EMERGENCY CARE IN THE FREE STATE PROVINCE:
A RETROSPECTIVE STUDY OF THE PATIENT AND DISEASE PROFILE AND THE QUALITY OF PATIENT RECORDS.

SCHOOL OF PUBLIC HEALTH
UNIVERSITY OF THE WESTERN CAPE

STUDENT: Dr. T. M. CHANDRAN (2036312)

A mini-thesis submitted in partial fulfillment of the requirements for the degree of Masters in Public Health (MPH) in the School of Public Health, University of the Western Cape.

SUPERVISOR: Dr. DEBRA J. JACKSON

JUNE 2002

KEY WORDS

Emergency Medicine, Pre-hospital care, In-hospital care, Emergency Department, Trauma, Injury, Violence, Intentional violence, Unintentional violence, Patient Records.

ABSTRACT

EMERGENCY CARE IN THE FREE STATE PROVINCE: A RETROSPECTIVE STUDY OF THE PATIENT AND DISEASE PROFILE AND THE QUALITY OF PATIENT RECORDS.

Dr. T.M. Chandran

MPH Mini-thesis, School of Public Health, University of the Western Cape.

The national and provincial governments of South Africa are busy restructuring Emergency Care, which enjoys frontline pivotal role in its health care delivery system. Research on Emergency Care is very limited locally and this study does a baseline situational analysis in the hope of stimulating further research.

OBJECTIVES include the measurement of patient and disease profile of emergency room visits, salient features of trauma/violence patients, quality of care and quality of records and utilization of service by the community.

METHOD: This cross-sectional retrospective study uses multistage stratified random sampling and the principle of probability proportional to sample size of the patient record population of five regional hospitals in free State. Content analysis or record review of the sample is done using a schedule. Data capture and analysis is done using Epi-info 2000.

FINDING of the study is described in six distinct contexts. **Patient profile** examines the demographic and socio-economic features. Most patients are 20 to 40 year age group belonging to African population from low socio-economic strata. High-income group appears to avoid public service. **Disease profile** reveals predominance of medical and trauma patients with 56% non-emergency patients. Crowding of Emergency room by non-emergency patients is evident from outcome pattern of 50% discharge after treatment. **Quality of care** is measured indirectly. Over 60% of patients waits for more than an hour in ER, X-rays for trauma and laboratory tests for medical condition are frequent investigations and no therapeutic procedure is given in ER for over 50% of patients. **Trauma profile**: Accidents (40%) and violence (40%) constitute major cause with traffic accident 10%. Most accidents occur in home and its surroundings in the form of accidental fall. Interpersonal violence (82%) is the common form of violence but the woman-child-elderly abuse is surprisingly low. **Quality of records** is generally poor. Most components of the records are around 40% compliant and theatre and discharge records are around 10% compliant. **Analysis of association** of variables such as waiting time, quality of record and emergency status to other variables in the study does not reveal many significant relations. Few associations detected are: (a) quality of records improves with longer waiting time, (b) Medical patients are more likely to be a child, get a laboratory test and gets discharged after treatment and (c) relatively more male patients visit emergency room for real emergency conditions.

CONCLUSIONS: The study unravels many areas of emergency care in Free State that can be improved. Non-emergency patients frequently treated in ER. There is room for improving access to service, preparedness, service organization, integration of pre-hospital and in-hospital care and emergency care systems. Several recommendations regarding policy development and areas/topics for further research are listed.

15 June 2002

DECLARATION

I declare that *Emergency Care in the Free State: A retrospective study of the patient and disease profile and quality of patient records* is my own work, that it has not been submitted for any degree or examination in any other University, and that all the sources I have used or quoted have been indicated and acknowledged by complete references.

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Dr. Chandran T Moorkoth

15 June 2002

ACKNOWLEDGEMENTS

The following organizations contributed to the successful completion of this research:

- Department of Health, Free State
- Pelonomi Hospital, Bloemfontein
- Goldfields Hospital, Welkom
- Nboitumelo Hospital, Kroonstad
- Bethlehem Provincial Hospital, Bethlehem
- Manapo Hospital, Qwa Qwa
- World Health Organization for the use of their statistics freeware, Epi-Info 2000.

Following individuals are acknowledged for the advice, support and valuable contributions at various stages of this study.

- Dr. Victor Litlhakanyane, Superintendent General, Department of Health, Free State
- Prof. Max Bachmann, Chief Specialist and Head, Department of Community Medicine, University of Free State.

Following Medical students are thanked sincerely and acknowledged for their assistance in data collection.

- Ms Boitumelo Ramorobi
- Ms. Pridence Melamu
- Ms. Lerato Dibuseng
- Mr. Carley Khaeane
- Mr. Peter Ledimo

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CHAPTER 1

INTRODUCTION

Considering the service expectations of the community, emergency care is perhaps the most important component of a hospital and health service in general. Accordingly, emergency care developed into a specialized field of study and practice in many countries and Emergency Rooms are transformed into a highly sophisticated, hi-tech and dedicated unit with specialized personnel, equipment, systems and protocol in a steady state of preparedness (Landry,J. 1987). Emergency Care is an important component of the total package of services provided by the Department of Health and it is a prioritised area of its activity. The quality of this critical service to the community to a large extent determines the image of the department as a whole and more importantly, it saves lives and reduces the burden of serious morbidity. Research in the field of emergency medical care is very limited and somewhat non-existent in South Africa (Clarke, M.E. 1998). However, many internationally developed technical innovations and advanced clinical protocols are implemented to improve the quality of emergency care in its pre-hospital, in-hospital and rehabilitative areas of care. Such transfer of technology in many instances lack research and administrative support, local adaptation capabilities and test of appropriateness to the community it serves. Locally initiated research on emergency medical care is essential to add value to the technology and facilitation of suitable adaptation.

Deeper knowledge and expertise in several branches of clinical medicine is combined to manage very seriously ill patients in emergency situations such as multiple trauma, heart attach and stroke. The need for a specialist with training in emergencies across the clinical specialities was recognized and a new medical specialty of Emergency Medicine established. Effective emergency care currently utilizes specialized transport systems and dedicated Emergency Rooms with 24-hour access to highly developed investigation and treatment facilities. The research in Emergency Medicine thus encompasses diverse issues from purely clinical topic to variety of organizational and management issues. This study is confined to a situation analysis to understand the volume and type of conditions treated, what happens in Emergency room and aspects of quality of care.

AIMS OF THE RESEARCH

Department of Health of the Free State province is restructuring the services to improve its access and quality since 1994. All aspects of Emergency Care including pre-hospital, in-hospital and inter-hospital care are undergoing changes. Better understanding of the current situation is a pre-requisite for such restructuring.

Study of the patient and disease profile of emergency care and the quality of care provided forms major part of this research. Trauma is somewhat synonymous with emergency medical care globally (WHO, 2001) and more detailed study is warranted. The quality of patient records, especially that of emergency medical care is emerging as an important field of medical research (Hajime Nawa, Tatsumi Ohara, et al. 2000). The patient record is a mirror of the quality of care provided, acts as an evaluation and research tool (O'Leary DS and O'Leary MR, 1992). Access to the record is accepted as a Patient's right in South Africa and a good record keeping protects the clinicians, hospitals and the department against litigation. The academic aim of the research is based on these factors.

Purpose of the study

To provide detailed analysis of the patients attending the Emergency Care facilities in Free State province in order to improve its access and quality and restructure it appropriately.

Aims of the Study

To describe different aspects of patient care in Emergency Room related to the patient need, quality of care and the process and outcome of care. Also to examine the relationship between selected parameters measured such as need and quality.

Objectives of the study

- To describe the demographic features of the patient, the disease profile of the Emergency Visits and quality of care provided in Emergency Rooms in the Free State province.
- To describe the characteristics of trauma patients that attends the Emergency Room with regards to its origin, seriousness, prevalence and etiology.
- To examine various components of patient records for its presence, completeness and insertion.

The strategic aim of the study is to provide a comprehensive understanding of delivery of emergency care in Free State. It will assist the service providers to improve the access and quality of emergency care. It will benefit the community and patients indirectly by improving the service delivery. The potential researchers on this topic can develop several secondary research problems as an outcome of this research.

BACKGROUND AND RATIONALE OF RESEARCH

The Emergency Room or Casualty is seen as the face of the Department of Health considering the physical and emotional state of the patients and their friends and relatives visiting this place, sometimes at unholy hours. Most of the patients admitted to the hospitals and many of the preventable mortality and morbidity originates in Emergency Room. A scientifically organized Emergency Care service, including pre-hospital and in-hospital care, in a steady state of preparedness can save many lives and prevent much of the morbidity with severe disability that is very costly to the patient, the society and health care providers. Above all, it is essential to improve the image of health care delivery system as a whole.

The Department of Health along with the private sector is responsible for the provision of Emergency Care in the Free State province. As a country in transition, South Africa is busy restructuring the Health Care delivery systems including Emergency Care. The organizational strategy, structures and systems for the delivery of desired or required quality and quantity of Emergency Care service must appraise many related local issues such as:

- The current situation of emergency care in the demarcated area of service delivery, which includes a detailed understanding of the types of emergencies, time and place of its origin and how it is managed presently.
- The international trends, best evidence based practices and its adaptability
- The affordability and equity standards in line with local realities
- The norms and standards related to the quality of emergency care from the site of its occurrence through the management and discharge of such patients, which will include the disaster management.

Provision of emergency care in new South Africa tells the tale of two worlds, highly advanced very effective first world system and somewhat neglected poorly organized third world system, as an aftermath of the severely fragmented health care system of the past (Clarke, M.E. 1998). Emergency care itself is fragmented as different specialty departments function independently and the specialty of Emergency Medicine does not exist. Uniform service standards and evidence based clinical and management protocols of emergency care are not established yet. It mostly imitates the western models of standards, equipment and protocol. Very limited information on emergency care is available in the province today and available data is scattered across in many places such as police mortuaries, Local Authority claim forms and public and private hospital statistics.

Intentional and unintentional violence is mostly managed at Emergency Room and very little data are available on this issue. Interpersonal violence in the form of child-woman-elderly abuse is rarely recognized (de Villiers PJ, Geffen LN, 1998).

Other continuing and emerging problems faced by the emergency care providers include:

- Uncoordinated, fragmented, poorly organized and managed services leading to misuse.
- The public and the media often criticize the quality of care.
- The emergency care records are mostly incomplete leading to poor medico-legal service and litigation.
- Emergency patients are not amenable to clinical and behavioural research and many studies are dependent on Emergency Room records.
- New regulations and laws like the Charter of Patient Rights and Promotion of Access to Information Act, 2000 requires that the patient records are available to public on request.

A baseline study is the most appropriate research process on Emergency Medicine for Free State at present. Findings of this study can improve the understanding of patients and service delivery regarding emergency care and assist the development of better service delivery systems and lead to many other specific studies to answer derived research problems.

FRAMEWORK OF THE RESEARCH

Most of the emergency care patients in Free State are managed at its five secondary care provincial hospitals. The private facilities and the community hospitals and clinics in public sector manage such patients to a lesser extent. The content analysis of the patient records generated in Emergency Room is an appropriate method for situation analysis in emergency service. Using a data collection schedule, all the relevant data required to meet the aims of the research can be obtained. Thus the study entails a record review for analysis and interpretation of emergency care at five hospitals. A multistage sampling technique is useful to limit the number of records to be reviewed. The Epi-Info 2000 statistics package, freeware of WHO, is a one stop software that can be used for the preparation of the data collection schedule, data capture and data analysis stages of the research.

The quality of patient records including coverage, standard, accuracy and legibility are critical to the quality of a record review. It is assumed that all basic data required for the study is available on patient records and the suggested sample will provide statistically precise results. Data collection by well trained research assistants, directly into the analysis software in the five regional hospital is expected to improve the quality of the research data.

CHAPTER 2

LITERATURE REVIEW

In general, the literature on emergency care can be as broad as the entire field of health care itself. This review focuses only on a small area of the available literature specifically on emergency care to elaborate on the significance of this study.

Perhaps the art and science of healing developed with the care of emergencies. In recent times, with the experiences gained during the World Wars, 'Emergency/Accidents Rooms or Casualty Wards' were established, which were called 'pits' after the gory arena they resembled. Later they were upgraded to glorified Emergency Rooms for the management of natural and man made emergencies, "where frightened interns waited while low, sleek, shiny-bright red or jet black vehicles hauled in their cargo of human misery". (From Journal of American College of Emergency Physicians, Dec 1979). Presently, Emergency Medicine is well established and rapidly developing as an important medical specialty. The American Board of Medical Specialty accepted Emergency Medicine as its 23rd specialty in 1979 (Landry,J. 1987). The recognition of its potential to save lives, need for preparedness, rule of 'golden hour', social impact (physical and mental) and medico-legal implications led to dramatic improvements in the organization, systems, techniques and expertise of Emergency Medicine. The "pits" of past years are rapidly changing into mobile or static emergency rooms with flashing lights and special equipment, a host of electronic gadgets and highly specialized professionals. Unfortunately the old "pit" still remains in many parts of the world, sometimes with only minor modification, or even with expensive hi-tech gadgets. Causes of this situation include among others, the absence of specialized personnel, systems, protocols and local research, severe lack of awareness of its potentials, need for perpetual preparedness and native problems of Emergency Care such as fragmented service for a polarized society (Clarke, M.E. 1998).

Medical emergency occurs in almost all branches of clinical specialty and the research in this field is mostly multi-disciplinary in nature. In addition to the clinical research for the development, trial and evaluation of drugs, procedures and equipment, research in emergency medicine deals with several non-clinical issues. While clinical research constitutes the lion's share of research in emergency medicine, non-clinical research is gaining momentum and includes:

- Surveillance of emergency conditions - its disease profile, demographics, seasonal variations, etc.
- Risk behaviour related to injuries and emergencies - its cause and prevention.
- Epidemiology of emergency conditions in general.
- Quality of care and economic evaluation of emergency care.
- Record keeping in emergency care.
- Pre-hospital emergency care or ambulance service.
- Quality assurance and continuous quality improvement in emergency care.

Research is also needed for the development of appropriate emergency care systems, treatment protocols and efficient utilization of resources.

IMPORTANCE OF EMERGENCY CARE

Trauma appears among the five leading causes of death in general population and third among the below 40 age group. This is true for all but very few countries in the world today and the disease specific death rate for injury is 98 per 100,000 population globally (WHO, 1999). The burden of disease and lasting disability caused by trauma is constantly increasing the service demand on health systems in public and private sector at all levels of care. It may be said that the burden of trauma is directly proportional to the level of 'modernization' and inversely proportional to improvement in quality of life. Along with it, an increasing number of heart attack, stroke, bronchial asthma, complicated diabetes mellitus and acute psychiatric problems need attention. Emergency care visits more than doubled during 20 years from 1960 to 1980 globally (Landry,J. 1987). A third of the total population needed care annually and half of admissions to many hospitals originate in Emergency Department. When the sensitivity and misery of the patients treated in these departments is added to this volume, nobody can deny the importance of Emergency Care in any health system, or more specifically in Free State Department of Health.

Furthermore, it is recognized that majority of incidence of violence in the community are either not reported or recognized by the health workers (de Villiers PJ, Geffen LN, 1998). The incidence of intentional violence in the form of domestic violence, sexual, child and elderly abuse and violence against women is escalating in modern society and South Africa experienced a rapid increase in crime rates in recent times (Marais A, de Villiers PJ, 1999). Unintentional violence, mostly vehicle accidents and sport injuries are also increasing in many

societies. The social cost of these preventable injuries is enormous as the mortality and morbidity increases.

