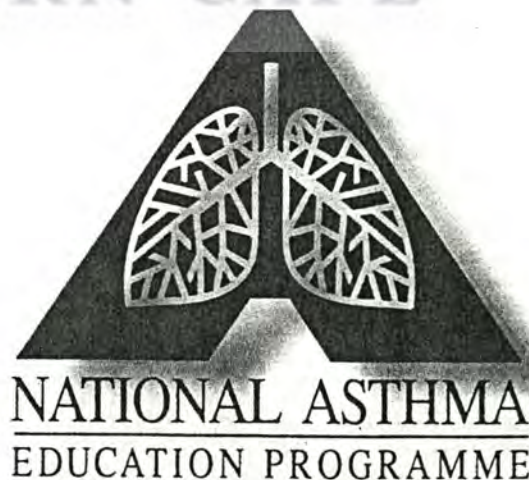
Please return the completed questionnaire in the self-addressed envelope.

Thank you for your valuable time.

Yours sincerely


Dr Merrick Zwarenstein

Health Systems Division
Medical Research Council
Cape Town
Ph: 9380454
FAX: 9380483



A. Some doctors find diagnosing asthma in children straightforward, others find it more difficult. What are your views when diagnosing asthma in children?

For each of the following questions please tick the single option that best agrees with your view.


1. In my view children presenting with recurrent cough, and current shortness of breath but no wheeze have asthma.
strongly agree agree disagree strongly disagree
2. In my practice I prescribe bronchodilators if I am unable to confirm the diagnosis of asthma in children.
strongly agree agree disagree strongly disagree
3. In my practice I usually need more than 3 consultations to make the diagnosis of asthma in children.
strongly agree agree disagree strongly disagree
4. When informing parents that their child has asthma, I prefer making use of the term
(please tick as many options as necessary)
- "asthma"
'tight-chest'
"bronchial" or "broncho-chest"
"bronchitis"
or other term " _____ "

If you would like to mention any other issues about the diagnosis of asthma in children please write them down here

B. As you know there are many different ways of administering drug treatment to asthmatic children. What are your views when treating asthmatic children?

For each of the following questions please tick the single option that best agrees with your view.

1. For children with mild wheeze, cough and/ or night waking which single drug do you usually prescribe first ...
- i. oral β_2 stimulants eg. salbutamol , fenoterol
ii. oral theophylline
iii. inhaled β_2 stimulants eg. salbutamol , fenoterol, terbutaline
iv. inhaled steroid eg. beclomethasone, fluticasone, budesonide
2. The single main reason I prescribe oral theophylline preparations in children is because...
- i parents ask me to do so
ii parents find it very effective
iii it is cheaper than other bronchodilators
iv it is easy to administer
3. In my opinion short-term (one week) oral steroids should be used in children with acute exacerbations of asthma.
strongly agree agree disagree strongly disagree
4. In my practice the cost of anti-inflammatory / steroid therapy is a limiting factor when treating asthmatic children.
strongly agree agree disagree strongly disagree

Contd on p. 3 

5. In my opinion the use of long term inhaled steroids in asthmatic children has side-effects.
 strongly agree agree disagree strongly disagree
6. In my opinion the use of oral bronchodilators like salbutamol and theophylline in asthmatic children causes side-effects.
 strongly agree agree disagree strongly disagree
7. In my practice I find that ...
 nebulisers are more effective than spacers
 nebulisers are as good as spacers
 nebulisers are less effective than spacers
 I don't use spacers and/or nebulisers
8. In my practice I find that antibiotics improve an episode of asthma in children.
 strongly agree agree disagree strongly disagree
9. Which of the following preventive measures do you advise parents of asthmatic children.
Please tick more than one option if appropriate
- i. avoidance of trigger factors eg. smoking around the child
 - ii. regular use of anti-inflammatory medication (eg. inhaled steroids or cromoglycate)
 - iii. care with exercise
 - iv. minimize emotional upset
10. In my practice I find that parents/carer-givers heed my advice about not exposing their asthmatic children to cigarette smoke.
 strongly agree agree disagree strongly disagree

If you would like to mention any other issues about the treatment of asthma in children please write them down here

C. We would like to know whether you perceive that parents/caregivers experience problems when caring for asthmatic children.

