"An Analysis Of Hospital Admissions in KZN between 1998 and 2002 "

Full Report: July 2004

PREFACE

It is a pleasure to write the Preface for this five-year review on the Hospital Admissions and Discharge Profile report, which gives a good indirect description of the burden of disease for the Province of KwaZulu-Natal. It is important that our Department bases it's Strategic Plans as well as Operational and Action Plans on sound evidence. This Review provides further evidence of the disease profile confronting us and as a result helps the Department to identify priorities and inform resource allocation using the best available information.

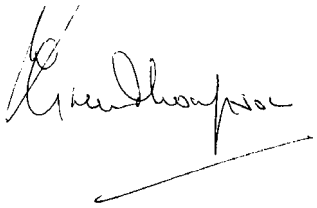
It is clear that infectious diseases account for the majority of work at District Hospitals and the District Health System while non-communicable diseases provide the majority of work at Regional, Tertiary and Central Hospitals. This is a correct spread although the infectious disease load at Tertiary and Central Hospitals as well as the non-communicable spread at Tertiary and Central Hospitals needs to be reduced. Application of the results of this report is necessary and will enable us to engage in robust discussions such that our further allocation of resources and development of priorities can be enriched.

From this report it, once again, clearly indicates that non-communicable diseases are common and that there is still a divide between the first and third world parts of our Province, which shape the disease profiles. HIV and AIDS is skewing the gains made by the Department in terms of improving access to health care, clinical protocols for the management of patients, the improved quality of care provided and the overall gains by all these initiatives. Further work needs to be done to sift out the variances caused by HIV and AIDS but this is not a simple task as HIV and AIDS is not a notifiable disease and nor does it mean that a person who is HIV positive has died from HIV and AIDS.

I wish to record the thanks of the Department to the Italian Co-operation and the Epidemiology Unit for this work. It would be appreciated this document stimulates further discussion, to help us to enhance our Baseline Survey for the next 5 years, to use this review to firm up the indicators and targets for the next five years and to consider further review of the resource allocation.

Enjoy reading this document, be enriched and please contribute to the next one.

Thank you.



Professor R W Green Thompson
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EDITORIAL

The research team, the Epi Unit and the Italian Cooperation must be congratulated for a study that has been well conducted and that will contribute tremendously to the efficient and effective management of the health services within the Province.

This study marks a significant step in the right direction towards policy formulation and rational planning of health services in the Province that takes into cognisance the mortality and morbidity profiles of patients presenting at hospitals. It is encouraging to note that anecdotal information can now be replaced by firm epidemiological evidence to guide the development of the departments' strategic objectives and the resource allocation to impact positively on the health status of communities. For the hospital service sector, an excellent opportunity is now provided to review its current and develop future service delivery plans that are aligned to the mortality and morbidity profiles.

This study confirms the experiences of the hospital service sector of the HIV/AIDS/TB epidemic on hospital service provision. The rising proportion of admissions for HIV/AIDS over 2 years (12.5% to 14.9%) has and will continue to put an increasing strain on the human and financial resources on hospitals. It would be interesting to monitor and evaluate the impact of the anti-retroviral programme on hospital services in the South African setting. The hospitals are challenged with the service provision for the triple burden of disease – those of poverty, life style and injuries. Resource allocation therefore between the competing demands for the services at the institutional level requires skilful balance that ensures best clinical outcomes within the available resources and simultaneously patient satisfaction.

The study has highlighted disease patterns, which are clearly amenable to changes through an integrated approach focusing on primary care, health promotion and prevention, intersectoral collaboration and community participation. This approach is essential in reducing the burden on the hospitals and for the provision of cost–effective health services. It is also encouraging to find that the admission patterns of the various

levels of hospital (central, regional, district) are in keeping with the expected patterns for these levels. This may therefore imply that there are efficiency gains that have been achieved by the hospital service sector but this can only be confirmed once an appropriateness of care evaluation has been conducted.

The timeous, accurate collection and use of statistics at all levels of management cannot be emphasised enough in terms of the benefits accrued for targeting the most appropriate cost-effective interventions to reduce the burden of preventable diseases as shown in this study. The need to ensure the availability and integrity of the medical records; the accurate recording of clinical information by the clinicians and a robust data management system for clinical information that informs planning, resource allocation and monitoring, are challenges that need be addressed with more rigor. A strong management imperative that compels all management levels to embark on evidence based decision making could enhance the culture of and begin to address the systemic issues of information use.

Finally this directorate fully supports the recommendations for this study to be repeated periodically over the next few years and the need for epidemiological modelling to augment the planning and the management capacity within the Department.

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FORWARD NOTE

The Italian Health Cooperation had the privilege of experiencing and contributing to the process of transformation to Democracy in KwaZulu-Natal. In fact, following the first humanitarian interventions performed in the "eighties" and "nineties" in Zululand, we had the opportunity to work within the main stream of the new Department of Health, for the common goal to render more equitable health services to the population, based on an attentive, comprehensive and scientific understanding of the health needs in KwaZulu-Natal. From 1999 to 2003 a first Project was implemented; we have been presently running the second Project. In both the Projects, an important part of the activities has been devoted to the integration between collection, interpretation and evaluation of Health data in the Province.

I think that the publication of the full report of the Hospital Survey, as much as the recent publication of the Epidemiology Bulletin on the Hospital Indicators, is a remarkable contribution of the Italian Cooperation to the tremendous effort of the Department of Health of KwaZulu-Natal. More extensive information about the Italian Cooperation in KwaZulu-Natal is displayed on the internal link of the site of Department of Health of KwaZulu-Natal.

Conceiving and leading the survey in all the provincial hospitals in 2003 has been a challenge for the Project, for the Epidemiology Unit and for each member of the Survey Team. The capable and competent guidance and coordination of our Epidemiologist Dr. Venanzio Vella, has been an asset within the process. Collating, analysing and interpreting the relevant data has been an important and demanding task.

Last, but by no mean the least, I wish to highlight the capacity building implications of the Hospital Surveys: all the team members acquired valuable experience with the Italian Cooperation. Many managers and Officers at central and hospital level have been involved in the process. I am sure that DOH will be able to capitalize from the survey on the causes of hospital discharge and from the ongoing survey to validate the hospital indicators. It might be done by regularly repeating such surveys and also creating a favourable environment in which the Hospital Managers and the Central Managers will commonly consider the relevant inferences of the surveys. The Italian Cooperation is eager to foresee further collaboration with the Colleagues and Managers of the Department along next year.

Finally we wish to stress that a third Italian Project, having as main objective supporting Department of Health of KwaZulu-Natal at Central Level to enhance collaboration on planning, will start soon. The Project will also have an important implementation component at the agreed District of Umzinyati.

Dr. Antonio Silvestri
Italian Project Leader

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Acronyms & Definitions of Terms

CFR	The Case Fatality Rate was the proportion of patients admitted for a disease who died.
Categories	Each Group was disaggregated into categories such as Respiratory infections under Group I, as shown in Annex III.
COPD	Chronic Obstructive Pulmonary Disease.
Diagnosis	Each diagnosis, based on the full medical history, was related to the underline medical condition that started the train of events leading to the hospitalisation. Two medical doctors reviewed each survey form and arrived independently at the diagnosis. In case the diagnosis was inconsistent, this was discussed and if there was no agreement the cause remained undetermined. The unit of analysis was the patient admitted between the 1st of January and the 31st of December of the years covered by the survey. This means that a patient who was admitted in the last few days of December of 1998 was considered within the calendar year of 1998 even if he/she was discharged in January of 1999.
DHS	1998 Demographic and Health Survey.
DOH	Department of Health.
FY	Financial Year.
Groups	Group I was composed of communicable diseases, pathological conditions affecting the maternal[1] and perinatal period, and nutritional conditions. Group II and Group III were respectively composed of non-communicable diseases and injuries.

[1] Normal deliveries were excluded from the analysis

HIS	The Health Information System (HIS) provides data that is collected at various levels of the health system, mainly to improve the management of the health services. These data are processed by the DOH to estimate the number of admission, discharges and deaths but no information is routinely collected on the medical diagnoses.
IHD	Ischaemic Heart Diseases.
ICD10	International Classification of Diseases No. 10.
Incomplete Abortion	Incomplete expulsion of the products of conception, with part of it remaining in the uterus.
KZN	KwaZulu-Natal.
LRTI	Lower Respiratory Tract Infections.
Modelling	Mathematical representation of phenomena, where assumptions are used to assess the variation in the epidemiological estimates. This provides an idea about the degree of uncertainty/error and about the robustness of the estimates.
NCHS	The National Center for Health Statistics in the United States has conducted national hospital discharge surveys (NHDS) since 1965.
PID	Pelvic Inflammatory Disease.
SPSS	Statistical Software for the Social Sciences.
TOP	Termination of pregnancy.
URTI	Upper Respiratory Tract Infections.
US	The United States.
Vital statistics	Records related to births, marriages, divorces, separations and deaths.
WHO	World Health Organization.

Acknowledgement

This report presents the estimates of the hospital admissions by cause, which occurred in KwaZulu-Natal in the period 1998-02. The survey was a joint product of the Kwazulu-Natal Department of Health (DOH) and the Italian Cooperation, which financed it and provided technical support. Dr. Thilo Govender, Principal Epidemiologist of the DOH provided her technical inputs during the survey. Dr. Sibongile M. Zungu, Director of the Institutional Support Services, DOH, gave her approval and sent a letter asking for the collaboration of the hospital managers. The hospital managers took their time to meet with the survey team and provided their assistance in getting access to the medical records. Dr. Venanzio Vella, epidemiologist of the Italian Cooperation, co-ordinated the survey, analysed the data and wrote this report, benefiting from the inputs of the people mentioned in this acknowledgement. Dr Dario Mariani, public health specialist of the Italian Cooperation cross-validated the discharge diagnoses. Dr. Antonio Silvestri, Project Leader of the Italian Cooperation followed up the financial aspects of the survey. The survey team members were Mr. Nkosinathi E. Mthethwa (supervisor), Mr. Bongani P. Kubheka, Mr. Smilo Mzolo and Miss. Pamela P. Mkhize, who were commendable for their hard work and professionalism. The archivists helped the team in tracing the registers and the medical records. Bisnath Reshma and Imam Rogany from the Italian Cooperation contacted the hospital managers to set up the schedule, coded the forms and entered the data into SPSS.

Abstract

i) Introduction

This report presents provincial estimates of the causes of hospitalisation in KwaZulu-Natal (KZN) between 1998 and 2002. While the Health Information System (HIS) provides indicators on the patient throughput, such as the number of admissions and discharges, the causes of hospitalisation are not included. A routine data collection system on the discharge diagnoses would be too costly, because it would require extra staff and an effective supervision to ensure the reliability of the diagnoses. For this reason, the Department of Health (DOH) of KZN, assisted by the Italian Cooperation, conducted a survey on the hospital discharges for the period 1998-02.

ii) Objectives

The objective was to estimate the burden of hospitalisation. This included the estimation of the admission rates by cause disaggregated by age and gender, the length of stay and the mortality by cause. The estimates were to be representative of the province and no disaggregation by district or hospital was within the scope of the survey.

iii) Methodology

The survey was based on a representative sample of the medical records stored in the archives of the public hospitals of KZN. The survey was carried out between May and September 2003 in 67 hospitals funded by the DOH, where a systematic random sampling of 1 every 500 medical records stored in the archives was applied. The initial objective was to get a representative sample of the medical records for patients who were admitted between the 1st of January and the 31st of December of 1998, 2000 and 2002. However, about one third of the hospitals did not have records for 1998 and the following available year was sampled instead. Nonetheless, three-year worth of admission records were sampled in each hospital and the results are presented as annual averages for the period 1998-02.

The diagnosis was decided according to the underlying medical condition that started the train of events leading to hospitalisation. Two medical doctors at the DOH reviewed independently each survey form and decided the final diagnosis according to the International Classification of Diseases No. 10 (ICD10). The inconsistent diagnoses were discussed to achieve consensus and in case this was not reached, the diagnoses were considered undetermined, which was the case in about 4% of the medical records.

The medical records provided the basis for the estimation of the average annual burden of hospitalisation for the period 1998-02. Because all the public hospitals were included in the survey and a systematic random sampling was used, the sample was self-weighted.

The data was inflated by the reciprocal of the sampling interval and it was divided by the number of years covered by the survey to produce the average annual provincial estimates. This produced a reliable profile of the annual burden of hospitalisation for the period 1998-02.

The diagnoses, based on the International Classification of Diseases No 10 (ICD10), were aggregated in accordance with the Burden of Disease (BOD) methodology. Group I was composed of communicable diseases, maternal and perinatal conditions, and nutritional deficiencies. Group II and Group III were respectively composed of non-communicable diseases and injuries. Each group was disaggregated into disease categories such as respiratory infections for Group I, cardiovascular diseases for Group II and intentional injuries for Group III. Each category was further disaggregated into specific causes such as stroke for the cardiovascular category. The table on the subdivision of the ICD10 codes into Groups, disease categories and specific causes is in Annex III. The discharge diagnoses are presented as annual average estimates for the period 1998-02, except for the last figure that is related to the changes in the admission profile between 2000 and 2002.

iv) Results

The overall sample was fairly spread across the hospitals. The proportional distribution of the sample across the hospitals was very similar to the distribution of the admissions reported by the health information system, confirming that the sample was self-weighted. The results are presented by disease Group, category and specific cause.

Disease groups

Groups I, II and III caused respectively about half, one third and one fifth of all the admissions. There were an estimated 679,500 annual admissions for the period 1998-02; 489,000 of which were related to pathological conditions, including maternal conditions, and the rest were due to normal deliveries. Of these 489,000 admissions; 47%, 31% and 18% were respectively due to Groups I, II and III, while 4% of the causes remained undetermined. The main gender difference was a higher proportion of Group III among males, and of Group I and Group II among females.

Disease categories

AIDS was the primary cause of admission. AIDS and unintentional injuries are estimated to have caused respectively about 60,500 and 55,000 admissions per year during the period 1998-02. TB, respiratory infections, diarrhoea and intentional injuries followed next, with respectively about 41,500; 37,500; 35,000 and 33,500 admissions per year; while the other categories caused a decreasing number of admissions. Therefore, AIDS contributed to slightly more than 12% of the admissions in the period 1998-02. However, this does not include cases who had not yet developed AIDS and who were admitted for communicable diseases whose underline cause was HIV. Because only a

few patients were tested for HIV, it was not possible to estimate the proportion of communicable diseases whose underline cause was HIV.

Specific causes

Each category was disaggregated into more specific causes such as traffic accidents and falls for the 'unintentional injuries' category. The first five specific causes were AIDS, TB, diarrhoea, lower respiratory tract infections (LRTI) and assault. Abscesses, diabetes, traffic accidents, falls, burns, other accidents, incomplete abortion, stroke, epilepsy, psychosis, upper respiratory tract infections (URTI), malaria, congestive heart failure, hypertension and asthma ranked between the 6th and the 20th specific cause of admission.

Age profile

The age profile was informative about the burden affecting each age group. The most frequent causes of admission were communicable diseases among preschoolers, injuries among adolescents, AIDS and TB between 25 and 44 years of age, and non-communicable diseases after 44 years of age. The age groups contributing the highest number of admissions were preschoolers and adults between 15 and 44 years of age.

Type of hospitals

The admission pattern differed by type of hospital. The proportion of admissions due to non-communicable diseases and injuries was higher in central hospitals and declined in regional and district hospitals. The proportion of inpatients with TB, AIDS and other communicable diseases was higher in district hospitals and declined in regional and central hospitals.

Average length of stay

The average longest length of stay was for TB. Patients admitted for TB spent an average of 18 days; while patients affected by malignant neoplasms, musculoskeletal disorders, unintentional injuries, neuropsychiatric conditions and AIDS spent between 10 and 15 days. The average length of stay for most of the other categories was between 5 and 10 days.

Mortality

More than half of the hospital mortality was due to AIDS and TB. Because of the high case fatality rate and the high frequency of admission, AIDS and TB caused respectively about 39% and 12% of the total hospital mortality. The proportional contribution to hospital mortality was about 10% for cardiovascular diseases, 5% for respiratory infections, diarrhoea, diabetes and malignant neoplasms; and less than 5% for the other categories.

Disease profile within each category

The presentation of the results continues with a description of the profile of the most important diseases within each category. In group I, communicable diseases declined after 5 years of age, increased between 15 and 34 years of age and declined again after the age of 34. AIDS and TB accounted for more than half of the communicable diseases, diarrhoea and respiratory infections contributed for another 40%, and the remaining communicable diseases accounted for about 7%. Most of the rest of Group I was composed of maternal conditions, half of which was due to incomplete, spontaneous and threatened abortion.

In Group II, cardiovascular diseases were the first non-communicable diseases, followed by genitourinary conditions. Cardiovascular diseases and diabetes increased after 34 years of age, genitourinary conditions increased sharply among females of reproductive age and neuropsychiatric conditions peaked between 25 and 34 years of age. In terms of specific causes within each disease category, stroke and hypertension accounted for more than 40% of the admissions in the cardiovascular category. Nephritis and nephrosis were the most common causes of admission among males and pelvic inflammatory disease was the first cause of admission among females in the genitourinary category. Psychosis and substance abuse were more frequent among males, while depression was more frequent among females in the neuropsychiatric category. Diabetes was affecting more females and around 37% of the admissions for this condition were due to poor control ending in ketoacidosis and hyperglycemia. The most frequent digestive conditions were gastritis, cirrhosis of the liver and anal abscess. The first cause of malignant neoplasms was cancer of the oesophagus among males and cancer of the cervix among females.

In Group III, intentional and unintentional injuries affected more males than females and were concentrated in the youngest age groups. The most frequent injuries were not intentional and they peaked between 5 and 14 years of age. Intentional injuries were mainly due to assaults and they increased sharply between 15 and 24 years of age.

Trends

The main change between 2000 and 2002 was the increase in the number of admissions due to AIDS. Because 1998 was available for only two thirds of the sample, it was only possible to measure changes between 2000 and 2002. The proportion of admissions due to AIDS increased from 12.5% to 14.9% between 2000 and 2002. TB and respiratory infections increased as well but at a lower rate and the other diseases remained relatively stable.

v) Discussion

This survey is the first of its kind to provide provincial estimates for the causes of admission in the public hospitals of KZN. The results confirm that KZN is in the process of the epidemiological transition, which is characterized by the permanence of

communicable diseases and the insurgence of non-communicable diseases. Because of the co-existence of diseases of poverty and affluence, complex decisions need to be made on the basis of priority diseases, cost-effectiveness of interventions and feasibility allowed by available human and financial resources.

Group I

While primary prevention on risk factors can reduce the incidence in the long term, curative interventions can reduce the hospitalisation in the short term. The survey has estimated that clinical AIDS caused slightly less than 15% of the admissions in 2002 but the burden of HIV is higher because it is the underline cause of a high proportion of TB, respiratory infections, diarrhoea and other communicable diseases. The number of AIDS cases is rising because those who were infected by HIV years ago are approaching the clinical stage of AIDS. While preventive strategies to decrease the spread of HIV will be critical to tackle the roots of the problem, AIDS patients will increasingly overburden the hospitals in the next coming years. Antiretroviral therapy may reduce this burden by preventing the deterioration of AIDS, TB and other communicable diseases, which are associated with HIV.

Group II

Non-communicable diseases accounted for about one third of the admissions, with cardiovascular and genitourinary conditions being the most common non-communicable disease categories. Primary prevention will take a long time to reduce the risk factors that cause chronic degenerative diseases because of the difficulty involved in changing risky behaviours. Secondary prevention through effective treatment of those already affected by hypertension, diabetes and other non-communicable diseases can reduce the burden of hospitalisation. Costs and feasibility of preventive and treatment strategies need to be assessed so that interventions can be ranked in order of priority.