The surveillance of trauma or its components such as domestic violence, traffic accident and war related injury is done in many parts of the world. The violence and injury surveillance system of South Africa through a rapid assessment of its state hospitals estimates that hospitalisation due to trauma to be more than 2 million and between 50 to 75 per 1000 population (Violence and injury consortium, 2000).

PUBLIC HEALTH APPROACH TO EMERGENCY CARE

The 'Violence and Injury Prevention' division of World Health Organization introduced its Public Health Approach and entered this neglected area of public health (WHO, 2001). The rationale of this approach includes:

- The traditional view of injuries as 'accidents' or random events is refuted and shown to be preventable.
- Emphasis on treatment of emergencies at the expense of primary and primordial prevention efforts only increases the mortality and morbidity. Prevention of risk behaviour associated with injuries is proved to be effective; seat-belt laws and campaigns against drinking and driving are classic examples.
- The health care in USA with highest per capita spending is not able to reduce the mortality due to violence. The morbidity due to violence and heart disease is increasing.

Without effective preventive measures, modern lifestyle leads to more and more physical and mental injuries and other medical emergencies. The advanced life saving efforts of emergency care prevents death and increases the need for rehabilitative care, increasing health care costs. It ultimately results in less resource for preventive programs in poorer countries.

The public health approach against violence and injuries recommends a four-step approach (WHO, 2001), which is:

- Determination of the extent and causes of the problem.
- Identification of potentially modifiable risk factors, mostly risk behaviour.
- Development of most effective intervention and/or alternatives.
- Implementation and evaluation of promising interventions.

The research on various aspects of violence and all other emergencies is essential for the success of all these steps. The proposed study based on the review of records to determine the extent and characteristics of emergencies is an essential first step towards the achievable goal of its primary and primordial prevention.

QUALITY ASPECTS OF EMERGENCY CARE

Considering the consequences of mishaps happening in Emergency Room, a continuous quality improvement program should be an essential part of its management (O'Leary, DS & O'Leary, MR. 1992). The structure, procedures and protocols in the Emergency Department and the process and outcome of managing the patients are regularly audited to ensure quality. Acceptability, appropriateness, continuity, effectiveness, efficacy, patient perspective, safety of care environment and timeliness of care are the components of quality (Terrace, IL. 1990).

For practical reasons, most audits of emergency care are a retrospective process by way of record review. Even though the 'good chart is not correlated with good outcome', the quality of documentation is considered as a measure of quality in Emergency Room (O'Leary, D.S. & O'Leary, M.R. 1992). Above all, an adequate process and outcome audit of Emergency Room can only be done with the help of legible and comprehensive records.

The Records Review as a research tool in emergency Medicine is fraught with many problems.

- The quality of records keeping in Emergency Rooms is inadequate. Lack of dedicated and properly qualified staff, poor organization and protocols, misuse by the public for non-emergency conditions and fluctuation in service need are some of the reasons.
- The patients in need of emergency care are seen in various levels of hospitals in public and private sector. It may never be treated in many situations such as domestic violence. The care seeking behaviour is again determined by the access to the facility, poverty and the social circumstances of injury. Thus, it is difficult to determine the exact service need in a community.
- Poor archiving procedures, lack of control on patient records and inadequate archiving facility all makes it difficult to retrieve the records.

In spite of the problems, the records review remains the only possible means to evaluate emergency care in Free State presently.

Quality of patient records is becoming a prime concern of health care providers in the public and private sector in recent times. Access to information is recognised as an important patient right. Adequate record keeping is part of the health information system and its importance in emergency room cannot be overemphasised. Good records are essential for patient billing, evaluation of service, defence against litigation and research. Cover sheet, history, nurse and physician reports, instruction sheets, laboratory report and discharge summary are usually studied for omission, insufficient or non-description, insertions, etc. (Hajime Nawa, Tatsumi Ohara, et al. 2000). Evaluation of records for the compliance of predefined standard of record keeping is often used to measure the quality of records.

The literature review looks at the current situation of emergency care globally with emphasis on South African realities in an organizational point of view. The need for restructuring the service is evident. The aspects of the quality of care excluding the technical and clinical issues and its potential to prevent death and disability in the community are discussed. This study provides an opportunity to explore these issues further to understand why and how the delivery of emergency care can be improved in a local context.

CHAPTER 3

RESEARCH DESIGN AND METHODOLOGY

This is an explorative study to understand the current situation regarding the patients seeking emergency care in Free State and their problems. The quality of the records is also examined. A cross-sectional study to measure the prevalence of emergency conditions including trauma is designed. Specific objectives of the study are:

1. To determine the volume and other characteristics of emergency medical service including trauma in Free State.
2. To examine the extent and some of the important features of trauma patients (intentional and unintentional violence) in Free State.
3. To assess the quality of the patient's records created in emergency department.
4. To examine the utilization of Emergency medical service by the community.

STUDY DESIGN

The overall design is retrospective, descriptive and quantitative based on the content analysis (record review) of the patient records kept in secondary hospitals. The five secondary hospitals in Free State (Pelonomi, Goldfields, Boitumelo, Bethlehem and Manapo Hospitals) provide most of the emergency care and the patients with such problems attending district hospitals are referred to secondary hospitals. The minor emergencies managed at primary level of care at the public health institutions and all levels of care provided at the private sector in Free State are excluded in the study for practical reasons.

The records of all the patients who attended the Emergency Room during January to December 2000 are included in the study. A multistage stratified random sampling technique spread across the year is used to account for the seasonal variation and to ensure homogeneity of the sample.

SCHEDULE OF DATA COLLECTION

A schedule of data collection is prepared using Epi-Info 2000 to capture necessary information to achieve the objective of the study. The secondary data available in the hospital records are transferred to the schedule. The schedule covers all aspects of the study with subsets of data

collection fields. The subsets are related to patient information, disease category, events in emergency room, more details on trauma patients and quality of records. The instrument was piloted to ascertain its practicability and availability of data on the patient records. The schedule with definition of items and instruction to the research assistants is attached as appendix A.

SAMPLING DESIGN

The records of all the patients admitted to the Emergency Department of the five secondary hospitals in Free State during the year 2000 constitute the finite **universe or population** to be studied. The sample selection is done in three stages. The **sampling unit** for the first stage is secondary hospitals and all of them are selected. The records in each of these hospitals are registered chronologically in a monthly or yearly basis. The month is further divided into three strata as first third, middle third and last third of the month; i.e. 1 to 9, 10 to 19 and 20 to the end. This stratification method is designed to counteract the effect of seasonal variation of emergency patients and also to neutralize the differences in the pattern of attendance within the month. It is known that the volume and types of patients vary during different months of the year and in the beginning of the month and end of the month. The whole year is thus stratified into 36 10-day periods. Finally, a predetermined number of records (third stage sampling unit) are selected from these strata randomly depending on the total sample size required for the study.

Patient registers in the emergency department of each hospital are a readily available source list. Usually the basic information on patients admitted is recorded in this register, which forms the basis of daily and monthly statistics of the department.

Sample size is determined based on the parameters to be estimated, which are mostly proportions in this study, sampling procedure, which is a multistage stratified random sampling and availability of resources such as personnel, time, stationary, transport etc. The minimum sample size required is calculated using the assumption that random error with in 99% confidence interval for a normally distributed estimates (z), the permissible difference of 0.05 (5%) between sample and population estimates, which is an indicator of precision (d), and total number of records registered at the emergency department during the year 2000 (N) (Gupta, B.N, 1995). The first stage sampling is not required since all five hospitals are

included in the study. Second stage sampling is done for the finite population of the total number of patient entries in the register of the hospitals stratified on a time scale.

Minimum sample size required for estimates, mostly proportions based on above assumptions is 666. ($z = 2.58$, $d = 0.05$, $N = 104,400$) The study also looks into the characteristics of Trauma/Violence patients and the population of trauma patients is a subset of the total population, which is estimated to be 40% of the total. The double the sample size is required if study was done exclusively for trauma patients in the population. The problem of missing records is a real possibility. Therefore, a sample size of 1500 is considered optimal based on above factors and additional resources needed for increased sample size is considered insignificant.

The sample size of 1500 required is distributed to five regional hospitals according to the statistical principle of 'probability proportional to population size' (Gupta, B.N, 1995). The number of records to be reviewed in each hospital is further distributed to each stratum, which is the number of records to be selected from each third of the month selected.

Sampling process is tabulated below for hospitals included in the study.

Description	Pelonomi	Goldfields	Boitumelo	Manapo	Bethlehem	Total
Estimated number of patients seen at ED in the hospitals during the year 2000	42,000	21,000	19,800	15,600	6,000	104,400
Average number of patients seen at the ED in the hospitals per month	3,500	1,750	1,650	1,300	500	8,700
Hospital's share of the universe or record population (%)	40	20	19	15	6	
Desired total sample size	1,500					
Desired sample size per hospital distributed according to probability proportional to population size principle	603	302	284	224	86	1,500
Sample size per quarter	151	75	71	56	22	375
Sample size per stratum of records per third of one a month	50	25	24	19	7	125

OBSERVATIONAL DESIGN

The observational design involves the content analysis of selected patient records and capture of data on a schedule prepared for the purpose. The number of items in the schedule is minimal and mostly requires copying the information, as written on the record. The items in need of manipulation or decision by the observer are defined adequately to avoid inter- and intra-observer bias. The research assistants are provided with adequate tools for identification of selected records and clear instruction to fill the schedule. The schedule is tested in a real situation using real records under supervision for familiarization, correction of unexpected errors and to ensure validity and reliability of data collected.

The tests of sound measurement tool (the schedule) are its validity, reliability and practicality (Kothari, C.R. 1990). The validity of the schedule, its ability to measure what is supposed to be measured, is adequate since it provides enough information mostly in an unambiguous format to meet the objectives of the study and systematic error is minimized. The schedule is considered reliable (the ability to produce consistent result) since the records review is devoid of response bias and leads to minimal observer bias in a record review exercise. The economy, convenience and interpretability are three measures of practicality. The economy is ensured with the use of optimal sample size and small number of items in the schedule. The exclusion of district hospitals and private sector is planned for the purpose of convenience but the results are expected to be valid since only small numbers of serious emergencies are treated in these institutions. The interpretability is improved with the use of same software for design of schedule, data entry and final analysis along with adequate definition of items and the instruction for the use of schedule. The schedule with definitions (Appendix A) and instruction sheet (Appendix C) are attached.

OPERATIONAL DESIGN

Operational design included the following activities:

- Preparation of the schedule and sampling design using Epi-Info 2000
- Discussion with colleagues, staff of ER, clinicians and supervisors for guidance.
- Obtaining permission for the Department of Health to conduct the study.
- Consultation with the management of the hospitals to obtain permission to conduct the study and mobilization of necessary resources

- Submission to the Higher Degrees Committees of University of Western Cape and Free State for ethical review.
- Discussion with the research assistants on the schedule and research in general
- Test of the schedule using patient records and training of research assistants at Pelonomi Hospital to ensure validity, reliability and practicability.
- Preparation of sample selection schedule for each hospital as explained.
- Preparation of logistics and time schedule for hospital visits including accommodation, transport and facilities.

Other operational issues included the approval for the research from Department of Health and hospital managers, preparation of computers with Epi-Info 2000 to each hospital and arrangement with personnel in records room.

DATA COLLECTION AND ANALYSIS

Detailed instruction for data collection was prepared and discussed with research assistants and data capture to the Epi-Info 2000 software completed in 3 weeks as planned. The Epi-Info database separately compiled from five hospitals is combined, collated and verified. The last two fields of the database on 'emergency or not' and 'overall quality of record' are completed using data on relevant fields.

Data analysis consisted of compiling frequency tables (univariate analysis) for relevant items in the schedule and preparation of n x n tables (multivariate analysis) to test the association of selected variable to others. All the tables thus prepared are attached as Appendix D.

First, the sample size achieved is tested for the homogeneity and whether the principle of probability proportional to sample size is achieved or not. Frequency tables for demographic, patient profile and disease profile variables and the quality of the care are grouped together in the next section of analysis. Profile of trauma is presented separately, followed by the analysis of quality of records. Lastly association/relationship tables of few of the relevant variable are listed.

LIMITATIONS OF THE STUDY

All the hospitals and the clinics to an extent provide emergency care of varying gravity. The study is limited to 5 regional hospitals, which have advanced trauma unit in the province. The

study result is expected to represent the population attributes on the assumption that only very minor trauma patients in small numbers are seen at District hospitals in the province. The shortage of expertise in these hospitals leads to referral of most emergency patients to regional hospitals.

Ideally, patients attending private institutions for emergency should be included in the study. Review of records at private hospitals is possible but difficult. Records of those patients attending general practitioners are very difficult to review.

In general, the data collection is limited to the basic demographic and disease profile except in trauma patients. It is not planned to collect information necessary to elicit etiological, specific management or similar detailed analysis of emergency care events or patients since only limited set of data are collected routinely in Emergency Department. Often information related to the etiology and interventions are not recorded in detail for scrutiny and require the data to be collected in an appropriate format prospectively.

The variations in the format of records between hospitals and the degree of completeness between professionals resulted in poor quality of data and the analysis of trauma related variables are affected to an extent in the study.

CHAPTER 4

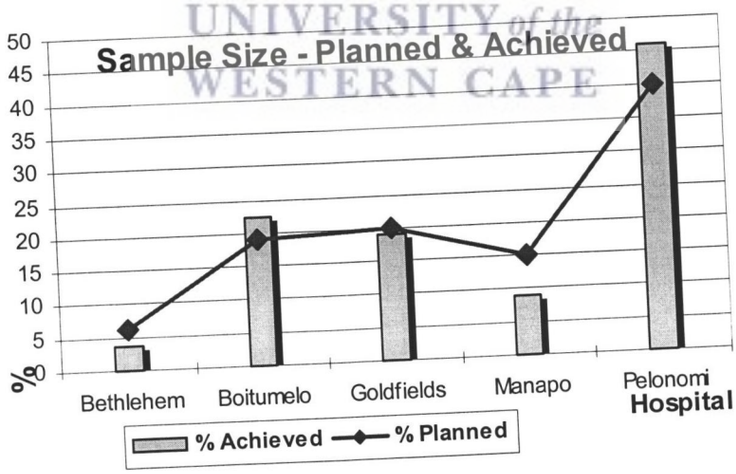
PRESENTATION AND DISCUSSION OF THE FINDINGS

This chapter presents the results of the study graphically and discusses of the findings with the help of some inferences derived from it. The implication of the sample size achieved compared to that was planned is analysed first. This is followed by the discussions on patient profile, selected indicators of the quality of service, trauma profile and the quality of ER records. Finally a short discussion is given on the association of some of the variable in the study. Full report of the data analysis is attached as Annexure D, which includes frequency tables and multivariate analysis tables.

ANALYSIS OF SAMPLE SIZE

It was planned to review 1500 records from 5 regional hospitals based on the principle of probability proportional to population size. The sample size achieved is 1048 records since some of the selected records were not available. This is still within the minimum sample size needed for the study to achieve 99% Confidence Interval. The reduction in sample size across

Figure 4.1: Sample Size of component hospitals



the hospitals is not proportional (Figure 4.1) population size as required, which may compromise the probability proportional to population size principle. A validation technique similar to that of 'Standardization of Population' is done on sample size values of the hospitals to verify the accuracy of point estimates within 99% Confidence Interval. Usually, standardization of population is done to compare parameters such as crude death rate of two

populations. Comparison of crude death rates without considering the population pyramid can result in erroneous interpretation of the result. Even when the age-specific death rates and total population of two countries are identical, the crude death rate can differ considerably due to the differences in the population structure. Results of this study suffer similar situation due to differences in hospital specific sample size required and achieved for the study.