For each of the following questions please tick the single option that best agrees with your view.

1. I find that parents/care-givers are aware of the severity of breathing problems in children..
 strongly agree agree disagree strongly disagree
2. In my practice most parents consult with me when the child's breathing problems are ...
 very severe severe moderate mild
3. I find that parents don't easily accept the diagnosis of "asthma" in children.
 strongly agree agree disagree strongly disagree
4. In my practice I find that parents exert pressure on me to prescribe an antibiotic for children suffering from acute asthma.
 strongly agree agree disagree strongly disagree
5. In my practice I encourage parents to bring their chronic asthmatic children for follow-up care...
 whenever there is a flare-up monthly
 every second or third month every 6 months

Contd on p. 4

6. In my practice I find that the cost of repeat consultation(s) limits asthmatic children from obtaining follow-up care.
 strongly agree agree disagree strongly disagree
7. If a patient with asthma is poor and I feel they need regular visits I would ask the patient to return and charge a reduced (50% or less) consultation fee.
 strongly agree agree disagree strongly disagree

If you perceive other issues concerning the provision of care by parents/ care-givers to asthmatic children please write them down here ...

D. We would like to know *your* perceptions on the treatment provided by parents/ care-givers to asthmatic children.

For each of the following questions please tick the single option that best agrees with your view.

1. In my experience asthmatic children comply with prescribed medication.
 strongly agree agree disagree strongly disagree
2. In my practice I find that parents and care-givers of asthmatic children find it useful to differentiate between asthma "preventers" eg. steroids and symptom "relievers" eg. β -2 stimulants.
 strongly agree agree disagree strongly disagree
3. I find that parents can afford inhaled medication when caring for their asthmatic child.
 strongly agree agree disagree strongly disagree
4. I find that parents express fear /reluctance when I prescribe inhaled medications to asthmatic children
 strongly agree agree disagree strongly disagree
5. In my practice I prescribe regular preventive therapy for moderate and severe asthmatic children.
 strongly agree agree disagree strongly disagree
6. In my opinion the cost of preventive therapy eg. steroids, cromoglycate, reduces compliance among asthmatic children.
 strongly agree agree disagree strongly disagree
7. I find that there is conflict among parents/care-givers when avoiding exposure of cigarette smoke to asthmatic children .
 strongly agree agree disagree strongly disagree
8. In my experience parents are afraid/reluctant to use steroid therapy in asthmatic children.
 strongly agree agree disagree strongly disagree

If you perceive other issues concerning the provision of care by parents/ care-givers to asthmatic children please write them down here ...

Appendix 4

Health Systems Division

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Tel: 021 938 0454 • Fax: 021 938 0483

24/04/98

Dr. _____

Address _____
Mitchell's Plain
7735

Dear Colleague

The National Asthma Education Programme (NAEP) and the Medical Research (MRC) have jointly embarked on a programme aimed at providing technical support to primary care practitioners treating children with asthma.

We have worked with experts and GPs to produce a small set of key messages for practitioners like yourself caring for children with chestiness and asthma (see attached). These messages were selected from the South African childhood and adolescent asthma guidelines (1994).

We will be contacting you to arrange an appointment to discuss these primary care messages and would be grateful if you could give us 15 minutes of your time. At a later stage we would assess the usefulness of these visits.

Please contact either Drs **Merrick Zwarenstein** (phone 9380454) or **George Swingler** (phone 6585111) if you have any queries.