Group III

Injuries affected disproportionately more males and unintentional injuries were more frequent than intentional ones. Traffic accidents were the most frequent unintentional injuries followed by falls, burns, accidental poisoning and other unintentional injuries. Four out of ten injuries among males and two out of ten injuries among females were due to assault. The rest of the intentional injuries were due to attempted suicides, which were the only injuries affecting more females than males. Prevention of traffic accidents can produce an impact faster than other preventive strategies, if compliance with traffic regulations is enforced. Reducing interpersonal violence is much more difficult because it is deeply routed in socio-economic and cultural causes.

vi) Conclusions and recommendations

The results of this survey should provide a sound basis to improve planning and to measure the impact of intervention strategies. The results of the survey provide a sound basis to set priorities and a benchmark against which to measure future trends. The policy debate should strike a balance between competing priorities and feasibility of interventions within available human and financial resources. Medical doctors and patients affected by specific conditions would argue that there is no need to set priorities because each and every patient should be covered whatever the costs may be. However, covering all the needs is impossible due to budget limitations and some ranking should be done on the basis of the burden of hospitalisation, the cost effectiveness of interventions and the limitations of the health system in implementing them.

Taking into account the limitations of the health system is critical. Having identified health problems and cost-effective interventions is not enough if feasible strategies are not in place. Although hypertension and diabetes are priority diseases and treatment guidelines are available, most patients affected by these conditions continue to be hospitalised because they are poorly treated at primary care level. The challenge for the DOH is to find alternatives to improve this situation within feasible implementation criteria and limited available resources. Once strategies are more in line with what is achievable within the limited capacity of the health system, they could become more effective in reducing the complications of those already affected by long-term diseases and therefore reduce the need for hospitalisation. Follow up surveys could be conducted once every few years to assess such effectiveness by measuring changes in the admission rates for target diseases.

1) Introduction

Although the information on the causes of hospitalisation is essential to plan a better use of resources, this information is hard to get. In most countries, the Health Information Systems fail to collect reliable information on the discharge diagnoses. The collection of reliable statistics on medical diagnoses requires a complex and costly system in terms of extra staff, training, supervision and quality check that is beyond the capacity of most routinary data collection systems.

Even the most advanced countries resort to surveys to estimate the causes of hospitalisation. For example, the National Center for Health statistics (NCHS) in the United States (US) has conducted national hospital discharge surveys (NHDS) since 1965. The NHDS is the principal source of information on discharge diagnoses from non-federal short stay hospitals in the US. This is used to measure the trends in the causes of hospitalisation, medical and surgical procedures, and length of stay by cause.

Maynard et al. (1988) described patient characteristics and the outcomes for cardiovascular procedures performed in 214 hospitals in the United States between 1993 and 1994. They described the characteristics of the patients such as age and gender, insurance ownership and residence. Multivariate analysis showed that advanced age, diabetes, gender, and Medicaid payer status were associated with increased risk of mortality. This survey helped to estimate the annual national rates for these interventions, including complications and mortality.

In Canada, Hoey and McDonald (1978) have sampled hospital admission records for the years 1966 through 1974. Their objective was to measure changes associated with the introduction in 1970 of the universal health insurance. They found that non-surgical discharge rates continued to decline in Montreal and remained steady in the rest of the province. In contrast, discharges following surgery did not decline in Montreal and increased substantially since 1970 in the rest of the province.

For diseases with a high degree of hospitalisation, surveys of medical records have been used to estimate the population rates. Naess et al. (2002) have sampled discharge records to determine incidence and short-term outcomes of people aged 15 to 49 years with first-ever cerebral infarction in 1988-1997 in Hordaland County, Norway. Rahman et al. (2000) sampled hospital records to estimate injury rates in Bangladesh. Barber et al. (1998) used hospital records to estimate rates for fatal and nonfatal gunshot wounds and sharp instrument assaults in Massachusetts. Phadungkiat et al. (2002) estimated the incidence of hip fracture in Thailand by sampling hospital records. Akinbami and Schoendorf (2002) studied the trends of childhood asthma prevalence, health care utilization and mortality to assess changes in the disease burden among children in the US.

Present status in KZN

The KZN DOH does not have provincial estimates on the hospital discharges and deaths by cause. The Department of Informatics of the DOH collects several indicators related to the hospital throughput such as the number of admissions, discharges and deaths, but no statistics is produced on medical diagnoses. There is no routinary system to extract and process the information from the medical records. Only a few hospitals produce some statistics on the discharge diagnosis, but this is done more because of the interest of individual managers than as a concerted effort from the DOH to get representative statistics for the whole province.

This situation does not allow the DOH to know why patients are admitted, how long they stay per type of admission, and what are the causes of death. According to the Strategic Position Statement for KZN (2001), AIDS was estimated to have contributed 19% of all the admissions in 2001. It is important to confirm these estimates because they have profound implications in terms of utilization of resources and displacement of other patients. Implementing a routine data processing of all the medical records is neither feasible nor desirable because it would have prohibitive costs, it would take too long to implement and it would not be the best use of scarce resources. The only way to get a representative picture at the moment is to take a representative sample of the medical records that are stored in the archives of the hospitals.

To describe the burden on AIDS and other diseases on the health system, the DOH and the Italian Cooperation decided to conduct a survey on the hospital admissions in KZN. The estimation of the admission rates for major diseases, the case fatality rates and the average length of stay by cause will be used to rank health problems in order of priority and identify interventions that may reduce the burden of hospitalisation.

2) Objectives

The objective of this survey was to measure the burden of hospitalisation. This included the estimation of the number of admissions by cause disaggregated by age and gender, the length of stay and the mortality by cause. The estimates were to be representative of the province and no disaggregation by district or by hospital was within the scope of the survey. Therefore, the universe was the province and the data was related to the hospital admissions.

3) Methodology

The survey was based on a representative sample of the medical records, which were stored in the archives of the hospitals funded by the DOH. The sample size was based on the proportion of hospitalisations expected to be due to AIDS. The null hypothesis was that about 19% of the admissions were due to AIDS and to get such estimate within an error of +-2%, with a certainty of 95%, the required sample was in the order of 1,400

medical records per year[2]. Considering that according to the health information system (HIS), the average annual number of admissions in KZN is in the order of 700,000[3], the sample was to be reached by selecting about one medical record every 500.

Besides sampling the latest available year to get the most updated estimates for rapidly increasing diseases like AIDS, it was also decided to repeat the same sample across several years to get a more stable picture of the hospitalisation profile. This approach had the objective to produce a pooled sample on which to base more stable estimates of the average annual burden. Most diseases have annual fluctuations and by taking into account only the most recent year there is a risk of over-estimating some diseases that are at their peak and under-estimating other diseases that are at their lowest level. Taking several years into account allows to estimate a more stable annual average, which is essential for ranking priorities. Because hospitals keep their medical records for a maximum of five years, it was decided to sample the records related to the admissions of the calendar years of 1998, 2000 and 2002.

Taking all the public hospitals was considered more efficient than taking a sample. Sampling a few hospitals would be less effective in capturing the inter hospital variation and would be associated with higher sampling errors. This means that a much larger sample of medical records would have been required to maintain the same sampling errors. Therefore, selecting a few hospitals would not have been much of a gain in terms of the time spent by the enumerators to complete the survey. Sampling hospitals makes sense in large countries where there are hundreds of hospitals and taking a sample provides logistic gains and cost savings. Therefore, all the publicly funded hospitals, with the exception for the small institutions for the chronically disabled were included.

A systematic random sampling based on the registers of the admissions was applied in each hospital. The archivists provided all the registers related to the admissions for 1998, 2000 and 2002, which were used as the sampling rosters. The first admission of each year was selected by drawing a random number between 1 and 500. The following ones were selected by applying a sampling interval of 500 till the last admission for the respective year was reached**.** Having exhausted the admissions for 1998, the same procedure was repeated for the registers of 2000 and 2002. Unfortunately, about one third of the hospitals did not have records for 1998 and the next available year had to be selected instead.

Having selected the admissions, the relative medical records were traced on the shelves of the archives or any other place where they were stored. If a record was not available, every effort was done to locate it and if this did not succeed, the following admission in the register was selected instead. A total of 4077 records were collected from all the hospitals, which is equivalent to 1359 records per year. The enumerators extracted the information from the medical records through survey forms.

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[2] 1.96^2*0.19*(1-0.19)/0.02^2 = 1478

[3] Health Information Bulletin April 2000 to March 2000

The survey forms were coded at the DOH and the final diagnosis was assigned according to the underlying medical condition that started the train of events leading to hospitalisation. Two medical doctors reviewed each survey form and independently decided the medical diagnosis according to the International Classification of Diseases No. 10 (ICD10). For each case, the two independent diagnoses were compared and if they were not consistent, the medical history was reviewed and discussed to achieve consensus. If this was not reached, the diagnosis was considered undetermined, which was the case for about 4% of medical records.

As for the other diseases, the diagnosis of AIDS was based on the medical history. An admission was considered to be due to AIDS if the medical record stated clearly that the patient was a case of clinical AIDS. Examples of such statements included "clinical retroviral disease" and "terminal stage of AIDS". The medical records related to clinical AIDS were also searched for the major and minor signs of AIDS suggested by the World Health Organisation, and for the results of relevant laboratory tests including HIV and CD4 cell count. Because of the conservative criteria applied for the diagnosis of AIDS, it is likely that the number of admissions due to AIDS is an under-estimate.

The data was entered, cleaned and analysed. A trained coder entered the information into SPSS 11.0 and a research assistant reviewed the SPSS records against the original survey forms. The data was further validated for miscoding and inconsistencies by running frequency distributions and cross tabulations. The records, which were source of inconsistencies, were identified and their information was corrected accordingly. Because the survey covered all the public hospitals and a systematic random sampling was applied, the sample was self-weighted. The provincial annual estimates were produced by inflating the data by the reciprocal of the sampling interval and by dividing by the number of years covered by the survey. The 95% confidence intervals (CI) were estimated to provide the uncertainty around the estimates. In surveys, the 95% CI are based on the sampling errors related to the variability occurring by chance. This variability is due to the fact that a sample rather than a census of all records is taken. There is a 95% probability that the real value is within the numeric interval defined by the 95% CI.

The diagnoses were coded according to the International Classification of Diseases No. 10 (ICD10) and were aggregated into three main Groups, as suggested by the Burden of Disease (BOD) methodology introduced by Murray and Lopez. Group I was composed of communicable diseases, maternal conditions[4], perinatal conditions and nutritional deficiencies. Group II and Group III were respectively composed of non-communicable diseases and injuries. Each Group was disaggregated into disease categories, such as the cardiovascular category in Group II, and each category was disaggregated into specific causes, such as stroke and ischaemic heart diseases in the cardiovascular category. The ICD10 codes in Annex III provide the list of the categories from I-A (tuberculosis) through III-B (intentional injuries). The specific causes are listed under each category, such as 'self-inflicted' and 'assaults' under III-B.

[4] Excluding normal deliveries

The disaggregation of the groups into categories was based on the BOD methodology and the frequency of admissions. For example AIDS and TB were considered categories under Group I, even if they are specific causes, because of their high frequency of admissions. Diarrhoea and respiratory infections were disease categories under Group I because they are clusters of diseases, which are characterized by common routes of transmission of the causing agents and because they affect the same organ systems.

The disaggregation of the categories into specific causes was influenced by the diagnostic feasibility. For example, diarrhoea was not disaggregated into more specific causes because very few cases were tested to identify the causal agent of diarrhoea. Respiratory infections were further divided into upper and lower respiratory infections because this was within the diagnostic feasibility allowed by the information contained in the medical records.

Hospitalisation rates were based on the population expected to be using the public hospitals. According to the Strategic Position Statement of 2001, the proportion using the public hospitals was estimated at about 88% of the population. The 2001 census, adjusted for population growth and for the proportion expected to be using the public hospitals, provided the denominator for the rates.

4) Results

The overall sample of 4077 admissions was fairly spread across the hospitals. Table 1 shows that the distribution of the sample is very similar to the distribution of the admissions reported by the HIS, confirming that the sample was self-weighted. The hospitals' proportional distribution of the average annual number of admissions reported by the health information system (HIS), for the period between financial year (FY) 1999/00 and FY 2002/03, is very similar to the distribution of the sample collected by the survey. For example, King Edwards had an average of about 57,000 annual admissions between FY99/00 and FY02/03, which corresponds to about 8% of the average annual admissions for all the hospitals. Similarly, the 322 records sampled by the survey in King Edwards correspond to about 8% of the total sample collected by the survey. It has to be noted that the two proportional distributions cannot be identical because the data reported by the HIS cover a different time period and the HIS is not free of errors.

Most of the results presented in this analysis are related to the average annual admissions for the period 1998-02. The results presented between section *4.1* and *4.8* are related to the estimated annual admissions for the period 1998-02, while section *4.9* describes the changes in the admissions between 2000 and 2002.

Table 1 Distribution of the admissions reported by the HIS and distribution of the sample across the hospitals of KZN

Type of hospital	Name of hospital	District	Average annual admissions FY99/00 – FY02/03	% Admiss. over total	Records sampled by the survey	% sample over total
Central hospitals	King Edward	Ethekwini	57215	8.3%	322	7.9%
	Wentworth		6062	0.9%	41	1.0%
	Grey's	Umgung.	21915	3.2%	110	2.7%
Regional hospitals	Madadeni	Amajuba	19466	2.8%	116	2.8%
	Newcastle		10698	1.5%	65	1.6%
	Addington	Ethekwini	37109	5.4%	235	5.8%
	King George		1188	0.2%	7	0.2%
	M. Gandhi		17245	2.5%	110	2.7%
	Pr. Mshiyeni		36194	5.2%	230	5.6%
	RK Khan		27638	4.0%	181	4.4%
	Stanger	Ilembe	20576	3.0%	134	3.3%
	P Shepstone	Ugu	16297	2.4%	108	2.6%
	Edendale	Umgung.	34962	5.1%	212	5.2%
	Ladysmith	Uthukela	21515	3.1%	138	3.4%
	Ngwelezane	Uthungulu	19988	2.9%	89	2.2%
	L Umfolozi		15774	2.3%	86	2.1%
District hospitals	Niemeyer	Amajuba	2392	0.3%	17	0.4%
	Osindisweni	Ethekwini	7692	1.1%	54	1.3%
	St Mary's (Marianhill)		12527	1.8%	62	1.5%
	Montebello	Ilembe	3986	0.6%	26	0.6%
	Umphumulo		4272	0.6%	21	0.5%
	Untunjambili		3356	0.5%	19	0.5%
	Christ the King	Sisonke	9038	1.3%	56	1.4%
	E.G. Usher Memorial		7372	1.1%	47	1.2%
	St Apollinaris		5918	0.9%	35	0.9%
	Tayler Bequest		8936	1.3%	62	1.5%
	GJ Crooke's	Ugu	14294	2.1%	76	1.9%
	Murchison		8101	1.2%	55	1.3%
	St Andrew's		9340	1.4%	55	1.3%
	Appelsbosch	Umgung.	4195	0.6%	27	0.7%
	Northdale		23202	3.4%	126	3.1%
	Bethesda	Umkhany.	7013	1.0%	37	0.9%
	Hlabisa		10892	1.6%	75	1.8%
	Manguzi	Umkhany.	6856	1.0%	40	1.0%
	Mosvold		9258	1.3%	58	1.4%

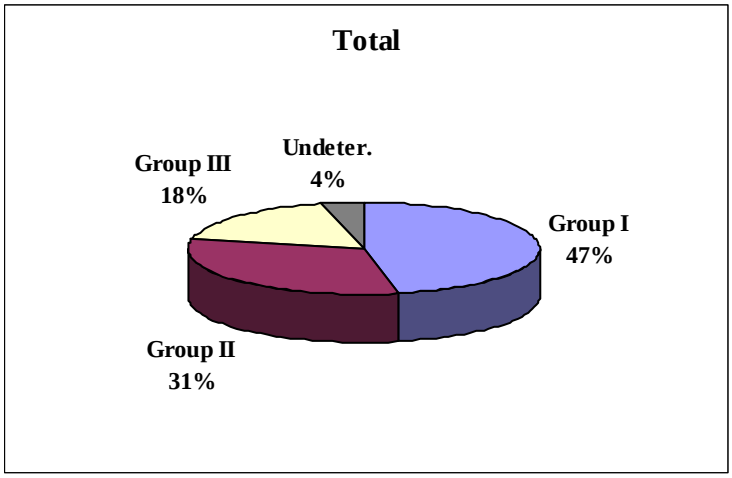
Cont.

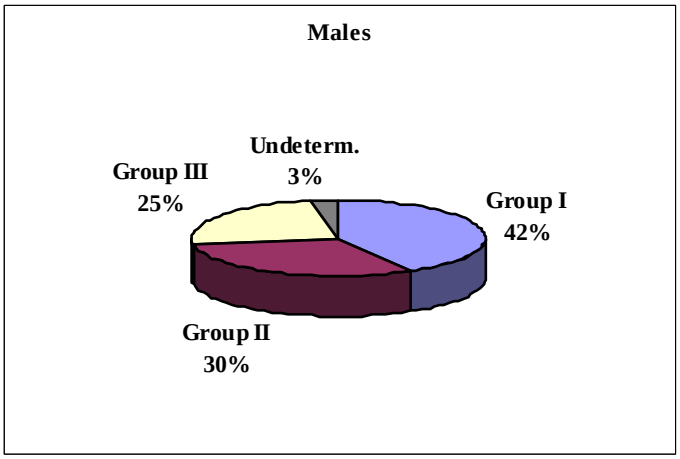
Type of hospital	Name of hospital	District	Annual admissions FY99/00 – FY02/03	% admiss. over total	Records sampled by the survey	% sample over total
District hospitals	Mseleni	Umkhany.	5198	0.8%	36	0.9%
	Charles Johnson Memorial	Umzinyathi	9905	1.4%	59	1.4%
	Church of Scotland		12752	1.8%	43	1.1%
	Dundee		10028	1.4%	63	1.5%
	Greytown		10094	1.5%	47	1.2%
	Emmaus	Uthukela	9189	1.3%	39	1.0%
	Estcourt		14198	2.1%	86	2.1%
	Catherine Booth	Uthungulu	6317	0.9%	36	0.9%
	Ekhombe		2815	0.4%	17	0.4%
	Eshowe		18884	2.7%	82	2.0%
	Mbongolwane		2420	0.3%	15	0.4%
	Nkandla		6802	1.0%	33	0.8%
	KwaMagwaza (St Mary) Melmoth		5182	0.7%	29	0.7%
	Benedictine	Zululand	13287	1.9%	77	1.9%
	Ceza		4719	0.7%	27	0.7%
	Itshelejuba		6763	1.0%	43	1.1%
	Nkonjeni		6213	0.9%	46	1.1%
	Vryheid		12544	1.8%	85	2.1%
Special. hospitals	Madadeni - TB	Amajuba	811	0.1%	2	0.0%
	Madadeni Psych.		2033	0.3%	15	0.4%
	King George TB	Ethekwini	1931	0.3%	8	0.2%
	King George Psychiatry		1103	0.2%	7	0.2%
	C James SANTA		564	0.1%	6	0.1%
	D McKenzie SANTA		338	0.0%	5	0.1%
	FOSA TB Hosp		643	0.1%	3	0.1%
	Khotsong SANTA	Sisonke	483	0.1%	6	0.1%
	D. Farrell SANTA	Ugu	732	0.1%	4	0.1%
	D. Goodwin SANTA	Umgung.	389	0.1%	3	0.1%
	Mountain View	Zululand	476	0.1%	5	0.1%
	Siloah Lutheran		513	0.1%	6	0.1%
	St Francis		1205	0.2%	8	0.2%
	Thulasizwe		851	0.1%	4	0.1%
TOTAL			**691853**	**100.0%**	**4077**	**100%**

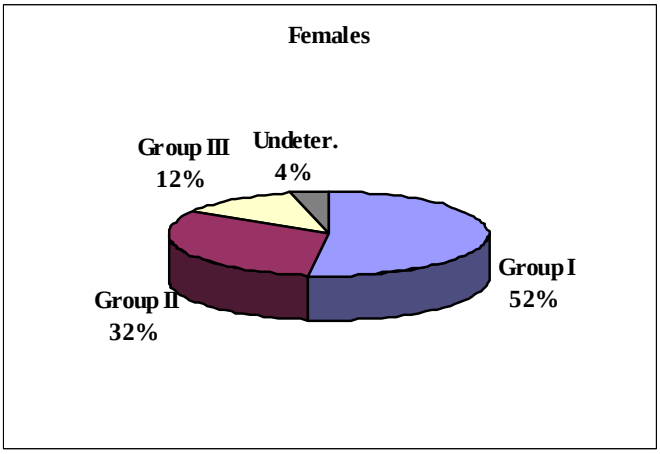
4.1) Groups I, II and III

According to the estimates derived from the survey, there were about 679,500 annual admissions between 1998-02, 489,000 of which were due to pathological conditions, including those related to maternal conditions, and the rest were due to normal deliveries. Of these 489,000 annual admissions, about 47%, were due to Group I, which included communicable diseases, maternal and perinatal conditions and nutritional deficiencies. About 31% were due to Group II, which was composed of non communicable diseases, about 18% were due to Group III, which was related to injuries, and 4% were undetermined (Figures 1-3). The main gender difference was a higher proportion of admissions due to Group III among males and a higher proportion of Group I and II among females.