VALIDATION OF SAMPLE SIZE ACHIEVED

The standardization exercise is done using result of one of the items of the study, *'whether the ER visit is an emergency or not'*. Apparent discrepancy of sample size related to this item is explained in table 4.1.

Table 4.1: Analysis of the variable, Emergency or Not emergency from the study

	Total Records	No. of emergency	Percentage Emergency	No. of non-emergency	Percentage Non-emergency
Study Result (Point Estimate)	957	540	**56.4**	417	**43.6**
95%CI study result		**(53.2 to 59.6)**		**(40.4 to 46.8)**	
Calculation of Hospital specific percentages of emergency and non emergency					
Pelonomi Hospital (603)	416	276	**66.3**	140	**33.7**
Goldfields Hospital (302)	185	109	**58.9**	76	**41.1**
Boitumelo Hospital (284)	226	119	**52.7**	107	**47.3**
Manapo Hospital (224)	92	23	**25.0**	69	**75.0**
Bethlehem Hospital (86)	38	13	**34.2**	25	**65.8**
Figures in bracket with the name of the hospital are required sample size.					

Wide variation in the point estimates of emergency and non-emergency cases specific to the hospitals on either sides of point estimate of the study result is evident. Direct standardization to test the validity of result obtained is done as follows.

The point estimate of this item is calculated using the achieved sample size in the study as above. The sample size required per hospital is taken as standard population and used to calculate the standardized point estimate (direct method) for the item as shown in table 4. 2.

Table 4.2: Calculation of standardized Result (Percentage Emergency Cases)

Hospital	Standard Population (Ps)	Hospital Specific Result (Ri)	Ps X Ri
Pelonomi Hospital	603	66.3	400
Goldfields Hospital	302	58.9	178
Boitumelo Hospital	284	52.7	150
Manapo Hospital	224	25.0	56
Bethlehem Hospital	86	34.2	29
Total (Σ)	1499		813

Standardized Result $= = \frac{\sum (P_s x R_i)}{\sum P_s}$	**813/1499 = 54.2**
Where P_s = the standard population (desired sample size) of the specific hospitals And R_I = Hospital Specific Result (percentage of emergency in the hospitals). (BN Gupta, 1995)	

Column Ps is the required sample size per hospital. Column Ri is the point estimate for the item calculated using sample size obtained per hospital and corresponding 'emergency' count. The numbers in the column PsXRi represents the count of emergency cases of each hospital if required sample size was achieved for the result obtained. Standardized result is calculated using total count for the total standardized population.

BOX 1: Calculation of test of significance

Standard Error of difference between two proportions of two samples[4] is calculated using the

Formula: S.E of Difference $(p_1 - p_2) = \sqrt{pq(\frac{1}{n_1} + \frac{1}{n_2})}$

where $p = \frac{n1p1 + n2p2}{n1 + n2} = \frac{957 \text{ x } 0.564 + 1499 \text{ x } 0.542}{957 \text{ x } 1499} = 0.55$ and $q = (1 - p)$

So S.E. $= \sqrt{0.55x0.45x0.001712} = 0.020581$

Here R = Actual Proportion, which is the result obtained as percentage emergency cases (56.4), SR = Standardised Proportion, which is the standardised percentage of emergency cases (54.2) and the Standard Error of the differences as calculated above are known. Thus,

The Test of significance $= \frac{R - SR}{S.E} = \frac{56.4 - 54.2}{0.020581} = 1.0653$ This is less than 1.96

The statistical significance of the difference between the measured/obtained point estimate (56.4) and standardized point estimate (54.2) of emergency cases in the study is tested. The difference is considered significant (or is considered to be due to real difference in the population) if the ratio of the difference between the standardized and actual results to the standard error of the difference is more than 1.96 for 95% level of significance and 2.58 for 99% level of significance.

The test of significance is 1.0653 for the variables of the exercise above. If the ratio is below these values it is considered to be due to random variation in the sample (chance) and not due to inadequate and non-homogenous sample. If the value is more than 1.95, the difference is significant and results are not reliable. Thus it can be safely assumed that the results of this study are accurate at 99% confidence interval for the sample finally achieved.

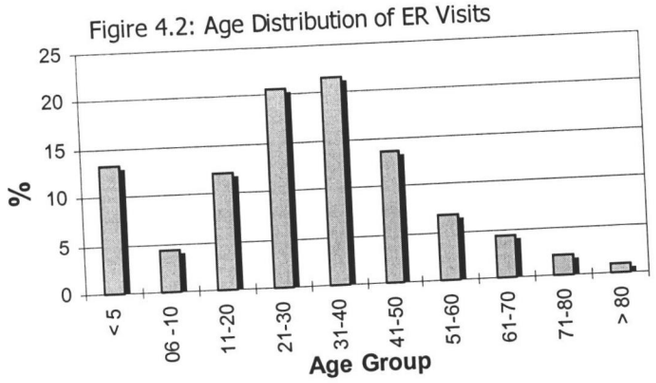
Even though the total sample size and hospital specific sample size are satisfactory, the accuracy of the findings related to trauma suffered in two ways. The sample size achieved is low (340) even though it is a satisfactory sample size for the trauma population. Data on few items related to trauma was missing on the ER records selected.

PATIENT PROFILE

Age, sex and selected socio-economic indicators and disease conditions for the patients who attended the ER are outlined below. Fee classification of patient and occupation are used to measure socio-economic status. The geographic origin of the patient related to the regional hospital is used to see whether the patients are seen at the correct level of care.

AGE DISTRIBUTION

Figire 4.2: Age Distribution of ER Visits



The 20 to 40 age groups attend ER predominantly. Above 50 age groups use ER less frequently compared to the Outpatient department of the hospital. (Department of Health Free State, 2001).

GENDER DISTRIBUTION

Table 4.3: Gender distribution of ER visits

	Frequency	Percent	95% CI	
Female	507	48.4	45.3%	51.5%
Male	530	50.6	47.5%	53.6%

Gender distribution of the ER visits is 51:49 in favour of male patients and this again differs from the usual health seeking behaviour seen in clinics, where female patients predominates.

ETHNIC DISTRIBUTION

Table 4.4: Ethnic distribution of ER visits

Ethnic Group	Frequency	Percent	95% CI	
African	941	90.1	88.1%	91.8%
Asian	6	0.6	0.2%	1.3%
Coloured	69	6.6	5.2%	8.3%
European	25	2.4	1.6%	3.6%

The African population constitutes 90% of the ER patients. Followed by Coloured (6.6%) and European (2.4%) and Asian (1%). Compared to the general population, which is 84.8%, 3%, 12% and 0.2 % respectively (Stats SA, 1999), the European population is less dependent on the public sector emergency service.

RESIDENCE OF THE PATIENTS

The place of residence of the patients visiting ER is analysed to determine the status of the regional hospitals as secondary level emergency facility for the population in its drainage area.

Table 4.5: Place of residence of patients visiting ER

	Frequency	Percent	95% CI	
Free State	18	1.70	1.10%	2.80%
Non-South African	2	0.20	0.00%	0.80%
Other Provinces	17	1.60	1.00%	2.70%
Same district	439	42.10	39.10%	45.20%
Same town	567	54.40	51.30%	57.40%

Most patients originate from the same town and the rest from the same district. The finding confirms that the hospitals meet the secondary emergency care needs of the community. In

addition, the hospitals provide primary level emergency care to the population in the town where the hospital is situated.

ECONOMIC STATUS - FAMILY INCOME

Fee structure of public sector is based on family income. This classification was used to collect this information. Economic status of 94.4% of the patients is the 'no income' category and 3.3% is the full payment category. Around 70% of the population in Free State earn less than 1000 Rands per month. This result, if a true reflection of the income of patients, signifies that higher income groups are managed by the private sector. Under reporting of the income is expected since there is no adequate mechanism to verify the declared income of the patient. In any case, mostly poor patients use the public sector and pay a nominal fee.

The occupation of the patients reflects the economic classification above. Most of the patients

Table 4.6: Occupation of patients visiting ER

Occupation	Frequency	Percent	95% CI	
Business	6	0.6	0.2%	1.3%
None	780	74.8	72.0%	77.4%
Others	87	8.3	6.8%	10.2%
Professional	27	2.6	1.7%	3.8%
Semiskilled worker	78	7.5	6.0%	9.3%
Trading	2	0.2	0.0%	0.8%
Unskilled worker	63	6.0	4.7%	7.7%

reported to have no income. Professionals, semi-skilled workers and business people constituted less than 10%. Issue of under reporting is a real possibility.

DISEASE PROFILE

Even though, data on Provisional Diagnosis as recorded on ER records was collected, the diagnosis data are difficult to analyse. Presently, the diagnosis is not routinely coded using ICD-10 classification or other coding system and the wording of the diagnosis does not follow any acceptable classification guideline. Thus diagnosis is categorized into general specialties to overcome this problem in this study.

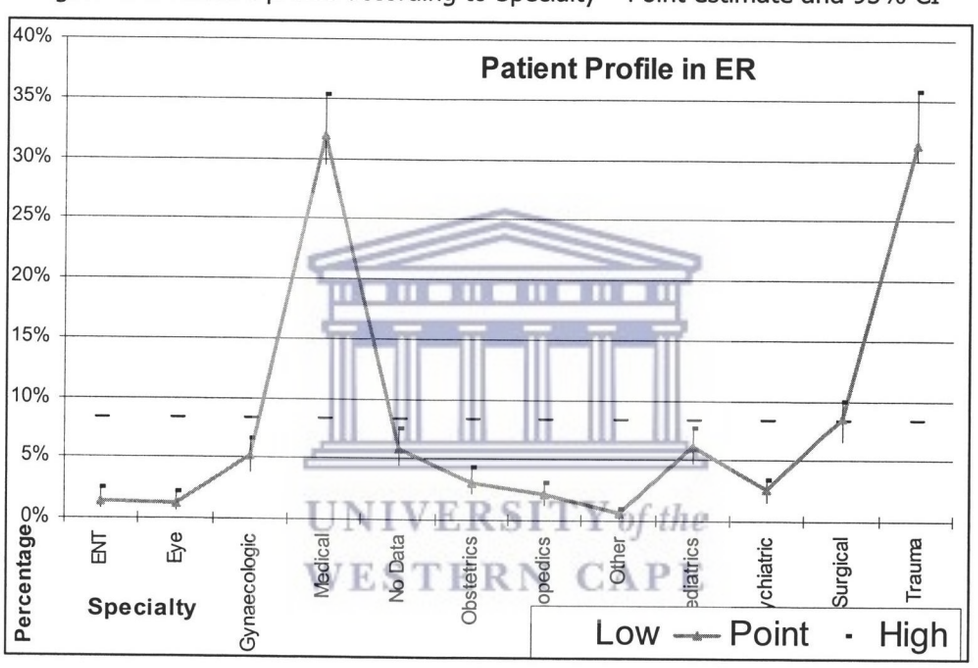
The diagnosis most frequently recorded includes:

- Trauma: assault, lacerations, fracture of limbs and ribs, appendicitis and contusions

- ❖ Medical: pneumonia, tuberculosis, asthma, hypertension, diabetes mellitus, epilepsy, tonsillitis and gastroenteritis
- ❖ Gynaecologic: abortions and pelvic inflammation, and
- ❖ Paediatric: bronchopneumonia and poisoning.

The disease profile based on general specialty is shown in figure 4.4. Medical and trauma patients constitute two-thirds of the ER attendance. Surgical, paediatric and gynaecologic conditions are less than 10% of the attendance.

Figure 4.4: Disease profile according to Specialty – Point estimate and 95% CI



The above analysis indicates that many of the patients attend ER for non-emergency medical conditions and minor trauma. Such a utilization pattern compromises the care of patients with very serious conditions and indicates poor quality of care at the ER unit.

QUALITY OF EMERGENCY CARE

An analysis of the technical quality of emergency care is beyond the scope of this generalized situational analysis and patient satisfaction aspect of quality is not directly measured in this retrospective record review. The discussion on quality of care is based on indirect measures of events in ER during the management of patient and its outcome. Access to service as an indicator of quality of service is also considered.

Access to service is an indicator of how the emergency care is organized in the province through an appropriate referral system and the capability and distribution of 24-hour health services. The total number of ER visits to Regional Hospitals in Free State province reflects the access to this vital service. This estimate excludes the patients seen at district hospitals and other 24-hour services, which is very minimal. The substantial number of emergency care patients seen in private facilities is also excluded. The table 4.7 analyses the service volume and annual visits per 1000 population of the drainage area of the regional hospitals.

Annual visits to ER per 1000 population for the public hospitals in Free State province is 38, which is less than the estimated figure of 50 to 70 for trauma patients in South Africa for the year 1998 (Violence and Injury Surveillance Consortium, 2000). This annual figure translates into 11 visits per 100,000 population. It may be due to differences in the study method or less emergencies in Free State. It can also be an indication of either under-supply or

Table 4.7: Annual visits at ER per 1000 population of drainage area

Regional Hospital	Pelonomi	Goldfields	Boitumelo	Bethlehem & Manapo	Free State
Total ER visits per Hospital*	42,000	21,000	19,800	21,600	104,400
Population of drainage area#	850,000	700,000	445,000	719,000	2,714,000
Annual Visit/1000 Population	49	30	44	30	38

* ER visits according to the hospital statistics database of the Free State Department of Health

#Population according to Stats SA mid year estimation for the year 1999

under-utilization of service and limited access to emergency care in Free State. Variation across the districts is also demonstrated.

Availability of well-organized pre-hospital care (ambulance service) is essential for critically ill patients to reach the ER. Only 12% of the patients attending ER in Free State are brought in by the Ambulance. The large number of non-emergency visits to ER may have resulted in this

Table 4.8: Emergency or not

	Frequency	Percent	95% CI	
Non-emergency Condition	417	43.60	40.40%	46.80%
Emergency Condition	540	56.40	53.20%	59.60%

low figure rather than the non-availability of ambulance to really critical patients. The fact that the ambulance service attends an average of less than 2 calls per day per 100,000 population in Free State (Department of Health, Free State, 2001) correlates with the finding. However, it may also be the case that there is limited phone access in the rural communities so that the ambulance cannot be called, and that if phones were more accessible or a uniform emergency call service, such as 911, was in place that there would be a greater demand for ambulance services.

Table 4.9: Investigations done in ER

	Frequency	Percent	95% CI	
ECG	8	0.8	0.20%	1.40%
Laboratory Tests	151	15.3	12.60%	17.40%
None	193	50.5	46.90%	58.60%
Others	107	10.9	7.00%	10.90%
X-ray	223	22.6	20.60%	26.30%

Most frequent **investigation** in ER is Radiography (23%), followed by laboratory tests (15%). No investigation is requested for almost 50% of the patients. It reinforces the earlier finding that minor trauma and medical conditions are more common ER visits. The pattern of laboratory tests for medical patients and radiology for trauma patients is evident.

Procedures done in ER also reveal the same scenario. The diagnostic procedures (16%) are more frequently done than surgical procedures including application of Plaster of Paris (12%) for the patients in ER and no procedure is done for more than 50% of the patients.

The **waiting time** in ER from the time of registration to the time attended by a health professional is an important indicator of quality of care for the customers. Figure 4.5 shows the percentage of patients attended to in a half hourly interval. Almost two-thirds of the patients are seen after one hour. This reflects the shortage of personnel, overcrowding due to non-emergency patients and absence of adequate emergency protocols and preparedness in emergency care unit.