Yours sincerely



Dr Merrick Zwarenstein MBBCh, MSc
Head: Health Systems Division
MRC



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PRIMARY CARE MESSAGES FOR ASTHMA IN CHILDREN

- In general practice asthma should be diagnosed in the presence of a recurrent cough and/or wheeze that responds to a bronchodilator. Children under 2 years with these symptoms should be referred.
- Anti-inflammatories prevent symptoms and are the most cost-effective treatment. Regular doses (400 μ g or less) of inhaled steroids have no significant side-effects in children.
- The treatment of asthmatic children depends on the severity of their condition.
A *mild* asthmatic child i.e. occasional attacks should use an inhaled β -2 stimulant such as salbutamol, fenoterol, terbutaline as needed.
A *moderate* asthmatic child i.e. with more frequent attacks should use increased doses of regular inhaled anti-inflammatory agent such as sodium cromoglycate or steroid for a few days with supplementary inhaled β -2 stimulant as needed.
A *severe* asthmatic child i.e. with daily/continuous attacks should be managed in consultation with specialist care and should use regular inhaled anti-inflammatory therapy, and inhaled β -2 stimulant as needed.
- Inhaled medication is safe and effective therapy for asthma. Oral bronchodilators have many side-effects and in long-term therapy are expensive.
- Spacers are as effective and safe as nebulisers even in young children. Spacers are good even if they are homemade.
- Short course oral steroids (5 days) are useful for severe exacerbations, prevents admission for status asthmaticus, have no systemic side-effects and can be stopped without tapering. Refer to specialist if exacerbations are very severe, frequent or poorly controlled.
- Asthma can vary with time and regular assessment is necessary to individualize therapy. In general practice assessment of asthmatic children should occur at 3-monthly intervals including peak flow measurements where feasible, and patients should also attend when there is a flare-up.
- Smoking around asthmatic children aggravates their asthma. Studies have shown that when doctors advise parents on smoking avoidance the parents usually act on this advice.

Appendix 6

CHAMP educational materials supplied to GPs: 3-part desk folder and 500 ml home-made spacer.

Contents of *3-part desk folder* (details on page 255):

- Front cover: Primary care management of asthma in children with an angled diagnostic reminder
- Inner left arm: Prompts for treatment of asthma based on severity
- Middle: Structured practice record card for children with asthma (front and back pieces)
Pen containing diagnostic reminder
Parent's asthma information card
- Inner right arm: Pharmacoeconomic information on cost of drug therapy
- Outer left arm: Prompts for the diagnosis and treatment of asthma. These were replicated in an A3 size laminated poster (details on page 259) to serve as an additional reminder.

500 ml home-made spacer reminder (details on pages 235-238 and 259)
The label attached to the spacer is inserted.

UNIVERSITY *of the*
WESTERN CAPE



**Recurrent chestiness in
children ->? Asthma**

Primary Care Management of Asthma in children

**UNIVERSITY of the
WESTERN CAPE**

TREATMENT OF ASTHMA IN CHILDREN

General

- Check parent's and child's knowledge on when to use "preventer" and "reliever" medication.
- Advise against exposure to cigarette smoke.
- Spacers are as effective as nebulisers for delivering inhaled bronchodilator and steroid therapies.
- Demonstrate to parent and child how to use spacer.
- Children 2-7 years should use a spacer when using inhaled asthma medication.
- Children below 2 years need a special spacer and need specialist referral.

Mild asthma

- Inhaled short-acting β_2 stimulant *prn*.

Moderate asthma

- Regular inhaled steroid 50-200 μ g *bd* OR sodium cromoglycate.
- Short-acting inhaled β_2 stimulant *prn*.
- Monitor and assess symptoms at least 3 monthly.

Severe asthma

- Consult specialist.
- Increased doses of regular inhaled anti-inflammatory for a few days.
- Short-acting inhaled β_2 stimulant *prn*.

Exacerbations : Child with either mild, moderate or severe asthma can have an acute exacerbation.

- Increased doses of regular inhaled anti-inflammatory for a few days.
- Add short-course (5 days) oral steroids. No need to taper dosage on stopping. Refer if no improvement.
- Refer to specialist if exacerbations are very severe, frequent or poorly controlled.

