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1. Abbreviations and acronyms

AIDS	Acquired Immune Deficiency Syndrome
AMREF	African Medical and Research Foundation
CBR	Crude Birth Rate
CDR	Crude Death Rate
GDS	Genital Discharge Syndrome
GTZ	German Development Agency
GUD	Genital Ulcer Disease
HIV	Human Immunodeficiency Virus
IDC	Infectious Disease Centre
LSHTM	London School of Hygiene and Tropical Medicine
M:F	Male to female ratio
MOH	Ministry of Health
MUCHS	Muhimbili University College of Health Sciences
NACP	National AIDS Control Programme (referred to as the Programme)
NIMR	National Institute for Medical Research
ODA	Overseas Development Administration
PID	Pelvic Inflammatory Disease
RPR	Rapid Plasma Reagins
STDs	Sexually Transmitted Diseases
TPHA	Treponema Pallidum Haemogglutination Assay
UK	United Kingdom
VDRL	Venereal Disease Research Laboratory
WHO	World Health Organization
WHO/GPA	World Health Organization/Global Programme on AIDS

2. Acknowledgements

The National AIDS Control Programme (NACP) would like to thank all the health workers, who have participated in collecting the data for this epidemiological report. The Programme recognizes the important role played by various health personnel in obtaining such data which are indispensable in the efforts to control the HIV/AIDS epidemic. In order to facilitate timely production of this report in future, the Programme strongly urges for continued interest and efforts among the peripheral health workers in providing the necessary data. This normally consists of properly filling the appropriate forms, compiling routinely collected data and submitting them promptly for analysis, compilation and subsequent report writing. The Programme is also working on ways to improve the data collection process by further simplifying the reporting forms to include only crucial information that can be used to provide timely feedback.

Preparation of the report

This report was prepared by the Epidemiology Unit of the National AIDS Control Programme (NACP) of the Ministry of Health in Collaboration with the Department of Epidemiology/Biostatistics of the Institute of Public Health, Muhimbili University College of Health Sciences (MUCHS). The preparation has entirely relied upon the information which has been received from the regions during the period between 1st of January, 1995 and 31st of December, 1995. Despite a number of logistic problems outlined in the report, all data received were processed, analysed and interpreted in full consideration of possible effects of interventions as well as limitations of data due to incomplete reporting by hospitals.

Distribution of the report

This report is produced and distributed for use by those who helped to provide the information therein so that they can see for themselves the outcome of their efforts. In addition, the report is intended for use by all service providers, social scientists, health professionals, students of the health sciences and other sectors as well as individuals and agencies collaborating in AIDS work. The following are already on the Programme's mailing list for regular distribution.

- All Medical Officers in charge of hospitals
- All District Medical Officers
- All District AIDS Control Co-ordinators
- All Regional Medical Officers
- All Regional AIDS Control Co-ordinators
- All departments, Ministry of Health
- All Units, National AIDS Control Programme
- All donor agencies
- All members of the Sectoral Technical AIDS Committees
- All members of the NACP committees and sub-committees
- All members of the National AIDS Committees
- All Medical libraries
- All UN agencies

Important message to readers

In the course of writing this report errors may have arisen as a result of transcription or incorrect recording of information. Although utmost care has been exercised in producing the report there may still be some errors. Readers are therefore strongly urged to inform the programme about any such errors promptly so that they can be rectified before the next report.

3. Executive summary

AIDS Case reports

This report covers the period, January to December, 1995 but takes into account previous reports. In particular, the report includes the well-known first three AIDS cases in Tanzania which were reported in 1983 in the Kagera Region. Since that time, cases have continued to increase, and by 1986 all regions of the country had reported the existence of AIDS cases. Subsequent observations indicate that by the end of 1990 a cumulative total of 25,503 cases had been reported to the NACP with a doubling time of 15 months and by the end of 1995 the cumulative number of cases had reached 81,498 with a doubling time of 333 months. However, this increase in the number of reported AIDS cases simply indicates an increasing trend but does not reflect the real situation in terms of the true number of existing cases. The reported cases are few compared to existing ones because only one out of 4-6 AIDS cases are reported in the country due to problems of AIDS diagnosis and other logistics which exist in many of the health care facilities. Thus, the current total number of estimated cumulative AIDS cases in Tanzania stands at about 400,000 while only 81,498 cumulative AIDS cases had been reported until December, 1995. Late reporting by the regions to the NACP headquarters In Dar es Salaam also contributes to the figures in this report not reflecting the reality in terms of accuracy.