Figure 4.5: Waiting time

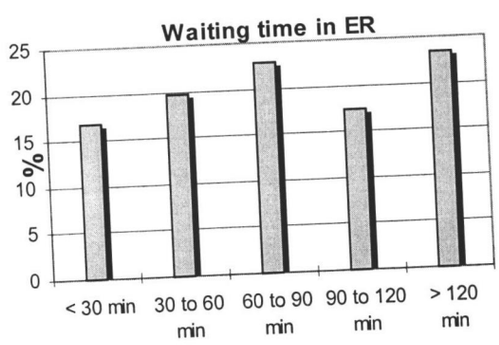
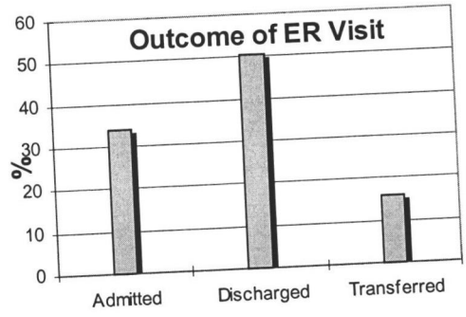


Figure 4.6: Outcome of ER Visit



The findings related to the **outcome of ER visits** partly explain the causes of long waiting time. Around 50% of the patients are treated in ER and discharged home. Very few patients are admitted directly to the High Care unit and 33% goes to the wards. Out of the 15% of the patients transferred out of ER, 2% goes to a higher care facility and 2% to a lower care facility. The staff in ER spends lots of their time to sort out the less serious patients and lack of appropriate protocol and triage arrangement forces at least some of the seriously ill patients waiting for their turn at the expense of the "golden" hour of their management.

The **emergency status** (Table 4.8 above) of the patients visiting ER is done with the help of a predefined criteria of emergency based on the presenting complaints and provisional diagnosis. The result of emergency status analysis supports and is useful to explain most of the quality related findings above. The criteria used are more of a patient perspective than a technical one. Any trauma even if it is minor is treated as emergency since it needs immediate attention. Other emergency conditions include difficulty in breathing, any bleeding, dehydration, chest pains and other symptoms including psychiatric symptoms that are considered serious. Even with this liberal definition of emergency, 56% of the visits to the ER were for non-emergency conditions. Availability of a 24-hour outpatient or urgent care service with limited emergency care capability in the periphery or in the same institution can reverse this situation and it can free time of ER staff for the management of real emergencies.

TRAUMA PROFILE

The analysis of trauma that follows is based on 340 emergency room records, which is 32.8% of the total sample. Accordingly, total number of trauma patients treated is 34,243 in the year 2000 and it includes major and minor trauma caused by accidents, violence and suicide. It represents a rate of 12 per 1000 population annually and constitutes only a small portion of the total expected trauma burden in the province. The 1990 Cape Metropolitan study shows that 25% of the trauma is treated in private sector (van der Spuy,1996) and many other studies indicates that majority of the violence and accident related injuries are not reported (Marais, A. De Villiers, P.J. et al. (1999). Furthermore, trauma related data was not recorded adequately in many records reviewed.

Another important limitation relates to the nature of trauma and availability of rapid response emergency care services. Globally, trauma is a leading cause of death and victims of serious trauma will not reach ER. A combined morbidity and mortality study is needed to understand trauma situation in the province.

Some of the significant findings of the study are tabulated below and the full set of data tables is available in Appendix D.

Table 4.10: Causes of Injury

	Frequency	Percent	95% CI	
No Data	17	5.0	3.00%	8.00%
Other Accidents	139	40.9	35.60%	46.30%
Suicide	11	3.2	1.70%	5.90%
Traffic/Transport	33	9.7	6.90%	13.50%
Violence	139	40.9	35.60%	46.30%

Violence and accidents including traffic accidents are common causes of injury as expected.

Table 4.11: Place where injury occurs

	Frequency	Percent	95% CI	
Bar, Disco	4	1.3	0.40%	3.50%
Commercial Area	2	0.6	0.10%	2.60%
Construction Site	3	1.0	0.30%	3.10%
Health Service area	5	1.6	0.60%	4.00%
Home & Surroundings	89	28.8	23.90%	34.30%
No Data	171	55.3	49.60%	61.00%
Other	2	0.6	0.10%	2.60%
Prison/Custody	1	0.3	0.00%	2.10%
Public Transport	1	0.3	0.00%	2.10%
Road	21	6.8	4.40%	10.40%
School/Educational area	2	0.6	0.10%	2.60%
Sports Fields	8	2.6	1.20%	5.20%

Injuries occur mostly in the home and its surroundings. Other important place of injury is road and sports fields. This result is unreliable due to missing data.

Characteristics of Accidents

The most common types of accidents are accidental fall (59%), blunt, sharp or crush injuries (14%) and burns (10%).

Characteristics of traffic accidents

The Traffic Accidents constitute 10% of the trauma patients visiting the Emergency Room in Free State. Victims of such accidents are mostly the private vehicle passengers (37%), Pedestrians (20%), driver of the vehicle (8%) and public vehicle passengers (8%). The light motor vehicles are most commonly involved in traffic accidents (66%) followed by taxies (8%).

Characteristics of Violence

Among the violence recorded, knife (33%) and other objects (42%) are most common weapon used and hitting or kicking is recorded in 14% of the cases. Interpersonal violence other than woman, child and elderly abuse (82%) is the most common type of violence seen. This finding is contrary to the common belief about the woman-child-elderly abuse reported in the country. Under reporting of the condition, exaggeration of the issue due to the sensitive nature of the issue, inadequacy of the sample and missing data might have contributed to this finding.

Only 10% of the trauma patients are considered seriously ill based on the definition given in the record review schedule. This surprise finding in Free State reflects less violent nature of

Table 4.12: Seriousness of the injury

	Frequency	Percent	95% CI	
Fatal	2	0.6	0.10%	2.40%
Minor	141	41.6	36.30%	47.10%
Moderate	164	48.4	43.00%	53.80%
No Data	1	0.3	0.00%	1.90%
Severe	31	9.1	6.40%	12.90%

the people or it may be due to under-reporting of woman, child and elderly violence. The exclusion of fatal trauma in the study is another reason for the above finding.

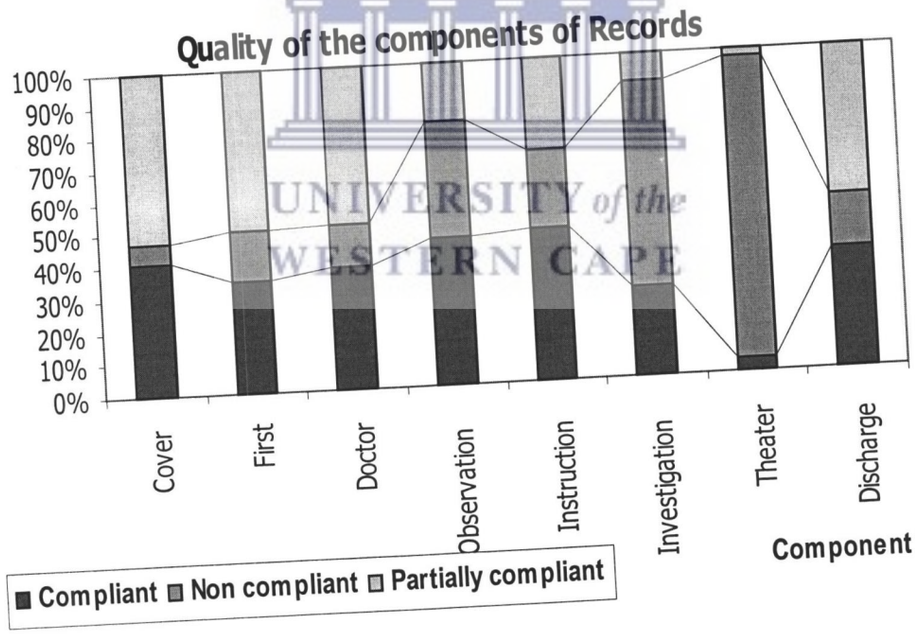
Common site of injury on the body

Most patients (18%) seen at ER sustained multiple injuries. Other areas of the body affected in the order of frequency are leg, hand, face, arm, head, abdomen and chest.

QUALITY OF RECORDS

The quality of patient records reflects the quality of service and way in which the service is organized. Several components of the records are evaluated for its content and completeness based on a predefined criteria and recorded as compliant, partially compliant and non-compliant. Criteria for this classification vary with the component of the record examined. If all basic information that is required are seen on the record irrespective of its detail, it is considered compliant. If most of the information is available, it is partially compliant. If most of the information is missing or it is difficult to read, it is non-compliant. It is not related to the importance of the missing data. The 'cannot comment' count is as non-compliant during analysis. The 'explanation column of the instrument given in Appendix A provides the details of the criteria for each of the component of the patient record examined. The result is presented in figure 4.7.

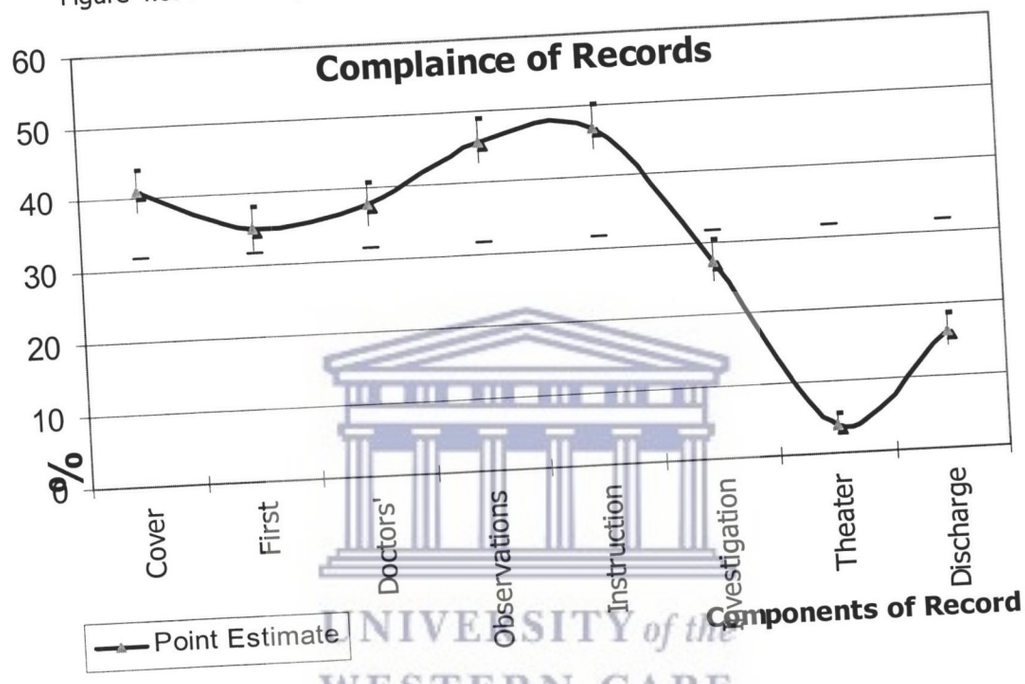
Figure 4.7: Quality of patient records in ER



Observation by the nursing staff and instructions by the Doctors are above 40% compliant. Cover sheet, first report, doctor's report and discharge report are less compliant. The records of operation theatre are least compliant but evaluates mostly as partially compliant. This is an area, which needs definite intervention considering the importance of patients' records in

present day environment. Emergency care records, specifically that of injury and trauma deserves more details to investigate its circumstances and causes. More information is needed to design locally relevant interventions against this serious and preventable burden of disease in the community. The probability of compliance within 95% confidence interval is presented in figure 4.8.

Figure 4.8: Probability of compliance of records



ANALYSIS OF THE ASSOCIATION OF VARIABLES

It is useful to investigate the association of some of the variables in the study such as waiting time, quality of records, place of residence, age and gender of patients among themselves or other variables. Such associations if detected are useful in designing quality improvement program and targeted preventive measures.

A full list of the results of the association analysis using selected variables is given in Part 2 of the Appendix D. Some of the significant results are discussed below:

Table 4.13: Test of association – Waiting time Vs Severity of trauma

		Severity of trauma			
		Minor %	Moderately severe %	Severe %	Total %
Waiting time	Immediate	16.98	20.18	16.67	18.45
	< 1 hr	21.7	34.86	22.22	27.9
	1-2 hr	40.57	27.52	44.44	34.76
	> 2 hr	20.75	17.43	16.67	18.88
	Total	100	99.99	100	99.99
p- 0.2287					

- Contrary to the expectation, there is no relation between the severity of trauma and waiting time. Percentage of patients with minor, moderate and severe injury waits somewhat the same time as the general population. It is an indication of inadequate triage and symptom/seriousness based protocol in ER.

Table 4.14: Test of association – Waiting time vs Quality of records

		Quality of record (%)			
		Good	Average	Poor	Total
Waiting time	Immediate	16.36	23.44	29.88	25.22
	< 1 hr	25.45	27.6	25.9	26.81
	1-2 hr	38.18	30.99	26.69	30
	> 2 hr	20	17.97	17.53	17.97
	Total	100	100	100	100

- There is a direct correlation between the quality of records and waiting time. Longer the waiting time, the quality of records increases. It is possible that seriously ill patients are treated and transferred to other departments with less attention to the records and those less serious patients are treated and discharged with better recording.

Table 4.15: Test of association – Waiting time vs Emergency Status

		Emergency Status (%)		
		Not emergency	Emergency	Total
Waiting time	Immediate	26.3	23.22	24.6
	< 1 hr	27.6	26.65	27.07
	1-2 hr	27.6	32.4	30.28
	> 2 hr	18.51	17.68	18.05
	Total	100	100	100
p- 0.552				

- The status of the patient as emergency or non-emergency does not influence the waiting time, which again points to the lack of triage and protocols in ER.
- Association of disease classification to waiting time shows that obstetrics patients are seen sooner than surgical and orthopaedic patients. Attention to Medical and trauma is not affected, probably a statistical effect due to larger caseload.

Table 4.16: Test of association – Specialty vs Quality of records

		Quality of records			
		Good	Fair	Poor	Total
Specialty	Medical	11.97	52.1	35.92	100
	Trauma	14.64	68.22	17.13	100
	Total	13.33	60.32	26.35	100
p- 0.000					

- Quality of records is poor for medical patients and marginally better for trauma patients
- Patients form the same town presents with severe trauma compared to patients from other towns.
- No variation is seen for the outcome of the ER visit for the patients from same town or other towns.
- More children presents with medical conditions and there is marginally more patients with trauma in other age groups.

Table 4.17: Test of association – Emergency Status vs Gender

		Gender		
		Female	Male	Total
Emergency Status	Not emergency	48.39	38.80	43.52
	Emergency	51.61	61.20	56.48
	Total	100	100	100
p- 0.003				

- More male patients presents with real emergency condition compared to female patients. This correlates with the relation of more male patients with trauma and female patients with medical conditions.

Within the limitation of missing data, specifically related to the analysis of trauma patients, the results characterize the situation of emergency care in Free State. Regional hospitals are able to manage large number of emergency conditions adequately and referrals are limited. Serious trauma is comparatively less compared to large metropolitan areas, this public sector service cater for poorer communities and plays an important role in the health care delivery system. Waiting time is reasonable, but need improvement. Influx of non-emergency patients creates a degree of disorganization with regards to the organization, preparedness and quality of care. The quality of all the components of ER records can be considered poor. The analysis of association between the variable did not reveal any significant finding.

Salient features of the study will be further discussed in the next chapter along with possible outcome and recommendations.

CHAPTER 5

CONCLUSION AND RECOMMENDATIONS

The strategic objective set out in the study is realized satisfactorily with a detailed description of the current situation of emergency care in Free State. Patient and disease profile of emergency care is described with more details on trauma patients. Some aspects of the quality of care and quality of record keeping are elaborated. Statistical accuracy of the results is satisfactory for the main study and the subset of trauma analysis. Important deductions of the findings, consequent recommendations and logical next step are presented on three main areas of emergency care in Free State; the overall situation, injury and trauma features and quality of care including quality of patient records.