RECORD CARD FOR CHILDREN WITH ASTHMA

Patient details

NAME : _____ Date of birth: _____

Address _____ Tel : _____ Date: _____

Assessment of asthma severity

Please tick the child's symptoms in the appropriate boxes below. Grade the asthma according to the worst symptom(s).

	MILD ASTHMA	MODERATE ASTHMA	SEVERE ASTHMA
Symptoms during the day	Most weeks no symptoms at all.	Symptoms most weeks but not every day.	Symptoms most days
Symptoms while sleeping at night	Not more than twice per month.	Not more than three times per month.	Four or more times per month.

Other problems: _____

Treatment prescribed today - please refer to drug details on opposite page.

- Inhaled reliever: _____
- Inhaled preventer: _____
- Other medication: _____

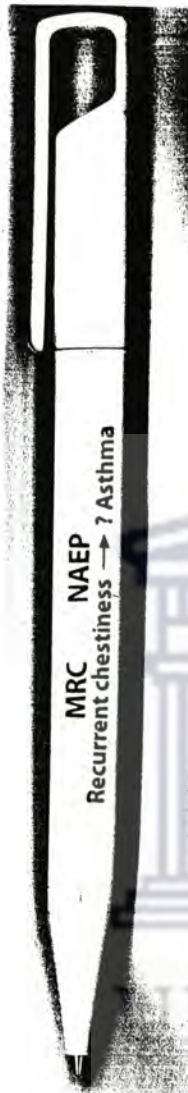
Child's next appointment :

- date :
- when symptoms recur
- before medicines are finished



FOLLOW-UP ASTHMA VISTS	Date: _____	Date: _____
<p><i>IS THIS CHILD'S ASTHMA CONTROLLED? Check :</i></p> <ol style="list-style-type: none"> In the last week how many times did child take reliever medication? _____ <i>(should be 3 or less)</i> In the last month how many times did child awaken at night with chest symptoms? _____ <i>(should be 2 or less)</i> In the last month how many times did child miss school because of chest symptoms? _____ <i>(should be 0)</i> In the last month how many times did child receive emergency care or admitted to hospital for asthma? _____ <i>(should be 0)</i> <p><i>If all answers close to expected values (or less), child is well controlled. If any answer is higher than acceptable value, child may not be controlled.</i></p> <p>WAYS TO IMPROVE CONTROL OF ASTHMA</p> <ol style="list-style-type: none"> If child is not using a preventer, prescribe an inhaled preventer. If child is not using a spacer, demonstrate and recommend spacer. Check inhaler technique and demonstrate improvements. If child is using an inhaled preventer and inhaler technique is good: <ol style="list-style-type: none"> Check adherence to prescribed dose. Emphasize importance of regular /daily use and slow onset of action of preventer. inflammatory (steroids up to 200µg bd). If child is stable and well controlled, reduce dose of inhaled preventer to minimum effective dose. <ol style="list-style-type: none"> For acute exacerbations prescribe short-course. (5 days) oral steroids. Refer if no improvement. PEFR: _____ Other diagnoses and treatment _____ <p>Date of next appointment _____</p>	<p>Management: _____</p> <p>Inhaled preventer: _____</p> <p>↑ dose to: _____ bd</p> <p>↓ dose to: _____ bd</p> <p>Inhaled reliever: _____ prn</p> <p>Oral steroids (5 days) _____</p> <p>expected _____ achieved _____</p> <p>Other diagnoses: _____</p> <p>Other treatment: _____</p> <p>Date: _____</p>	<p>Management: _____</p> <p>Inhaled preventer: _____</p> <p>c) Increase dose of inhaled anti- ↑ dose to: _____ bc</p> <p>↓ dose to: _____ b</p> <p>Inhaled reliever: _____ p</p> <p>Oral steroids (5 days) _____</p> <p>expected _____ achieved _____</p> <p>Other diagnoses: _____</p> <p>Other treatment: _____</p> <p>Date: _____</p>

Pen



Parent's Asthma Information Card



Cigarette smoke makes your child's chest tight and is bad for his/her lungs.