Figures 1-3 Disease Groups, KZN, 1998-02



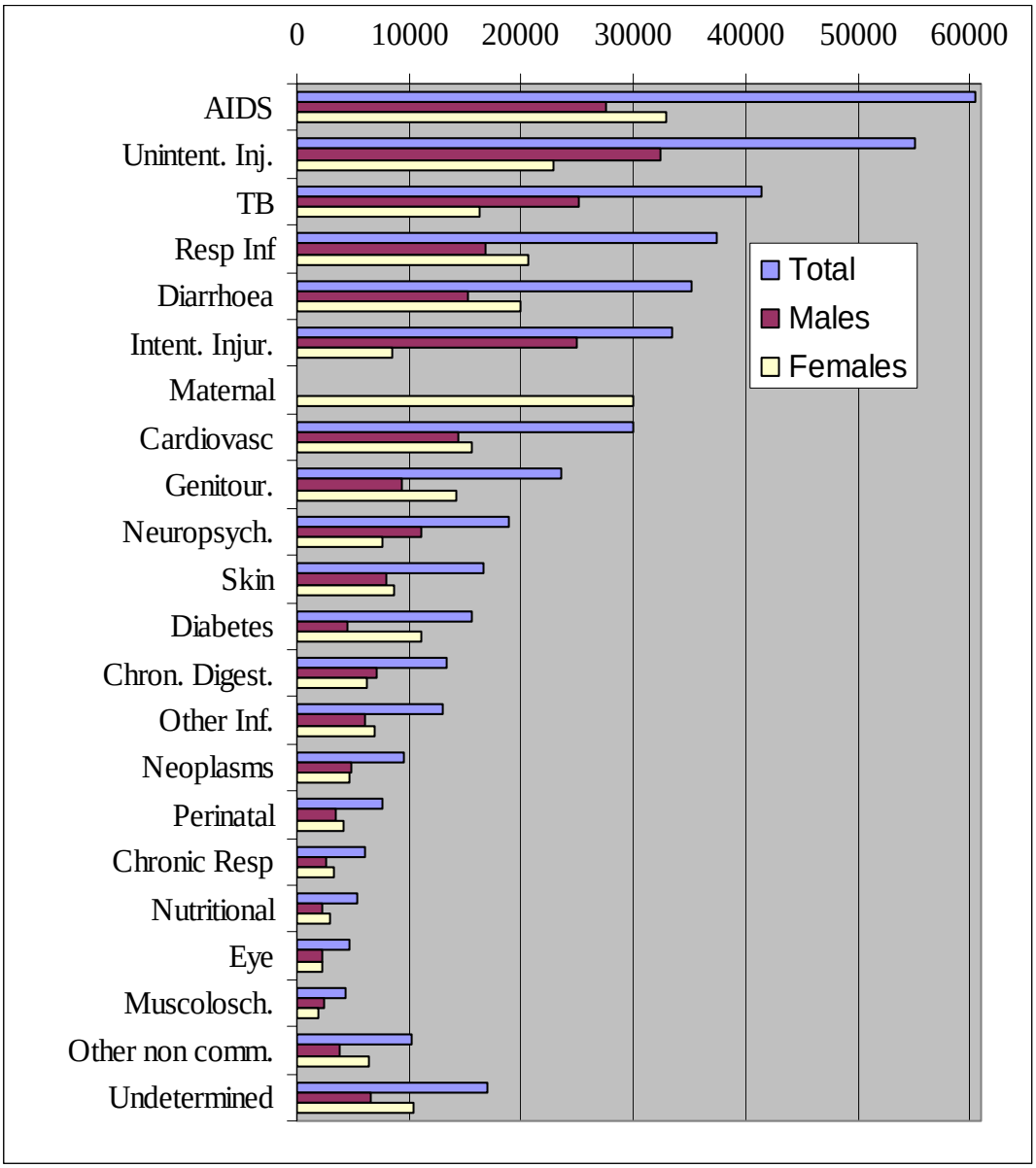




4.2) Categories

When the three main groups were disaggregated into disease categories, the first cause of admission was AIDS, followed by unintentional injuries. According to the BOD criteria, the three Groups were disaggregated into categories, as explained in the methodology. In the period 1998-02, AIDS and unintentional injuries (i.e. trauma) are estimated to have caused respectively about 60,500 and 55,000 admissions per year (Figure 4). TB, respiratory infections, diarrhoea and intentional injuries (i.e. assault) followed next, with about 41,500; 37,500; 35,000 and 33,500 admissions per year. Each of the other categories caused between 30,000 and 4,000 admissions per year. In terms of gender differences, males were more admitted for injuries and TB; and females were more admitted for AIDS, diabetes and genitourinary conditions.

Figure 4 Annual admissions by disease category, KZN, 1998-02

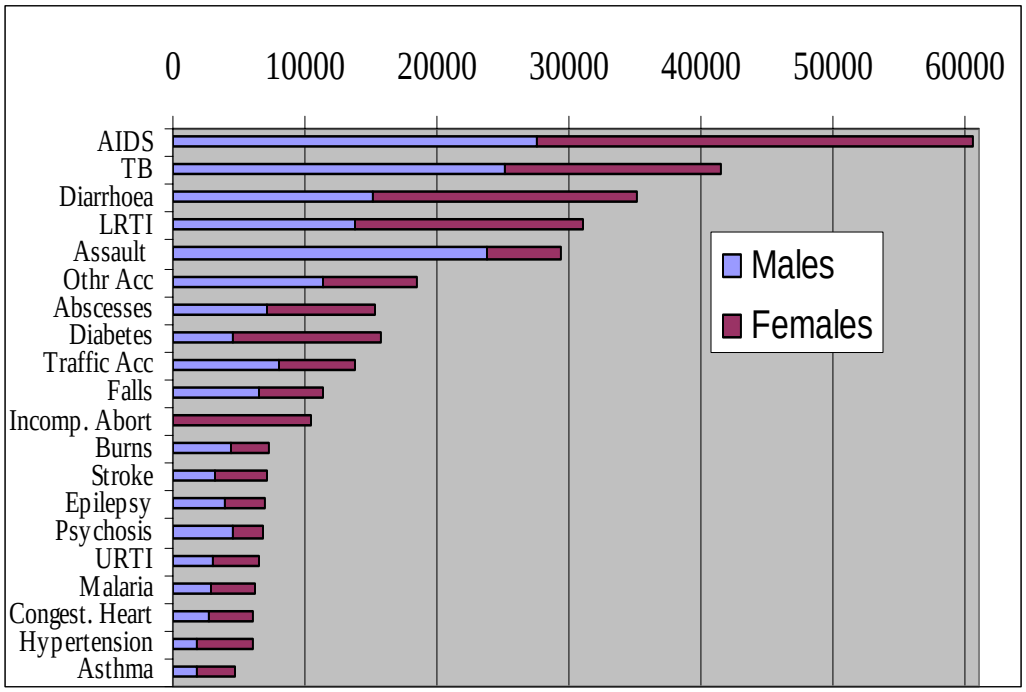


Therefore, in the period 1998-02, AIDS was the primary cause of admission. The results of this analysis are based on the 489,000 admissions estimated to have occurred each year between 1998 and 2002. These admissions were due to pathological conditions, including maternal conditions, but excluded normal deliveries. AIDS contributed to slightly more than 12% of these admissions (11.2%-13.6%, 95% CI) in the period 1998-02. If all the annual estimated 679,500 admissions, including normal deliveries, are taken into account, the proportion of total admissions due to AIDS would be in the order of 8.9% (8%-9.8%). The above burden does not include the full impact of HIV, which is the underline cause of a high proportion of many communicable diseases.

4.3) Specific causes

As mentioned in the methodology, each category was disaggregated into specific causes such as upper and lower respiratory tract infections for the 'respiratory infections' category. The first five specific causes of admission were AIDS, TB, diarrhoea, lower respiratory tract infections (LRTI) and assault (Figure 5). Specific causes of unintentional injuries, abscess, diabetes, incomplete abortion, stroke, epilepsy and psychosis ranked between the 6th and the 15th position. The ranking differed between genders with TB and assault being more frequent among males, and AIDS and diabetes being more frequent among females.

Figure 5 Leading specific causes, annual admissions, KZN, 1998-02



4.4) Age profile

Figures 6 and 7 show respectively the proportion and the annual number of admissions by cause by age. TB, AIDS and other diseases of Group I[5] caused most of the admissions for children under 5 years of age, while injuries were the most common cause of admission between 10 and 14 years of age. TB and AIDS increased after 14 years of age and peaked between 25 and 34 years of age, while non-communicable diseases started increasing after 44 years of age. Figure 7 provides a better picture of the size of the burden of hospitalisation by age because it shows the considerable number of admissions among children and between 15 and 44 years age.

Figure 6 Admission profile by age, KZN, 1998-02

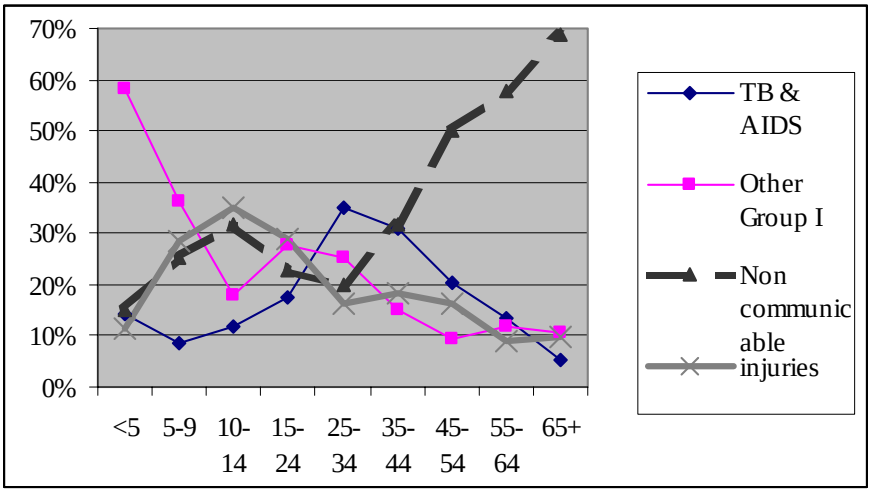
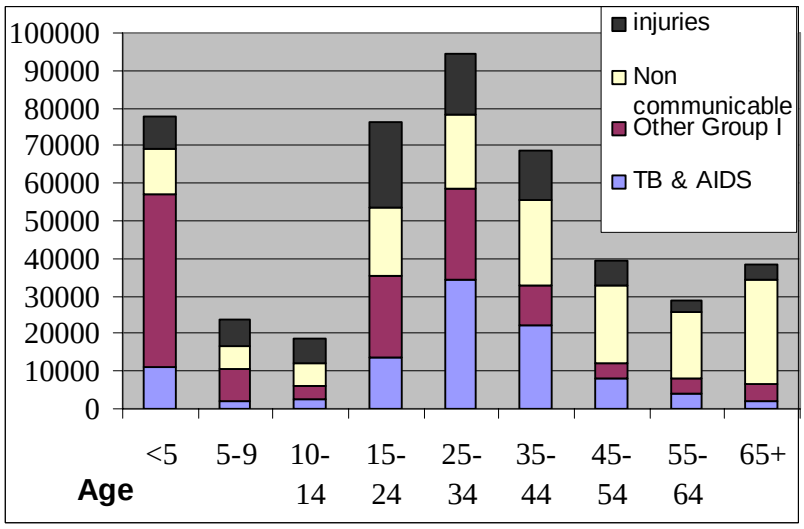


Figure 7 Estimated numbers of annual admissions by age, KZN 1998-02

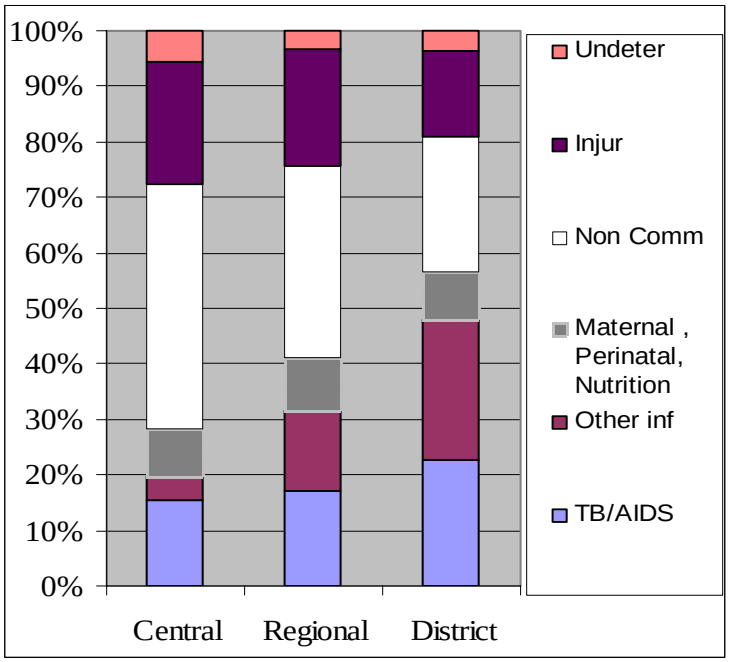


[5] Other diseases of Group I included communicable diseases, besides AIDS and TB, maternal and perinatal conditions, and nutritional deficiencies

4.5) Type of Hospitals

Figure 8 provides the admission profile by type of hospital. In terms of proportion of admissions by cause, non-communicable diseases and injuries were the most common causes of admission in the central hospitals and gradually declined in importance in regional and district hospitals. TB, AIDS and other communicable diseases were less frequent in central hospitals and increased in regional and district hospitals. Maternal and perinatal conditions, and nutritional deficiencies had a similar proportion of admission in all types of hospitals. District hospitals had a fair representation of all diseases.

Figure 8 Admission profile by type of hospital, KZN, 1998-02



4.6) Average length of stay

Figure 9 and table 2 show the average length of stay in days per type of admission. The longest stay was for TB patients who spent an average of 18 days; followed by patients suffering from malignant neoplasms, musculoskeletal diseases, unintentional injuries, neuropsychiatric conditions and AIDS who spent between 10 and 15 days; while the other conditions had a decreasing length of stay. Except for TB and AIDS, patients with communicable diseases spent a shorter period of time compared with non-communicable diseases. The average length of stay increased with age, reaching a peak of 10 days between 45 and 59 years of age, and it was longer for males and for admissions in specialized hospitals.

Figure 9 Average number of days spent in hospital, KZN, 1998-02

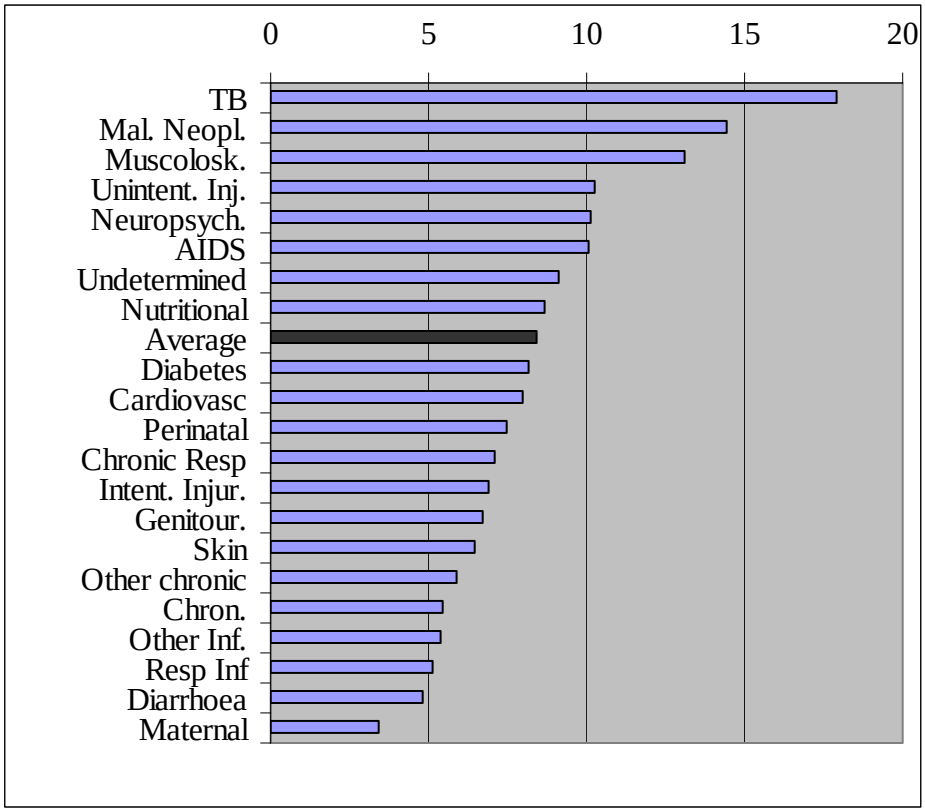


Table 2 Average length of stay*, KZN, 1998-02

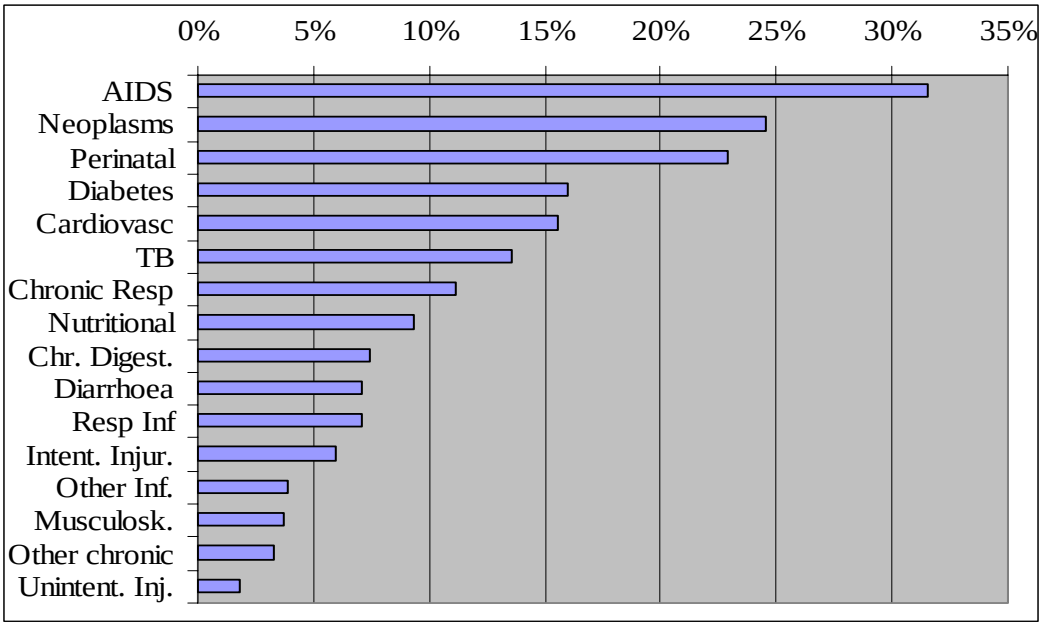
	Mean	95% Confidence Interval (CI) Min	Max
Age Groups			
<5	7.0	6.2	7.7
5-14	8.3	7.8	8.9
15-44	8.5	8.0	8.9
45-59	10.1	8.8	11.3
>=60	8.9	8.4	9.4
Gender			
Males	9.3	8.6	10.1
Females	7.7	7.1	8.3
Type of Hospital			
Central	9.7	8.4	11.1
Regional	6.9	6.3	7.5
District	7.9	7.3	8.5
Special.	36.4	29.1	43.6
Total average	8.5	8.0	8.9

* For all conditions, including maternal, and excluding normal deliveries

4.7) Mortality

AIDS had the highest case fatality rate (CFR). Figure 10 shows the proportion of patients who were admitted and who died from a disease category. About one third of patients admitted with AIDS died versus about one fourth of patients admitted with malignant neoplasms and perinatal conditions. CFR was about 16% for diabetes and cardiovascular diseases, 14% for TB and 11% for chronic respiratory conditions. Nutritional conditions, chronic digestive conditions, diarrhoea, respiratory infections and intentional injuries had a CFR between 5% and 10%. Other communicable diseases, musculoskeletal conditions, other chronic degenerative diseases and unintentional injuries had a CFR of less than 5%.