Most affected regions

During 1995 the Mbeya region reported the highest absolute number of AIDS cases in the country. However, after taking into account the regional population sizes the Dar es Salaam region had the highest case rate. Regions following Dar es Salaam in the rank of case rates were Mbeya and Kagera in decreasing order. The three regions have kept the same positions in the order of reporting high numbers of AIDS cases for the last four consecutive reports.

HIV infection rates

Data on HIV infection rates have been obtained through ante-natal clinics, blood donors and surveys involving selected populations. During 1995 data were received from 10 ante-natal clinics throughout the country and they show that the HIV-1 prevalence ranges from 0.0% to 32.5%. These data can be taken to be fairly representative of the respective catchment populations. However, due to blood donor selection towards those with low HIV infection risk, data from blood donors have increasingly under-estimated the prevalence of HIV infection in the general population. During 1995 blood donor data showed that 7.8% of the adult male population and 9.4% of the adult female population were HIV infected. However, during 1994 HIV prevalence among female blood donors was observed to be less than that in male blood donors. In the previous years HIV prevalence in blood donors was always higher in females. Thus, based on age-and-sex specific blood donor prevalence as observed in 1995 and an adult population of 15,000,000, the estimated total number of adult HIV infections in mainland Tanzania during 1995 was about 1,200,000. This represents a 50% increase over and above the estimates of 1994.

Impact of STD case management on HIV incidence.

To determine the impact of STD treatment on the incidence of HIV infection, a trial was carried out in Mwanza in 1992. The trial consisted of a follow-up study in which the incidence of HIV infection over a two-year period in the communities with improved services was 1.2%

compared to 1.9% in the communities without improved services. From these results it was concluded that the intervention reduced the incidence of HIV infection by 42% after adjusting for the effects of other risk factors.

The Mwanza trial was the first of its kind (randomized controlled trial) to show a significant impact of an HIV prevention strategy on the incidence of HIV infection. The study therefore concluded that an STD treatment programme, designed to be replicable and sustainable within the existing primary health care services of a developing country such as Tanzania has succeeded in reducing the incidence of HIV infection by a significant level in a rural population. The Programme has received the report with great interest and plans are under way to seek support to implement the results of this trial on a wider scale.

Orphans resulting from the death of one or both parents from AIDS constitute a significant social problem in the Tanzanian society today. NACP defines orphans as those children aged below 18 years who have lost one or both parents due to AIDS. At present the national estimate stands at 200,000 orphans. The majority of these orphans are in the Kagera region where more than 100,000 orphans have been reported.

Projections

Using 1990 figures, it has been estimated that by the year 2000 there will be about 1,000,000 AIDS cases in Tanzania if the current rate of infection continues. At that time there will be about three times as many persons infected by the HIV as the number of AIDS cases. The number of orphans will also be approaching that of AIDS cases.

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4. Introduction

This report covers the status of the HIV/AIDS epidemic in mainland Tanzania until December, 31st 1995 and provides an overview of the situation with updated figures since the ninth report of December, 1994. The report therefore supersedes all previous reports of the NACP surveillance activities since its first report in 1989.