- if your child keeps having "asthma attacks" and
- has difficulty in speaking due to shortness of breath or
- doesn't get better after using prescribed medication

then consult your DOCTOR, DAY HOSPITAL or HOSPITAL as soon as possible.

Your child's **reliever** medication is

Reliever medication provides quick relief from chest-tightness. It should only be used when your child has difficulty breathing. If reliever medication is used more than 3 times a week your child should go to the DOCTOR.

Your child's **preventer** medication is

Preventer medication keeps the lung passages open. It must be taken everyday until the doctor tells you that your child may discontinue the medication. It takes 1-2 weeks to start working.

Cost (rand) per month of inhaled steroids and cromolyns (complete unit) for prevention ("preventers") of asthma in children. Doses of 50µg unless specified.

	Inhaled Steroid		Inhaled Cromolyn 2-20mg bd x 30days	
	100µg bd x 30 days	200µg bd x 30 days		
R20+	Beclate 100µg.	—	Lomudal inhaler 1mg, 5mg; Tilade - M Aerosol 2mg.	
R30+	Beclate, Budeflam 100µg, Pulmicort aerosol 100µg.	Beclate 200µg.		
R40+	Clenil, Inflammide (50µg,100µg) Pulmicort aerosol, Ventzone.	—		
R50+	Pulmicort turbuhaler 100µg.	Pulmicort aerosol 100µg, Beclate 100µg, Inflammide 200µg.		
R60+	Aerobec 100µg, Becotide 100µg.	Budeflam 100µg.		
R70+	—	Pulmicort aerosol 100µg, Pulmicort turbuhaler 200µg.		
R80+	Becotide.	Inflammide 100µg.		
R90+	Aerobec, Viarox, Becodisks 100µg.	Inflammide		
R100+	—	Pulmicort turbuhaler 100µg.		
R110+	Flixotide inhaler, Flixotide Accuhaler 100µg.	—		
R120+	Flixodisk disk 100µg.	Becotide 100µg, Becodisks 200µg.		
R130+	—	Aerobec 100µg.		
R140+	—	—		
R150+	—	—		Lomudal spinhaler 20mg

Cost (rand) per puff of inhaled β-2 stimulants (complete unit) for relief ("relievers") of asthma symptoms in children.

0.10-0.20	Airomir, Asthavent, Breatheze, Bronchospray, Venteze, Ventimax, Salbutin autohaler, Fensol.
0.20-0.30	Berotec aerosol, Ventolin.
0.30-0.40	Bricanyl aerosol 0,25µg.
0.40-0.50	—
0.50-0.60	—
0.60-0.70	—
0.70-0.80	—
0.80-0.90	—
0.90-1.00	Bricanyl turbuhaler
R1.00-R2.00	Berotec inhalets, Ventodisks 200µg.

Oral steroids for acute exacerbations in children.

Cost (rand) for a typical 5-day course: 30 x 5mg tablets; 15mg/5ml syrup

≤ R10	Be-Tabs, Fams-Prednisolone, Panafcort, Capsoid.
R10+	Predeltin, Predeltilone.
R20+	Acu-Prednisolone.
R30+	Trolic.
R40+	Meticorten, Meticortelone.
R50+	—
R60+	—
R70+	Prelone 50ml

NOTE:

Cost of medications calculated from recommended retail prices of the Generics Dictionary vol. 3 # 1 February 1998 and from prices quoted by the manufacturers and retail pharmacies. The prices are subject to change.

RECURRENT CHESTINESS IN CHILDREN → ? ASTHMA

Diagnosis of asthma in children

Consider asthma in children (even in infants) with:

- recurrent cough, wheeze or bronchitis.
- symptoms of cough or wheeze responding to a bronchodilator.

A chesty child is more likely to be asthmatic if:

- there is a history of eczema or hayfever.
- there is a history of wheeze with infection or colds.
- one or both parents have asthma symptoms.