Figure 10 Case Fatality Rate by disease, KZN, 1998-02



More than half of total hospital mortality was due to AIDS and TB. Figure 11 shows the proportion of total hospital mortality due to each disease category. Because of their high CFR and frequency of admissions, AIDS and TB caused respectively about 39% and 12% of total hospital mortality. Cardiovascular conditions caused slightly less than 10% of hospital mortality. Most of the other categories, namely respiratory infections, diarrhoea, diabetes and malignant neoplasms caused 5% of mortality; and the other conditions caused less than 5% of total mortality. Although unintentional injuries were the second most common cause of admission, they caused a small fraction of the total mortality because of their low CFR. This may be due to a tendency to over admit accidents that are not serious enough to require hospitalisation and to the fact that those affected by the most serious accidents die before reaching the hospital.

Figure 11 Proportion of hospital mortality due to disease categories, KZN, 1998-02

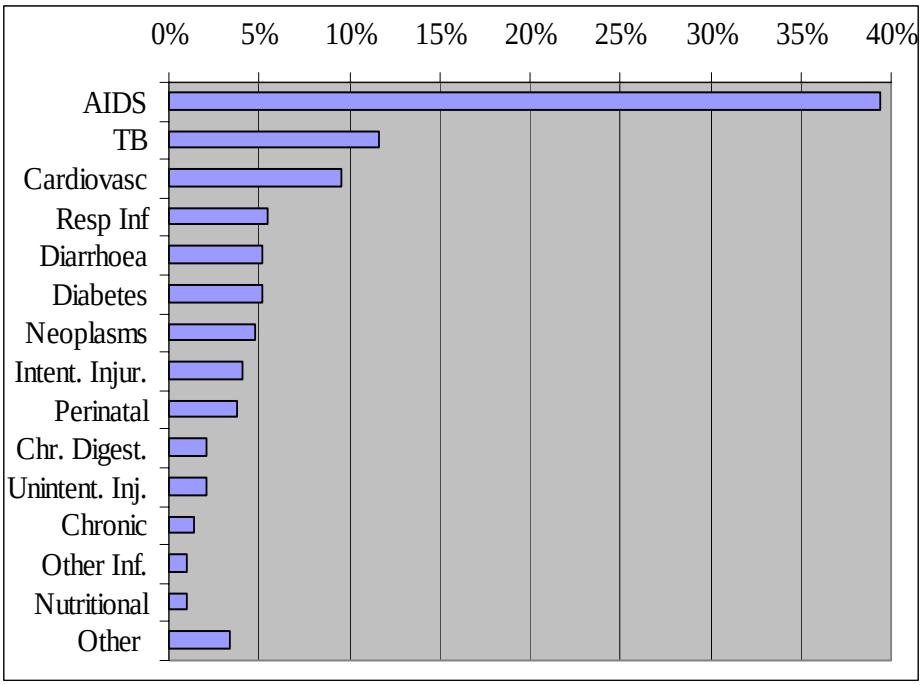


Figure 12 shows the expected number of deaths for the first 10 specific causes. When categories were disaggregated into specific causes, AIDS, TB, diarrhoea, lower respiratory tract infections (LRTI), diabetes, stroke, assault, perinatal conditions, congestive heart failure and chronic obstructive pulmonary diseases (COPD) ranked among the first 10 specific causes of death.

Figure 12 Estimated annual hospital deaths by cause, KZN, 1998-02

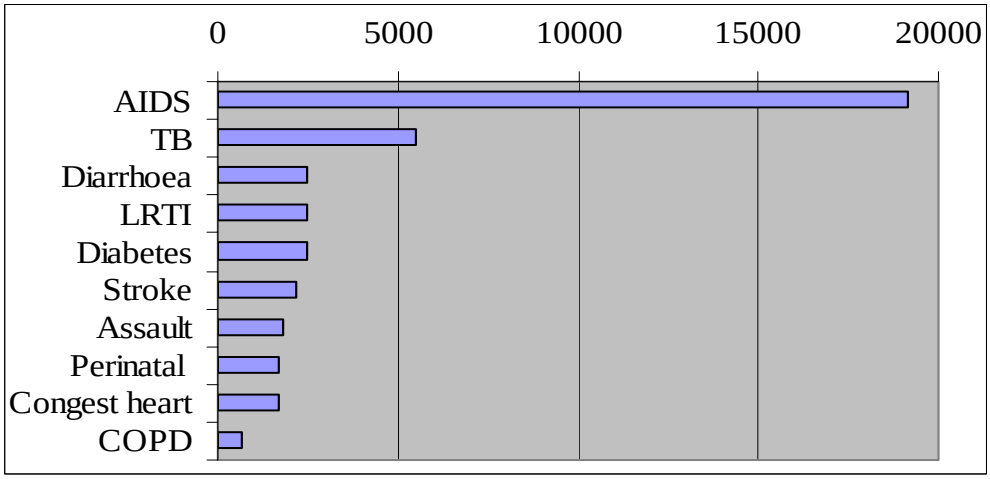
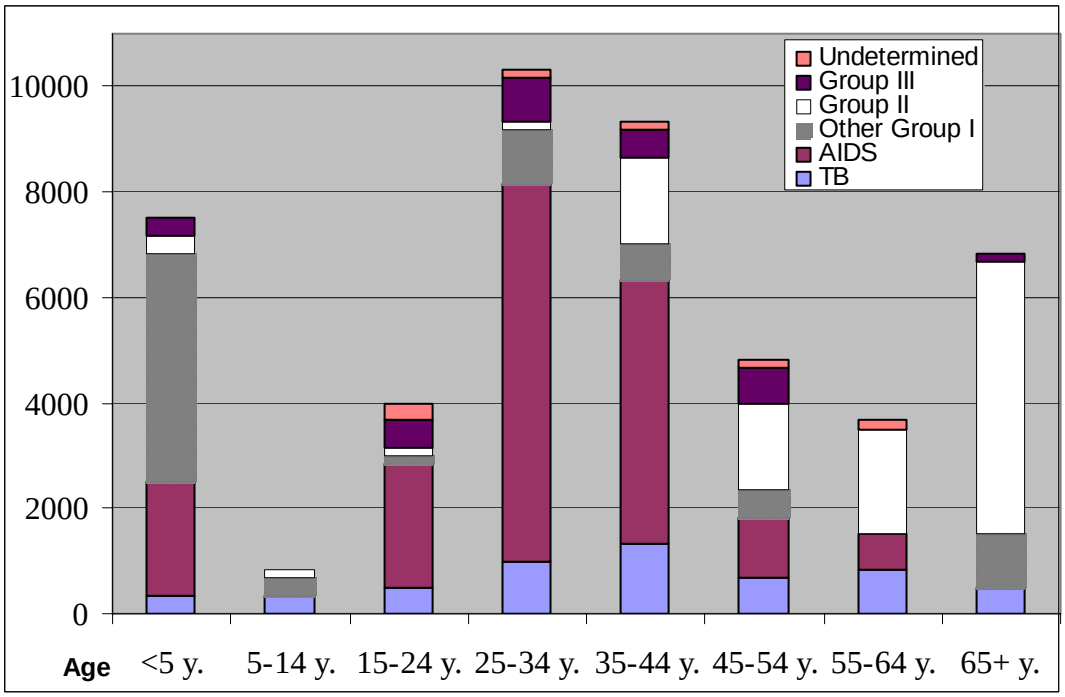


Figure 13 shows the estimated annual number of hospital deaths by age. Preschoolers and adults between the age of 25 and 44 contributed more deaths because these age groups had a higher number of admissions. Most of the mortality in adults between 25 and 44 years of age was due to AIDS and TB, while deaths from injuries were under-represented compared with what is known from vital statistics. As already mentioned, this is probably due to the fact that the most serious injuries end up in death before reaching the hospitals.

Figure 13 Estimated annual hospital deaths by age, KZN, 1998-02



4.8) Disease profile within each category

Group I

This section describes the disease profile within each category. Figure 14 shows the expected annual number of admissions for major communicable diseases by age. Communicable diseases were more frequent among children, declined between 5 and 14 years of age, rose among young adults and declined again after the age of 34. The peak between 25 and 34 years of age is more prominent for TB and AIDS, which is probably responsible for part of the increase of the other infectious diseases in this age group. Figure 15 shows that more than half of the burden of the admissions for communicable diseases was due to TB and AIDS, and about 40% was due to diarrhoea and respiratory infections. The rest of the other infectious diseases, which included malaria, hepatitis, and meningitis, contributed to about 7% of the admissions for communicable diseases.

Figure 14 Estimated annual admissions for communicable diseases, KZN, 1998-02

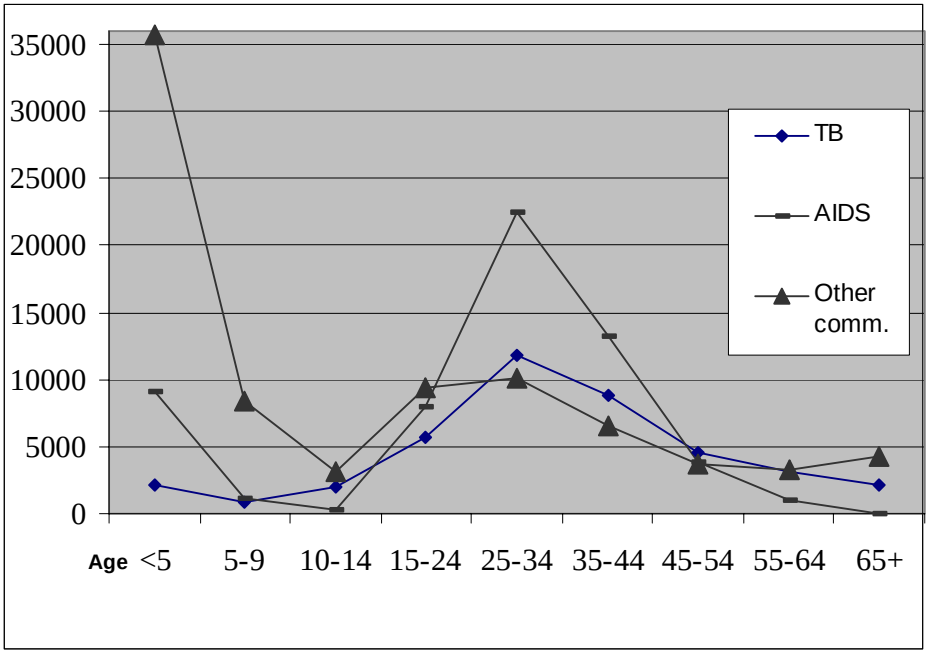
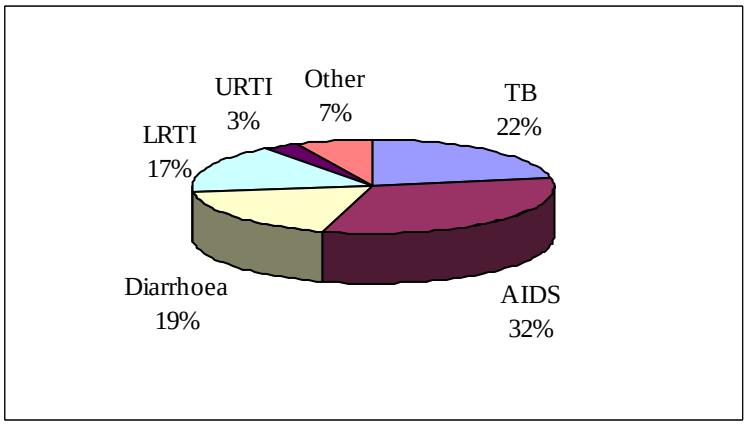
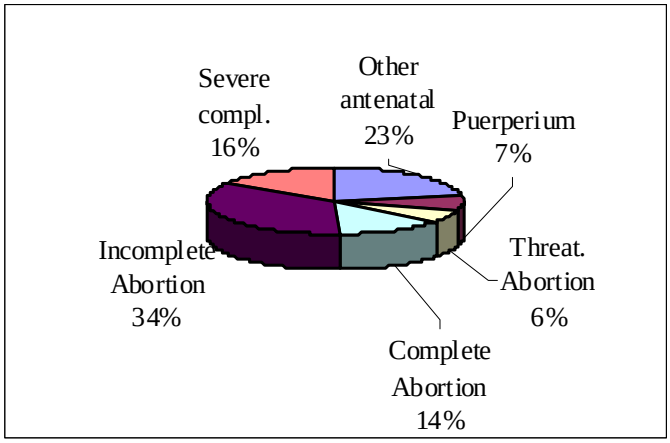


Figure 15 Admission profile of communicable diseases, KZN, 1998-02



The rest of Group I was mainly due to maternal conditions. Figure 16 shows that incomplete abortion is the most frequent maternal condition, followed by complete and threatened abortion. The rate for incomplete abortion for women between 15 and 49 years of age was 452 per 100,000 (95% CI 343-562), which is not significantly different from 362 (95% CI 282-441) per 100,000 estimated for South Africa by the Evaluation of the Implementation of the Choice of Termination of Pregnancy (TOP) Act published in 2000.

Figure 16 Admission profile of maternal conditions, KZN, 1998-02

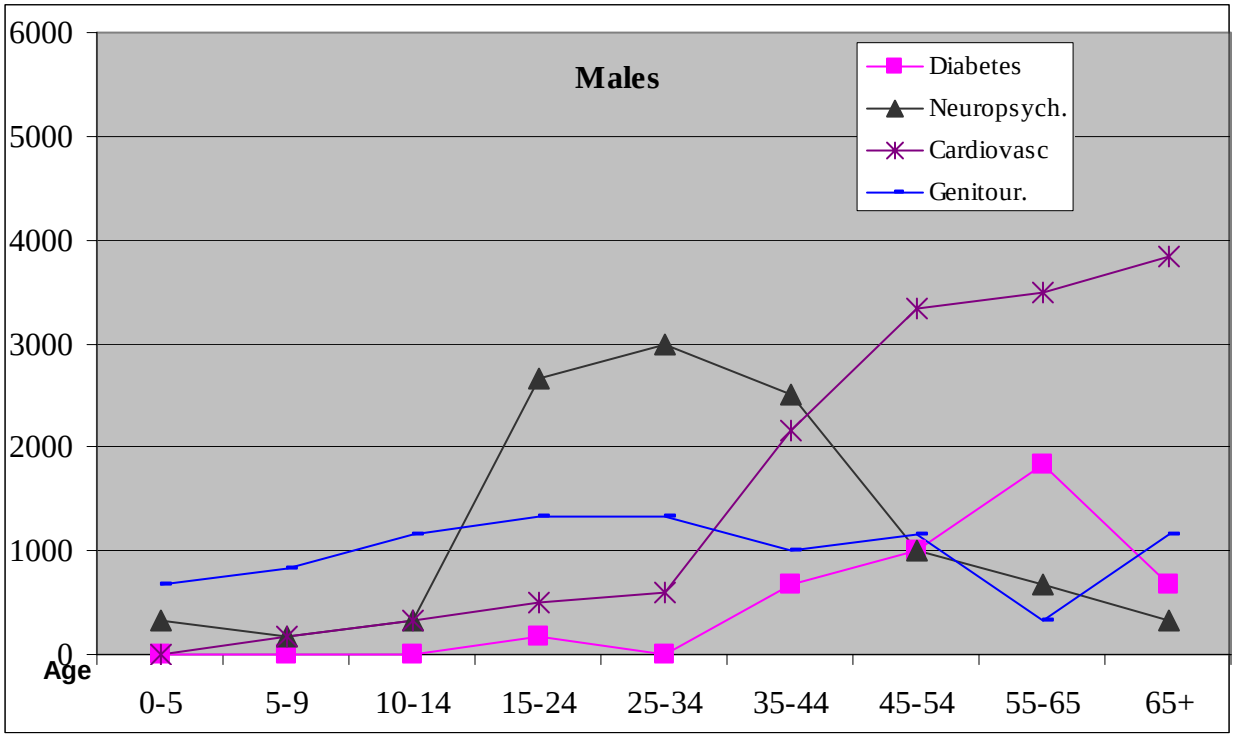


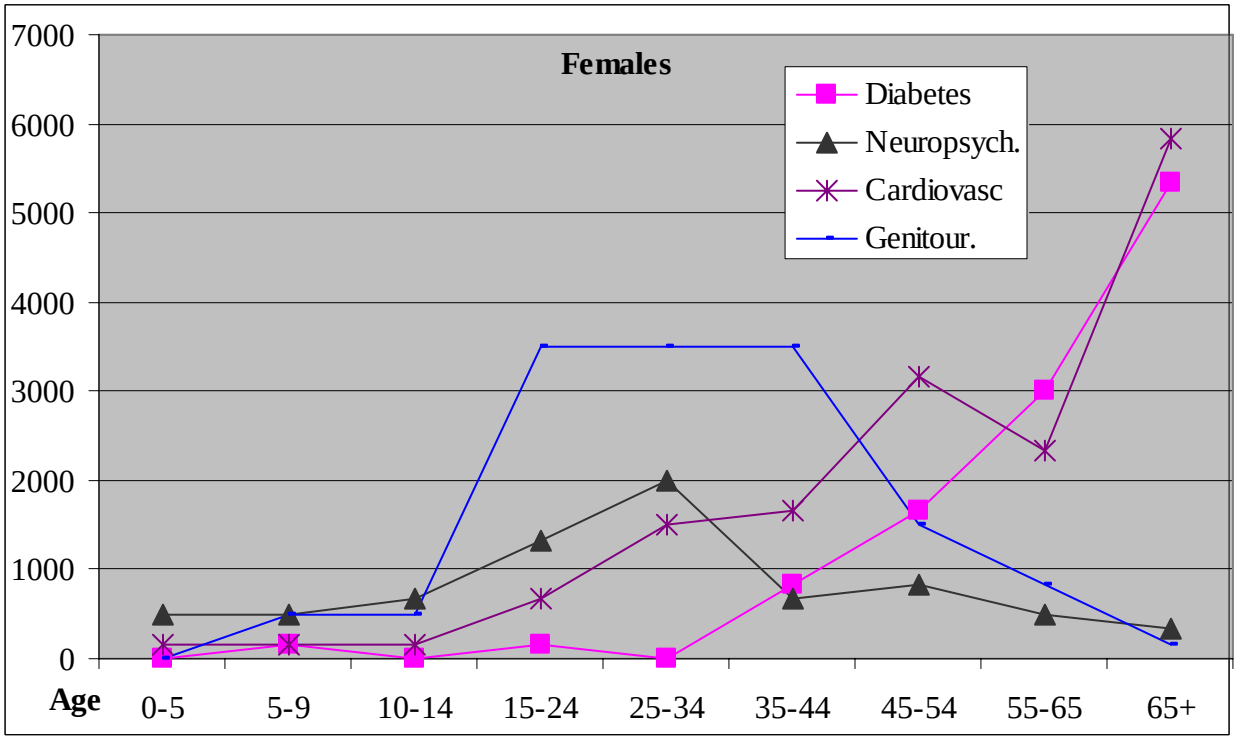
Because only a minority of women would admit to have committed abortion, incomplete abortions are commonly used as a proxy for induced abortions. About one third of incomplete abortions could be considered induced, according to what was found by Jewkes et al (1997) in their survey on incomplete abortion in South Africa. The reason for the high frequency of incomplete abortion could be due to the limited knowledge about the availability of TOP, the limited availability of services providing TOP, the attitude of staff and other barriers. About one fourth of the admissions due to maternal conditions were due to other antenatal conditions such as hyperemesis and false labour. Severe complications accounted for 16% of maternal conditions and included organ failure, sepsis, hypertension, eclampsia, and ectopic pregnancies. Complications of puerperium caused about 7% of maternal conditions and included obstetric septic wound and breast abscess.