An important attribute of the study is the fruitful use of otherwise dormant data, collected regularly by the department in its institutions. The record review even with its limitations is a comparatively easy method of research that can yield valuable information for decision-making, problem solving and research in clinical and health care management spheres. Need for good quality records cannot be overemphasised. Another interesting feature of this study is the exclusive use of electronic media for preparation of schedule, collection and collation of data and final data analysis. Use of Epi-Info 2000 at all these stages of study saved lots of time and stationary.

EMERGENCY CARE IN THE FREE STATE

The demographic features of the patients in need of emergency care are clearly understood. As in other departments of the hospital service, mostly the poorer sections of the community use the public sector service. Study shows that very few paying patients uses the service unless the economic classification at the admission is drastically wrong. It is up to the health care managers to develop creative interventions to attract patients from all socio-economic groups of the community.

With the understanding of disease and demographic profile, it is easier to adapt the infrastructure, protocols and procedures to provide appropriate care, which is critical, lifesaving and costly. The findings can be fruitfully used for comprehensive planning and organization of the ER that covers diverse issues such as appropriate allocation and training of the staff, preparation of treatment protocols and stocking of equipment, medication and consumables.

The hospitals included in the study are secondary care facilities. The patient population appears to be a combination of all levels of care based on the patient profile and a little more than half the patient comes from same town. It implies that the many patients seen at these hospitals can be managed at a lower level facility. Absence of satisfactory services at the periphery or ingrained conditioning of the people to visit hospitals in case of emergency are some of the issues to be addressed to change this situation. Development of appropriate services based on geo-demographic and patient profile data and marketing of the service is essential to manage this situation.

TRAUMA/INJURY FINDINGS

An important trauma related finding is incomplete patient record. Trauma surveillance is essential for the prevention of violence and accidents using reliable information regarding its magnitude, causes and consequences. Record review being the most appropriate method of research in emergency care, missing or inadequate data impede the development and implementation of preventive strategies. The findings on trauma in this study provide insight into the characteristics of various types of trauma. The burden of trauma/injury on the society and health service such as the extent of minor trauma, traffic accidents and violence is explained. A surprise finding on violence is the relatively low prevalence of child-woman-elderly violence. Inability of the health professionals to recognize this problem is well documented. More focused study on violence and accidents are needed to address this important cause of death and disability.

QUALITY OF CARE

The combination of quantity and quality related finding of this study is able to derive an overall picture of how the emergency care is provided in the province. Influx of non-emergency patients, more than 50% getting discharged from ER and relative paucity of therapeutic and diagnostic procedures indicates the existence of 'pits' situation. A stream of non-emergency patients shouting for help is mixed with a trickle of seriously ill patients; bleeding, groaning or breathing heavily. Junior and often, inexperienced physicians are unable to cope with the situation and frightened nursing staff is calling for help continuously, internally and externally. Such situation, if exists, it is a recipe for disaster and calls for drastic changes. Findings of this study provide better understanding of the situation in Emergency Rooms. Some of the suggestions emanating form the study are:

- The staff, facility and equipment for the management of real emergencies separated, if possible physically, from non-emergency patients.
- The whole setup including equipment to be on the alert and in steady state of preparedness
- Adequate expertise and other resources made available in ER
- Well-documented and if possible rehearsed and regularly updated procedure, protocol and algorithm prepared for most common conditions or serious symptoms.
- Dedicated Emergency Care manager with Emergency Medicine background to manage the service.
- Facilitate supportive and smooth interaction across the whole spectrum of emergency care; pre-hospital care, in-hospital care and supporting therapeutic and diagnostic services.

Concerns of access to service and unmet needs of the community are other quality-related findings of the study. Properly organized emergency care service by itself can improve access. Creation of sub-facilities to manage minor emergencies for deserving geographic units in the catchment area of the hospital and community education on appropriate use of service are other possible initiative worth probing.

The need to improve the quality of patient records is established in the study. This issue goes beyond the confines of emergency care unit and require institutional, academic and departmental intervention. It may require a complete review of the structure of patient record provincially. An easy to use record format that captures all the necessary information and facilitate easy entry of data in a chronological order will improve its quality. Properly completed and signed medical records are nowadays a legal and ethical necessity and promote quality of care and research opportunities.

A qualitative study utilising Focus Group Discussion techniques involving management and ER related staff of all five regional hospitals involved in this study is a desirable the next logical step to follow. Such a study can focus on system-people-management-resource issues related to ER that cannot be found on the records. The qualitative data will complement the findings of this study. It will shed more light into the study results, produce clearer definition of any problem that exists, help design appropriate intervention in a consultative way and provide a platform for dissemination of the report of this study.

RECOMMENDATIONS

The study provides a reasonably clear understanding of the delivery of emergency care in Free State. Based on the findings, discussion and conclusions drawn, few recommendations are listed for further thoughts.

PRIORITY POLICY RECOMMENDATIONS

1. Review and restructuring of service delivery:

   Based on need based planning starting form the community, improving access to care, user friendly referral systems and transport, 24-hour services at strategic points, dedicated and appropriately skilled personnel and availability of essential and appropriate resources.

2. Support for the disadvantaged communities:

   Public sector need to address the special circumstances of the poor, neglected and abused people and those in remote inaccessible areas.

3. Integration of pre-hospital and inter-hospital care and continuity of care:

   The pre-hospital and in-hospital components of emergency care should function as an unitary system in an integrated and mutually supportive manner to improve the quality and outcome of care and to improve the efficiency.

4. Develop Emergency Medicine as a speciality to manage emergencies holistically.
5. Facilitate preparedness in emergency room with the help of service delivery systems, clinical guidelines and avoiding non-emergency in emergency room.
6. Develop Emergency Care system supported by scientific and proven procedures and protocols
7. Review and improve the creation and archiving of patient records in emergency rooms. Design of appropriate formats to facilitate compliance, capture of all essential facts and incentives for better record keeping are some of the tools that can be used.
8. Facilitate detection and appropriate management of all types of victims of violence.
9. Development of violence and injury surveillance system and emergency care information system.
10. Development of quality standards and continuous quality improvement programs in emergency rooms
11. Development of preventive strategies for violence and injury – public health approach

RECOMMENDATIONS FOR FURTHER RESEARCH

This study provides baseline information on many aspects of emergency care and it can be used to develop more focused research on aspects of its clinical, preventive and organizational issues. Some of the areas are:

1. To determine the cause, circumstances, consequences and long term effect of emergency conditions including violence and injury
2. To compare or develop best practice, evidence based and locally relevant procedures and treatment protocols
3. To design locally relevant interventions to prevent violence and injury.
4. To determine socio-economic, cultural and risk behaviour related causes of violence and injury.
5. To study more specific research issues such as motor vehicle accidents and suicide.
6. To develop emergency care system.
7. To enquire into the utilization of service and abuse of emergency care resources by the community.
8. To understand the causes of poor record keeping practice.

The current status of emergency care in Free State and in South Africa as a whole provides several opportunities for research and improvement. This study looks into it very superficially leaving the whole area of clinical research untouched and leaves several questions unanswered.

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APPENDICES

Appendix A

THE SCHEDULE FOR RECORD REVIEW & EXPLANATION OF THE ITEMS

This is a replica of the schedule prepared on Epi-Info 2000 for data capture. The last column provides the explanation of the item. Items are prepared as drop-down list in Epi-Info 2000.

Item description	Instruction and Drop-down selection	Explanation
A. Patient information		
1. Hospital ID	Pelonomi Goldfields Boitumelo Bethlehem Manapo	Self explanatory
2. Patient ID	Type the number	Use the **Record ID** in the Random selection sheet of all the months created.
3. Age	Type the number	Need to calculate if only Date of Birth is given on the patient record
4. Gender	Male Female Unknown	Select one
5. Occupation	None Unskilled worker Semiskilled worker Professional Business Trading Others	Need to convert the occupation written on the patient record into one of the categories listed. Unskilled = workers without any training Semi-skilled = with training to do the job Professional = special education and training Trading = retailers, hawkers etc. Business = all business activities
6. Ethnic Group	African Asian European Coloured Others	Self-explanatory, others may not appear
7. Residence/Address	Type only the name of the town	Available on the cover sheet Click on next question when finished.
8. Residence Classification	Same town Same district Free State Other Provinces Non-South African	Select one depending on the location of the hospital and the residence town above. Records clerks will be able to help
9. Patient Classification	H0 H1 H2 H3 H4 Private Medical Aid	This information is available of the cover sheet. Find out from records clerks in advance. (This is an economic classification used in Free State, H0 is no income and H4 high income and fully paying patient)

B. Information about the events at Emergency Department		
10. Date of Arrival (MM:DD)	Type date **MM: DD** format	Stick to the format, Information available on cover sheet. Type '00' for seconds
11. Time of Arrival (HH:MM:SS)	Type time	Stick to the format, Information available on cover sheet. Type '00' for seconds
12. Transport used by patient	Private vehicle Ambulance Other types of transport No data On foot	Look at the nurse's first report for this information. Use No data if difficult to find the information
13. Time seen by the Doctor	Type time	Stick to the format, Information available on observation sheet. Type '00' for seconds
14. Main Presenting complaint	Type	Type the reason why patient came to the casualty as recorded in the first report by nurse or doctor's history taking part.
15, 16. Investigation done 1 & 2	X-ray Laboratory Tests None No data ECG Others	Examine the doctor's reports and select first two investigations requested. Skip the item 16 if no data or no request is made. Laboratory tests include blood, urine or any other tests. And X-ray includes all types of imaging (ultrasound CT scan etc.)
17, 18. Provisional Diagnosis 1 & 2	Type the data – It is an important item and fill in 'no data' only if it is really impossible to find it.	Mostly seen at the end of the doctor's report. There is a place on the coversheet for this information in some hospitals. Find out the tradition in the hospital. Skip the item 18 if there is only one diagnosis.
19. Disease Classification 1 & 2	Medical Surgical Obstetrics Gynecology Pediatrics Orthopedics Trauma Psychiatric Eye ENT Other No Data	This classification depends mainly on the provisional diagnosis supported by the presenting complaints. It may be difficult to classify when two conditions co-exit. If in doubt about your decision, leave the item blank. It is possible to place the diagnosis on one of the classifications and 'No data' and 'Others' rarely occur.

21. Outcome/disposal at ED	Discharged	Mostly self-explanatory. Transferred – lower level means send back to clinic or district hospital. Pelonomi may send back to other regional hospitals. Higher level means Universitas or Pelonomi in case of other hospitals and Universitas in case of pelonomi. Other departments occur when patient is referred to other departments in the same hospital.
	Admitted - High Care	
	Admitted - Ward	
	Absconded	
	Transferred - Lower level care	
	Transferred - Higher level care	
	Transferred - other departments	
	Other	
	No Data	
22. Date of outcome /disposal (MM: DD)	Type	Remember the format MM: DD
23. Time of outcome /disposal	Type	
24. Procedure done in ED	None	Plaster of Paris is also known as POP. Drainage of cavity includes pleura, peritoneum or joint cavities. Diagnostic procedure includes test aspiration, Lumbar puncture etc.
	Suturing	
	No Data	
	Plaster of Paris	
	Drainage of abscess	
	CPR	
	Drainage of cavity	
	Diagnostic procedure	
	Other procedures	
25. Waiting time to see Doctor	**Do not type anything against these three items.** Just press 'enter" key.	These items are calculated automatically by the program from the entries made above.
26. Days spend in ED		
27. Time spend in ED		

C. Information about the Trauma/Injury **(Fill this page only if the classification of disease is Trauma)**		
28. Place of Injury	Bar, Disco	Information is available on the clinical notes of the doctor or presenting complaint or observation note of the nurse.
	Commercial Area	
	Construction Site	
	Farm	
	Home & Surroundings	
	Health Service area	
	No Data	
	Other	
	Other Recreational Area	
	Prison/Custody	
	Public Transport	
	Road	
	School/Educational area	
	Sea, Lake, Dam	

29. Cause of Injury/trauma	No Data Others Other Accidents Suicide Traffic/Transport Interpersonal violence	Trauma usually occurs: Accidentally (Traffic/transport is one of them). The injury inflicted by animals or insects are included here Self-inflicted, 'suicide' or Interpersonal, caused by other people Use others if you cannot place in any of the above
30. User Type if Traffic/transport	Driver No data Other Passenger - private Passenger - public Pedestrian	Self-explanatory, select one of them if data is available in the nurses' or doctors' notes
31. Vehicle type if traffic/transport	Bicycle Bus Car, Bukkie, LMV Motorcycle No data Other Taxi Train Truck, trailer	Self-explanatory, select one of them if data is available in the nurses' or doctors' notes
32. If other accident, its cause	Accidental Fall Bite - Dog Bite - others & Sting Burns - fire Burns - others Blunt, sharp or crush injury Drowning Firearm related Machinery related No data Other causes Poisoning - paraffin Poisoning - Others	Self-explanatory, select one of them if data is available in the nurses' or doctors' notes
33. If attempted Suicide, its cause	Burns Drowning Firearm Hanging Blunt, sharp or crush injury Jump/fall No data Other causes Poisoning	Self-explanatory, select one of them if data is available in the nurses' or doctors' notes

34. If interpersonal violence, its cause	Hit with Knife Hit with other objects Burns Choking/strangulation Explosion Firearm Human bite No Data Others Poisoning Push/kick/fist	Self-explanatory, select one of them if data is available in the nurses' or doctors' notes
35. If Interpersonal Violence, its type	Abuse - child Abuse - elderly Abuse - woman Gang related Interpersonal - excluding child, elderly and woman Legal intervention No data Other types War/riot	Self-explanatory, select one of them if data is available in the nurses' or doctors' notes
36. If interpersonal violence, its perpetrator	Friend No data Other relatives not listed Others not listed Parent -biological Parent - step Partner/spouse Police/legal Stranger	Self-explanatory, select one of them if data is available in the nurses' or doctors' notes
37. Severity of Injury	Fatal Minor Moderate No Data Severe	Minor = small cuts and bruises or single wounds Moderate = Multiple injury admitted to ward Severe = transferred to higher center or admitted to high care unit.
38. Area of the body affected	Abdomen arm Chest Face, eye Foot Hand Head Neck Leg Multiple parts No data Other part not specified Back Vertebral column Brain & spinal cord	Watch out for multiple injuries, which is very common.