Refer child under 2 years of age with recurrent chestiness.

Treatment of asthma in children

ASTHMA SEVERITY DRUG TREATMENT

Mild	Inhaled β_2 stimulant <i>prn</i>
Moderate	Inhaled anti-inflammatory bd + inhaled β_2 stimulant <i>prn</i>
Severe	Increased doses of inhaled anti-inflammatory bd + inhaled β_2 stimulant <i>prn</i>

Treatment of an asthmatic child with an acute exacerbation

Exacerbations occur in mild, moderate and severe asthmatic children.

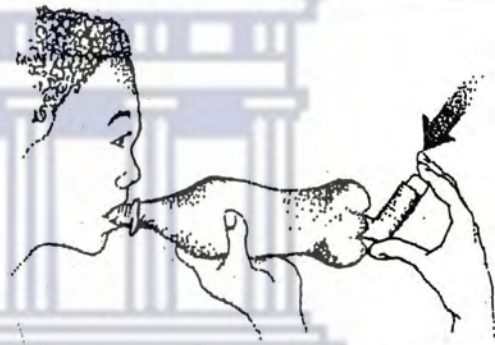
- Prescribe increased doses of regular inhaled anti-inflammatory for a few days.
- If severe add short-course (5 days) oral steroids. No need to taper dosage on stopping. Refer if no improvement.
- Refer to specialist if exacerbations are very severe, frequent or poorly controlled.



500 ml home-made spacer



Label attached to 500ml home-made spacer



↑
Hole cut at bottom ridge of bottle
for insertion of inhaler mouth-piece

Health Systems Division

Centre for Epidemiological Research in South Africa
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24/04/98

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Dr _____
Address _____

Dear Colleague

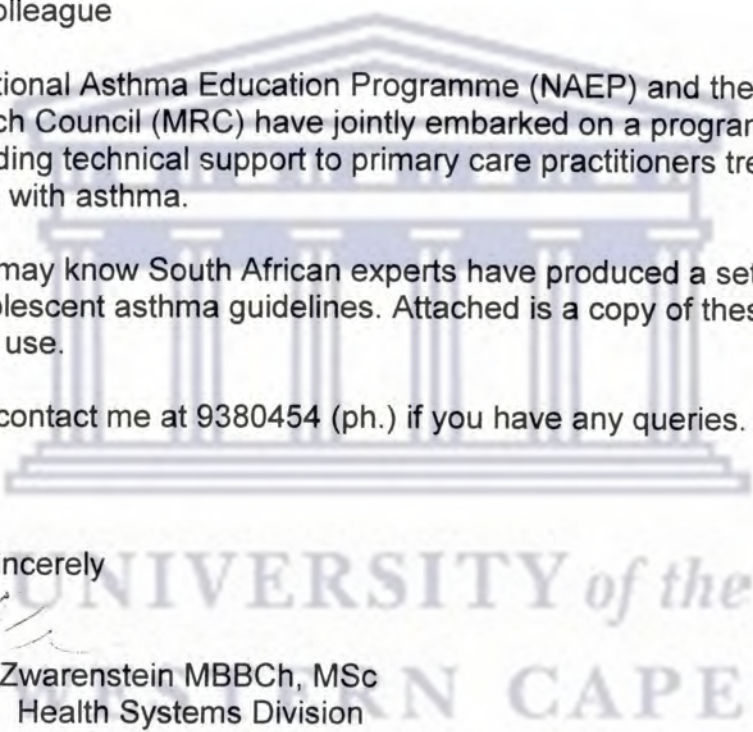
The National Asthma Education Programme (NAEP) and the Medical Research Council (MRC) have jointly embarked on a programme aimed at providing technical support to primary care practitioners treating children with asthma.

As you may know South African experts have produced a set of childhood and adolescent asthma guidelines. Attached is a copy of these guidelines for your use.

Please contact me at 9380454 (ph.) if you have any queries.

