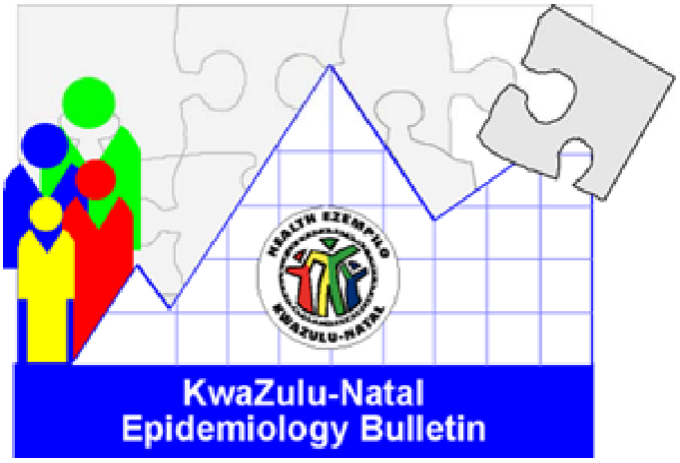


Issue 1: November 2002

PREFACE

Today the world is a global village and disease is a global issue.

All Departments of Health need to have good data so as to practice evidence based medicine, develop evidence based policies, ensure evidence based priorities, evidence based implementation, create evidence based protocols, indicators, evaluation and monitoring systems and also audit ourselves with evidence based indicators, outputs and facility parameters. Epidemiology Units can assist with the foundations of all these. For this reason it is imperative that a Provincial Department of Health has a sharing data base in a strong Epidemiology Unit that creates a strong ethics and culture of accumulating accurate and relevant data, necessary then to perform its functions and is mature enough to change when necessary but in accordance with scientific data and evidence.

It is a pleasure to support, authorise and assist with the publication of this Epidemiology Bulletin of the KwaZulu-Natal Department of Health. It is a creation of a number of units and people. Congratulations to all of you. You have done a collective and individual job of good work. Let this bulletin not just be a publication, but let it be the lifeblood of all we do. We need to assess and to reassess what we do, critisise constructively, consider value for money, prioritise and budget allocations. Let us ensure that our budget process is dictated by priorities (National, Provincial and Departmental).

Let us measure ourselves and ensure that we are doing well. We must always do what is best for patients and let this bulleting tell us objectively how we are doing that. Let us all look forward to the next bulletin and be brave enough to critisise each other but to do so constructively. To all, well done.

_____

PROF R.W. GREEN-THOMPSON : SECRETARY
DEPARTMENT OF HEALTH KWAZULU-NATAL

Editorial

It gives me great pleasure to write the editorial for the first edition of this publication as it represents many milestones for the Epidemiology Unit. It shows what can be produced as a result of teamwork and the bringing together of interested people with a common goal around a table. This embodies the critical requirement in any information system:

- The Initiative and
- The Team

But, most importantly it starts the journey, which will see the Epidemiology Unit, grow into a resource for the KwaZulu Natal health services.

The new millennium has been coined the Information Age. There is no doubt that the phrase **" Information is Power"** has taken on greater meaning in the 21st century. In health, we are constantly required to take decisions regarding the allocation of resources and the establishment of health services that will have lasting consequences. Oftentimes the information to support these decisions is lacking, incomplete or outdated. This forms the catalyst for putting in place systems and processes to collect this information that will allow you to support and monitor the results. It forms the lifeblood of the planning process, which is a spiral that is constantly revisiting past decisions and improving upon them.

It is a fallacy to believe that the collection of information depends on record clerks, statisticians and computers. It is the core activity of any individual who has to plan. The Epidemiology Unit is your partner in assisting YOU with the tools to collect, analyze and interpret the results of the information correctly. This will help us learn from past actions, improve the quality of decisions made currently, predict and plan effectively for future challenges facing the health sector.

The Epidemiological Bulletin will be published quarterly on topics that are relevant to the provincial health services. This first edition covers three infectious diseases, Cholera, HIV and Tuberculosis in the context of HIV infection, which contribute to the burden of infectious diseases in KwaZulu Natal. However, South Africa is in the midst of an Epidemiological Transition. It faces a dual burden of disease- that of Communicable and Non-communicable Diseases. The net result is an impact on life expectancy, demand for health resources and quality of life. Future editions will attempt to quantify the Burden of Disease in KwaZulu Natal and other topical issues relevant to the provincial health services.

In conclusion, I would like to extend a big 'Thank You" to all those who contributed to making this a reality. Your commitment and ongoing support of the Unit is appreciated.

Dr. Thilo Govender
Principal Specialist
Epidemiology Unit
KwaZulu Natal Department of Health

Acknowledgement:

We would like to thank the following people whose support and guidance was invaluable in the preparation of this publication.

Prof. Green Thomson for valuable comments on the draft reports, **Prof. Hendricks** and **Dr. Thilo Govender** for technical support and guidance to complete this issue of the "KZN Epidemiological Bulletin", **Prof. Allan Smith** from the University of Natal for coordinating the laboratory analysis of the antenatal survey samples for KZN. The Director, Health Information Services, **Mr Vuma Magaqa**, Provincial Antenatal Survey Co-coordinator **Mr. Ahmed** and all other health care workers from the sentinel sites for collecting the antenatal survey data. Special thanks to the members of Epidemiology and Indicators Publication Committee, **Dr V. Vella** from Italian Cooperation and **Dr P Rodriguez** from Cuban Cooperation for valuable comments. We also like to thank **Provincial Operations Centre** and **The GIS Unit** for providing cholera surveillance data. The staff from district and Health facilities for their tireless effort to manage cases whose diligent reporting this entire study is based on. Finally we thank **Mrs P. Naidoo** (Secretary, Epidemiology Unit) for providing logistical support.

Authors of this issue:

Dr. AKM. Hoque (KwaZulu Natal Department of Health)
Dr. F. Meidany (Ndwedwe District Child Survival Project, MCDI)
Dr. C. Mugero (World Health Organization)
Dr. D. Mariani (Italian Cooperation)

HIV INFECTION IN KWAZULU NATAL
A PROVINCIAL UPDATE

BACKGROUND

The National Antenatal HIV Survey is conducted every year in all nine provinces in a selected number of primary health care facilities. In 2001 in the KwaZulu Natal this survey was carried out in a representative number of sentinel sites, well distributed throughout the province. According to this survey in 2001 about 33.5% of all pregnant women attending public antenatal services in this province was living with HIV[1].

A national strategy has been adopted since 1989 to track the epidemic among the sexually active population (pregnant mothers) through National HIV and Syphilis Survey in South Africa to monitor the epidemic and measure the effectiveness of the intervention programme. A national report is published on the survey representing the provincial estimation. A further analysis of the provincial data was conducted to estimate the prevalence of HIV within the different health districts of KwaZulu Natal.

METHOD

3521 women attending primary health care antenatal services all over the KZN Province were tested for HIV during October 2001. All 11Health Districts were represented in this survey. For the first time, a small number of private hospitals pregnant women participated in a separate survey in the same period using a similar protocol. Blood samples were analysed at the Medical School Institute of Virology of University of Natal, using one Elisa test. Data were captured at the Institute of Virology using d-BASE programme and analysed on Epi-info in the Provincial Epidemiology Unit, KZN Department of Health. A member of the Medical Care Development International Ndwedwe Child Survival Project assisted in the analysis and interpretation of the results of this survey.