39. Alcohol Use	No Yes Suspected No data	Yes only if recorded clearly No data if no mention of alcohol in nurse's or doctor's notes

D. Content evaluation of patient record	
Following items require your decision whether it is: Cannot comment Compliant Non compliant Partially compliant The decision is based on the definition of the item. Minimum requirement for the item to be compliant is given against each item below. If all those criteria are met, it is compliant. If none of them is present, it is non-compliant. If at least one item is present, it is partially compliant.	
40. Cover sheet/admission details	Cover sheet should contain patient information. Usually a prescribed form is used. If it contains at least the following information, it is considered compliant • Name, Age or date of birth, Gender • Address • Occupation or income • Patient classification • Name and address of person responsible for payment
41. First report at ED (Nurse/doctor)	Minimum information here include: • How the patient came in/brought into casualty • Description of the condition of the patient • Presenting complaint or reason for coming • History of present complaint.
42. Doctor' report in ED	Should contain: • History of the present complaint in more detail • Relevant past history and habits like alcohol and smoking • Examination findings – general and by human systems • Provisional Diagnosis
43. Observation Record at ED (Nurse/doctor)	Usually nurse's record which repeated at regular interval and include • Patient's general condition • Pulse, BP and Temperature • Record of treatment given

44. Instruction Record in ED (doctor)	Instruction record should contain at least one of the following according to the condition of the patient: • Request for X-rays, lab tests • Medical treatment and related instructions • Decision on further management such as admission, discharge or transfer
45. Investigation Record (x-ray, lab report)	The investigation report should be either copied on to the patient chart or the original report is pasted to it properly. If no report is seen on a record with lab or x-ray request, it is non- compliant. If few of them are missing, it is partially compliant
46. Theater/procedure Record in ED	Need to record only if patient was taken to the theater. Record should contain • Record of informed consent • Pre-medication instruction and proof of it being given • Record of anesthesia, BP, pulse regularly • Description of the operation • Post operative instructions
47. Admission Record	Need to record only if the patient was admitted The date and time of admission Diagnosis at admission Ward to which admitted
48. Discharge/transfer record	Needed for all patients not admitted to the hospital and include: • Date and time of discharge or transfer • Instruction of medication to take home for discharged patients • Proof of referral letter if transferred • Instruction to come back or attend other facilities if required

E. Additional Information	
49. Emergency or not	For the purpose of this study, any trauma even minor one is an emergency. Others include, any type of breathing difficulty, bleeding, dehydration, chest pain and other symptoms considered serious.
50. Quality of data	Combined Quality of record as compliant, partially compliant or non-compliant. Average of the rating obtained on individual components 40 to 48

Appendix B

EXPLANATION OF SAMPLE SELECTION PROCEDURE

Appendix B.1

FIRST STAGE STRATIFICATION & DISTRIBUTION OF SAMPLES TO STRATUM

Sample size and distribution among the selected regional hospitals

The rationale of sample selection and the method used for the distribution of total sample size to five Regional Hospitals based on probability proportional to population size is explained in table 1 with real values. First three rows lists the record population. Rows 5,6,7 lists the distribution.

Table 1	Pelonomi	Goldfields	Boitumelo	Manapo	Bethlehem	Total
Estimated number of patients seen at ED in the hospitals during the year 2000	42,000	21,000	19,800	15,600	6,000	104,400
Average number of patients seen at the ED in the hospitals per month	3,500	1,750	1,650	1,300	500	8,700
Hospital's share of the universe or record population (%)	40	20	19	15	6	
Desired total sample size	1,500					
Desired sample size per hospital distributed according to probability proportional to population size principle	603	302	284	224	86	1,500
Sample size per quarter	151	75	71	56	22	375
Sample size per stratum of records per third of one a month	50	25	24	19	7	125

Appendix B.2: SECOND STAGE STRATIFICATION

Random selection of '10-day-period' of the month and identification of the starting date of the segment of the month

A month is divided into 3 segments of 10 day each as in column 3 below. By selecting a random number between 1 and 3, the segment of the month from which the required sample records for that particular month is determined. The columns below show such numbers selected for each hospital for all the months.

Month		10-day Periods	Pelonomi	Goldfields	Boitumelo	Manapo	Bethlehem
January	1	1 to 9	2	3	2	3	2
	2	10 to 19					
	3	20 to 31					
February	1	1 to 9	2	2	3	3	3
	2	10 to 19					
	3	20 to 29					
March	1	1 to 9	2	3	2	2	2
	2	10 to 19					
	3	20 to 31					
April	1	1 to 9	2	2	2	3	3
	2	10 to 19					
	3	20 to 30					
May	1	1 to 9	2	3	3	2	2
	2	10 to 19					
	3	20 to 31					
June	1	1 to 9	2	1	1	1	2
	2	10 to 19					
	3	20 to 30					
July	1	1 to 9	2	2	2	2	3
	2	10 to 19					
	3	20 to 31					
August	1	1 to 9	2	2	2	3	2
	2	10 to 19					
	3	20 to 31					
September	1	1 to 9	2	1	3	3	3
	2	10 to 19					
	3	20 to 30					
October	1	1 to 9	3	1	3	1	2
	2	10 to 19					
	3	20 to 31					
November	1	1 to 9	1	3	1	2	3
	2	10 to 19					
	3	20 to 30					
December	1	1 to 9	1	2	2	2	1
	2	10 to 19					
	3	20 to 31					
Number of records to be selected per month			50	25	24	19	7

Here 1= the segment of the month 1 to 9, 2= dates 10 to 19 and 3= 20 to end of month

IDENTIFICATION OF THE SEGMENTS OF REGISTER AT EMERGENCY DEPARTMENT FOR FINAL RECORD SELECTION

For each of the hospital, a table is prepared as below. Using the random number in table 2 above, starting date of the segment is listed.

Name of the patient attending the Emergency Room is listed in the register, which is the source list. The first patient listed on the first day of the segment listed below is identified. The register number corresponding to that patient is written in the next column.

Example : xxxxxxxx Hospital

Starting date of the randomly selected 10-day-period of the month	**Copy on the blank space below** the first number on the Emergency Department register corresponding to the selected date in the left column
10th January	
10th February	
20th March	
10th April	
20th May	
10th June	
10th July	
1st August	
20th September	
20th October	
10th November	
1st December	

This is done for all the five hospitals separately.

Appendix B-3

RANDOM SELECTION OF RECORDS FROM THE SEGMENTS SELECTED EARLIER.

A spreadsheet as shown below is prepared for all the months. After identification of the starting number of the patient ID for the selected '10-day-period' as above, it is copied against the specific cell in the spreadsheet as indicated. The spreadsheet will randomly select the patient ID of the records to be used in the sample. Required numbers of record are selected randomly. This is done for each month.

These spreadsheets are prepared specifically for each of the 5 hospitals. An example is shown below:

Pelonomi Hospital, Bloemfontein

Selection of record according to the ED Register

Month for which selection is done:	**March**	
Period selected for the Month:	**10th to 19th**	
Starting Number on the Register for the selected 10-day period	=	**450**
Number of Records required from the 10 day period	=	**50**
Maximum number of Casualty visits expected per month	=	**4100**

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Record ID	Casualty ID	Records Room ID
1	**468**	
2	**495**	
3	**521**	
4	**545**	
5	**582**	
6	**588**	
7	**630**	
8	**666**	
9	**683**	
10	**695**	
11	**741**	
12	**748**	
13	**774**	
14	**814**	
15	**831**	
16	**860**	
17	**908**	
18	**933**	
19	**955**	
20	**978**	
21	**1013**	
22	**1028**	
23	**1066**	
24	**1081**	
25	**1121**	
26	**1136**	
27	**1163**	
28	**1184**	
29	**1213**	
30	**1256**	
31	**1280**	
32	**1310**	
33	**1334**	
34	**1361**	
35	**1388**	
36	**1405**	
37	**1441**	
38	**1453**	
39	**1492**	
40	**1524**	
41	**1535**	
42	**1571**	
43	**1602**	
44	**1632**	
45	**1641**	
46	**1670**	
47	**1718**	
48	**1737**	
49	**1768**	
50	**1792**	
51	**1813**	
52	**1845**	
53	**1868**	
54	**1894**	
55	**1927**	
56	**1947**	
57	**1982**	
58	**2004**	
59	**2034**	
60	**2058**	

Records ID is the identification number of the record for the study
Casualty ID is the number selected from the Emergency Room register as explained above
Record Room ID is the identify number of that particular patient in Record room, which is looked up according to patient name.

Appendix C

LOGISTICS OF DATA COLLECTION

INSTRUCTION TO THE RESEARCH ASSISTANTS ON DATA COLLECTION AT DIFFERENT REGIONAL (SECONDARY) HOSPITALS

Five secondary hospitals in Free State are included in the study. A schedule is prepared using Epi-Info 2000 to collect the data needed to fulfill the objectives of the study. The sample size is 1500 records, which is distributed among the hospitals according to probability proportional to size of the population of records. Research assistants will capture the data according to the plan tabulated below.

Name of the student	Name of the hospital	No. of Records	Period
Boitumelo Ramorobi Prudence Melamu	Manpo Hospital, Qwa Qwa Bethlehem Regional Hospital	228 96	
Lerato Dibuseng Carley Khaeane	Goldfields Hospital, Welkom	288	
Peter Ledimo	Boitumelo Hospital, Kroonstad	300	
All the students	Pelonomi Hospital, Bloemfontein	600	

Data is captured directly into the Epi-Info 2000 database from each hospital and later merged into one database on completion of the work.

The activities involved in data collection may be broadly grouped into Preparatory Phase and Data Capture phase. These two stages are described separately.

A printed copy of the schedule is provided as Appendix A, which provides the explanation of each item and definition of some of the items. It will help to familiarize its content and act as a reference during the data capture.

It is important that all the records are completed uniformly or according to the same criteria. The instructions regarding the sample selection and data capture be followed precisely as it is given in the explanation column of Appendix A.

Always ask for advice from the personnel in the hospital, when in doubt. Medical Officer or Casualty Nurse will help with clinical questions pertaining to the data capture. Any problem with the use of computer can be directed to secretarial or management staff with computer knowledge.

PREPARATORY PHASE

1. Arrival and introduction

On arrival at the hospital, the letter of introduction is presented to the SEO of the hospital. The SEO will:

- Arrange the accommodation and meals for the duration of the stay
- Introduce to the Medical Officer and the Records Clerk to help the retrieval of records and data capture
- Allocate the computer terminal with Epi-Info 2000

2. Identification of the first patient number on 10-day-period selected for each month

Use the single sheet provided with the following heading to complete this activity.

"Appendix B"

PREPARATION OF A LIST OF FIRST PATIENT ON THE CASUALTY REGISTER FOR THE STARTING DATE OF RANDOMLY SELECTED 10-DAY-PERIOD OF ALL THE MONTHS IN THE YEAR 2000"

With the help of the person (Professional Nurse or others) in charge of the casualty department locate the Casualty register for the period January 2000 to December 2000. The starting date of 10-day-period is given in above document and locate that date on the Register. Then copy the first number of the patient of that day onto the space provided in the appendix B.

Note:

It is possible that different hospital uses different method for numbering their Casualty register.

Possibilities are:

- It starts with '1' on the 1st of January and carry on with the series continuously throughout the year, we will call it the **yearly series**
- It starts with '1' on 1st of every month and series ends on the last day of the month and a new series is started each month, we will call it **monthly series**. (most probable method in most hospitals)
- It starts with '1' on everyday and the series end on the same day, using a new series on each day; we will call it **daily series**.

Make a note of the method used in the hospital on the Appendix B. It is important for the next step of the sample selection procedure.

3. Random selection of record number using the program provided

(Make sure that a printer is connected to the computer before starting this activity)

This step is done only after completing the starting number for all 12 starting date in Appendix B, Table 1.It involves the use of the Excel file labeled **"EMS Record selection {hospital name}"** on the stiffy provided as shown in appendix B. It is required to transfer the files on the stiffy to the hard drive of the computer you are going to use.

3. 1. Transfer of file from Stiffy to the hard drive (Drive C:) of the computer

(Use this procedure if you are not familiar with 'file copy' in computer use. Also, you can get help from somebody in the hospitals to do it for you)

Copying the file - drag and drop method using windows explorer

Place the stiffy provided into the stiffy drive after the computer is on and ready to use. Click [**start**] icon on the left lower corner of the screen. From the menu that appear, select [**programs**] (it will be highlighted into a blue strip now). A list of all programs available on the computer will be listed to the right. Drag the mouse to the right onto [**windows explorer**]. Click on windows explorer to start the program. A new screen appears with menu on the top and two windows on lower part. Narrow window on the left list all the folders on C: drive and the broad window on the right list all the folders and files in the selected folder on the left side. With the stiffy in Dirve A: (the stiffy drive) click on the [**3½ Floppy A:**] on the left window. The files on the stiffy provided will be listed on the right window now. Select the file **"EMS Record selection {hospital name}"** by clicking on the name. Hold down the mouse in right click position and drag the mouse to the left window and place it over the folder labeled "My document" on the left narrow window. The folder 'My document' will be highlighted with a blue strip. Now release the finger form the mouse. The process of copying the file will be started with a green light appearing near the door of stiffy drive. Click on the 'My document' folder when it is completed to see the name of the file copied on the right side, which confirms the copying process. Now close the window (exit program) by clicking on the [**x**] mark on the right-upper corner of the window.

3.2. Prepare the list of randomly selected record numbers using Microsoft Excel program provided on the stiffy.

Start the Excel program either by clicking the Excel icon on the desktop or selecting [Start], [programs] and [Microsoft Excel] as explained above. When the Excel window appears, select [open] icon or click 'file' menu on top left corner and then click on 'open' on the drop-down menu. A new smaller window with the list of excel files in the 'My document' folder will appear. Select the file "EMS record selection {hospital}" by clicking on it.

(Use this procedure if you cannot see the required file on the list: If "look in: My document" does not appear on the top of this small window, click on the 'down arrow' to the right of it. It will bring a dropdown menu with list of drives A:, C: etc. on it. Double click on C: to list all the folders and files on C:. The 'My document" folder will be visible and double click on it to see the list of all the files in this folder. The "EMS record selection....." should be one among them.)

(This procedure can be used to open the file on A: drive too. If the stiffy is in the drive and [**3½ Floppy A:**] is clicked, list of files on the stiffy drive will appear. By selecting the desired file the file can be opend)

If the file is not on view, click on the arrows on the scroll-bar on the bottom or right of this small window. After locating the required file in the small window, select it by clicking on it. Now click on the tab [**open**] on the right side of this file open window.

The spreadsheet with hospital name and other details will appear on the screen. Fill in the blocks of square as requested. Fill in the square against **the "Month for which record is selected:"** and **"Randomly selected starting date:"** by clicking on the square in front of it and typing the information, i.e. name of the month and the starting date as in annexure 1. Click on the "0" against the line **"Starting Number on the Register on the selected 10-day period"** and type the starting number you copied onto the annexure 1. Print the page before doing anything else. To print the page, either click on [**print**] icon on menu bar or select 'File', then 'Print...' on sub-menu and clicking [OK] tab on the small window that appears when 'print...' is clicked.

The procedure of filling the 3 squares with appropriate information as was done above for January is repeated for all the 11 other months using annexure 1.

When this activity is successfully completed, you will have 12 printed sheets with the hospital name and heading **"Selection of record according to the ED Register"** and other information. The 3-column table on these sheets provides the following information:

Record ID	Casualty ID	Records Room ID
1	3	

The record ID will start from 1 on the sheet for January and continues into following months and the last number in the December sheet will be the total number of records to be selected in that hospital. This number will be copied onto the schedule in data capture phase as such in later stage.

The casualty ID is the randomly selected record number according to the casualty register. It is created based on the starting number you filled in the spreadsheet program. If the 'yearly' or 'monthly' serial number is used in Casualty Register, the numbers in this column will correspond

to the numbers in the register. Modification is needed if 'Daily' serial number is used and it will be explained later.

Record Room ID is the number or any other identification code with which the selected records are retrieved from the archive or Record Room of the hospital. (The casualty ID you copied is not used to store records in the main record's room of the hospital) It is essential to convert the casualty ID to Record Room ID, depending on the record storing method used in the hospitals. A unique ID is used for storing so that it can be retrieved when needed. Some hospitals use date of birth of the patient to file the records, others may use a code constructed for the purpose.

3.3. Compilation of Record Room ID

At first, in consultation with the records clerk and person in-charge of casualty, identify the unique field (piece of information) in Casualty Register such as patient ID, date of birth or name, which will enable the records clerk to retrieve the specific file. Sometime it may require a combination of fields on the Casualty Register as identifier.