Group II

Figures 17 and 18 show the expected annual number of admissions due to non-communicable diseases by age and gender. Cardiovascular diseases, neuropsychiatric and genitourinary conditions, malignant neoplasms and diabetes caused most of the admissions due to chronic degenerative diseases. Admissions for most non-communicable diseases increased with age, except for neuropsychiatric conditions, which peaked between 25 and 34 years of age, and for genitourinary diseases, which were more frequent in the sexually active age groups.

Figures 17 & 18 Admission profile of non-communicable diseases, KZN, 1998-02

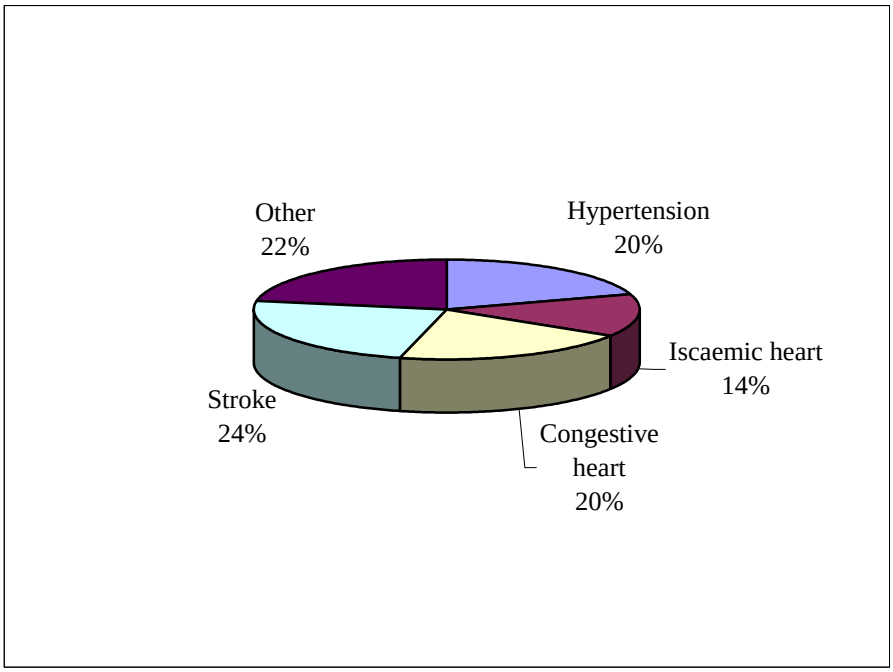




Stroke was the most frequent cardiovascular disease. Stroke and hypertension caused more than 40% of the admissions due to cardiovascular diseases, followed by congestive heart failure, ischaemic heart diseases and other cardiovascular conditions. The annual crude admission rate for stroke estimated by this survey was about 125 per 100,000 for the population 20 years and older. The age specific rates were 22 per 100,000 between 20 and 44 years of age, 223 per 100,000 between 45 and 64 years of age and 671 per 100,000 above 64 years of age; while the case fatality rate was 30%.

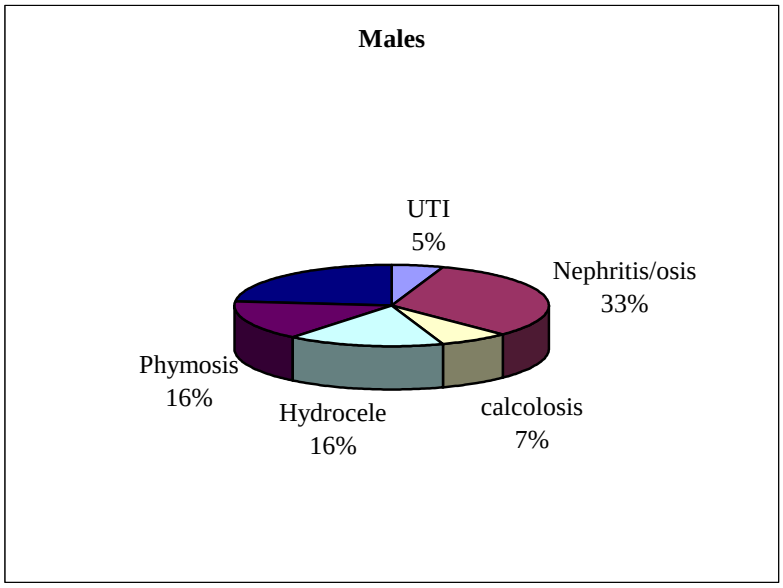
These estimates are in line with the information available for South Africa and KZN. Rosman (1986), who monitored hospital admissions for acute stroke in a hospital serving an urban population of about 115,000 people in Mamelodi in 1986, estimated an admission rate of about 101 per 100,000 for the population 20 years and older and a case fatality rate of 33%. According to the 1998 DHS, the self reported incidence of stroke in KZN was 188 and 187 per 100,000 respectively for men and women 15 years and older. The higher rates estimated by the 1998 DHS could be due to the fact that a proportion of patients with stroke is not hospitalised or that the DHS may have included both new and old cases of stroke.

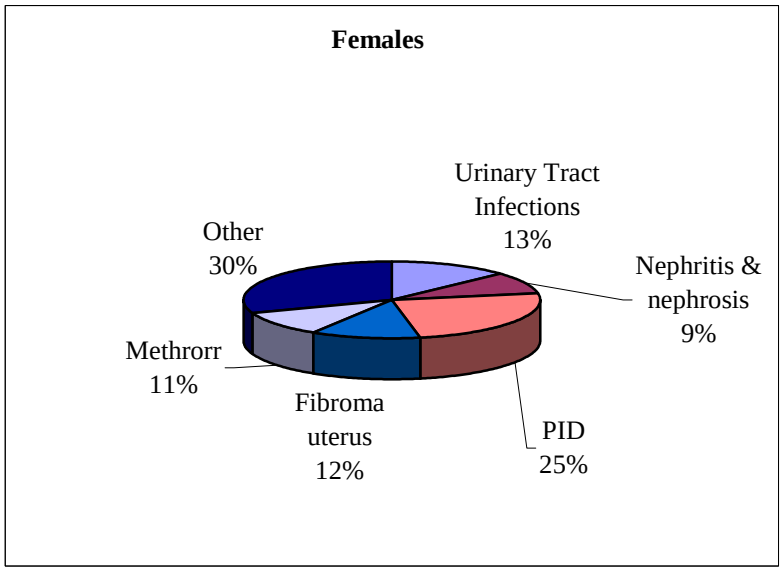
Figures 19 Admission profile of cardiovascular diseases, KZN, 1998-02



Genitourinary diseases were the second most common non-communicable category after cardiovascular diseases. The most frequent conditions were nephritis and nephrosis, hydrocele and phymosis among males; and pelvic inflammatory disease (PID) and fibrosis of the uterus among females.

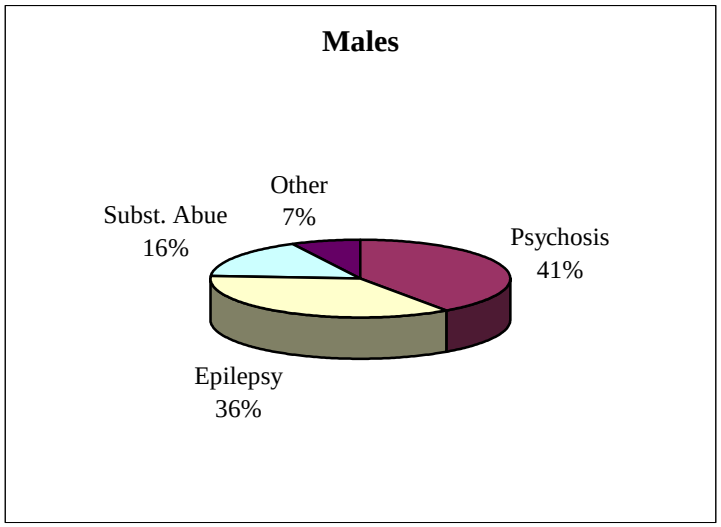
Figures 20 & 21 Admission profile of genitourinary diseases, KZN, 1998-02

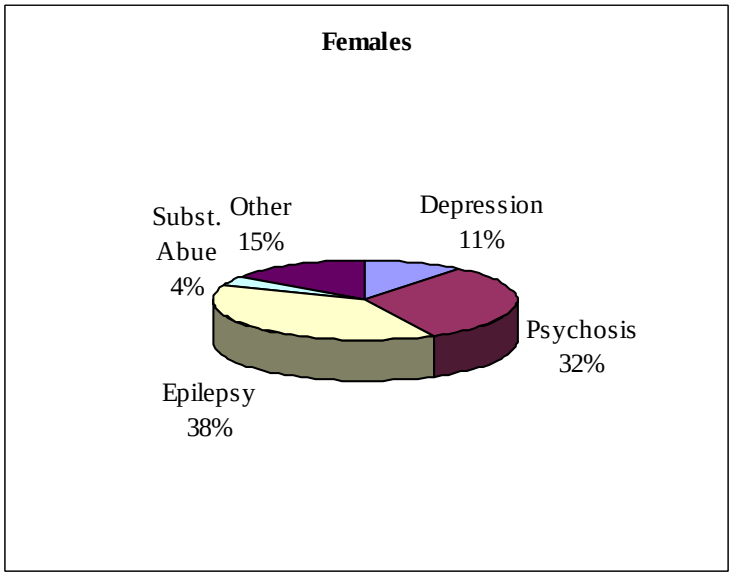




Neuropsychiatric conditions affected the young age groups. Epilepsy was the most common neurological condition and had a higher frequency of admissions among children. Most psychiatric conditions reached a peak between 25 and 34 years of age, with males having a higher frequency of admissions for psychosis and substance abuse, and females being more admitted for depression.

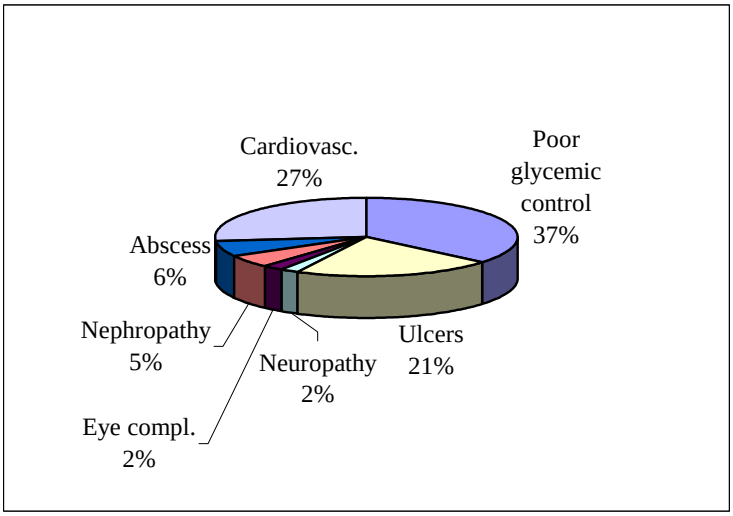
Figures 22 & 23 Admission profile of neuropsychiatric conditions, KZN, 1998-02





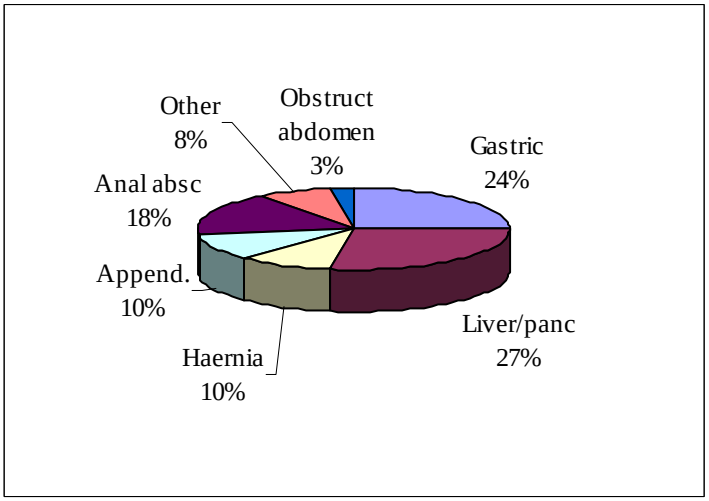
The main reason for hospitalisation among diabetics was related to poor glycemic control. About 37% of admissions were related to ketoacidosis, hyperglycemia and other metabolic imbalances related to poor control at primary care level. Cardiovascular complications and ulcers were the second and third cause of admission among diabetics; followed by abscess, nephropathy, neuropathy and eye complications.

Figure 24 Admission profile of diabetes, KZN, 1998-02



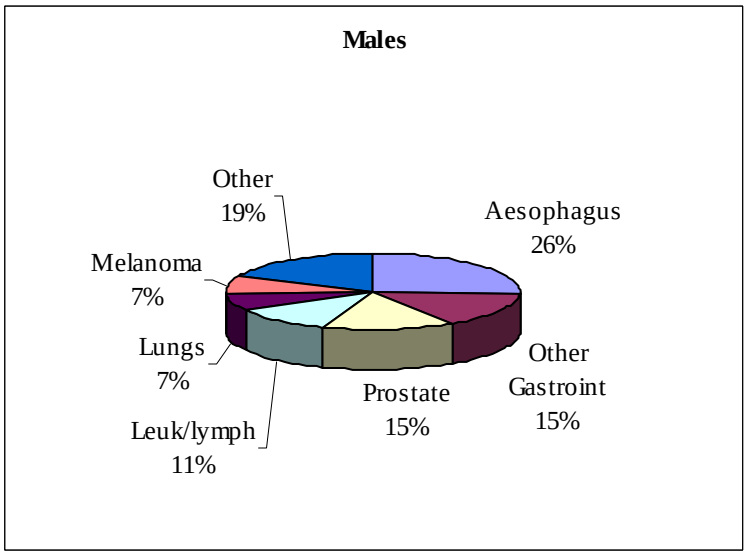
The digestive category was composed of chronic conditions affecting the gastrointestinal system, including pancreas, liver and the biliary tract. Of these admissions, about one fourth was related to cirrhosis of the liver, pancreatitis and gall bladder diseases; while another fourth was due to gastritis and peptic ulcers. The other most frequent causes of admission for this category were anal abscesses and fistulae, appendicitis and inguinal hernia. Admissions due to digestive conditions were more frequent between 15 and 34 years of age, with acute abdomen being more common between 15 and 24 years of age and gastric problems being more frequent between 25 and 34 years of age.

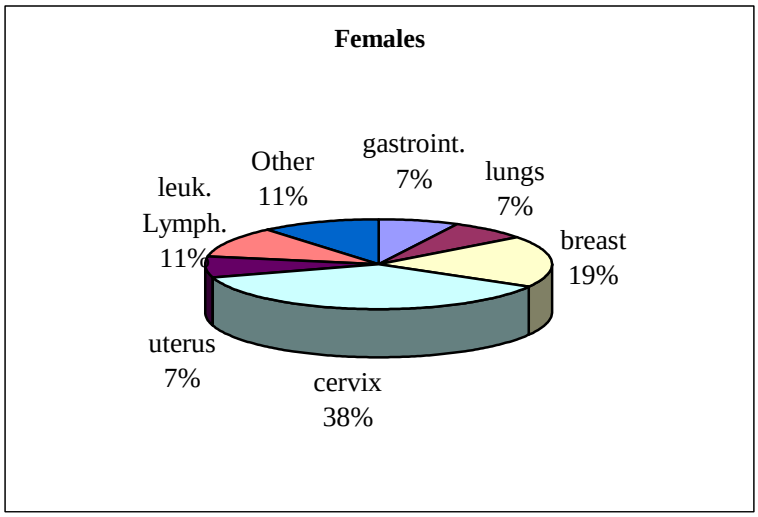
Figure 25 Admission profile of digestive conditions, KZN, 1998-02



Cancers of the oesophagus and of the cervix were the most frequent malignant neoplasms. The first two malignant neoplasms were those of the oesophagus and of the prostate among males, and those of the cervix and of the breast among females. This is in line with what was reported by the cancer registry for South Africa for 1993 and 1995, according to which the first two malignant neoplasms are cancer of the oesophagus and of the prostate among black males; and cancer of the cervix and of the breast among black females.

Figures 26 & 27 Admission profile of malignant neoplasms, KZN, 1998-02





Group III

Injuries affected more males than females and were concentrated among adolescents and young adults. Unintentional injuries were more frequent than intentional ones and they included traffic accidents, falls, accidental poisoning, burns and other accidents. Admissions for all unintentional injuries peaked between 5 and 14 years of age and gradually declined afterwards (Figure 28), but accidental poisoning and burns were more common among preschoolers. Intentional injuries were mainly due to assaults and increased sharply between 15 and 24 years of age. Two thirds of the admissions for all types of injuries were among males, but most of the attempted suicides occurred among females.