RESULTS

According to the 2001 survey, an estimated 33.5% of the antenatal clients in the public clinics in this province were infected by HIV (95% CI: 30.6% - 36.4%). This represents a decrease of about 2.7% from the previous year (relative decrease of about 7.4%). This decrease is not statistically significant[1]. The prevalence of HIV for the general population of South Africa for this year (2001) was 24.8% (95% CI: 23.6 – 26.1), an increase of 0.3% (relative increase of about 1.2%).

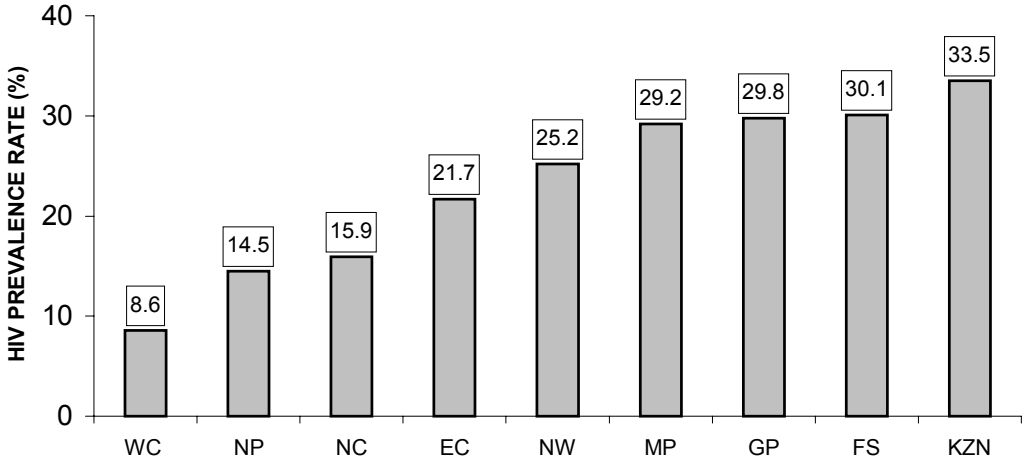


Fig 1. Antenatal HIV Survey Results by Province: South Africa 2001 (Source: National Department of Health)

There is now compelling evidence that the present trend in HIV infection in South Africa in general and in KwaZulu Natal in particular will have a profound impact on future rates of infant, child and maternal mortality, life expectancy and economic growth. Observing the trends of HIV infection over years of Antenatal HIV Survey clearly shows the exponential increase in the level of HIV prevalence over-time. The following graph shows this trend in South Africa and KZN.

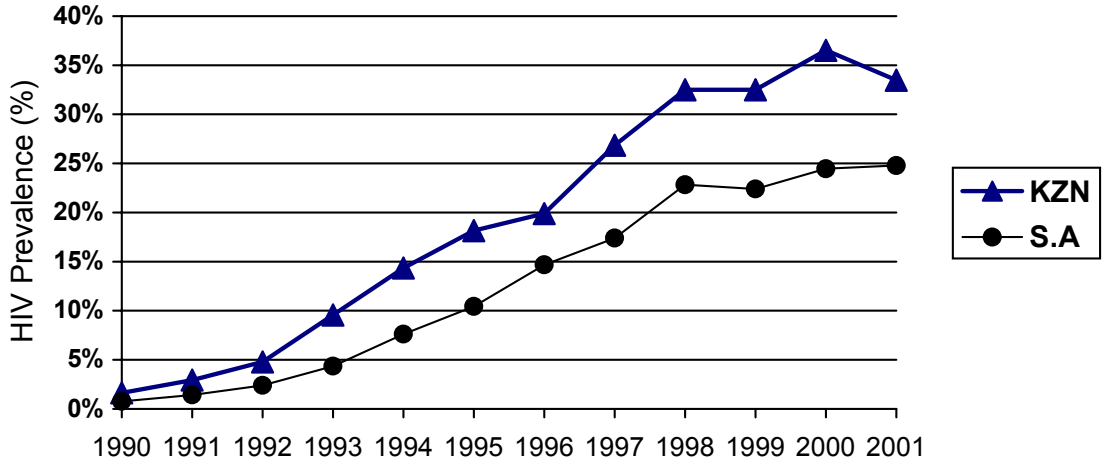


Fig 2. HIV Infection among Antenatal Clients in Public Facilities in South Africa and the KwaZulu Natal Province: 1990 - 2001

Geographic Distribution of HIV: Although data collection from KZN represented 8 Health Regions further analysis were conducted for 11 Health Districts thus shows the geographic distribution of HIV prevalence per health district. eThekweni (Durban) Health district with a prevalence of 41% had the highest HIV prevalence in this province, followed by Amajuba (Newcastle) of 40% and Ugu (Portshepstone) with 39% HIV seropositivity. Umkhanyakude (Jozini) health district had the lowest prevalence in KwaZulu Natal (26%). This disaggregated data according to the new district boundaries must be treated with caution. The sample of clinics included in the sentinel survey provides an accurate assessment of the provincial profile but lacks statistical power if disaggregated further.
This analysis of district distribution is not statistically significant. It has limited value for comparison and management objectives given the generalised nature of the epidemic.

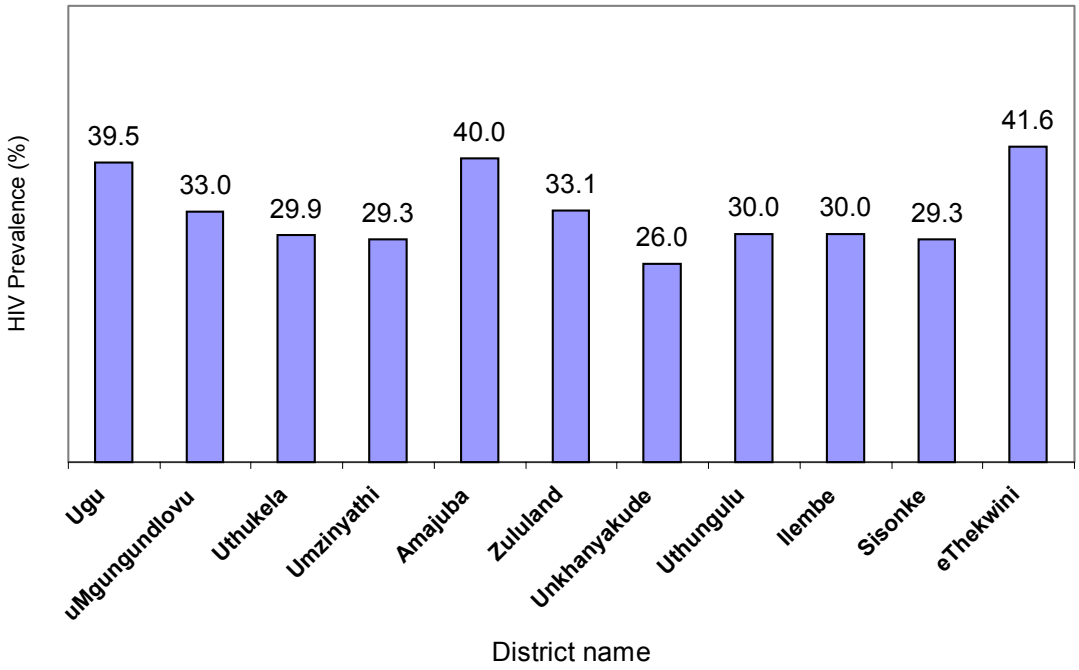


Fig. 3 HIV Prevalence among Antenatal Clients in the KwaZulu Natal Health Districts, 2001

HIV infection in different age groups: According to this survey, the highest prevalence of HIV infection is observed among the pregnant women in the age group of 25 – 29 years (42.6%), followed by the age group of 20-24 and 30-34 with values of 39.3% and 36.5% respectively. The following figure shows the distribution of HIV in different age groups in KwaZulu Natal.