Since the first reported AIDS cases in Kagera in 1983 the HIV/AIDS epidemic has been on the increase in the country affecting mainly the sexually active populations of both sexes as well as children born of infected mothers. By 1986 all regions of the country had reported the existence of AIDS cases and by the end of 1990 a cumulative total of 25,503 cases had been reported to the NACP from the regions. The cumulative total by the end of 1995 was 81,498. This increase in the number of reported cases since 1983 is an indication of the increasing trend in AIDS cases but does not reflect the real situation in terms of the true number of existing cases in Tanzania. This discrepancy is due to problems of AIDS diagnosis brought about by a general lack of facilities for the diagnosis of AIDS in most rural hospitals. Furthermore, logistics problems are many, and as a result, access to health care facilities which can establish AIDS diagnosis is limited to a small fraction of the population.

Types of HIV infection

Until there is more reliable information regarding the existence of HIV-2 infection in Tanzania the NACP assumes that all AIDS cases and HIV infections are due to HIV-1 infection. This is because the existence of HIV-2 in Tanzania has not yet been confirmed. The only published report on HIV-2 in Tanzania suggested that HIV-2 infection existed in north western Tanzania in 1989. Ever since no further HIV-2 reports have been received despite continuing surveillance for HIV-2. For example the GTZ Family Health Programme in Mbeya is trying to re-test all positive samples for HIV-2 but has not so far isolated any. Although it is possible that unrecognized HIV-2 infection might be present in Tanzania, its prevalence is probably too low to be easily detected. However, the closeness of Tanzania to neighbouring countries where there have been reports of HIV-2 detection is likely to place the country at risk of HIV-2 infections due to the unrestricted movements of people across the borders.

HIV transmission

In Tanzania, like in most of the sub-Saharan Africa, transmission of HIV infection is predominantly heterosexual, accounting for over 90% of the cases. Vertical transmission, which in most cases is also a result of the mother having been infected through sexual exposure, is emerging as an important mode of transmission as more and more infected mothers become pregnant and subsequently infect their babies. Although blood, blood products and injections may have accounted for a substantial amount of HIV transmission in Tanzania, this situation is being brought under control as blood screening facilities for HIV infection become more widely available, reliable and affordable than they have been in the past.

5. The Tanzanian AIDS situation in a global context

A total of 1,291,810 cumulative AIDS cases in adults and children have been reported to WHO as of 15th December, 1995 since the onset of the pandemic in 1981. This is a 26% increase from the 1,025,073 cumulative cases reported until 3rd January, 1995. The distribution of the HIV/AIDS pandemic by geographical area is shown in Table 1 below:

Table 1

Global distribution of estimated HIV infections, reported and estimated adult AIDS cases

Continent	Estimated HIV infections	Reported AIDS Cases	Estimated AIDS Cases
Africa	>11,100,000	442,735 (34%)	4,500,000 (75%)
Americas	>3,000,000	659,652 (51%)	960,000 (16%)
Asia	>3,500,000	28,630 (2%)	300,000 (>5%)
Europe	>550,000	154,103 (12%)	240,000 (<4%)
Oceania	>25,000	6,680 (1%)	60,000 (<1%)
TOTAL	>18,175,000	1,291,800 (100%)	6,060,000 (100%)
Tanzania	1,200,000	81,498	400,000

WHO Global Programme on AIDS - December 1995

Note: In Table 1 the number of reported AIDS cases for mainland Tanzania cannot be directly compared to those of the continents in the table, as date and completeness of reporting may differ.

From Table 1 we note that so far the Americas have contributed more than 50% of the reported AIDS cases, while Africa accounts for a little more than one third of the reported cases. This is mainly because reporting of AIDS cases in Africa has generally been delayed or is incomplete. In Tanzania, it has been estimated that only one out of 4-6 AIDS cases are reported to official sources. Thus, taking the 81,498 cumulative AIDS cases reported until the end of 1995 and an average estimate of one reported case out of 5, we have an overall estimate of about 400,000 cumulative AIDS cases for Tanzania until end of 1995.