Figure 28 Age distribution of the admissions due to injuries, KZN, 1998-02

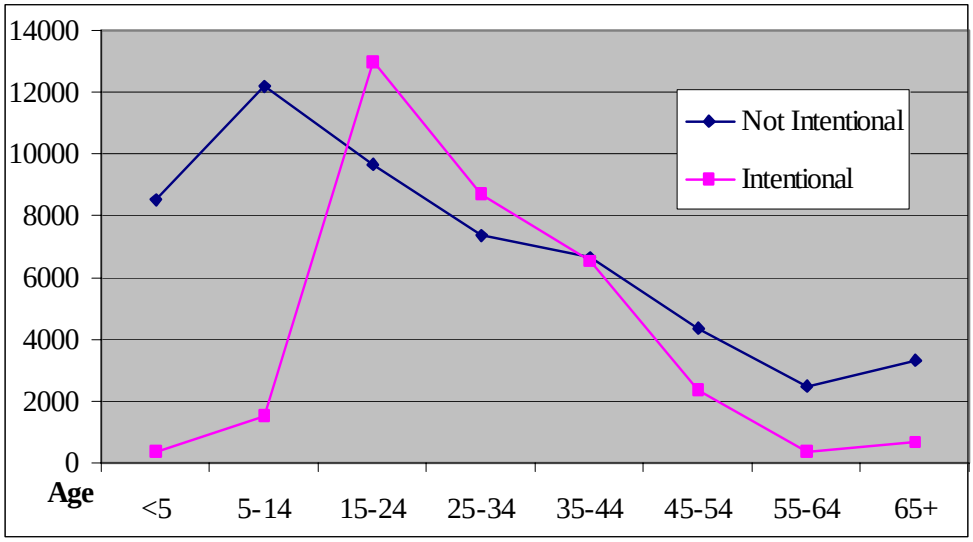
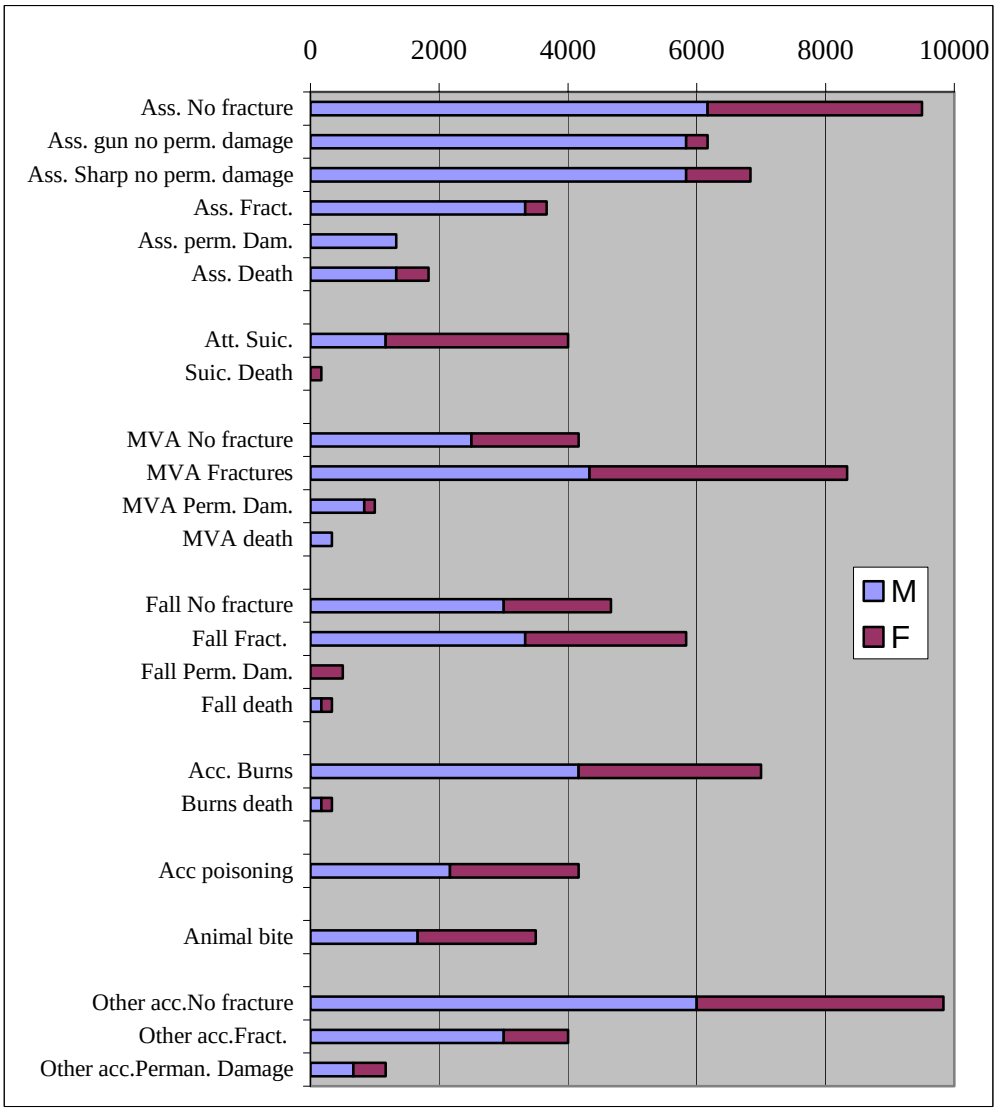


Figure 29 shows the consequences of different types of injuries. Admissions for all types of injuries were estimated at slightly more than 88,000 per year for the period 1998-02. There were an estimated 29,300 admissions due to assaults; of which about 3,700 caused fractures, 1,300 ended up in permanent damage, such as paralysis and amputation, and about 1,800 caused death. The rest of the intentional injuries were due to about 4,000 attempted suicides most of which were among females. The average annual number of admissions for unintentional injuries was estimated at about 55,000 per year and included traffic accidents, falls, burns and accidental poisoning. Of the estimated 13,800 annual admissions due to motor vehicle accidents 8,300 caused fractures and 1,000 resulted in permanent damage. Of the estimated 11,300 annual admissions due to falls, about 5,800 caused fractures and about 500 ended up with a permanent damage. The other most common unintentional injuries were accidental poisoning, attempted suicides and animal bites. The number of deaths for all causes of unintentional injuries was slightly less than 1000 per year, but these estimates are to be viewed with caution because of the wide

confidence intervals. Furthermore, the small number of hospital deaths from injuries suggests that a high proportion of people dying from injuries are not hospitalised because they die before reaching the hospital. Therefore, hospital statistics is likely to provide an under-estimate of the burden of mortality due to this category.

Figure 29 Estimated annual admissions due to specific injuries, KZN, 1998-02

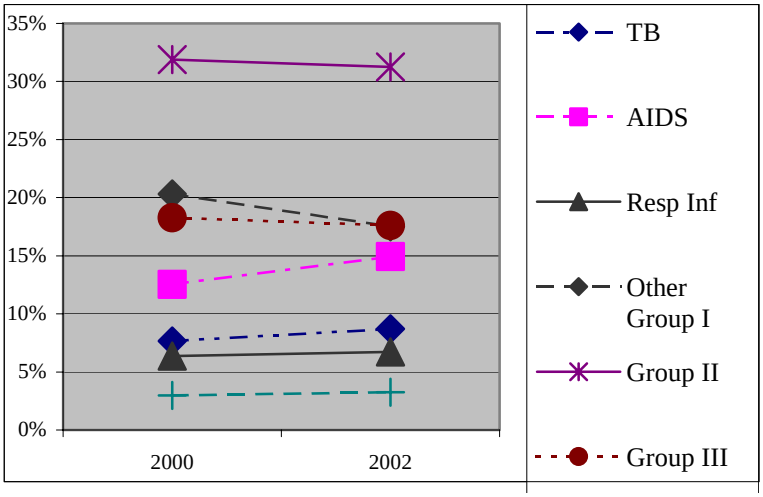


4.9) Trends

AIDS, TB and other respiratory infections have increased their burden between 2000 and 2002. Because only two thirds of the hospitals had data for 1998, it was only possible to compare the changes between 2000 and 2002, which are shown in Figure 30. The

proportion of admissions due to AIDS increased from 12.5% to 14.9% between 2000 and 2002. TB and respiratory infections had a more limited increase, the rest of Group I declined slightly because malaria and cholera, which had epidemic peaks in 2000, declined in 2002; while Group II and III remained stable. If we take the year 2002 alone, the expected number of admissions due to AIDS predicted by the survey is in the order of 75,500 with a 95% CI of 64,400-86,600. This is equivalent to about 14.9% of the admissions, with 95% confidence intervals of 12.7%-17.1%.

Figure 30 Admission profile in 2000 and 2002 in KZN

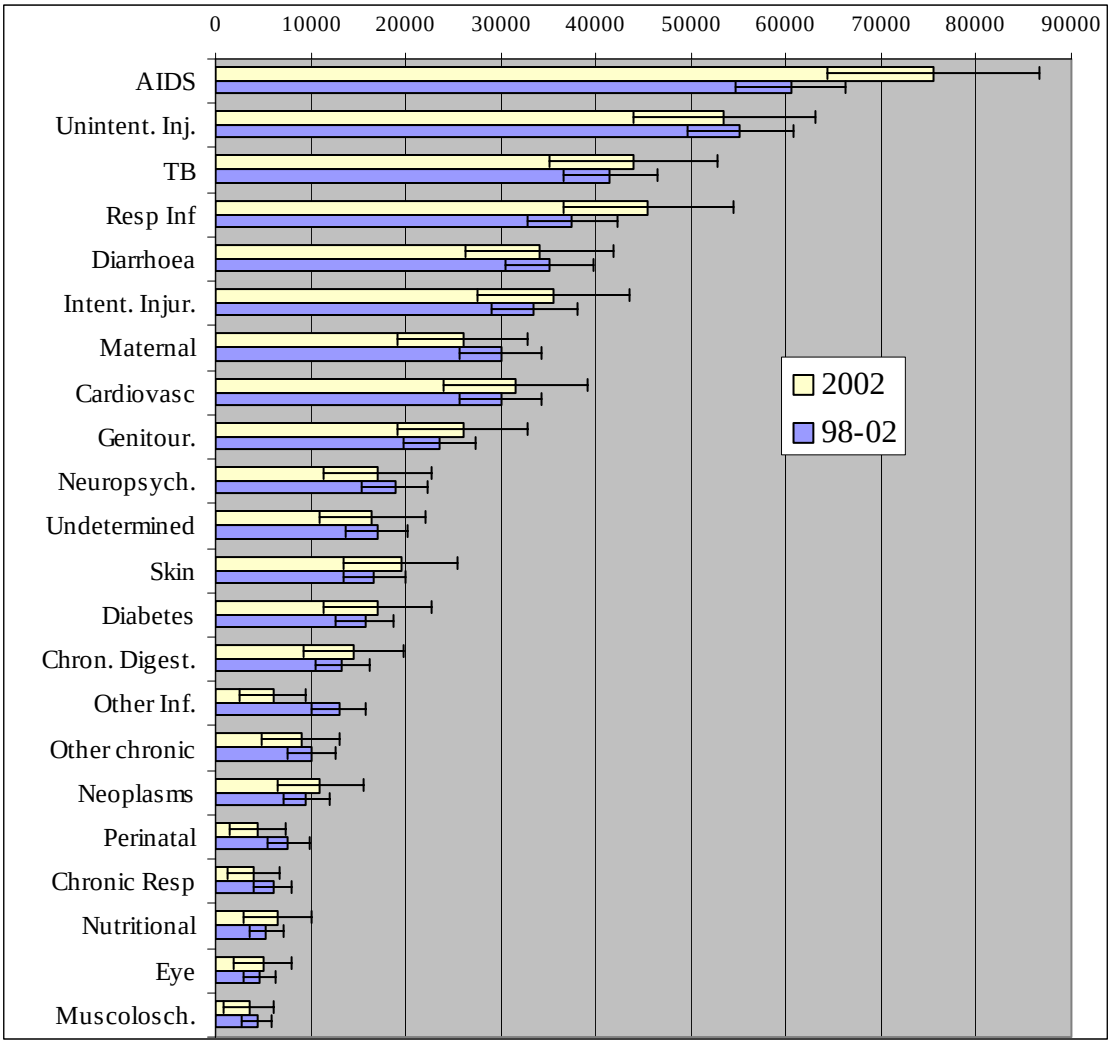


The average annual estimates based on the period 1998-02 provide a reliable measure of the burden of hospitalisation for most diseases. Figure 31 shows that compared with the annual average for the period 1998-02, the main difference in 2002 is the rise of AIDS and to a minor extent of respiratory infections, which are probably rising because of HIV. Another difference is the lower frequency of other infectious diseases in 2002 because of the decline in malaria and cholera compared with the period 1998-02. For the rest of the other categories there is no substantial difference between the annual estimates based on 1998-02 and those ones based on 2002. Figure 31 confirms that the average annual estimates presented in this report, which are based on the pooled sample covering the period 1998-02, provide a reliable estimate of the annual burden of the hospitalisation. The main exception is AIDS which is constantly raising and for which the estimates for the year 2002 provide a better picture of the burden.

Because most diseases have annual fluctuations, taking a specific year into account may fail to produce the annual hospitalisation profile required for planning. Taking the latest year covered by the survey would not provide a representative picture of the average annual burden because, due to annual variations, some diseases would be at their highest peak and others would be at their lowest levels. For example, malaria has sharply declined as cause of admission between 2000 and 2002 because of the successful efforts of the malaria control programme. However if the most recent data of 2002 were used

for the sake of establishing priorities, malaria would be wrongly considered a low priority. Because malaria and other communicable diseases have cyclic epidemics, they are bound to reappear at epidemic level in the next coming years and their average admission burden is better represented when several years are taken into account. Also for chronic degenerative diseases, which are characterized by a very slow annual increase and relatively small numbers, the estimates for the period 1998-02 can be used to establish priorities based on the average annual burden of hospitalisation. Another reason for taking the whole period covered by the survey, as the basis for establishing priorities, is the narrower confidence intervals and therefore the better precision allowed by the larger sample, compared with the smaller sample representing 2002.

Figure 31 Comparison between the average annual estimates and 95% CI for the period 1998-02 and 2002



5) Discussion

This survey has provided provincial admission rates by disease category and specific cause. Because of the lack of a routinary data processing system of the discharge diagnosis and because records are destroyed every five years or even earlier, a survey was the only option to get the estimates on the admission rates by cause for the last few years. The results have been presented for the period 1998-02, even if one third of the hospitals did not have records for 1998 and the next available year was sampled instead. This is unlikely to have affected the estimates, which are based on a representative sample of three-year worth of admissions' records in every public hospital.

The survey has provided unbiased provincial estimates by cause, even if the confidence intervals for some disease are wide. As in any survey, the standard errors depend on the sample size, which is based on the hypothesis to be tested. The sample was selected to test the hypothesis that AIDS causes 19% of the admissions and the uncertainty of the estimates is wide for many conditions characterized by relatively low admission rates. Producing more precise estimates for all the causes of admissions would have required a prohibitively large sample size. There is always a trade off between what can be done with the available budget and time frame.

These are provincial estimates and they cannot be disaggregated by district or by hospital. This limitation is related to the design of the survey, which had the main objective of obtaining provincial estimates by cause. Future surveys may be designed to obtain more disaggregated estimates by district and by hospital, keeping in mind that the costs of the survey and the time schedule will increase according to the extent of disaggregation.

The statistics presented in this report is related to the hospital admissions and it cannot be directly extrapolated to the general population. Admissions do not represent what is going on in the population and the burden of hospitalisation is different from the burden of disease (BOD) in the population. The probability of being hospitalised varies across diseases and it is influenced by the access to the hospitals and by the admission policies. Some diseases are almost never hospitalised and therefore they do not appear in the admission statistics. Other diseases are more frequently hospitalised because they require complex diagnostic tests or because they have a high degree of seriousness, leading to hospitalisation in a high proportion of cases. Therefore, the statistics presented in this report should be used in terms of hospital utilization and not as population estimates of incidence and mortality. More work needs to be done to use these and other data sources through epidemiological modelling to arrive at reasonable estimates of the incidence and mortality in the population.

Another limitation is that the number of admissions per se does not fully reflect the burden of hospitalisation. Each admission counted as one episode and no attempt was made to assign a weight reflecting the seriousness of the medical condition and its consumption of hospital resources. Assigning a weight according to the seriousness of the medical condition would have provided a better measure of the burden of hospitalisation but no reference was found in the literature on the use of such weights in

hospital discharge surveys. Because these weights would have a managerial objective, they would be correlated with the consumption of hospital resources associated with each condition, and they would be different from the disability weights used to estimate the DALYs.

Notwithstanding the above limitations, this report provides the most reliable and updated estimates of the annual hospital admissions by cause expected for KZN. The average annual number of admissions for pathological conditions, including maternal conditions but excluding normal deliveries, was slightly lower than half a million. About half, one third and one fifth of these admissions was respectively due to Group I, Group II and Group III.

5.1) Group I

AIDS

The most updated estimates for 2002 suggest that for that year, AIDS contributed to slightly less than 15% of the admissions. In 2002, clinical AIDS is estimated to have contributed to 14.9% (12.7% and 17.1%, 95% CI) of total admissions. This does not include the full burden of HIV, which should include the proportion of diseases whose underline cause is HIV. Therefore, the burden of HIV is likely to be much higher than the 15% estimated for clinical AIDS.

The burden of AIDS is more evident when mortality is considered. Of the total hospital mortality which occurred between 1998 and 2002, more than half was caused by TB and AIDS, about 17% was due to other conditions of Group I, 24% was due to Group II, 6% was due to Group III and 2% remained undetermined. These estimates are slightly higher than the burden of mortality estimated by Bradshaw et al. in the 2000 BOD study for South Africa. According to Bradshaw, the proportional mortality due to AIDS, other diseases of Group I, Group II and III was respectively 30%, 21%, 37% and 12%. However these estimates are not comparable because they are related to the general population of South Africa, while this survey has dealt with the hospital admissions for KZN. The age distribution of the hospital deaths was strongly influenced by AIDS and TB, and had a similar pattern to that reported by the South Africa BOD study.

Other Group I diseases

The rest of group I was composed of other communicable diseases and maternal conditions. TB, respiratory infections and diarrhoea caused most of the rest of the burden due to communicable diseases. For the admissions due to maternal conditions, a high proportion was due to incomplete abortion, which was the 6th single cause of admission among females. Incomplete abortion is considered a proxy for induced abortion and it is used to monitor the availability of the services providing Termination of Pregnancy (TOP). The 2000 evaluation of the implementation of the choice of TOP Act found that KZN was performing a lower number of abortions per 100,000 women than

most of the other provinces. Although KZN was the second province in terms of number of designated facilities to provide TOP, the proportion of these facilities that were providing TOP was the smallest of any province. Harrison et al. (2000) found that in KZN there is opposition among health staff to provide TOP on demand and the only acceptable reasons for providing TOP were rape, incest or serious health problems. This is an example of an existing gap between approval of policies and strategies to implement them. A more in-depth analysis of these constraints would help to improve the strategies to make TOP more accessible and in accordance with prevailing social norms.

5.2) Group II

The high burden of non-communicable diseases reflects the ongoing epidemiological transition. As noted by Walker (2001), as late as in 1970, Africans who turned 50 had a longer life expectancy than whites due to the low prevalence of chronic diseases of lifestyle. This is no longer the case because the change in lifestyle has caused an increase in the frequency of hypertension, obesity, diabetes and cancer. Chronic degenerative diseases are therefore expected to place substantial demands on a health system, which is already overburdened by AIDS and other communicable diseases.

Cardiovascular diseases

Cardiovascular diseases are the primary chronic degenerative diseases and their burden is substantial. Cardiovascular diseases ranked 8th in terms of total admissions and 3rd in terms of proportional hospital mortality. Pestana et al. (1991) have estimated that in 1991 the cost of cardiovascular diseases in South Africa was between 4.1 and 5 billion rands. These were health care direct cost and indirect costs due to loss in earning, but they excluded the costs related to rehabilitation and follow up. No estimates are available on the costs of cardiovascular diseases for KZN.

Stroke was the most frequent cardiovascular condition, ranking 6th in terms of specific cause of mortality. According to Vorster (2002), stroke is a major public health problem amongst black South Africans, possibly because of a high prevalence of hypertension, obesity, smoking and hyperfibrinogenaemia. At the moment, stroke produces a higher burden than ischaemic heart disease (IHD) in the health transition of black South Africans. However, IHD may become more prominent due to increasing intake in total fat and animal proteins, and high levels of body mass indices and total serum cholesterol.

Hypertension is the major risk factor for cardiovascular and renal diseases, and control strategies need strengthening. On the primary prevention side, hypertension could be controlled by decreasing salt and alcohol consumption, and by controlling obesity. However, the high prevalence of these risk factors found by the 1998 DHS suggests that health promotion strategies have not been successful.

Secondary prevention through drug treatment of hypertension remains the most cost effective choice at the moment. The Hypertension Society of Southern Africa has produced guidelines for the management of hypertension at primary care level. These

include lifestyle modification, low dose diuretics as first line drugs, reserpine or betablockers or angiotensin-converting enzyme inhibitors or calcium channel blockers as second line drugs and hydralazine as third line drugs.

However, the high proportion of cardiovascular diseases due to hypertension and stroke suggests that prescribing practices, access to treatment and compliance are problematic. The 1998 DHS reported that in KZN only 27% of men and 54% of women with a blood pressure above 140/90 knew that they had hypertension. The DHS found that only 23% of men and 31% of women with hypertension were using medication and only half of those under medication had normal levels of blood pressure. There is a need to update this information and to assess what are the causes behind the poor control of hypertension at the primary health care level.

Diabetes

Also in the case of diabetes, the provision of effective treatment at primary health care level would help to reduce its complications and therefore the need for hospitalisation. Primary prevention through health promotion should tackle obesity and other risk factors for diabetes, while treatment of those already affected should help to prevent the complications of diabetes, reducing the need for hospitalisation. More than one third of the admissions for diabetes were related to poor glycemic control, suggesting that treatment guidelines are not effectively implemented. Rotchford et al. (2002) described the diabetic population under the care of the public health sector in a rural district of KZN. They found that only about 16% of diabetic patients had an acceptable glycemic control, 65% had hypertension, 36% were severely obese, 40% had retinopathy and 6% had foot problems.