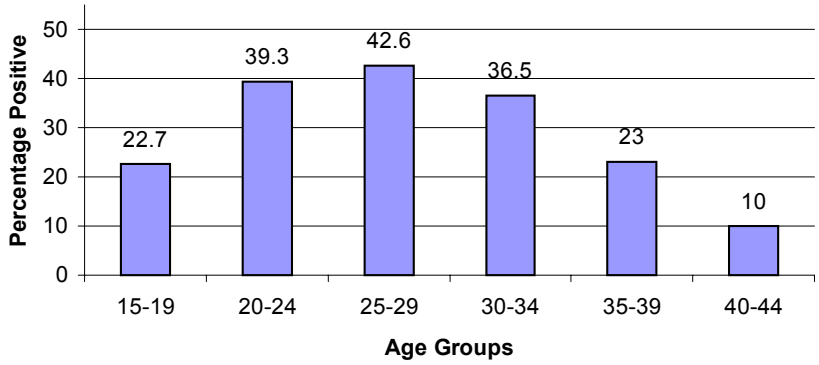


Fig 4. Age Distribution of HIV among antenatal clients in KwaZulu Natal: 2001

Gravidity and HIV Prevalence: There is an inverse relationship between the number of pregnancies (gravidity) and HIV infection in this province. The lower the number of pregnancies, the higher the prevalence of HIV. This relationship is possibly explained by increasing age associated multiparous women. The following graph shows this correlation between the number of pregnancies and HIV infection.

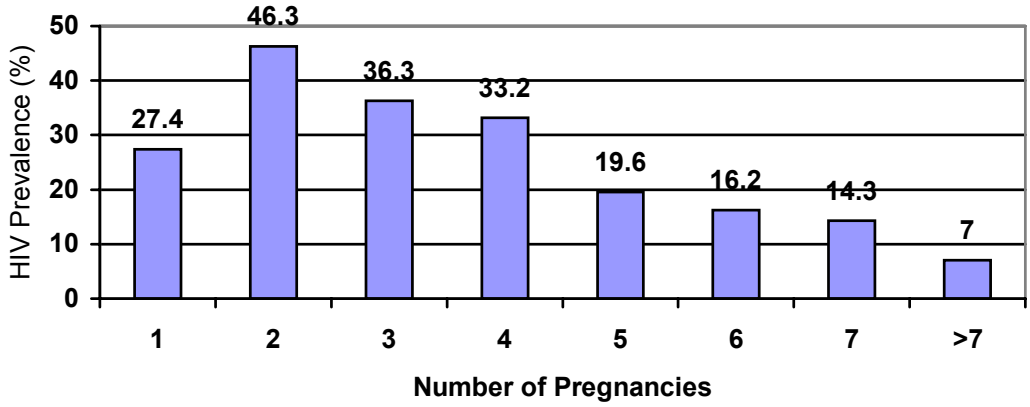


Fig 5. Number of Pregnancies and HIV Prevalence among Antenatal Clients in the KwaZulu Natal province in 2001

Level of Education: The only socio-economic variable that was included in this survey was the education level of the participants. It is clear that in the province of KwaZulu Natal, education does not have any protective effect against HIV infection. It seems that among the women who have attended school and high school, the highest HIV prevalence is observed among the antenatal clients that have higher education levels. This trend was also observed in the previous years. Therefore implication for health promotion efforts directed at school level.

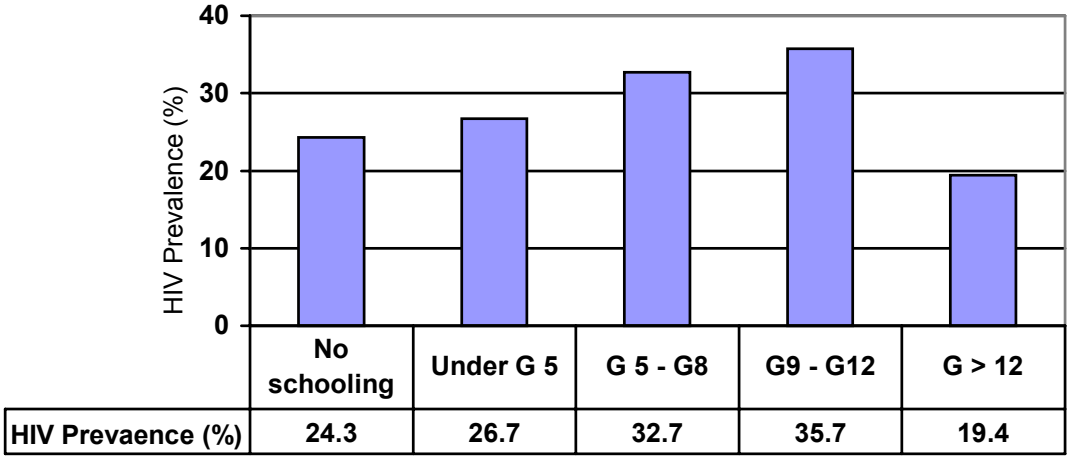


Fig 6. HIV Prevalence among Antenatal Clients (different Education Levels) in KwaZulu Natal: 2001

Estimating HIV prevalence among men: Antenatal Prevalence rates have been used to track the epidemic in the general population in the absence of other reliable population based estimates over time. For the purposes of planning HIV/ AIDS Programmes, model driven projections are used. However there remains a need for more research to be conducted on these models and their sensitivity in different circumstances.

To estimate HIV prevalence among men, an extra variable was included to the HIV Antenatal Survey questionnaire in the Eastern Cape in years 2000, namely "age of the father of the baby" [2].. The National Department of Health and all other provinces adopted this method for 2001 HIV Antenatal Survey. Each pregnant woman participating in the antenatal survey was asked to provide age of the father of her baby. This method assumes that all or a significant majority of the partners of the HIV positive mothers are also infected with this virus. The following figure is an estimation of the HIV prevalence among sexually active men in this province in 2001. The higher HIV prevalence in older men in comparison with women who are being infected in younger ages must be noted.