6. AIDS case reporting

Method of case reporting

Each region in the country is issued with a pad containing sets of forms known as clinical AIDS notification forms on which all cases of AIDS should be reported. The pads issued are region and hospital specific to avoid double reporting of cases. The information to be filled on the form includes age, sex, marital status, major and minor symptoms and their duration in weeks, type of HIV screening used, supplementary HIV test used e.g. Western blot, doctors opinion on possible source of infection, date of reporting and clear instructions on the final disposal of the form. All duly filled forms are then returned and submitted to the epidemiology unit of the NACP where they are compiled and prepared for data entry, analysis and report writing. This method of reporting became well established in 1990 when it became possible to collect information on various personal and demographic characteristics of AIDS patients. This development has subsequently enriched our data base which is continuously being up-dated as new data become available from the regions. Previous to 1990, only numbers of AIDS cases were being reported and hence where analysis of personal and demographic characteristics has been presented in this report such cases have been excluded.

Time trend and spatial distribution of AIDS cases

Since the last report of December, 1994 (Report No. 9), a total of 28,251 AIDS cases have been reported to the NAQP from the regions, bringing the cumulative total to 81,498 AIDS cases as per December, 31st 1995.

The cumulative number of AIDS cases by region and year, and the cumulative case rate (Number of cases per 100,000 population) are shown in Table 2a and Table 2b. Note from the table that a total of 44 AIDS cases were reported without specifying the region of origin during 1990 (1 case), 1994 (1 case) and 1995 (42 cases) indicating that the quality of reporting was particularly poor in 1995. The tables also show the doubling time in months, the regional population estimates and the ranking of the regions according to the AIDS case rates. The doubling time between 1993 and 1994 was 108 months, while that between 1994 and 1995 was 333 months, suggesting a three-fold slower growth rate of AIDS cases during the latter period.

Table 2 (a) Cumulative AIDS cases by region and year (1983-1990)

Region	YEAR							
	1983	1984	1985	1986	1987	1988	1989	1990
Arusha	0	0	0	10	47	217	433	647
Coast	0	0	1	4	79	224	465	938
Dar es Salaam	0	0	51	471	1,470	3,093	5,209	7,246
Dodoma	0	0	0	7	47	105	262	310
Iringa	0	0	1	3	68	305	374	728
Kagera	3	106	322	847	1,666	2,143	2,576	3,472
Kigoma	0	0	0	3	50	109	244	607
Kilimanjaro	0	1	8	36	207	455	571	966
Lindi	0	0	0	1	10	46	113	484
Mara	0	0	0	3	30	99	141	280
Mbeya	0	0	0	16	208	751	1,077	3,890
Morogoro	0	0	0	11	88	254	364	637
Mtwara	0	0	1	5	26	90	199	479
Mwanza	0	0	15	54	171	448	667	1,303
Rukwa	0	0	0	1	5	98	94	140
Ruvuma	0	0	0	20	46	81	210	571
Shinyanga	0	0	0	8	31	144	238	583
Singida	0	0	0	6	74	197	284	456
Tabora	0	2	5	6	59	232	525	927
Tanga	0	0	0	13	80	210	351	838
Unspecified	-	-	-	-	-	-	-	1
TANZANIA	3	109	404	1,525	4,462	9,301	14,397	25,503
Doubling time (in months)	2	6	6	8	11	19	19	15

NB: Any differences in the figures in Table 2 from previous reports may be attributed to previously unreported cases which became reported in 1995.

The data in Table 2 are believed to reflect the real trend of AIDS cases in the country, although in reality the absolute numbers of cases are assumed to be a factor of about 5 times higher due to under-reporting, under-diagnosis and delays in reporting. Given the large pool of HIV infections already existing in the population as well as future infections that might occur in the years to come, a rapidly increasing cumulative number of AIDS cases will continue to be documented up to and beyond the year 2000.

AIDS cases reported since last report

A total of 28,251 AIDS cases were reported to the NACP between 1st January 1995 and 31st December, 1995. Of these cases, only 2,053 (7.3%) were freshly reported as AIDS cases diagnosed during the year of this report. The rest of the cases (92.7%) had not previously been reported due to a variety of reasons but were subsequently reported during the year of this report. Table 3 shows the distribution of these cases by year they should have been reported. The table also indicates that the delay in reporting involves unreported cases dated as far back as 1987. This situation has led to a constant alterations in the annual number of reported AIDS cases each time a report is written making figures of a particular year differ from report to report. Such changes also affect important parameters such as the doubling time and the case rates.