Malignant neoplasms

Malignant neoplasms of the oesophagus and of the cervix are the most frequent cancers and they could be prevented. Cancer of the oesophagus is associated with alcohol and tobacco consumption, and a diet poor in fruits and vegetables. Cancer of the cervix is associated with the sexual transmission of papilloma virus and it is more frequent in low socioeconomic groups. Therefore primary prevention through a change in lifestyles is again the first choice but it will take a long time to produce an impact.

Pap smear screening could detect a high proportion of cancer of the cervix but its feasibility and costs need to be assessed. Fonn et al. (2002) tested a screening programme on a target population of women 20 years and older in several provinces of South Africa. Among the women covered by the screening, the detection rate was 2.4% for low-grade squamous intraepithelial lesions (SIL) 1.8% for high-grade SIL and 0.5% for invasive cervical cancers. Although these results show the potential benefits of Pap smear screening, the authors suggested that detection per se would not solve the problem without a strengthening of the health services and without a better link between the staff performing the screening and the staff located in the treatment centres.

Making available cervical cancer screening may not be accompanied by a higher use. Wellensiek et al. (2002) found that nearly 90% of women of high socioeconomic status in Durban did not use cervical cancer screening even if they were aware of its benefits and the services were available. Therefore, a further problem is to convince the target group to use the services where they are available.

Any intervention needs to be considered in the context of the overall burden of disease (BOD) and within the priorities allowed by the budget envelope. There are policy makers who have questioned the rationale of a full-fledged cervical cancer screening programme. McCoy and Barron (1996) have argued that cervical cancer screening is not feasible and it is not even desirable given more pressing health needs. Wilkinson (1997) has stated, "Universal cancer screening, while ultimately desirable, is not feasible within the current resources". Sitas et al. (1997) have argued that a screening programme with 70% coverage will have the potential of reducing the overall cumulative incidence by one third. Wilkinson (1997) counter argued "…… our experience is that getting results back to the patient is very difficult. Only 22% of patients undergoing biopsy (for any reason) in Hlabisa ever received their results". This is a good example of the policy debate concerning the best use of scarce resources with infinite health problems to be solved. With so many problems affecting the population, each intervention should not be considered in isolation but in the overall context of the BOD. There is a need to list all major health problems in terms of morbidity and mortality, check the feasibility of cost-effective interventions within available resources and rank pap smear screening in order of priority.

Neuropsychiatric conditions

The higher frequency of admissions for depression among women is in line with what is known from the literature. Bhagwanjee et al. (1998) conducted a survey in a rural area of KZN and they found that females had a significantly higher prevalence of depression while other psychiatric disorders were significantly more frequent among males. According to the WHO 2000 Global BOD, depression is more frequent among women and is behind their higher frequency of attempted suicides.

5.3) Group III

The two most frequent admissions for injuries are assault and traffic accidents. Intentional and unintentional injuries produce a sizable burden in terms of DALYs lost because they affect the youngest age groups and they are associated with high mortality and long-term disability. According to the WHO 2000 Global BOD report, road traffic accidents are a leading cause of overall burden of disease in men and when DALYs rather than deaths are considered the burden is more apparent. The SA BOD study estimated that in the year 2000, 22% and 8% of years of life lost were due to injuries respectively among males and females in South Africa. Traffic accidents could be reduced substantially through a further strengthening of the compliance with traffic regulation, which KZN is already actively pursuing. The prevention of interpersonal violence is

much more complex because it is caused by socioeconomic and cultural factors that are difficult to change.

Several preventive strategies have been suggested in the past to prevent accidental poisoning. Two third of the admissions for accidental poisoning were concentrated among preschoolers and they were mainly due to paraffin ingestion. This confirms the findings of studies carried out in several areas of South Africa, according to which, paraffin ingestion is one of the most common causes of accidental poisoning among children. This is caused by poor storage of paraffin containers and could be prevented through adoption of childproof containers. However, this is not sufficient to prevent accidental paraffin ingestion if containers are left open and an educational campaign would be necessary to create awareness.

6) Conclusions and recommendations

This is the first report providing reliable provincial estimates on the hospital admissions for KZN. The estimates can be used to expand the epidemiological database, rank priorities, rationalize the planning of effective interventions and evaluate their impact.

The estimates can be used to expand the epidemiological database. Although hospital admissions cannot be directly used to derive the epidemiological estimates in the general population, admission rates for some diseases approach the population rates because of their high probability of hospitalisation. For example, the admission rates for stroke and malignant neoplasms were consistent with what is expected in the population. On the other hand, mortality from injuries appeared to be under-represented compared with other data sources. Therefore, more work needs to be done to assess the use of hospital admission rates and other data sources to estimate population rates for specific diseases.

In terms of priorities, the admission profile confirms the presence of a triple burden of communicable and non-communicable diseases, and injuries. AIDS, unintentional injuries, TB, respiratory infections, diarrhoea and maternal conditions were the first six causes of admission. Cardiovascular diseases and genitourinary conditions were the first two chronic degenerative diseases. When genders were considered separately, the first two causes of admission were unintentional injuries and AIDS for males, and AIDS and maternal conditions for females. TB and injuries were more frequent among males, while AIDS, genitourinary diseases and diabetes affected more females.

There are several intervention strategies to be considered. Most of the burden was caused by well-known risk factors, which are influenced by cultural values that shape attitude and behaviour since early childhood. Sexual norms influence the spread of HIV, other sexually transmitted diseases and unwanted pregnancies; eating habits, consumption of alcohol and smoking cause a high proportion of non-communicable diseases; traffic violations and interpersonal violence cause most injuries. This sombre picture could be avoided through a long process of health promotion, aiming at tackling the roots of these problems but this will take a long time to produce an impact.

Secondary prevention at primary care level could reduce the hospitalisation for key diseases. These interventions include the identification and treatment of those who are more at risk. AIDS is the most frequent cause of admission and mortality, and reducing the progression of the disease through the antiretroviral therapy should reduce the burden of hospitalisation due to AIDS and other communicable diseases associated with HIV. Similarly, identifying and effectively treating those most at risk for chronic degenerative diseases should help to reduce their hospitalisation.

However, cost effective interventions for TB, AIDS, hypertension, diabetes, fail when they are scaled up to cover increasing numbers of patients at primary care level. TB cure rate is low, only a minority of patients have their hypertension and diabetes under control, and the scaling up of antiretroviral therapy will be even more complex to implement. Therefore implementation strategies need to be strengthened through the following steps:

- Formulation of priorities in line with the BOD;
- Ranking interventions in order of priority, according to BOD and cost-effectiveness criteria;
- Identification of patients at risk by using screening criteria at primary care level. This can be done by using risk charts to identify patients at different degree of risk according to the presence of risk factors such as hypertension, obesity, smoking and alcohol consumption;
- Reassessment of the implementation criteria of the priority interventions. To improve the effectiveness of interventions, the DOH should reassess the feasibility of the treatment guidelines for hypertension, diabetes and other diseases. The reasons for their poor implementation at primary care level may include unrealistic assumptions and expectations, leading to overstretching of the health personnel and poor patients' compliance with treatment protocols. It would be necessary to re-formulate the guidelines by estimating the human and financial resources required for an effective implementation and by comparing the implementation requirements with what is available at primary care level; and
- Monitoring of the occurrence of implementation bottlenecks to re-adjust the implementation strategies.

An improvement of the implementation strategies at primary care level should be reflected by a decline in the admission rates for target diseases. If treatment is accessible, successfully prescribed and complied with, the complications associated with many diseases should decline, reducing their admission rates. This survey has provided a baseline against which to measure changes in the admission rates for target diseases. A repetition of this survey in a few years time will provide a follow up against which to measure changes in hospitalisation that will help to judge the effectiveness of the health strategies. The follow up survey could be expanded in scope to estimate the rates of surgical procedures and relative complications, or to focus on specific issues related to management and quality of care. By the same token, if more precise estimates will be required or if the estimates need to be disaggregated to each district or each hospital, the

sample will have to be expanded considerably. However, it should be kept in mind that any expansion in scope increases the complexity, the costs and the time schedule to implement the survey and it should be justified by clear objectives and hypotheses to be tested.

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Annex I - Methodology

The sample was based on the hypothesis that 19% of the admissions were due to AIDS. To get such estimate with an error of +-2%, with a probability of 95%, 1,478 medical records[6] per year were needed. Considering that the average annual number of admissions for the period to be covered were in the order of 700,000, a systematic random sampling of one every 500 would have provided the required sample. All the public hospitals were enrolled in the survey and the records related to 1998, 2000 and 2002 were to be sampled in the archives.

The planning of the survey was carried out between April and May 2003. Dr Zungu, Director of the Institutional Support Services of the DOH, sent a letter to the hospital managers, informing them about the objectives of the survey. The enumerators were trained to select the medical records, extract the information and summarize it on the survey forms. The pre-test helped to clarify the variation in the record keeping system of the archives and the problems involved in tracing the medical records. After the testing, the methodology was refined and finalized to ensure that no record was excluded from the sampling.

The team composed of one supervisor and three enumerators were trained on how to sample the records and extract the information. The training lasted for about one week during which the supervisor traced the registers of the admissions, applied the sampling method, assigned the tasks among the enumerators, checked that every attempt was carried out to trace unavailable records, ensured that information on the survey forms reflected that contained in the medical records and the medical terminology was properly interpreted by the enumerators.

The team visited the hospitals between the end of May and the end of September 2003. The schedule was set up according to the availability of the hospital managers to meet the survey team. The archivist assisted the team in tracing the registers of the admissions, which provided the sampling rosters and in identifying the location of the medical records.

The supervisor selected all the registers for 1998, 2000 and 2002 and applied a systematic random sampling. Beginning with the register of 1998, the first admission was selected by extracting a random number, falling in the sampling interval between 1 and 500. If for example, 332 was the random number, the supervisor started counting from the first admission on the register of 1998 till he reached the 332nd; while the following admissions were selected by adding the sampling interval of 500 (i.e. 832, 1332). This process continued till the last admission on the register related to 1998 was reached. When 1998 was exhausted, the same procedure was repeated for the registers of 2000 and 2002. In the hospitals, where the records for 1998 were not available, the next available year was selected instead. The folders of the medical records related to the sampled admissions were traced on the shelves of the cabinets of the archives or in any other place where the medical records were stored. In case a folder was missing, the archivist made

[6] $1.96^2 * p * (1-p)/e^2$, where p = % admissions because of AIDS, e = error.

every effort to trace it and if this did not succeed the following admission on the register was selected instead.

The enumerators filled each survey form by extracting the relevant information contained in each folder and by summarizing the medical history. The information included gender, date of birth, date of admission and of discharge, admission and discharge diagnoses, outcome of the discharge, signs and symptoms from the medical history, laboratory and other medical tests, and any other information which could have helped to finalize the diagnosis. Each medical record was screened for the presence of HIV test and other relevant tests, and for the major and minor signs of AIDS suggested by the World Health Organization (WHO). Major signs included the reporting of fever, major loss of weight and diarrhoea lasting for more than one month. Minor signs included persistent cough lasting for more than one month, generalized dermatitis, herpes zoster or herpes simplex, candidiasis and generalized lymphadenopathy. The records were also searched for generalized Kaposi sarcoma, pneumocystis carinii pneumonia and criptococcal meningitis. Any relevant notes written by nurses and doctors on the medical records were summarized. In case of death, the death certificate was traced and recorded. The questionnaires were checked for completeness by the team supervisor before leaving the hospital and if the supervisor judged that the information in some of the records was insufficient, these records were left with the medical manager for a final diagnosis.

Diagnosis

Care was taken to use objective medical criteria. The task of the enumerators was to collect the information on the medical records but they did not decide the medical diagnosis. This was carried out at the DOH, where two medical doctors independently reviewed the information on each survey form. The final diagnosis was assigned according to the underline medical condition that started the train of events leading to the hospitalisation. For example, if the patient had a lower tract respiratory infection and there was a positive HIV test, the diagnosis was assigned to AIDS. If the medical history included clear statements such as “clinical retroviral disease” and “terminal stage of AIDS” the diagnosis was assigned to AIDS. Clinical AIDS cases were also reviewed for the presence of the major and minor signs of AIDS suggested by WHO. Because of the conservative criteria used in categorizing clinical AIDS and the low proportion of patients tested for HIV, the estimate of about 15% of the admissions due to AIDS in 2002 is an under-estimate of the burden of HIV. The diagnoses were coded according to the International Classification of Diseases No. 10 (ICD10). In case a diagnosis was inconsistent, the two medical doctors reviewed the related medical history again to sort out their differences. If there was no agreement, the diagnosis remained undetermined, which was the case for about 4% of records.

Analysis

The forms were coded and entered into SPSS at the DOH. A trained coder entered the data into SPSS 11.0 and a research assistant compared the SPSS records with the

information contained in the original survey forms. Another quality check was carried out by running cross tabulations to identify inconsistencies, trace the records causing inconsistencies and apply the necessary corrections.

The cleaned file was then analysed to produce the estimates presented in the results. The statistics were obtained by inflating the sample by the reciprocal of the sampling fraction and by dividing for the number of years covered by the survey. The 95% confidence intervals (CI) gave the uncertainty around the estimates. Because the statistics are derived from a sample, they can differ from the same statistics derived from a complete census. The 95% CI was based on +/- 1.96 multiplied by the standard errors, which are related to the sampling variability occurring by chance because only a sample rather than the entire universe of records is taken. If repeated surveys were conducted with the same method, 95 out of 100 times, the estimates would be within the 95% CI.

Annex II - Survey Form

Hospital…… Record # …….

Marital status

Single	Married	Widowed	Divorced	Separated

Date of birth

Year		Month		Day		Age

Type of case

h.	p.h.	p.

Sex

m.	f.

Diagnosis……

Date of

Year		Month		Day	

admission. Ward

Disease: 1.	
2.	
3.	
4.	
E.CODE:	
SURGICAL PROCEDURES 1.	
2.	
3.	

Unauthorized discharge Date……

Authorized discharge ……..Date……..

Results

Cured	Improved	I.S.Q.	Died	Absconded

Laboratory Investigation

INDICATE THE RESULTS OF ANY LABORATORY EXAMS CARRIED OUT

HIV test Yes No Result……

Sputum Test Y N Result…….

Xray Y N Results…….

Other (specify) Y N Results…….

CHECK IF ANY OF THE FOLLOWINGS ARE IN THE MEDICAL RECORD (after the = write the exact term recorded in the medical record):

a) TB =	
b) Cryptococcal meningitis =	
c) Candidiasis oro pharynx =	
d) Loss of weight of more than 10% in the last month =	
e) Diarrhoea lasting more than one month =	
f) Fever lasting more than one month =	
g) Persistent cough lasting more than one month =	
h) Generalized dermatitis =	
i) Herpes zoster or herpes simplex =	
j) Generalized lymphadenopathy =	
k) Pneumocystis carini =	
l) Bacterial pneumonia =	
m) Kaposi Sarcoma =	
n) Other (specify) =	

IN CASE THE PATIENT WAS TRANSFERRED INDICATE

REASON…….
Date.,…….. Where

Write down any other information that may be found in the medical record
……
……
……
……
……
……
……
……

IN CASE OF DEATH FILL THE FOLLOWING:
Date of death:……..
Causes of death according to the death certificate: (If ICD of causes of death was used indicate if it is ICD9 or ICD10 and write the code)
a)……..
b)……
c)……
d)……..
Second Cause……..

In case of female deaths, was she pregnant in the 42 days before death Yes No

Annex III - ICD10

Table III.1 Groups, categories and single causes of admission

Category name	ICD10 CODES
I. Group I (Communicable, Maternal, Perinatal & Nutritional Conditions)	
I-A. Tuberculosis	A15-A19, B90
I-B. HIV/AIDS	B20-B24
I-C. Diarrhoeal Diseases	A00-A04, A06-A09
I-D. Respiratory infections	
Lower Resp Inf	J10-J18, J20-J22
Upper Resp. Inf.	J00-J06, H65-H66, H70
I-E. Other Infectious & parasitic	
Sexually Transmitted Diseases excluding HIV	A50-A64
Childhood Cluster (pertussis, polio, diphtheria, measles, tetanus)	A33-A37, A80, B05, B91
Bacterial Meningitis	A39, G00
Hepatitis	B15-B19
Malaria	B50-B54
Schistosomiasis	B65
Intestinal nematodes	B76-B79
Other infectious & parasitic	B88
I-F. Maternal conditions	
Sever Complications of pregnancy and delivery:	
Ectopic pregnancy	O00.0-O00.9
Hypertension, preeclampsia, Eclampsia	O10-O16
Diabetes in pregnancy	O24-O24.9
Disorders of placenta	O43-O45
Haemorrhage	O44-O46, O67, O72
Obstructed labour	O64-O66
Maternal sepsis	O85-O86
Abortion:	
Medical abortion	O0.4
Complete abortion	O03.5-O03.9, O05.5-O05.9, O06.5-O06.9
Incomplete abortion	O03-O03.4, O05-O05.4 O06.0-O06.4
Threatened abortion	O20.0
Puerperium:	
Obstetric septic wound, breast abscess	O86.0, O91
Other :	
Hyperemesis, false labour, anaemia	O21-O21.9, O28.0, O47
Urinary tract inf. in pregnancy	O23-O23.9
Other disease and complications of pregnancy/labour/delivery	O26.9, O36.4, O75.8-O75.9, 090, O99

Cont.

Category name	ICD10 CODES
I-G. Perinatal conditions	
Prematurity	P05-P07
Birth asphyxia	P20-29
Birth trauma	P10-P15
Neonatal jaundice	P57-P59
Sepsis	P36
Other perinatal	P60-P96
I-E. Nutritional deficiencies	
Protein-energy malnutrition	E40-E46
Iron deficiency anaemia	D50
II. Group II - Non-communicable Diseases	
II-A. Malignant neoplasms	
Carcinoma mouth oropharynx	C00-C14
Carcinoma oesophagus	C15
Carcinoma stomach	C16
Carcinoma colon & rectum	C18-C21
Carcinoma liver	C22
Carcinoma lungs, trachea, bronchi	C33-C34
Melanoma	C43
Carcinoma breast	C50
Carcinoma cervix	C53
Carcinoma corpus uteri	C54-C55
Carcinoma prostate	C61
Lymphoma & multiple myeloma	C81-C90, C96
Leukaemia	C91-C95
Other malignant neoplasms	C41, C47-C49, C67-C75, C97
II-B. Diabetes Mellitus	E10-E14
II-C. Neuropsychiatric conditions	
Depression and bipolar affective disorders	F30-F33
Psychosis	F20-F29
Epilepsy	G40-G41
Alcohol & other substance abuse	F10-F19
Other neuropsychiatric disorders	F01, F03, F40-F45, G30-G31
II-D. Eye disorders	
Conjunctivitis	H10
Corneal ulcer	H16
Glaucoma	H40
Cataract	H25-H26
Other eye disorders	H21-H22, H49-H50

Cont.

Category name	ICD10 CODES
II-E. Cardiovascular diseases	
Rheumatic heart disease	I01-I09
Hypertension	I10-I15
Ischaemic heart diseases	I20-I25
Arrhythmia	I44-I49
Congestive heart failure	I50
Cerebrovascular diseases	I60-I69
Inflammatory heart diseases	I30-I33, I38, I40, I42
Thrombosis, trombophlebitis and other disorders of peripheral vessels	I73-I82
Varicose veins	I83
Haemorrhoids	I84
Other cardiovascular diseases	I27, I89, I95
II-F. Respiratory diseases	
Chronic obstructive pulmonary diseases	J40-J44
Asthma	J45-J46
II-G. Digestive diseases	
Ulcer of oesophagus	K22
Peptic ulcer	K25-K27
Gastritis	K29
Cirrhosis of the liver	K70, K74
Liver access	K75
Gall bladder diseases	K80-K82
Inguinal hernia	K40
Appendicitis	K35-K37
Perianal abscess/anal fissure/fistula	K60-K61
Intestinal obstruction	K91
Diverticulitis	K57
Haematemesis of unknown origin	K92
Pancreatitis	K86
Other digestive diseases	K92
II-H. Genitourinary diseases	
Urinary tract infection	N39.0
Nephritis / nephrosis	N00-N19
Renal colic/calculosis	N20-N22
Urethral stricture	N35
Prostatic hypertrophy	N40
Hydrocele, orchitis, epididimitis	N43-N45
Septic paraphymosis	N48
Urinary incontinence	N39.4
Macromastopathy	N60
Ovarian cyst	N83
Prolapse uterus	N81
Pelvic Inflammatory Disease	N73

Cont.