When the unique field(s) is identified and the records clerk is convinced that he can retrieve the patient records from the Hospital Records Room with this identifier, start filling the presently blank column in the **"Selection of record according to the ED Register"** sheet you printed out earlier(Record Room ID column). Use the Casualty register for the whole year and the above sheets to perform this procedure. It may be useful to request help from staff in the hospital to complete this activity. The Record Room ID column of all 12 months should be filled accurately.

(Compilation of Record Room ID if Daily Series is used to number Casualty Register: First few numbers on the Casualty ID column will correspond with the numbers in the Casualty Register. Since second day starts with new series, numbers on the register will not correspond to the numbers in your sheet. You can number the casualty register continuously for the next 10 days that is on the annexure 1 with a pencil to create a monthly series. It will make the numbers in the sheet you printed to correspond with the numbers you created now and the patients against those numbers can be selected for compiling the Record Room ID.)

3.4 Retrieval of records from Records Room

Now you are equipped with 12 sheets containing Record ID, Casualty ID and Record Room ID. Hand over one sheet at a time to the Records clerk to retrieve the corresponding patient folder from the Records Room. With the first batch of record coming from the records room you are ready for the Data Capture Phase of the activity.

Please retain the appendix B and all the 12 sheets you printed. It is required later as reference.

DATA CAPTURE PHASE

It is essential that the following tasks are completed before data capture.

- Ensure the availability of the computer terminal with Epi-Info 200 installed on it.
- Complete the preparatory phase. Appropriate records will be available for data capture if this phase is completed.
- Read the annexure 2, the explanation of the schedule and its items.
- Familiarize with the casualty records in the hospital. Request the Medical Officer and the Professional Nurse to help you understand the way in which the casualty records are written and recorded in that hospital.

Copy the Epi-info database file provided on Stiffy onto the computer

A database file labeled, "ReviewSchedule" is available on the stiffy provided. Method of transferring or copying this file to the C: drive (hard drive) of the computer is similar to the procedure used to copy the Excel file labeled "EMS Record selection {hospital}" earlier. **The folder on Drive C: into which the file "ReviewSchedule" is copied to is not "My document" but "Epi2000",** i.e. drag the file "ReviewSchedule" from A: drive and drop it on the folder "Epi2000" when you are in the Windows Explorer window.

Start Epi-info 2000 and open the database for data entry

It can be done in one of the following ways.

1. Double click the Epi-Info startup icon on the desktop to open the program. Double click on [enter data] button on the left row.
2. Or click on [start], [program] and [Epi Info 2000] to select submenu in sequence when [Epi Info ENTER] sub-menu will be visible. Double click on the selected area as it is highlighted with blue bar on it.

Either way, a two-window screen will be produced with 'page number' on top of small window and "enter" displayed on top of large window. Click on 'File' menu and select 'open' from the drop-down menu. Double-click on this selection. A small window with the heading "select the project" and list of database files will appear. Select file **'ReviewSchedule"** from the list. (It is the program you copied onto the 'Epi info 2000' folder of the C: drive earlier) Now double click on the selection when another window with the heading 'select the project' appears. Select 'rrsdetail' in the window and click "OK" button on the right. The schedule for data capture is available on the screen by now.

It may be useful to enlarge the large window on which the schedule appears. Move the cursor to the edge of the window. The cursor changes shape into √ or · depending on the edge on which the cursor is placed. When such arrow is visible, hold down the right mouse button and drag the

mouse outwards to expand the window. It can be done on the bottom (·) or left (√) edge of the large window. This will expand the working area and facilitate data entry.

Data Entry

- Use the Annexure 2 as a reference to enter data and strictly follow the instructions and definitions given.
- It will be useful to acquaint with the patient folder before starting the data entry.
- Normally there is no reason to change the order in which the entries are made. The cursor moves to the next entry automatically when entry is finished. In some instances you have to move the cursor on to a specific data entry area and click to enter the data there. Click on the down arrow to see the drop-down list where a down-arrow is seen and select the answer from the list.
- Remember not to enter any data on items 25,26,27,51 and 52. Just press [enter] key when these items are reached

Routine for the end of a session and end of data capture

The data you entered is automatically saved as you enter it. So there is no need to save the file at the end of the session. To close the program click on [**x**] at the right upper corner of the window or select 'exit' from the 'file' menu. Remember to shut down the computer before it is switched off. Click [start], [shut down...] and click "OK" on the pop-up window when 'shut down' circle is selected.

When all the work is finished, you need to copy the file "ReviewSchedule" back to the stiffy provided. Here the drag and drop method described above is used from 'windows explorer' program. Double-click on 'Epi info 2000' in window explorer small window. The files in the folder Epi info 2000 is displayed on the large window of windows explorer. If the file "ReviewSchedule" is not visible, scroll the list down by clicking on the down-arrow at the button of the right scroll bar. When it is visible, drag and drop it on the [**3½ Floppy A:**] line in smaller window (upper part). Click 'OK' if a pop-up window for the confirmation of this action appears.

Tips on Enter Data routine

By clicking on the page numbers it is possible to move between the pages. Do it only if it is essential. Usually it is not required if the data items are filled one after the other.

The the content of the record you filled earlier can be looked at by clicking on '<' or '>' tabs on the bottom left corner. The current record displayed in large window is displayed above these tabs. It is useful you want to make any corrections.

To see all the items listed in the drop-down list, you can scroll the list using the scroll-bar. If the scroll bar is not visible type the first letter of the entry you want to make. Refer to annexure 2 to see all the items in the list and find out the first alphabet of the item in that list you wanted to enter.

If the error message appears click on [Bypass] button repeatedly until it disappears and continue the work.

Annexure D

PART 1:

PRELIMINARY ANALYSIS (FREQUENCY TABLES)

1.1 SAMPLE ANALYSIS

Table 1: Records required and realized

Hospital	Frequency	Percent realized	Percent expected
Bethlehem	38	3.6	6.0
Boitumelo	234	22.3	19.0
Goldfields	200	19.1	20.0
Manapo	94	9.0	15.0
Pelonomi	482	46.0	40.0
Total	1048	100.0	100.0

Expected sample size is based on probability proportional to size. The variations in the realized sample size is standardized using correction factor

1.2 DEMOGRAPHIC INFORMATION

Table 2: Age distribution: N=1036

Age Group	Frequency	Percent	Cum Percent
< 5years	138	13	13
06 to 10 years	45	4	18
11 to 20 years	125	12	30
21 to 30 years	214	21	50
31 to 40 years	224	22	72
41 to 50 years	142	14	86
51 to 60 years	70	7	92
61 to 70 years	46	4	97
71 to 80 years	22	2	99
> 80 years	10	1	100

Table 3: Gender distribution: N=1048

	Frequency	Percent	Cum Percent	Range: 95% CI	
Female	507	48.4	48.9	5.3	51.5
Male	530	50.6	99.4	47.5	53.6
Unknown	6	0.6	100.0	0.2	1.3

Table 4: Occupation: N= 1043

Occupation	Frequency	Percent	Cum Percent	Range: 95% CI	
Business	6	0.6%	0.6%	0.2%	1.3%
None	780	74.8%	75.4%	72.0%	77.4%
Others	87	8.3%	83.7%	6.8%	10.2%
Professional	27	2.6%	86.3%	1.7%	3.8%
Semiskilled worker	78	7.5%	93.8%	6.0%	9.3%
Trading	2	0.2%	94.0%	0.0%	0.8%
Unskilled worker	63	6.0%	100.0%	4.7%	7.7%
Total	1043	100.0%	100.0%		

Table 5: Ethnic Group:

	Frequency	Percent	Cum Percent	Range: 95% CI	
African	941	90.1%	90.1%	88.1%	91.8%
Asian	6	0.6%	90.7%	0.2%	1.3%
Coloured	69	6.6%	97.3%	5.2%	8.3%
European	25	2.4%	99.7%	1.6%	3.6%
Others	3	0.3%	100.0%	0.1%	0.9%
Total	1044	100.0%	100.0%		

Table 6: Residence:

	Frequency	Percent	Cum Percent	Range: 95% CI	
Free State	18	1.70%	1.70%	1.10%	2.80%
Non-South African	2	0.20%	1.90%	0.00%	0.80%
Other Provinces	17	1.60%	3.50%	1.00%	2.70%
Same district	439	42.10%	45.60%	39.10%	45.20%
Same town	567	54.40%	100.00%	51.30%	57.40%
Total	1043	100.00%	100.00%		

Table 7: Patient Classification:

	Frequency	Percent	Cum Percent	Range: 95% CI	
H0	179	17.40%	17.40%	15.20%	19.90%
H1	790	76.90%	94.40%	74.20%	79.40%
H2	21	2.00%	96.40%	1.30%	3.20%
H3	4	0.40%	96.80%	0.10%	1.10%
H4	17	1.70%	98.40%	1.00%	2.70%
Medical Aid	3	0.30%	98.70%	0.10%	0.90%
Private	13	1.30%	100.00%	0.70%	2.20%
Total	1027	100.00%	100.00%		

Table 8: Transport Used by the patient:

	Frequency	Percent	Cum Percent	Range: 95% CI	
Ambulance	113	12.00%	12.00%	10.00%	14.30%
No data	713	75.60%	87.60%	72.70%	78.30%
On foot	27	2.90%	90.50%	1.90%	4.20%
Other types of transport	51	5.40%	95.90%	4.10%	7.10%
Private vehicle	39	4.10%	100.00%	3.00%	5.70%
Total	943	100.00%	100.00%		

1.3 EVENTS IN EMERGENCY ROOM (QUALITY OF CARE)

Table 9: Investigations done:

	Frequency	Percent	Cum Percent	Range: 95% CI	
ECG	8	0.8	0.8	0.20%	1.40%
Laboratory Tests	151	15.3	16.1	12.60%	17.40%
No data	304	30.8	47.0	29.50%	35.80%
None	193	19.6	66.5	17.40%	22.80%
Others	107	10.9	77.4	7.00%	10.90%
X-ray	223	22.6	100.0	20.60%	26.30%
Total	986	100.0	200.0		

Table 10: Classification of the condition according to Specialty: Disease Profile

	Frequency	Percent	Cum Percent	Range: 95% CI	
ENT	15	1.4	1.4	0.80%	2.50%
Eye	13	1.2	2.6	0.60%	2.10%
Gynaecologic	57	5.2	7.7	3.80%	6.50%
Medical	350	31.9	39.7	29.40%	35.20%
No Data	64	5.8	45.5	4.50%	7.50%
Obstetrics	34	3.1	48.6	2.10%	4.30%
Orthopedics	24	2.2	50.8	1.20%	3.00%
Other	7	0.6	51.4	0.10%	0.90%
Pediatrics	67	6.1	57.5	4.70%	7.70%
Psychiatric	28	2.6	60.1	1.50%	3.40%
Surgical	94	8.6	68.6	6.50%	10.00%
Trauma	344	31.4	100.0	29.90%	35.80%
Total	1097	100			

Table 11: Outcome/Disposal at Emergency Room

	Frequency	Percent	Cum Percent	Range: 95% CI	
Absconded	4	0.40%	0.40%	0.10%	1.10%
Admitted - High Care	4	0.40%	0.80%	0.10%	1.10%
Admitted - Ward	231	22.40%	23.20%	19.90%	25.10%
Discharged	346	33.60%	56.80%	30.70%	36.60%
No Data	337	32.70%	89.50%	29.90%	35.70%
Other	3	0.30%	89.80%	0.10%	0.90%
Transferred - Higher level care	11	1.10%	90.90%	0.60%	2.00%
Transferred - Lower level care	10	1.00%	91.80%	0.50%	1.80%
Transferred - other departments	84	8.20%	100.00%	6.60%	10.00%
Total	1030	100.00%	100.00%		

Table 12: Procedure done in Emergency room:

	Frequency	Percent	Cum Percent	Range: 95% CI	
CPR	3	0.30%	0.30%	0.10%	1.00%
Diagnostic procedure	162	16.20%	16.50%	14.00%	18.70%
Drainage of abscess	7	0.70%	17.20%	0.30%	1.50%
Drainage of cavity	9	0.90%	18.10%	0.40%	1.80%
No Data	437	43.70%	61.90%	40.60%	46.90%
None	94	9.40%	71.30%	7.70%	11.40%
Other procedures	185	18.50%	89.80%	16.20%	21.10%
Plaster of Paris (POP)	16	1.60%	91.40%	1.00%	2.60%
Suturing	86	8.60%	100.00%	7.00%	10.60%
Total	999	100.00%	100.00%		

Table 13: Waiting time at Emergency room:

Waiting time	Count	Percentage	Cum. Percentage
< 30 minutes	91	17	17
30 min to 60 min	107	20	36
60 min to 90 min	124	23	59
90 min to 120 min	95	17	77
> 120 minutes	127	23	100
Total	544	100	

1.4. ANALYSIS OF TRAUMA PATIENTS

Table 14: Place of Injury

	Frequency	Percent	Cum Percent	Range: 95% CI	
Bar, Disco	4	1.30%	1.30%	0.40%	3.50%
Commercial Area	2	0.60%	1.90%	0.10%	2.60%
Construction Site	3	1.00%	2.90%	0.30%	3.10%
Health Service area	5	1.60%	4.50%	0.60%	4.00%
Home & Surroundings	89	28.80%	33.30%	23.90%	34.30%
No Data	171	55.30%	88.70%	49.60%	61.00%
Other	2	0.60%	89.30%	0.10%	2.60%
Prison/Custody	1	0.30%	89.60%	0.00%	2.10%
Public Transport	1	0.30%	90.00%	0.00%	2.10%
Road	21	6.80%	96.80%	4.40%	10.40%
School/Educational area	2	0.60%	97.40%	0.10%	2.60%
Sports Fields	8	2.60%	100.00%	1.20%	5.20%
Total	309	100.00%	100.00%		

Table 15: Cause of Trauma

	Frequency	Percent	Cum Percent	Range: 95% CI	
No Data	17	5.00%	5.00%	3.00%	8.00%
Other Accidents	139	40.90%	45.90%	35.60%	46.30%
Others	1	0.30%	46.20%	0.00%	1.90%
Suicide	11	3.20%	49.40%	1.70%	5.90%
Traffic/Transport	33	9.70%	59.10%	6.90%	13.50%
Violence	139	40.90%	100.00%	35.60%	46.30%
Total	340	100.00%	100.00%		

Table 16:Traffic Accidents: User type

	Frequency	Percent	Cum Percent	Range: 95% CI	
Driver	3	7.30%	7.30%	1.50%	19.90%
No data	12	29.30%	36.60%	16.10%	45.50%
Passenger - private	15	36.60%	73.20%	22.10%	53.10%
Passenger - public	3	7.30%	80.50%	1.50%	19.90%
Pedestrian	8	19.50%	100.00%	8.80%	34.90%
Total	41	100.00%	100.00%		

Table 17:Traffic Accident: Type of vehicle

	Frequency	Percent	Cum Percent	Range: 95% CI	
Bicycle	1	2.60%	2.60%	0.10%	13.80%
Car,Bukkie,LMV	25	65.80%	68.40%	48.60%	80.40%
Motorcycle	2	5.30%	73.70%	0.60%	17.70%
No data	7	18.40%	92.10%	7.70%	34.30%
Taxi	3	7.90%	100.00%	1.70%	21.40%
Total	38	100.00%	100.00%		

Table 18: Type of Accident Injury

	Frequency	Percent	Cum Percent	Range: 95% CI	
Accidental Fall	83	58.50%	58.50%	49.90%	66.70%
Bite - Dog	5	3.50%	62.00%	1.20%	8.00%
Blunt,sharp or crush injury	20	14.10%	76.10%	8.80%	20.90%
Burns - others	13	9.20%	85.20%	5.00%	15.10%
Firearm related	4	2.80%	88.00%	0.80%	7.10%
Machinery related	3	2.10%	90.10%	0.40%	6.00%
Other causes	5	3.50%	93.70%	1.20%	8.00%
Poisoning - Others	5	3.50%	97.20%	1.20%	8.00%
Poisoning - paraffin	4	2.80%	100.00%	0.80%	7.10%
Total	142	100.00%	100.00%		