Table 2 (b) Cumulative AIDS cases by region and year (1991-1995)

Region	YEAR					Population	Rate	Rank
	1991	1992	1993	1994	1995			
Arusha	1,117	1,637	2,185	2,368	2,490	1,730,838	143.9	17
Coast	1,676	2,215	2,740	3,023	3,116	749,578	415.7	4
Dar es Salaam	8,834	9,295	10,406	11,050	11,241	1,477,962	760.6	1
Dodoma	536	762	1,028	1,071	1,077	1,839,206	58.6	20
Iringa	2,281	3,334	4,462	4,674	4,748	1,464,255	324.3	6
Kagera	4,742	5,813	6,646	7,064	7,163	1,602,514	447.0	3
Kigoma	930	1,556	1,920	2,070	2,084	1,040,803	200.2	14
Kilimanjaro	2,060	3,707	4,699	5,119	5,339	1,298,636	411.1	5
Lindi	842	1,211	1,691	1,966	2,064	757,727	272.4	9
Mara	639	980	1,304	1,393	1,419	1,176,320	120.6	18
Mbeya	6,924	9,890	11,439	12,214	12,312	1,829,892	672.89	2
Morogoro	2,398	3,598	4,328	4,575	4,605	1,476,698	311.8	7
Mtwa	1,361	1,968	2,090	2,201	2,254	1,010,408	223.1	13
Mwanza	3,041	4,207	5,349	5,731	5,858	2,268,991	258.2	11
Rukwa	261	496	715	777	783	915,786	85.5	19
Ruvuma	1,197	1,807	2,480	2,847	2,988	978,939	305.2	8
Shinyanga	1,278	1,874	2,624	3,062	3,215	2,168,600	148.3	16
Singida	763	1,107	1,472	1,688	1,718	952,924	180.3	15
Tabora	1,400	1,972	2,786	3,075	3,221	1,235,305	260.7	10
Tanga	1,914	2,636	3,207	3,475	3,759	1,509,507	249.0	12
Unspecified	1	1	1	2	44	-	-	-
TANZANIA	44,195	60,066	73,572	79,445	81,498	27,484,889	296.4	
Doubling time (in months)	15	27	41	108	333			

NB: The total population for 1995 by regions has been projected from the 1988 population census using a constant exponential growth model with an annual growth rate of 2.8% (i.e. difference between a CBR of 4.5% and CDR of 1.7% according to the 1988 population census).

Table 3. AIDS cases reported during 1995 by the year they should have been reported

Year	No. Of AIDS cases	Percent of total
1987	6	0.0
1988	15	0.1
1989	269	1.0
1990	3,124	11.1
1991	6,573	23.3
1992	7,195	25.5
1993	5,907	20.9
1994	3,109	11.0
1995	2,053	7.3
Total	28,251	100.0

to rise in all the four regions with Mbeya recording the fastest increase and seemingly catching up with Dar es Salaam. In order to appreciate this observation, Figure 1 in this report should be compared with that in the previous report.

Figure 1

Cumulative AIDS cases per 100,000 population (1983–95) (in four regions of Tanzania)