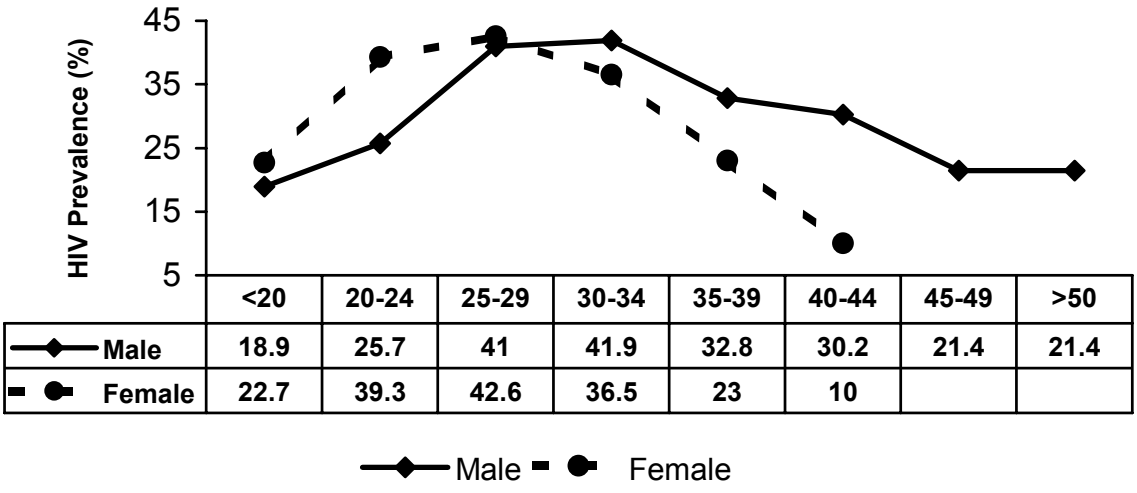


Fig 7. Estimated level of HIV infection among sexually active male and female in different age groups in the KwaZulu Natal Province in 2001

FACTS ON HIV INFECTION:

- By the June 2002 about 47 million people were infected by HIV in all the countries of the world. 95% of people living with HIV live in developing world (WHO).
- Two third of the world epidemic is in sub-Saharan Africa. At the national level, the 21 countries with the highest HIV prevalence are in Sub-Saharan Africa (World Bank).
- Around half of all people who acquire HIV become infected before they reach 25 years and typically die of the life-threatening illnesses called "AIDS" before their 35th birthday (UNAIDS).
- A significant cause of the dramatic rise in TB cases from the mid-1980s is the Human Immunodeficiency virus. Today tuberculosis is the single biggest killer of people infected with HIV. In many African countries, more than half of TB patients are also HIV positive. There, TB is perceived as synonymous with AIDS (WHO).
- With a total 4.8 million infected people, South Africa as a country has the largest number of people living with HIV/AIDS in the world (UNAIDS).
- The HIV prevalence for the antenatal clients in South Africa is about 24.8% (NDOH). This figure for KwaZulu Natal is 33.5. eThekweni Health District has the highest HIV prevalence in KZN (41%).
- South Africa will be faced with 1,85-million AIDS orphaned children in 2015, according to the Medical Research Council's burden of disease research unit. This figure represents 15% of children under the age of 15, whose mothers would have died of AIDS
- HIV has already affected our health system and in the near future it will place a huge demand on health and social services. It will threaten productivity through undermining the hard earned gains of development efforts of last decade.

Reference:

1. **National HIV and Syphilis seroprevalence survey in South Africa 2001** (Summary Report): Department of Health, Pretoria, Republic of South Africa
2. **Eastern Cape Epidemiological Notes, April 2001:** Eastern cape Department of Health, Bisho, South Africa

TB/HIV CO-INFECTION IN KWAZULU NATAL

Global Burden of TB/HIV

The global TB incidence in 2000 was estimated at 8.7 million cases. The estimated global incidence of HIV+ TB cases at 0.68 million and the number of people with TB/HIV co-infection were 16.3 million. Estimated TB deaths were 2 million and among HIV/TB cases death accounted for 0.5 million[1].

South Africa ranks 3rd as most affected Country in Africa Region and 9th globally with an incidence estimated at 526/100.000 and 60% of TB patients that are also HIV+[2].

UNAIDS estimates that in 2001 about 40 million people were living with HIV/AIDS and 3 million of them died of AIDS[3].

Sub –Saharan Africa with less than 10% of the world 's population has 70% of all HIV/AIDS cases and in 2001 the new cases were 3,5 million with 80% of all death attributable to AIDS. WHO estimated an overall TB/HIV co-infection prevalence rate for 1997 in Sub-Saharan Africa of 1194/100.000, with the highest prevalence rates in countries in Eastern and Southern Africa.

In 2001 South Africa had 5 million HIV/AIDS equal to 20.1% of total adult population (age group 15-49). According to *Technical Report on HIV/AIDS impact on Adult Mortality* (MRC 2001) "about 40% of the adult deaths 15-49 years that occurred in the year 2000 were AIDS related.

Magnitude of TB/HIV Co-infection in KZN

The last few years have been characterized by an increase in both HIV/AIDS and TB cases in the Province. HIV seroprevalence surveys have reported a steady increase of HIV among pregnant women in KZN from 1,6% 1990 to 36,2 in 2000[4] and the TB Control Programme have reported an increase in TB cases. These two intersecting epidemic are highly correlated because the immunity deterioration caused by HIV contributes to an increase in TB infection rates. This is suggested by the fact that 65% of TB cases are co-infected with HIV[5] as shown in Table 1.

Table 1: Estimated tuberculosis caseloads per province and proportion expected o be HIV co-infected in 2000

Province	Total TB cases	Proportion HIV positive(%)
Eastern Cape	56 495	40.0
FreeState	14654	51.7
Gauteng	45 598	44.8
KwaZulu-Natal	65 695	64.6
Mpumalanga	15657	59.1
Northern Cape	4 649	33.2
Northern Province	23 338	36.3
NorthWest	15549	45.5
WesternCape	34211	31.6
South Africa	273 365	47.6

Source: Medical Research Council, National Tuberculosis Research Programme

[1] TB/HIV. WHO/CDS/TB/2001.293
[2] Global Tuberculosis Control, WHO Report 2002
[3] Report on the Global HIV/AIDS Epidemic 2002, UNAIDS
[4] National HIV and Syphilis Seroprevalence Survey – 2001, DOH, Pretoria
[5] South Africa Health Review 2000. HST.

The TB cases reported by TB Programme is likely to be an underestimate of the true incidence. The cases reported have increased from 300 to 380 per 100.000 population between 1997 and 2000 (Table 2). That this is an under reporting is suggested by the fact that Hlabisa District reported an incidence of 700 TB hospitalisations per 100.000 population in 1998[6]. Moreover a report of HSR &ED-DOH stated that in South Africa only 37% of facilities reported their TB cases in 1999[7]. Furthermore the MRC has estimate a total of about 65.000 TB cases in KZN for the year 2000 equivalent to 720 per 100.000 population. Mortality among TB/HIV negative patients is 4.4% versus 17.8% in TB/HIV positive ones[8].

Table 2. TB Incidence rate and Treatment Outcomes in KZN.

	1997	*1998*	*1999*	*2000*
Incidence rate /100.000 pop.	300	350	390	380
Fatality rate %	5	8	8	
Cured %	46	47	40	
Treat. Interrupted %	24	24	27	

Source: DOH, Health Information Bulletin, 2000-01.