Yours sincerely

Merrick Zwarenstein MBBCh, MSc
Head: Health Systems Division
MRC



CLINICAL GUIDELINES

Management of childhood and adolescent asthma

1994 Consensus

South African Childhood Asthma Working Group

Objective. To make recommendations regarding the treatment of chronic asthma to achieve effective control; to emphasise that asthma is a clinical diagnosis; to stress the central role of inflammation in asthma; to recommend alternative agents for practice where certain drugs are not available; and to address new agents that have been introduced for the treatment of asthma.

Options. A new severity grading of mild, moderate and severe asthma is proposed to aid in the selection of medication. This severity assessment uses four features; attack frequency, nocturnal symptom frequency, hospital admissions and peak flow. Since asthma can vary with time, regular reassessment with a view to reassignment of individual grading is necessary.

Outcomes. Goals of effective control strive to ensure that the asthmatic leads a normal life free from symptoms with regular school attendance, restful sleep, normal growth and development, minimal acute attacks and avoidance of hospital admissions.

Evidence. Previous local and international consensus statements.

Benefits, harms, costs. Early diagnosis, accurate grading and effective control reduce morbidity and mortality and will be cost-saving. Pharmaco-economic evaluations of the cost of asthma show that medications *per se* represent a small percentage of the overall cost of asthma.

Recommendations. Inhaled therapy is preferred, even in young children, as aerosol devices for all ages are available. Mild asthma is treated with intermittent short-acting β -agonists, moderate asthma with regular cromoglycate and severe asthma with regular inhaled steroids. Environmental control, specialist referral and hazardous and unnecessary therapy are also addressed.

Sponsors. Roche Pharmaceuticals.

S Afr Med J 1994; 84: 862-866.

South African Childhood Asthma Working Group: A. Argent, S. Brown, D. Cohen, P. Duys, R. Gie, R. J. Green, D. K. Luyt, S. Mhlambi, F. Mokgoadi, C. Motala, A. Manjra, S. Naude, P. Potter (Secretary), G. Stiles, J. Vermeulen, E. Weinberg (Chairperson)
Report compiled by: D. K. Luyt, R. J. Green and D. Cohen
Contact person: D. K. Luyt, PO Box 17023, Hillbrow, 2038
(tel. (011) 484-6798/9, fax 643-2141)

Childhood and Adolescent Asthma Consensus 1994

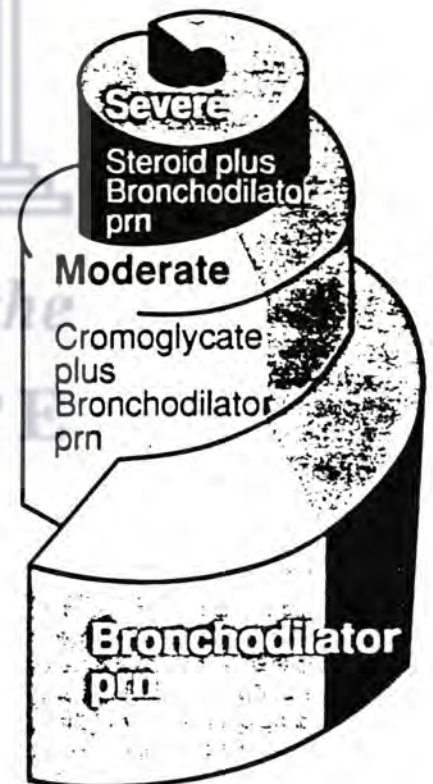
Statement of the SA Childhood Asthma Working Group

Diagnosis

Asthma must be diagnosed whenever a patient has recurrent wheeze or cough which responds to a bronchodilator

Assessment of Severity and Control Treatment

Frequency of attacks of cough and/or wheeze	Night time cough and/or wheeze	Prior admission to hospital for asthma	PEFR (%) predicted
Severe More than 1/week or continuous	Frequent	More than 1 previous admission or admission to ICU	< 60
Moderate Not more than 1/week	Infrequent (< 1/week)	1 previous admission	60 – 80
Mild Not more than 1/month	No	No	> 80



Note:

- One or more features may be present to assign a grade of severity; a patient must be assigned to the most severe grade in which any feature occurs.
- Regular assessment (at least every 3 months) with a view to reassignment of individual patients is necessary.