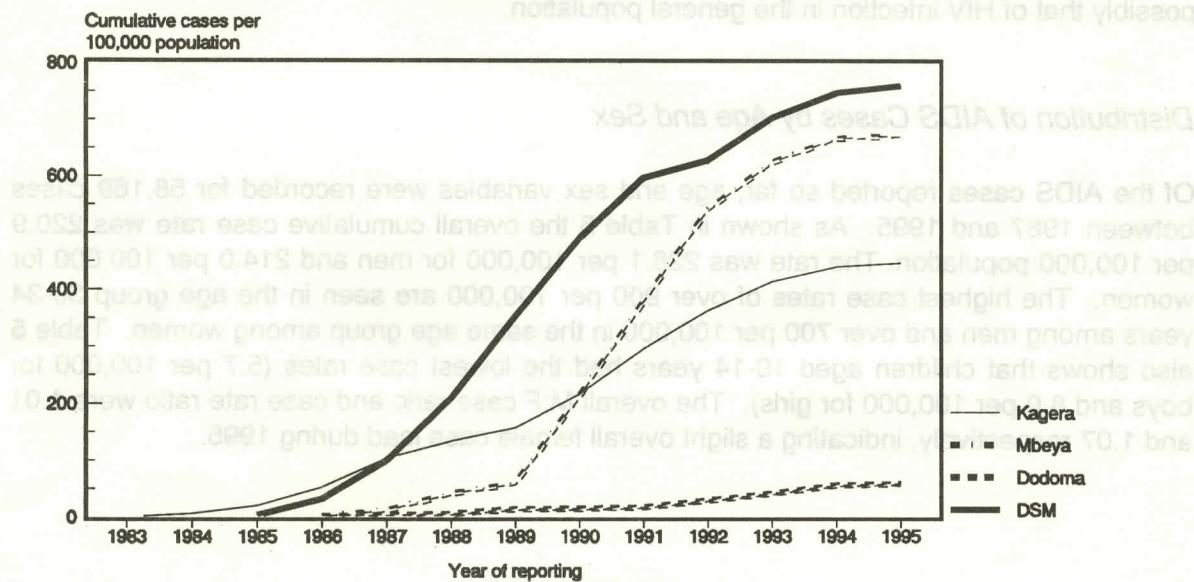


Figure 1 shows the case rates over the years for four selected regions, namely; Dar es Salaam, Dodoma, Mbeya and Kagera. Dodoma has been selected on the basis of reporting the lowest numbers of cases while the other three have been reporting the highest numbers. The case rates have been calculated from the reported cumulative number of AIDS cases (as the numerator) and the corresponding total regional populations after projection (as the denominator). The figure also shows that the case rates continue

Table 4. Annual number of newly reported AIDS cases (1983-1995)

Year of reporting	Newly reported cases
1983	3
1984	106
1985	295
1986	1,121
1987	2,937
1988	4,839
1989	5,096
1990	11,106
1991	18,692
1992	15,871
1993	13,506
1994	5,873
1995	2,053
Total	81,498

Table 4 shows the number of newly reported AIDS cases each year since 1983. The number increases from the initial 3 cases in 1983 to a maximum of 18,692 in 1991 after which there has been a sharp decrease. The table also reflects 44 previously unreported cases in 1990, 1994 and 1995.

Figure 2 shows the time trend in the number of newly reported cases each year as displayed in Table 4. The figure shows a gradual increase until 1989 followed by a sharp increase to a peak in 1991 and a sharp decrease to the present year. The shape of this figure reflects interesting events during 1988 and 1989 as well as in 1991. Possible explanations include a

comparatively poor reporting system prior to 1990. Furthermore, previously HIV infected subjects were now converting to AIDS and thus new cases began to increase rapidly.

In 1991, there was improved reporting with the introduction of updated and simplified surveillance forms which were distributed in all hospitals in the country. Surveillance data were at this time computerised, thus facilitating analysis and interpretation. Also problems of AIDS diagnosis leading to mistaken labelling of some patients as AIDS cases were reduced. Newly reported AIDS cases annually showed a decreasing trend after 1991 suggesting a gradually decreasing number of AIDS cases reported annually. Thus, while the shape can be entirely explained by problems of delayed or total lack of reporting, a true reduction in the number of newly reported cases cannot be ruled out. Hence, if all hospitals can promptly report all cases in the year they were diagnosed, an analysis of newly reported cases can provide an indirect assessment of changes and trend in the incidence of AIDS cases and possibly that of HIV infection in the general population.