In the meantime the effectiveness of treatment has deteriorated. The cure rate has declined from 46% to 40% between 1997 and 2000; the interruption of treatment has increased during the same period from 24% to 27% During the same period mortality has increased from 5 to 8% (Table 2). This situation is likely to produce a high burden on the health services as indicated in Table 3 and a study done in Hlabisa in 1999 already has shown an increase of 81% in hospital admissions, adult tuberculosis ward admissions increased by 360% and accounting for 11% of total hospital **admissions[9].**

Table 3. HIV/AIDS/TB admission rate per 1000 pop in KZN.

	Other admission	*AIDS admission*	*TB admission*	*Total admission rate*
98/99	89.6	14.1	n.a.	103.7
99/00	76.0	17.6	0.36	93.6
00/01	94.2	22.3	0.39	116.7
2010	73.2	90.1	1.65	165.0

Source: ABT Associates, 2000.

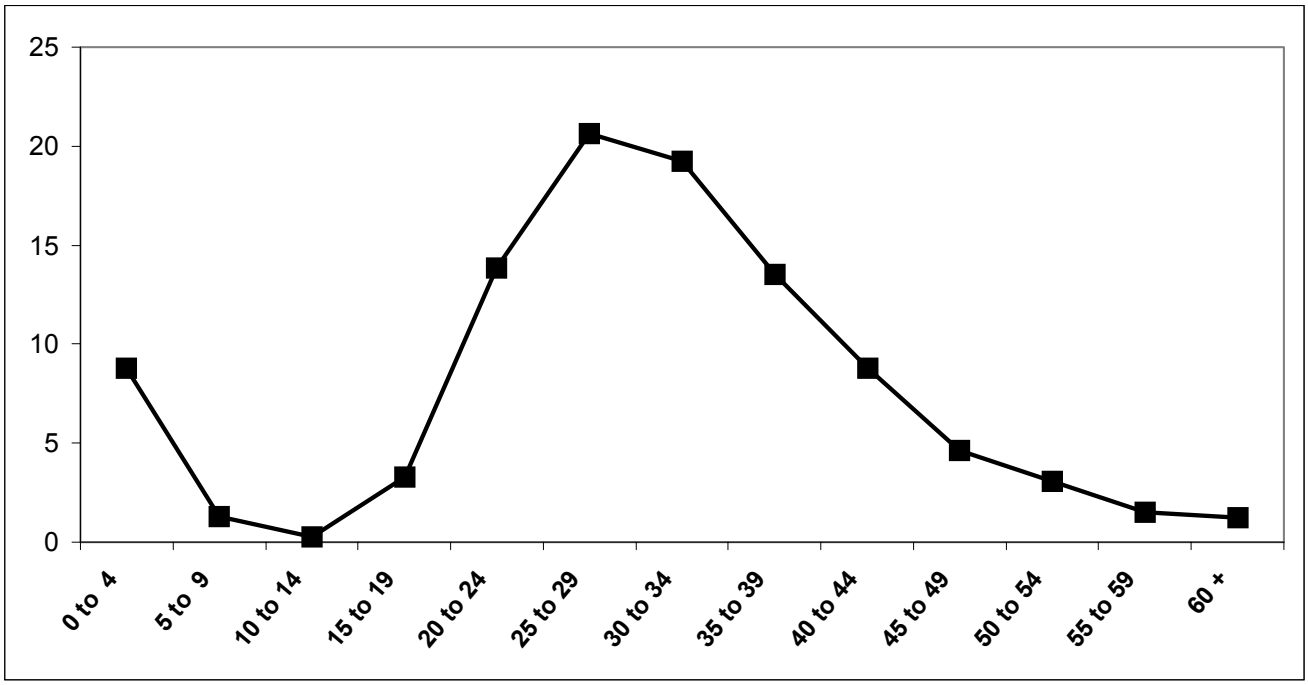
The above figures suggest that total admissions will nearly double and all the increase will be due to AIDS and TB. In 2001 Outpatient visits and Admissions related to HIV/AIDS were 1.700.000 and 200.000 respectively[10].

Furthermore TB with and without HIV will increase by 4 times in the next 10 years.

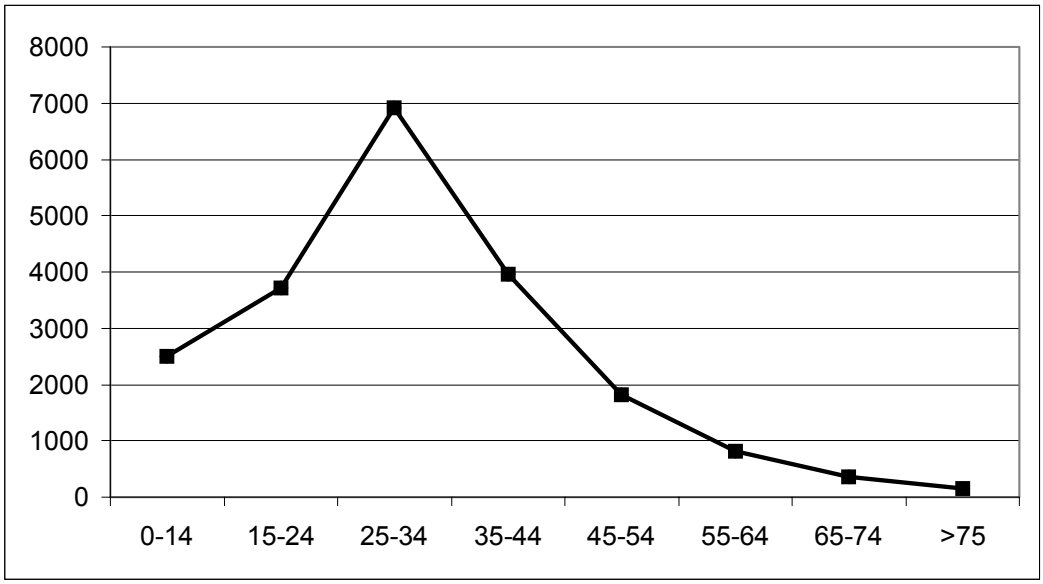
The fact that the two epidemic share several similarities is indicated also in the Graphs 1 and 2 where the age group distribution of the two diseases are shown, and another deadly link between the two epidemic is clearly represented.

[6] Conolly C et al: Impact of the HIV epidemic on mortality among adult with TB in rural SA.IJTLD1998 11;919-925.
[7] Department of Health, Health System Research and Epidemiology Directorate, June 2000.
[8] KZN Epidemiological Profile, DOH Intranet.
[9] Floyd K et al: Admission trends in a rural South African hospital , JAMA 1999 Sep 15;282(11):1087-91
[10] Center for Actuarial Studies of Cape Town, March 2002.

Graph. 1. Age group distribution of AIDS cases in KZN



Graph. 2. Age group distribution of TB cases in KZN.



Source: Health Information Bulletin 2001/02. Dept Informatics, DOH.

Consequences of dual epidemic.

The increase in of TB and HIV/AIDS is compounded by a failure of the health system to confront these diseases. Although the Direct Observed Treatment has been always around its effectiveness has declined as shown in table 2. This is likely to continue unless a more creative approach is implemented to tackle the increasing number of HIV/AIDS and TB cases expected in the next few years.