Category name	ICD10 CODES
Fibroma uterus	N85.2
Methrorragia	N92
Bartolini abscess	N75
Infertility	N97
Other genitourinary	N28.9, N29.8, N33.8, N39.9, N50.8, N51.8
II-I. Skin diseases	L00-L99
II-J Musculoskeletal diseases	
Degenerative muscular disorder	M60-M62
Rheumatoid arthritis,	M05-M06
Gout unspecified	M14
Arthritis	M13
Osteoarthrosis	M15-M19
Systematic Lupus Erythematosus	M32
Discal Hernia	M50-M51
Osteomyelitis	M86
Other musculoskeletric diseases	M20-M21
II.K Other non communicable	
Benign neoplasms	D00-D48
Endocrine disorders	D55-D80, E03-E07, E15-E16, E20-E34, E51-E89
Congenital anomalies	Q00-Q99
Oral conditions	K00-K14
Febrile convulsions	R 56
Group III - INJURIES	
III.A Unintentional injuries	
Road Traffic	V01-V89
Accidental Poisoning	X40-X49
Falls	W00-W19
Burns	X00-X09
Other unintentional	W20-W99, X10-X39, X50-X59
III.B Intentional injuries	
Self inflicted	X60-X84
Assault	X85-Y09

Annex IV - Tables

Table IV.1 Estimated annual admissions by disease category, KZN, 1998-02

	Males			**Females**			**Total**		
	Average	95% C.I.		**Average**	95% C.I.		**Average**	95% C.I.	
Group I									
TB	**25170**	21380	28960	**16330**	13200	19460	**41500**	36570	46430
AIDS	**27500**	23560	31440	**33000**	28710	37290	**60500**	54670	66330
Diarrhoea	**15170**	12150	18180	**20000**	16560	23440	**35170**	30600	39740
Resp. Inf.	**16830**	13670	19990	**20670**	17180	24160	**37500**	32790	42210
Other Inf.	**6000**	4070	7930	**7000**	4910	9090	**13000**	10150	15850
Maternal				**30000**	25880	34120	**30000**	25750	34250
Perinatal	**3500**	2010	4990	**4170**	2550	5790	**7670**	5470	9870
Nutritional	**2330**	1120	3550	**3000**	1620	4380	**5330**	3500	7170
Group II									
Malignant neoplasms	**4830**	3090	6570	**4670**	2950	6380	**9500**	7060	11940
Diabetes	**4500**	2820	6180	**11170**	8550	13780	**15670**	12550	18780
Neuropsych.	**11170**	8560	13780	**7670**	5480	9850	**18840**	15430	22240
Eye	**2330**	1120	3550	**2330**	1120	3550	**4660**	2950	6390
Cardiovasc.	**14330**	11400	17270	**15670**	12600	18740	**30000**	25750	34250
Chronic Respiratory	**2670**	1370	3970	**3330**	1880	4780	**6000**	4050	7950
Chronic Digestive	**7170**	5060	9280	**6170**	4200	8130	**13340**	10450	16220
Genitour.	**9330**	6940	11730	**14170**	11240	17090	**23500**	19720	27280
Skin	**8000**	5780	10220	**8670**	6350	10980	**16670**	13460	19880
Musculosk.	**2500**	1240	3760	**1830**	750	2910	**4330**	2680	5990
Other chronic	**3830**	2280	5390	**6330**	4340	8320	**10160**	7640	12690
Group III									
Unintent. Inj.	**32330**	28110	36560	**22830**	19180	26480	**55160**	49570	60760
Intent. Injur.	**25000**	21220	28780	**8500**	6210	10790	**33500**	29030	37970
Undetermined	**6670**	4630	8700	**10330**	7810	12850	**17000**	13760	20240
TOTAL	**231160**			**257840**			**489000**		

Table IV.2 Proportion of admissions by disease categories, KZN, 1998-02

	Males			Females			Total		
	Annual	Min	Max	**Annual**	Min	Max	**Annual**	Min	Max
Group I									
TB	**10.9%**	9.2%	12.5%	**6.3%**	5.1%	7.5%	**8.5%**	7.5%	9.5%
AIDS	**11.9%**	10.2%	13.6%	**12.8%**	11.1%	14.5%	**12.4%**	11.2%	13.6%
Diarrhoea	**6.6%**	5.3%	7.9%	**7.8%**	6.4%	9.1%	**7.2%**	6.3%	8.1%
Resp Inf.	**7.3%**	5.9%	8.6%	**8.0%**	6.7%	9.4%	**7.7%**	6.7%	8.6%
Other Inf.	**2.6%**	1.8%	3.4%	**2.7%**	1.9%	3.5%	**2.7%**	2.1%	3.2%
Maternal	0.0%	0.0%	0.0%	**11.6%**	10.0%	13.2%	**6.1%**	5.3%	7.0%
Perinatal	**1.5%**	0.9%	2.2%	**1.6%**	1.0%	2.2%	**1.6%**	1.1%	2.0%
Nutritional	**1.0%**	0.5%	1.5%	**1.2%**	0.6%	1.7%	**1.1%**	0.7%	1.5%
Group II									
Malignant neoplasms	**2.0%**	1.0%	3.0%	**1.8%**	1.1%	2.5%	**1.9%**	1.4%	2.4%
Diabetes	**1.9%**	1.2%	2.7%	**4.3%**	3.3%	5.3%	**3.2%**	2.6%	3.8%
Neuropsych.	**4.8%**	3.7%	6.0%	**3.0%**	2.1%	3.8%	**3.9%**	3.2%	4.5%
Eye	**1.0%**	0.5%	1.5%	**0.9%**	0.4%	1.4%	**1.0%**	0.6%	1.3%
Cardiovasc.	**6.2%**	4.9%	7.5%	**6.1%**	4.9%	7.3%	**6.1%**	5.3%	7.0%
Chronic Respiratory	**1.2%**	0.6%	1.7%	**1.3%**	0.7%	1.9%	**1.2%**	0.8%	1.6%
Chronic Digestive	**3.1%**	2.2%	4.0%	**2.4%**	1.6%	3.2%	**2.7%**	2.1%	3.3%
Genitour.	**4.0%**	3.0%	5.1%	**5.5%**	4.4%	6.6%	**4.8%**	4.0%	5.6%
Skin	**3.5%**	2.5%	4.4%	**3.4%**	2.5%	4.3%	**3.4%**	2.8%	4.1%
Muscolosk.	**1.1%**	0.5%	1.6%	**0.7%**	0.3%	1.1%	**0.9%**	0.5%	1.2%
Other chronic	**1.7%**	1.0%	2.3%	**2.5%**	1.7%	3.2%	**2.1%**	1.6%	2.6%
Group III									
Unintent. Inj.	**14.0%**	12.2%	15.8%	**8.9%**	7.4%	10.3%	**11.3%**	10.1%	12.4%
Intent. Injur.	**10.8%**	9.2%	12.4%	**3.3%**	2.4%	4.2%	**6.9%**	5.9%	7.8%
Undetermined	**2.9%**	2.0%	3.8%	**4.0%**	3.0%	5.0%	**3.5%**	2.8%	4.1%
TOTAL	**100 %**			**100 %**			**100 %**		

Table IV.3 Annual crude admissions rate per 100,000 population, KZN, 1998-02

	Males			Females			Total		
	Annual	Min	Max	**Annual**	Min	Max	**Annual**	Min	Max
Group I									
TB	**662**	563	762	**378**	306	451	**511**	451	572
AIDS	**724**	620	828	**765**	665	864	**746**	674	817
Diarrhoea	**399**	320	479	**463**	384	543	**433**	377	490
Resp Inf	**443**	360	526	**479**	398	560	**462**	404	520
Other Inf.	**158**	107	209	**162**	114	211	**160**	125	195
Maternal				**695**	600	790	**370**	317	422
Perinatal	**92**	53	131	**97**	59	134	**94**	67	122
Nutritional	**61**	29	93	**70**	38	101	**66**	43	88
Group II									
Malignant neoplasms	**127**	81	173	**108**	68	148	**117**	87	147
Diabetes	**118**	74	163	**259**	198	319	**193**	155	231
Neuropsych.	**294**	225	363	**178**	127	228	**232**	190	274
Eye	**61**	29	93	**54**	26	82	**58**	36	79
Cardiovasc.	**377**	300	455	**363**	292	434	**370**	317	422
Chronic Respiratory	**70**	36	104	**77**	44	111	**74**	50	98
Chronic Digestive	**189**	133	244	**143**	97	188	**164**	129	200
Genitour.	**246**	183	309	**328**	260	396	**290**	243	336
Skin	**211**	152	269	**201**	147	254	**205**	166	245
Musculosck.	**66**	33	99	**42**	17	67	**53**	33	74
Other chronic	**101**	60	142	**147**	101	193	**125**	94	156
Group III									
Unintent. Inj.	**851**	740	962	**529**	444	614	**680**	611	749
Intent. Injur.	**658**	559	758	**197**	144	250	**413**	358	468
Undetermined	**175**	122	229	**239**	181	298	**209**	170	249
TOTAL	**6085**			**5973**			**6026**		

Table IV.4 Average Length of stay by disease category, KZN, 1998-02

Disease	Mean	95% CI Min	Max
TB	**17.9**	14.8	21.0
Malignant neoplasms	**14.5**	9.5	19.4
Musculosk.	**13.1**	8.1	18.2
Unintent. Inj.	**10.3**	8.7	11.9
Neuropsych.	**10.1**	7.9	12.3
AIDS	**10.1**	8.9	11.3
Nutritional	**8.7**	5.2	12.2
Diabetes	**8.2**	6.2	10.2
Cardiovasc	**8.0**	6.3	9.7
Perinatal	**7.6**	4.8	10.4
Chronic Respiratory	**7.1**	2.1	12.2
Intent. Injur.	**7.0**	5.3	8.7
Genitour.	**6.8**	5.0	8.5
Skin	**6.5**	4.8	8.2
Other chronic	**6.0**	4.0	7.9
Chronic Digestive	**5.4**	4.1	6.7
Other Inf.	**5.3**	4.5	6.2
Resp Inf	**5.2**	4.6	5.8
Diarrhoea	**4.9**	3.8	5.9
Maternal	**3.4**	2.9	4.0
AVERAGE	**7.3**	6.9	7.7

Table IV.5 Estimated annual admissions, leading specific causes, KZN, 1998-02

	Males	95%	CI	**Females**	95%	CI	**Total**	95%	CI
	Annual	Min	Max	**Annual**	Min	Max	**Annual**	Min	Max
AIDS	**27500**	23560	31440	**33000**	28710	37290	**60500**	54670	66330
TB	**25170**	21380	28960	**16330**	13200	1946 0	**41500**	36570	46430
Diarrhoea	**15170**	12150	18180	**20000**	16560	23440	**35170**	30600	39740
LRTI	**13830**	10940	16720	**17170**	13960	20370	**31000**	26690	35310
Assault	**23830**	20130	27530	**5500**	3640	7360	**29330**	25130	33540
Other Accidents	**11330**	8700	13960	**7170**	5050	9280	**18500**	15120	21880
Abscesses	**7170**	5060	9280	**8170**	5920	10420	**15330**	12250	18420
Diabetes	**4500**	2820	6180	**11170**	8550	13780	**15670**	12550	18780
Traffic Accidents	**8000**	5780	10220	**5830**	3920	7740	**13830**	10900	16770
Falls	**6500**	4490	8510	**4830**	3090	6580	**11330**	8670	14000
Incomp. Abortion				**10500**	7960	13040	**10500**	7940	13060
Burns	**4330**	2680	5980	**3000**	1620	4380	**7330**	5180	9480
Stroke	**3170**	1750	4580	**4000**	2410	5590	**7170**	5040	9290
Epilepsy	**4000**	2410	5590	**3000**	1620	4380	**7000**	4900	9100
Psychosis	**4500**	2820	6180	**2330**	1120	3550	**6830**	4760	8910
URTI	**3000**	1620	4380	**3500**	2010	4990	**6500**	4470	8530
Malaria	**2830**	1490	4170	**3330**	1880	4780	**6170**	4190	8140
Congest. Heart	**2670**	1370	3970	**3330**	1880	4780	**6000**	4050	7950
Hypertension	**1830**	750	2910	**4170**	2550	5790	**6000**	4050	7950
Asthma	**1830**	750	2910	**2830**	1490	4170	**4670**	2950	6390

Table IV.6 Estimated annual crude admissions rates per 100,000 population, first 20 specific causes, KZN, 1998-02

	Males Annual	95% Min	CI Max	**Females Annual**	95% Min	CI Max	**Total Annual**	95% Min	CI Max
AIDS	**724**	620	828	**765**	665	864	**746**	674	817
TB	**662**	563	762	**378**	306	451	**511**	451	572
Diarrhoea	**399**	320	479	**463**	384	543	**433**	377	490
LRTI	**364**	288	440	**398**	323	472	**382**	329	435
Assault	**627**	530	725	**127**	84	170	**361**	310	413
Other Acc	**298**	229	367	**166**	117	215	**228**	186	270
Abscesses	**189**	133	244	**189**	137	241	**189**	151	227
Diabetes	**118**	74	163	**259**	198	319	**193**	155	231
Traffic Accidents	**211**	152	269	**135**	91	179	**170**	134	207
Falls	**171**	118	224	**112**	72	152	**140**	107	172
Incomp. Abortion				**243**	184	302	**129**	98	161
Burns	**114**	71	158	**70**	38	101	**90**	64	117
Stroke	**83**	46	121	**93**	56	130	**88**	62	115
Epilepsy	**105**	63	147	**70**	38	101	**86**	60	112
Psychosis	**118**	74	163	**54**	26	82	**84**	59	110
URTI	**79**	43	115	**81**	47	116	**80**	55	105
Malaria	**74**	39	110	**77**	44	111	**76**	52	100
Congest. Heart	**70**	36	105	**77**	44	111	**74**	50	98
Hypertension	**48**	20	77	**97**	59	134	**74**	50	98
Asthma	**48**	20	77	**66**	35	97	**58**	36	79

Table IV.7 Estimated annual admissions by type of injury, KZN, 1998-02

Injuries		**Expected Admissions**	95% CI Min	Max
Assault without gun/sharp object, no fracture & no permanent damage.		**9500**	7200	11800
Assault with Gun, no fracture & no permanent damage.		**6200**	4300	8100
Assault with Sharp object, no fracture & no permanent damage.		**6800**	4800	8800
Assault fractures		**3700**	2200	5200
Assault perm. damage		**1300**	400	2200
Assault death		**1800**	700	2900
Subtotal	29300			
Attempted Suicide		**4000**	2400	5600
Suicide death		**200***	*	*
Subtotal	4200			
MVA no fracture		**4200**	2600	5800
MVA fractures		**8300**	6100	10500
MVA perm. damage		**1000**	200	1800
MVA death		**300***	*	*
Subtotal	13800			
Fall no fracture		**4700**	3000	6400
Fall fractures		**5800**	3900	7700
Fall perm. damage		**500**	*	*
Fall death		**300***	*	*
Subtotal	11300			
Accidental burns		**7000**	5000	9000
Burns death		**300***	*	*
Subtotal	7300			
Accidental poisoning		**4200**	2600	5800
Subtotal	4200			
Animal bite		**3500**	2000	5000
Subtotal	3500			
Other accidents no fracture		**9800**	7400	12200
Other accidents fractures		**4000**	2400	5600
Other accidents permanent damage		**1200**	300	2100
Subtotal	15000			
TOTAL		**88600**		

* Unreliable estimates due to the small numbers

Table IV.8 Estimated annual deaths by category, KZN 1998-02

Category	% Total mortality *	Case Fatality**	Expected Annual Hospital deaths	95% CI Min Deaths	Max deaths
AIDS	**39.4%**	**31.5%**	**19200**	16400	21900
TB	**11.6%**	**13.6%**	**5700**	3900	7500
Cardiovascular	**9.6%**	**15.6%**	**4700**	3000	6300
Resp. Inf.	**5.5%**	**7.1%**	**2700**	1400	3900
Diarrhoea	**5.1%**	**7.1%**	**2500**	1300	3700
Diabetes	**5.1%**	**16.0%**	**2500**	1300	3700
Malign. Neoplasms	**4.8%**	**24.6%**	**2300**	1100	3500
Intent. Injur.	**4.1%**	**6.0%**	**2000**	900	3100
Perinatal	**3.8%**	**22.9%**	**1800**	700	2900
Unintent. Inj.	**2.1%**	**1.8%**	**1000**	200	1800
Rest of categories	**6.8%**	**4.0%**	**3300**	1900	4700
Undetermined	**2.1%**	**5.6%**	**1000**	200	1800
Total	**100.0%**		**48700**		

* % of total deaths caused by each category **% within each category who die

Table IV.9 Estimated admissions in KZN for the year 2002

	Expect. Number Admiss. Year 2002	95% Min	CI Max	**% Distribution Year 2002**	95% Min	CI Max	**Crude Rate 100,000 Year 2002**	95% Min	CI Max
Group I									
TB	**44000**	35200	52800	**8.7%**	7.0%	10.4%	**520**	416	624
RVD	**75500**	64400	86600	**14.9%**	12.7%	17.1%	**892**	761	1023
Diarrhoea	**34000**	26200	41800	**6.7%**	5.2%	8.3%	**402**	310	494
Resp. Inf.	**45500**	36600	54400	**9.0%**	7.2%	10.8%	**538**	432	643
Other Inf.	**6000**	2600	9400	**1.2%**	0.5%	1.9%	**71**	31	111
Maternal	**26000**	19100	32900	**5.1%**	3.8%	6.5%	**307**	226	389
Perinatal	**4500**	1600	7400	**0.9%**	0.3%	1.5%	**53**	19	88
Nutritional	**6500**	3000	10000	**1.3%**	0.6%	2.0%	**77**	35	118
Group II									
Malignant Neoplasms	**11000**	6500	15500	**2.2%**	1.3%	3.1%	**130**	76	184
Diabetes	**17000**	11400	22600	**3.4%**	2.3%	4.5%	**201**	135	267
Neuropsych.	**17000**	11400	22600	**3.4%**	2.3%	4.5%	**201**	135	267
Eye	**5000**	1900	8100	**1.0%**	0.4%	1.6%	**59**	23	96
Cardiovasc	**31500**	24000	39000	**6.2%**	4.7%	7.7%	**372**	283	461
Chronic Respiratory	**4000**	1200	6800	**0.8%**	0.2%	1.3%	**47**	15	80
Chronic Digestive	**14500**	9300	19700	**2.9%**	1.8%	3.9%	**171**	110	233
Genitour.	**26000**	19100	32900	**5.1%**	3.8%	6.5%	**307**	226	389
Skin	**19500**	13500	25500	**3.9%**	2.7%	5.0%	**230**	160	301
Musculosck.	**3500**	900	6100	**0.7%**	0.2%	1.2%	**41**	11	72
Other chronic	**9000**	4900	13100	**1.8%**	1.0%	2.6%	**106**	58	155
Group III									
Unintent. Inj.	**53500**	43900	63100	**10.6%**	8.7%	12.5%	**632**	519	746
Intent. Injur.	**35500**	27500	43500	**7.0%**	5.4%	8.6%	**420**	325	514
Undetermin.	**16500**	11000	22000	**3.3%**	2.2%	4.4%	**195**	130	260
TOTAL	**505500**			**100%**			**5974**		