Table 19:Type of Suicide Injury

	Frequency	Percent	Cum Percent	Range: 95% CI	
Blunt, sharp or crush injury	1	8.30%	8.30%	0.20%	38.50%
No data	2	16.70%	25.00%	2.10%	48.40%
Poisoning	9	75.00%	100.00%	42.80%	94.50%
Total	12	100.00%	100.00%		

Table 20: Cause of Interpersonal violence:

	Frequency	Percent	Cum Percent	Range: 95% CI	
Hit with Knife	47	33.10%	33.10%	25.40%	41.50%
Hit with other objects	59	41.50%	74.60%	33.30%	50.10%
Human bite	3	2.10%	76.80%	0.40%	6.00%
No Data	12	8.50%	85.20%	4.40%	14.30%
Others	1	0.70%	85.90%	0.00%	3.90%
Push/kick/fist	20	14.10%	100.00%	8.80%	20.90%
Total	142	100.00%	100.00%		

Table 21: Cause of Interpersonal Violence

	Frequency	Percent	Cum Percent	Range: 95% CI	
Abuse - child	1	0.70%	0.70%	0.00%	3.90%
Abuse - woman	1	0.70%	1.40%	0.00%	3.90%
Interpersonal - exlucding child, elederly and woman	115	82.70%	84.20%	75.40%	88.60%
Legal intervention	1	0.70%	84.90%	0.00%	3.90%
No data	20	14.40%	99.30%	9.00%	21.30%
Other types	1	0.70%	100.00%	0.00%	3.90%
Total	139	100.00%	100.00%		

Table 22: Severity of injury

	Frequency	Percent	Cum Percent	Range: 95% CI	
Fatal	2	0.60%	0.60%	0.10%	2.40%
Minor	141	41.60%	42.20%	36.30%	47.10%
Moderate	164	48.40%	90.60%	43.00%	53.80%
No Data	1	0.30%	90.90%	0.00%	1.90%
Severe	31	9.10%	100.00%	6.40%	12.90%
Total	339	100.00%	100.00%		

Table 23: Trauma: area of the body injured

	Frequency	Percent	Cum Percent	Range: 95% CI	
Abdomen	21	6.30%	6.30%	4.00%	9.60%
Arm	38	11.40%	17.70%	8.30%	15.40%
Back	8	2.40%	20.10%	1.10%	4.80%
Brain & spinal cord	1	0.30%	20.40%	0.00%	1.90%
Chest	13	3.90%	24.30%	2.20%	6.70%
Face, eye	39	11.70%	35.90%	8.50%	15.70%
Foot	13	3.90%	39.80%	2.20%	6.70%
Hand	40	12.00%	51.80%	8.80%	16.10%
Head	29	8.70%	60.50%	6.00%	12.40%
Leg	52	15.60%	76.00%	11.90%	20.00%
Multiple parts	61	18.30%	94.30%	14.40%	22.90%
Neck	7	2.10%	96.40%	0.90%	4.50%
No data	6	1.80%	98.20%	0.70%	4.10%
Other areas	5	1.50%	99.70%	0.60%	3.70%
Vertebral column	1	0.30%	100.00%	0.00%	1.90%
Total	334	100.00%	100.00%		

1.5 ANALYSIS OF THE QUALITY OF RECORD

Table 24: Cover sheet

	Frequency	Percent	Cum Percent	Range: 95% CI	
Cannot comment	32	3.10%	3.10%	2.20%	4.40%
Compliant	419	40.80%	43.90%	37.80%	43.90%
Non compliant	32	3.10%	47.00%	2.20%	4.40%
Partially compliant	544	53.00%	100.00%	49.90%	56.10%
Total	1027	100.00%	100.00%		

Table 25: First Report

	Frequency	Percent	Cum Percent	Range: 95% CI	
Cannot comment	84	8.20%	8.20%	6.60%	10.10%
Compliant	359	34.90%	43.10%	32.00%	37.90%
Non compliant	73	7.10%	50.20%	5.60%	8.90%
Partially compliant	512	49.80%	100.00%	46.70%	52.90%
Total	1028	100.00%	100.00%		

Table 26: Doctor's Report

	Frequency	Percent	Cum Percent	Range: 95% CI	
Cannot comment	85	8.30%	8.30%	6.70%	10.20%
Compliant	387	37.70%	46.00%	34.70%	40.70%
Non compliant	52	5.10%	51.00%	3.80%	6.60%
Partially compliant	503	49.00%	100.00%	45.90%	52.10%
Total	1027	100.00%	100.00%		

Table 27: Observation Record

	Frequency	Percent	Cum Percent	Range: 95% CI	
Cannot comment	343	33.40%	33.40%	30.50%	36.40%
Compliant	469	45.60%	79.00%	42.60%	48.70%
Non compliant	26	2.50%	81.50%	1.70%	3.70%
Partially compliant	190	18.50%	100.00%	16.20%	21.00%
Total	1028	100.00%	100.00%		

Table 28: Instruction Record

	Frequency	Percent	Cum Percent	Range: 95% CI	
Cannot comment	219	21.30%	21.30%	18.90%	24.00%
Compliant	482	46.90%	68.20%	43.80%	50.00%
Non compliant	33	3.20%	71.40%	2.30%	4.50%
Partially compliant	294	28.60%	100.00%	25.90%	31.50%
Total	1028	100.00%	100.00%		

Table 29: Investigation Record

	Frequency	Percent	Cum Percent	Range: 95% CI	
Cannot comment	624	60.80%	60.80%	57.70%	63.80%
Compliant	282	27.50%	88.30%	24.80%	30.30%
Non compliant	35	3.40%	91.70%	2.40%	4.80%
Partially compliant	85	8.30%	100.00%	6.70%	10.20%
Total	1026	100.00%	100.00%		

Table 30: Theater/procedure Record

	Frequency	Percent	Cum Percent	Range: 95% CI	
Cannot comment	958	93.30%	93.30%	91.50%	94.70%
Compliant	39	3.80%	97.10%	2.70%	5.20%
Non compliant	8	0.80%	97.90%	0.40%	1.60%
Partially compliant	22	2.10%	100.00%	1.40%	3.30%
Total	1027	100.00%	100.00%		

Table 31: Discharge/transfer Record

	Frequency	Percent	Cum Percent	Range: 95% CI	
Cannot comment	492	48.00%	48.00%	44.90%	51.10%
Compliant	166	16.20%	64.20%	14.00%	18.60%
Non compliant	76	7.40%	71.60%	5.90%	9.20%
Partially compliant	291	28.40%	100.00%	25.70%	31.30%
Total	1025	100.00%	100.00%		

1.6 ANALYSIS OF OTHER DATA

Table 32: Emergency or not

	Frequency	Percent	Cum Percent	Range: 95% CI	
Non-emergency Condition	417	43.60%	43.60%	40.40%	46.80%
Emergency Comdition	540	56.40%	100.00%	53.20%	59.60%
Total	957	100.00%	100.00%		

Table 33: Aggregate Quality of Records

	Frequency	Percent	Cum Percent	Range: 95% CI	
Mostly compliant	116	12.10%	12.10%	10.10%	14.30%
Partially compliant	540	56.10%	68.20%	52.90%	59.30%
Least compliant	306	31.80%	100.00%	28.90%	34.90%
	962	100%			

PART 2:

ANALYSIS OF ASSOCIATION USING SOME OF THE SELECTED VARIABLES.

1. Waiting time vs Severity

1=Immediate 2= < 1 Hour 3=1 to 2 Hour 4= > 2hours

wait	Severity: Minor	Moderate	Severe	Total
1	18	22	3	43
	16.98	20.18	16.67	18.45
2	23	38	4	65
	21.70	34.86	22.22	27.90
3	43	30	8	81
	40.57	27.52	44.44	34.76
4	22	19	3	44
	20.75	17.43	16.67	18.88
Total	106	109	18	233
	100.00	100.00	100.00	100.00

Pearson chi2(6) = 7.4167 Pr = 0.284

2.Waiting time vs Quality of Care

Wait. Time	Quality: 1	2	3	Total
Immediate	9	90	75	174
	16.36	23.44	29.88	25.22
<1hour	14	106	65	185
	25.45	27.60	25.90	26.81
1-2Hours	21	119	67	207
	38.18	30.99	26.69	30.00
> 2Hours	11	69	44	124
	20.00	17.97	17.53	17.97
Total	55	384	251	690
	100.00	100.00	100.00	100.00

3. Waiting time Vs Real emergency or not

0=not real emergency 1= real emergency

wait	Emergency 0	1	Total
1	81 26.30	88 23.22	169 24.60
2	85 27.60	101 26.65	186 27.07
3	85 27.60	123 32.45	208 30.28
4	57 18.51	67 17.68	124 18.05
Total	308 100.00	379 100.00	687 100.00

Pearson chi2(3) = 2.0998 Pr = 0.552

4. Waiting time Vs Disease classification

Specialty	waiting Time 1	2	3	4	Total
ENT	2 20.00	2 20.00	4 40.00	2 20.00	10 100.00
Eye	1 12.50	0 0.00	4 50.00	3 37.50	8 100.00
Gynaecologic	4 10.26	15 38.46	13 33.33	7 17.95	39 100.00
Medical	64 27.47	58 24.89	71 30.47	40 17.17	233 100.00
No Data	30 58.82	7 13.73	9 17.65	5 9.80	51 100.00
Obstetrics	12 46.15	7 26.92	7 26.92	0 0.00	26 100.00
Orthopedics	1 20.00	2 40.00	2 40.00	0 0.00	5 100.00
Pediatrics	8 18.18	14 31.82	12 27.27	10 22.73	44 100.00
Psychiatric	2 22.22	1 11.11	3 33.33	3 33.33	9 100.00
Surgical	11 18.97	21 36.21	18 31.03	8 13.79	58 100.00
Trauma	45 19.07	69 29.24	76 32.20	46 19.49	236 100.00
Total	180 25.03	196 27.26	219 30.46	124 17.25	719 100.00

5. Realtionship of few variables against the quality of records

Specialty	Quality 1	2	3	Total
ENT	0 0.00	9 64.29	5 35.71	14 100.00
Eye	0 0.00	5 41.67	7 58.33	12 100.00
Gynaecologic	10 21.28	22 46.81	15 31.91	47 100.00
Medical	37 11.97	161 52.10	111 35.92	309 100.00
No Data	0 0.00	6 11.32	47 88.68	53 100.00
Obstetrics	4 12.90	22 70.97	5 16.13	31 100.00
Orthopedics	0 0.00	10 76.92	3 23.08	13 100.00
Other	0 0.00	0 0.00	3 100.00	3 100.00
Pediatrics	8 14.55	33 60.00	14 25.45	55 100.00
Psychiatric	2 10.00	11 55.00	7 35.00	20 100.00
Surgical	8 10.53	40 52.63	28 36.84	76 100.00
Trauma	47 14.64	219 68.22	55 17.13	321 100.00
Total	116 12.16	538 56.39	300 31.45	954 100.00

Pearson chi2(22) = 139.9470 Pr = 0.000

Only selected disease classification

Specialty	Quality 1	2	3	Total
Medical	37 11.97	161 52.10	111 35.92	309 100.00
Trauma	47 14.64	219 68.22	55 17.13	321 100.00
Total	84 13.33	380 60.32	166 26.35	630 100.00

6. Investigation and Disease classification

Investigation	Disease -Specialty Medical	Trauma	Total
ECG	5	0	5
	1.83	0.00	0.87
Laboratory Tests	64	10	74
	23.44	3.33	12.91
No data	82	99	181
	30.04	33.00	31.59
None	55	60	115
	20.15	20.00	20.07
Others	30	15	45
	10.99	5.00	7.85
X-ray	37	116	153
	13.55	38.67	26.70
Total	273	300	573
	100.00	100.00	100.00

Pearson chi2(5) = 90.9400 Pr = 0.000

7. Residence and severity of the condition

0=same town 1= patients from other areas

Severity	sametown 0	1	Total
Minor	69	72	141
	48.94	51.06	100.00
Moderate	64	100	164
	39.02	60.98	100.00
Severe	19	12	31
	61.29	38.71	100.00
Total	152	184	336
	45.24	54.76	100.00

Pearson chi2(2) = 6.5588 Pr = 0.038

8. Origin of patient (same town or out of town) vs outcome

Outcome/disposal	sametown 0	1	Total
Absconded	4	0	4
	0.85	0.00	0.39
Admitted - High Care	1	3	4
	0.21	0.54	0.39
Admitted - Ward	130	101	231
	27.60	18.07	22.43
Discharged	158	188	346
	33.55	33.63	33.59
No Data	127	210	337
	26.96	37.57	32.72
Other	1	2	3
	0.21	0.36	0.29
Transferred - Higher	8	3	11
	1.70	0.54	1.07
Transferred - Lower l	3	7	10
	0.64	1.25	0.97
Transferred - other d	39	45	84
	8.28	8.05	8.16
Total	471	559	1030
	100.00	100.00	100.00

Pearson chi2(8) = 29.0119 Pr = 0.000

9. Age Vs residence of patients

age	sametown 0	1	Total
1	92 50.27	91 49.73	183 100.00
2	51 40.80	74 59.20	125 100.00
3	104 48.60	110 51.40	214 100.00
4	94 41.96	130 58.04	224 100.00
5	70 49.30	72 50.70	142 100.00
6	66 44.59	82 55.41	148 100.00
Total	477 46.04	559 53.96	1036 100.00

Pearson chi2(5) = 5.4934 Pr = 0.359

10. Age Vs Gender

age	Gender Female	Male	Total
1	76 15.05	105 20.04	181 17.59
2	63 12.48	61 11.64	124 12.05
3	110 21.78	103 19.66	213 20.70
4	113 22.38	110 20.99	223 21.67
5	69 13.66	73 13.93	142 13.80
6	74 14.65	72 13.74	146 14.19
Total	505 100.00	524 100.00	1029 100.00

Pearson chi2(5) = 4.7399 Pr = 0.448

11. Gender Vs Severity

Severity	Gender: Female	Male	Total
Fatal	0 0.00	2 0.96	2 0.60
Minor	56 43.75	83 39.90	139 41.37
Moderate	61 47.66	102 49.04	163 48.51
No Data	1 0.78	0 0.00	1 0.30
Severe	10 7.81	21 10.10	31 9.23
Total	128 100.00	208 100.00	336 100.00

Pearson chi2(4) = 3.6182 Pr = 0.460

12. Gender Vs Real emergency or not

Emergency	Gender: Female	Male	Total
0	226 48.39	187 38.80	413 43.52
1	241 51.61	295 61.20	536 56.48
Total	467 100.00	482 100.00	949 100.00

Pearson chi2(1) = 8.8882 Pr = 0.003

13. Gender Vs Disease classification

Specialty	Gender: Female	Male	Total
Medical	165 56.12	165 44.59	330 49.70
Trauma	129 43.88	205 55.41	334 50.30
Total	294 100.00	370 100.00	664 100.00

Pearson chi2(1) = 8.7087 Pr = 0.003

14. Gender Vs Residence

sametown	Gender: Female	Gender: Male	Total
0	237	237	474
	46.75	44.72	45.71
1	270	293	563
	53.25	55.28	54.29
Total	507	530	1037
	100.00	100.00	100.00

Pearson chi2(1) = 0.4297 Pr = 0.512