The worsening situation is likely to have several negative consequences including:

- An increasing number of TB and HIV/AIDS will overburden the health services displacing other patients;

- The quality of services is likely to decline further with increasingly poor compliance with treatment
- Morbidity and mortality are likely to increase
- Side effects, TB relapses and resistance are likely to increase
- Numbers of orphans has been estimated to account 65.500 by the year 2000 and nearly 500.000 in 2010[11]

How to contain the epidemic of TB and HIV/AIDS in KZN?

Due to this dramatic epidemiological profile an effective action is needed to integrate strategies against HIV/AIDS with those against TB. This can be carried out through a more concerted action between the Epidemiology Unit, the HIV/AIDS Programme and the TB Programme.

Although integration should be already present according to the policy documents it is hardly seen in practice. The rationale behind integration is a more cost effectiveness utilization of the scarce human and financial resources, however this is rarely achieved due to overburdening of staff with too many tasks and because of scarce managerial skills that do not allow to organize the limited manpower in terms of skills transfer and organization of task

The health manpower is dwindling because staff is leaving the public health system for greener pastures and a high proportion of it is already HIV positive. Research[12] carried out in 2000 has suggested that nation-wide 30% of student nurses, 12% of professional nurses, 14% of staff nurses and 7% of doctors are HIV+. It is therefore unlikely that in the next few years there will be any increase in health manpower and the health system will be obliged to cope with the staff it has.

The only way to cope with the present situation is to utilize the available resources in the most cost-effective way. This means taking stock of what is present at the moment in terms of staff and other resources by type of health unit and reorganize the activities accordingly.

Conclusion

According to a study done by Directorate of Health Financing & Economics " TB is the largest causes of admissions and uses a disproportionate number of acute bed days then rationalizing and improving the effectiveness of TB care will be critical to reducing the impact of HIV[13]".

Collaboration between theses programmes is essential aiming at co-ordination of services and improved access to care with a functioning laboratory network and a system for surveillance, monitoring and evaluation set in place. Moreover they should develop and strengthen referral system and joint training activities for health staff.

Coalition, partnership building and resources mobilization for TB and HIV/AIDS control should be initiated at Provincial level with a provision of harmonized packages of diagnosis, care and support for TB and HIV/AIDS suspects and patients incorporated in the general health delivery system.

[11] Whiteside A., Sunter C. AIDS the Challenge for South Africa. Human & Rousseau Tafelberg (Pty) Ltd, 2000
[12] Hensher M., Health Sector Impacts on HIV/AIDS: Key issues for planning, DOH-DHF&E. 2000
[13] Hensher M., Health Sector Impacts on HIV/AIDS:Key issues for planning, DOH-DHF&E.2000

EPIDEMIOLOGICAL CHARACTERISTICS OF CHOLERA EPIDEMIC IN KWAZULU-NATAL, 2000 – 2002.

Introduction:

Despite being a well-known disease and the measures of prevention and control understood, outbreaks of cholera continue to occur and reoccur with the devastating effect on human beings across many countries. Whereas it may not be possible to totally prevent the disease from entering into a country, the magnitude, duration and impact of these outbreaks can greatly be modified depending on the levels of epidemic preparedness and response in specific countries. The re-emergence of Cholera in August 2000 in KwaZulu-Natal and subsequently to other parts of South Africa has raised great concern for public health management and level of socioeconomic development.
A review of the characteristics of the epidemic was conducted as part of the monitoring and periodic analysis of on-going control measures in the province.

Background

Cholera in South Africa was considered as part of the third period of the 7th pandemic which originated in 1958 with endemic disease in Sulawesi in Indonesia (1,2). As early as 1971 South Africa was considered to be at risk of cholera due to hot, humid summers, seaports, overcrowded communities with low standard of environmental sanitation and scanty, restricted and unprotected water supplies in certain areas (3). The recent outbreak (of cholera) in South Africa was first reported on 20th August '00 from a local area of Ndabayanake in the Lower Umfolozi sub-district of Uthungulu health district, KwaZulu-Natal (KZN) province. Later, the epidemic spread to other districts within the province and to other provinces of South Africa namely Mpumalanga, Northern, Eastern Cape, Gauteng, and North West (6 out of 9 provinces). The purpose of this review was to describe the epidemic and basing on its characteristics makes suggestions for future control measures.

Objectives:

The objectives of the review were to describe Epidemiological pattern (distribution, the trends, magnitude), socio-economic and environmental factors in the affected areas as well as their influence on the direction of the present epidemic and for future prediction.

Materials and Methods:

1. Data on cholera cases and deaths in KZN were drawn from cholera surveillance systems (24 hour reporting system at the Provincial operational centre and Geographic Information System) and reports from National Department of Health, South Africa (S.A.).
2. The S.A. census 1996 data was used to calculate the attack rates.
3. Geographical Information System (G.I.S.) was used to map the affected areas, track the spread of disease and relate associated risk factors.
4. Socio-economic (per capita income and Household water supply) and environmental indicators were obtained from 1996 Census, 1995 October Household Survey and meteorological data from S.A. Weather Bureau.
5. Grouping and sero-typing of the causative organism as well as sensitivity patterns were obtained from the Regional Laboratory of the Department of Health, KZN and Department of Microbiology, Nelson Mandela Medical School, University of Natal.
6. We used MS excel and Map Info for displaying data on chart and production of epidemic trends and patterns
7. In the beginning of the outbreak the majority of cases had laboratory diagnosis. As the epidemic established, health facilities used clinical case definitions advised by the World Health Organization. This raised the number of cases and reduced significantly the case fatality rate.

Results:

During the study period, August 2000 – April 2002, a cumulative total of 119 576 cases of cholera and 284 deaths were reported in KZN.

Characteristics of the Epidemic: The most affected health districts were Eshowe, Lower Umfolozi, Ulundi, Ilembe (Stanger) and Ugu (Port Shepstone) accounting for 91% of all the cases reported in the province during 2000/01 epidemic (Table 1.) Figure 1 shows the map to indicate the distribution of all cholera cases in KZN during the epidemic periods. The highly affected areas are characterized by; rural, low per capita income of less than R3122 per annum (< $300), low (8%) supply of safe water (Tap water) and low sanitation coverage at household level.

Trends: Since the re-emergence of cholera in S.A. (2000), two epidemic periods have been observed (Graph 1) in KZN. The 2000/1 epidemic was of a high magnitude, reached a peak in February 2001 and tailed by September 2001. The incidence of cholera dropped from a weekly average of 6000 – 7000 cases (Jan./Feb. 01) down to 21 cases during September 2001 but did not tail off.
Since late November 2001 an upsurge of cholera was observed in the province but of low magnitude. Two peaks have so far been observed during the second epidemic period; the earlier peak in January 2002 followed by a second low peak during the first half of April 2002. During this epidemic the affected districts were Uthukela (Ladysmith), Amajuba (New Castle), Ugu and Ilembe. With exception of Ilembe and Ugu these districts were least affected during the previous epidemic and had very low attack rates (Table 1).

Table 1. Cholera attack rates, KZN

Districts	Population	Attack Rate 2000/01 per 100000 population	Attack rate 2001/02 per 100000 population
Eshowe	560879	5609	42
Lower Umfolozi	496588	4823	2
Ulundi	703390	3453	32
Stanger	265346	2890	369
Portsheptone	725777	1192	129
Pietermaritzburg	1153162	384	5
Newcastle	766344	368	247
Jozini	301980	113	39
Durban	2880558	85	3
Ladysmith	553892	77	1617
Total	**8407916**	**1257**	**161**

Cholera Cases: The female cases were predominant (59%). The age distribution of cases were found skewed to the young age group.