4. Ipratropium bromide (Atrovent)

Ipratropium bromide may be a useful adjunct to regular β_2 -agonist therapy in small children (< 1 year) in whom cough and/or wheeze are major symptoms.

Anti-inflammatory

1. Sodium cromoglycate (Lomudal)

Sodium cromoglycate (Lomudal) is indicated for the prevention of moderate asthma. It must be taken regularly to be effective to reduce bronchial hyper-reactivity. It is also useful in the prevention of exercise-induced asthma when taken 30 minutes beforehand. Sodium cromoglycate is remarkably safe in children.

2. Ketotifen (Zaditen)

Ketotifen (Zaditen) may be a useful adjunct to bronchodilator therapy in young (< 3 years old) highly allergic children who have atopic eczema or hay fever in addition to their asthma.

3. Inhaled steroids

Inhaled steroids should be used for prophylaxis in children with severe asthma. Steroid therapy should be tailored to the response documented by symptoms and, where possible, respiratory function testing. The lowest possible effective dose should be used. For inhaled beclomethasone (Becotide, Clenil, Ventzone, Viarox), budesonide (Inflammid, Pulmicort) and fluticasone (Flixotide), doses under 400 $\mu\text{g}/\text{day}$ are associated with minimal side-effects. Where higher doses are required, use of fluticasone (Flixotide), which to date has demonstrated reduced systemic effects, should be considered. The efficacy and safety of inhaled steroids are increased by the use of spacer devices. Where cromoglycate is not available, low-dose inhaled steroids may be considered.

4. Oral steroids

Short courses (≤ 14 days) of oral steroids (prednisone 1 - 2 mg/kg/d) are generally necessary in the treatment of exacerbations of asthma.² Maintenance treatment with daily or alternate-day oral steroids is indicated only in those rare patients not controlled by high-dose inhaled steroids. In children on oral steroids extra care should be taken during episodes of increased stress, e.g. surgery.

Other drugs — antihistamines

Antihistamines may be used for the treatment of hay fever in asthmatics with hay fever.

Tapering and terminating therapy

Children on anti-asthma therapy should be reviewed at least every 3 months, and if well controlled should be considered for reduction in treatment. Note that this should not be attempted during the patient's worst season.

Referral to a specialist

Referral of patients to a specialist is recommended if the goals of management are not achieved, or for the following reasons:

1. Diagnosis in doubt.
2. Unstable asthma.
3. Asthma interferes with normal life despite treatment.
4. Parents or general practitioners need further support.
5. When oral steroids are required regularly.
6. After a life-threatening episode.

Unnecessary therapy

The following are without benefit in the treatment of childhood asthma: antibiotics, cough syrups, mucolytics, ionisers and breathing exercises. Physiotherapy is indicated in children only where lobar collapse is documented. Frequent visits to the physiotherapist must indicate to the practitioner that the patient's maintenance anti-inflammatory treatment needs revision.

Hazardous therapy

Rectal aminophylline and immunotherapy are dangerous and contraindicated in childhood asthma.

The SACAAG is an official working group of the Allergy Society of South Africa. This meeting of the SACAAG was sponsored by Roche Products.

These guidelines are endorsed by the Medical Association of South Africa.

REFERENCES

1. South African Childhood Asthma Working Group. Management of childhood and adolescent asthma — 1991 consensus. *S Afr Med J* 1992; 81: 38-40.
2. South African Childhood Asthma Working Group. Management of acute asthmatic attacks in children. *S Afr Med J* 1993; 83: 286-289.
3. South African Childhood Asthma Working Group. Use of theophylline in childhood and adolescent asthma: addendum to 1991 consensus statement. *S Afr Med J* 1993; 83: 913-914.