Case Fatality Rate (CFR): CFR was used to monitor the quality of control measure especially case management. The CFR during 2000/2001 epidemic was 0.22% and during the current epidemic it remained low of 0.41%.
Causative Organism: A total of 5882 Polyvalent 01 agglutination tests done in the Regional Laboratory indicated that initial cases were of *V. Cholerae* Ogawa. Thereafter, the first Inaba case was detected on the 6th November 2000 in Hlabisa area (Lower Umfolozi Health sub district). Since then both Ogawa and Inaba have been isolated but Ogawa remained predominant (93%).

Sensitivity: Nalidaxic acid and Ciproflaxcillin were found sensitive but resistant to Tetracycline and Erythromycin which are known traditional drugs of choice for both serotypes.

Discussion:

The Cholera outbreak of 2000 in KZN came as a surprise in the country since the last case was reported in 1987 (2). However large cholera outbreak had been reported from the northern neighbouring country of Mozambique. With the presence of an extensive coast of Indian Ocean on the east and south, where commercial interchange and migratory flows are more intense, it's possible for cholera to enter KZN (country) through its border with Mozambique on the northeast or northern border.

The index case reported to have attended a funeral was from Lower Umfolozi district. A clear link between the different index cases from different districts could not be easily established. Cholera cases were reported in all 10 districts over the study period. The epidemic spread rapidly during the warm rainy summer season affecting mostly 4 districts (Lower Umfolozi, Zululand, Eshowe/Nkandla and Ugu) of KZN. The communities of these districts fall in areas of low socio-economic status (32% drink dam/river water and low per capita income of R3122 per annum (7).

While water is essential for survival, only 27% of African households have running tap water inside the dwelling for domestic purposes in KZN. The situation is particularly worse for the rural population (predominantly African) where it is only 8%. These communities depend on rivers, dams and wells as their main sources of water (5). Proper sanitation is the basis for prevention of many health conditions including diarrhoeal diseases (cholera). While only 5% of rural African populations of KZN have flush toilets in the dwelling, 24% have no facilities at all hence resort to surrounding bushes (4).

The second epidemic of a low magnitude affected the districts which were previously least affected (attack rate < 200/100,000 population.) namely; Ladysmith, Stanger, Greytown, Newcastle and Portshepstone. It is probably due to the acquired immunity, benefit from extensive cholera control activities that were protective to most of the districts.

Visitors from non-affected/previously mildly affected districts and provinces increased on the number of available susceptible group. Apparently, it appeared as if women were more susceptible (about 60% of reported cases) and younger age group (11-30yrs) hence over representation. However, due to high level of labour migration practices of male adults leaves behind children and female as dominant in the communities affected.

KZN occupies a unique geographical position within South Africa, in particular the long coastline and sharing of international borders to the West (Lesotho) and north (Swaziland and Mozambique) all of which are prone to and in the last few years have reported recurrent outbreaks of cholera. The vibrant cross border socio-economic activities especially inclined to the South African side further predisposes KZN to possible spill over of such epidemics.

Cholera outbreaks have been known to occur in places with low/lack of safe water supply and poverty (8). During the last 2 epidemics, cholera has mainly been concentrated in the vast rural areas of these districts (Uthungulu, Unkhanyakude, Zululand, Umzinyathi and Illembe) characterized with very low safe water (tap) supply (<35%) and poverty. Well as the above factors may not only be unique to these affected areas, there are many winding and slow moving rivers/streams to which the majority of communities depend on as sources of domestic water. The situation in parts of Uthungulu (industrial areas of Richards Bay and Empangeni) is compounded by labour migrants from northern districts and southern parts of Mozambique and Swaziland. Despite the low sanitation coverage, which is another well known risk factor not only for epidemic or endemic cholera but other diarrhoeal diseases; the development of water infrastructure through district programmes (eg. Shemula Water Project) in Umkhanyakude (Jozini) has proved protective to the local communities.
During the current epidemic, in addition to KZN in the east, recurrent outbreaks have also been reported from neighbouring Eastern Cape Province to the southeast. In both provinces the affected areas lie in a belt along the coastline extending to the southeast that received heavy rainfall (an average of > 600 mm per annum) (2).

Overall there has been a decline in the incidence rate and magnitude of cholera during current epidemic. Low attack rates have been observed in those previously severely affected districts and reverse is true. It is possible that the acquired herd immunity and impact of the overall Provincial cholera programme such as extensive health education and promotion, supply of safe water to the affected communities, strengthening case management and surveillance system at large have averted many cases and deaths in KZN.

It is not surprising therefore to find that during the current epidemic districts previously least affected e.g. Uthukela (Ladysmith), Amajuba (New Castle) turned out to have been most affected. The magnitude of present epidemic is less than 25% of the previous one. In addition to above possible explanations;

> During both epidemics, steady decline of cholera has been observed with the onset of winter season (May – August). However, it is important to note that despite being of a low magnitude cases are sporadic in nature covering wide areas within the affected districts. One might argue that these are not separate epidemics but three different peaks of one epidemic over time. A state of endemicity has been observed during epidemics of 1980-'87 and same pattern during 2000 –'02 outbreaks.

Limitations:
The reporting of cholera cases might have been influenced by level of interventions or level of awareness among the communities and health care workers in different districts. The reported cases based on surveillance definition not confirmed by laboratory tests. Laboratory tests were used to confirm cases arriving from new areas and re-attendances. Lack of current baseline data on crucial aspect such as safe water supply, coverage of toilets at the district level.

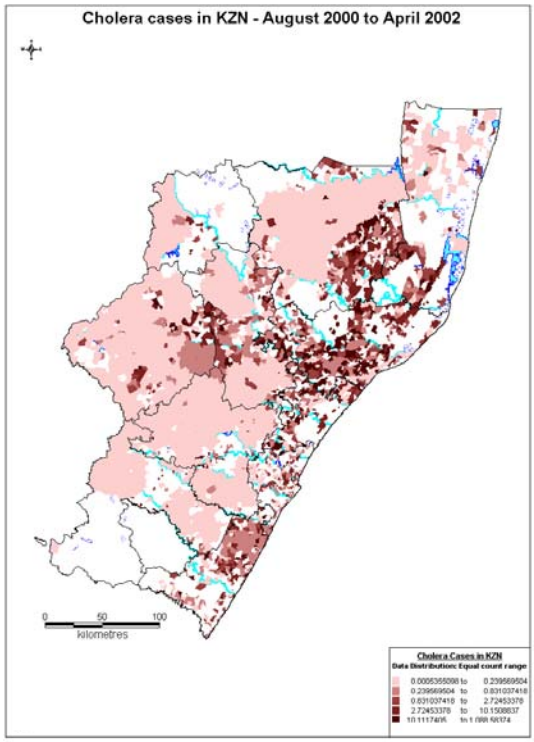
Issues/Concerns:

- The possibility of many asymptomatic carriers due to the characteristic of the causative organism (El Tor ogawa) which are likely to cause further outbreaks in KwaZulu Natal/other parts of South Africa.
- Presence of two different sero-type of *V.Cholerae* (El Tor ogawa and Inaba)
- Seasonal variation; this pattern has been previously documented during the 1980/87 epidemics, when upsurges and peaks were observed particularly during rainy, warm, summer season
- Practice of hygiene and stable safe water supply that are necessary for breaking the chain of transmission have not yet been fully modified particularly in the vast rural areas of KZN.
- The need for a rapid development of a functional multi sectoral, sustainable vigilance at all levels for Epidemic Preparedness and Responses (EPR).

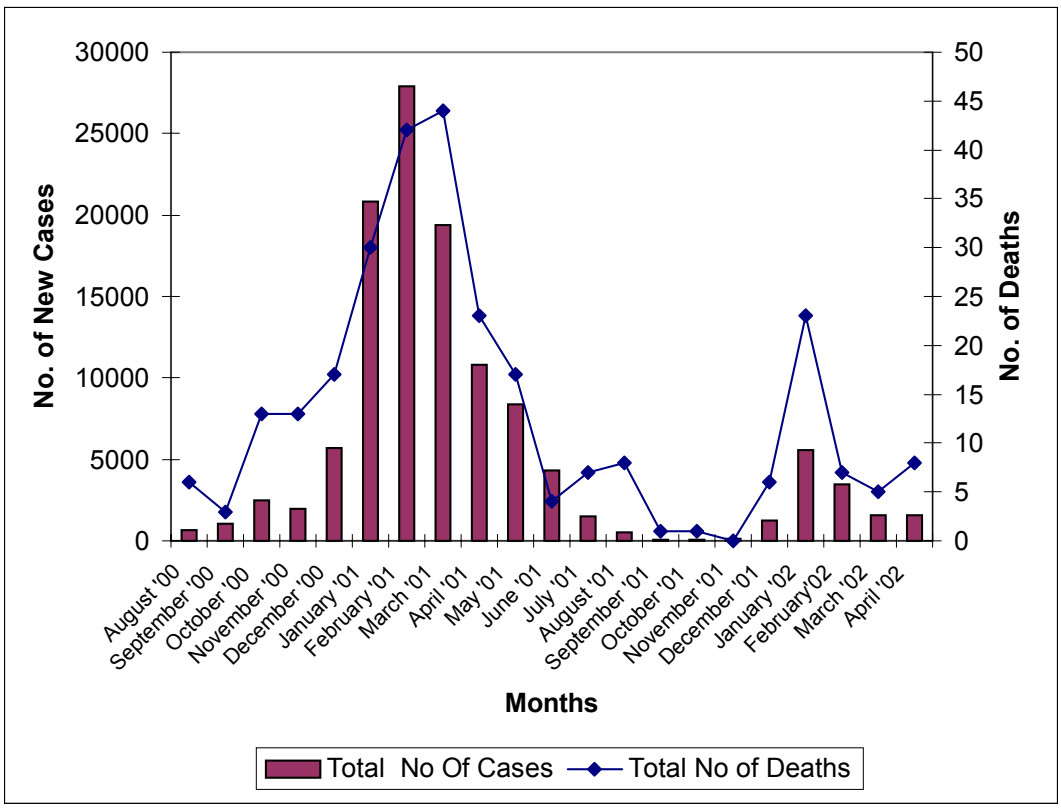
Conclusions

The communities most affected were black Africans, rural, in relatively high rainfall areas, low per capita income, with low safe water supply and coverage of toilet facilities.
In view of the above concerns/issues raised, it is possible to observe future outbreaks and or cholera could revert to a state of endemicity in KZN. This serves to underscore the urgent need to sustain and increase our awareness and vigilance to avert similar outbreaks in future.
Development of policies and strategies that ensures comprehensive and sustainable community development are critical for reversing the negative aspect of poverty and its associated evils (eg. diseases, crimes, etc). We call for undertaking operational research to evaluate and monitor the risk of environmental persistence of Vibrio Cholerae in KZN.

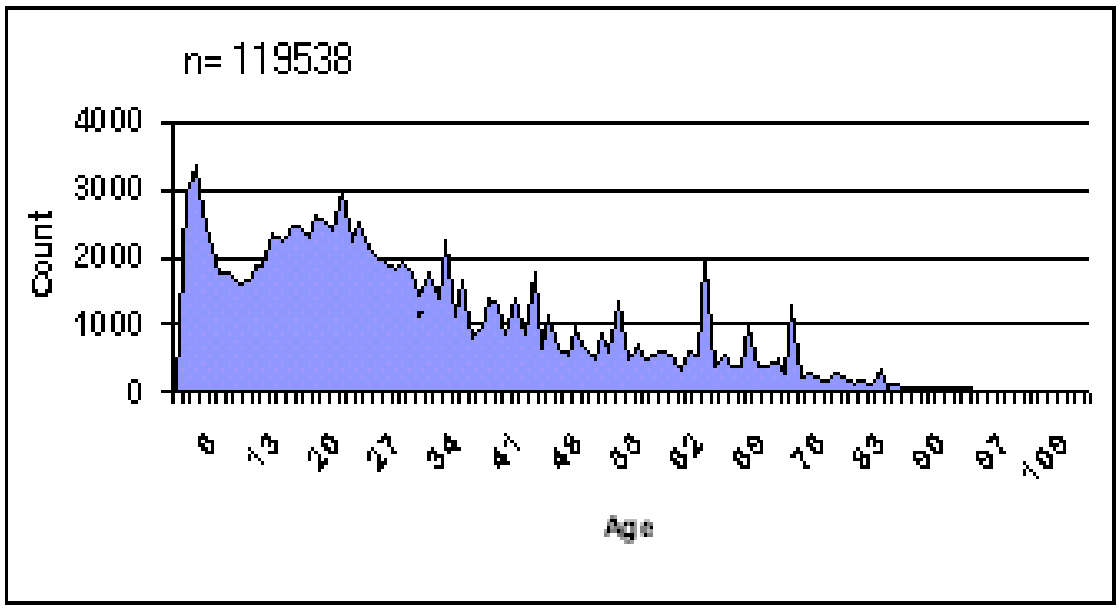
Figure 1 : KwaZulu Natal Province cholera cases map



Graph 1: Monthly Distribution of Cholera Cases & Deaths in KZN,Aug'00 - 28 April'02



Graph 2: Age Breakdown



Reference:

1. Beneson A S, Control of Communicable Diseases, Chapter 10, Cholera page 207-225.
2. Hustner H G V, Duplessis G, The Cholera Epidemic in South Africa, 1980 – 1987. *S Afr Med J* 1991; 79 : 539-44.
3. Editorial. Cholera. *S Afr Med J* 1971; 45 : 1.
4. State of South Africa Population Report, 2000. Chief Directorate Population and Development, Department of Social Development, Republic of South Africa. (Available at http://population.pwv.gov.za/state.htm)
5. Living in KwaZulu Natal, Selected findings of the 1995 October household survey CSS, Central Statistics, 1998;1 (Available at http://www.css.gov.za)
6. Cholera Treatment Guidelines, WHO 1993.
7. Statistics South Africa, Census 1996.
8. E.A. Waldman *et a*l, Cholera in Brazil during 1991 – 1998: Socio economic characterization of affected areas; *J. Headth Pop Nutr*. 2002 Mar; 20(1) : 85 – 92.