Distribution of AIDS Cases by Age and Sex

Of the AIDS cases reported so far, age and sex variables were recorded for 58,169 cases between 1987 and 1995. As shown in Table 5 the overall cumulative case rate was 220.9 per 100,000 population. The rate was 228.1 per 100,000 for men and 214.0 per 100,000 for women. The highest case rates of over 900 per 100,000 are seen in the age group 30-34 years among men and over 700 per 100,000 in the same age group among women. Table 5 also shows that children aged 10-14 years had the lowest case rates (5.7 per 100,000 for boys and 8.0 per 100,000 for girls). The overall M:F case ratio and case rate ratio were 1.01 and 1.07 respectively, indicating a slight overall female case load during 1995.

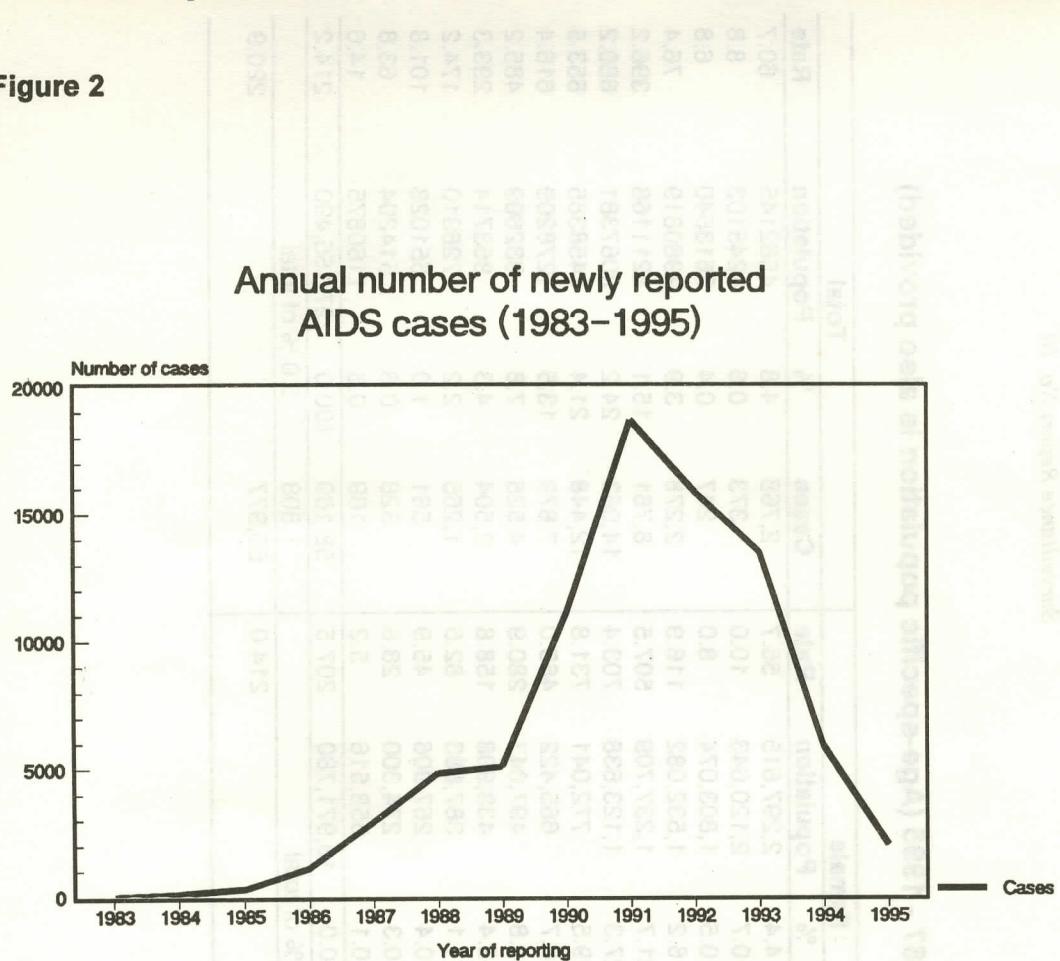
Figure 2

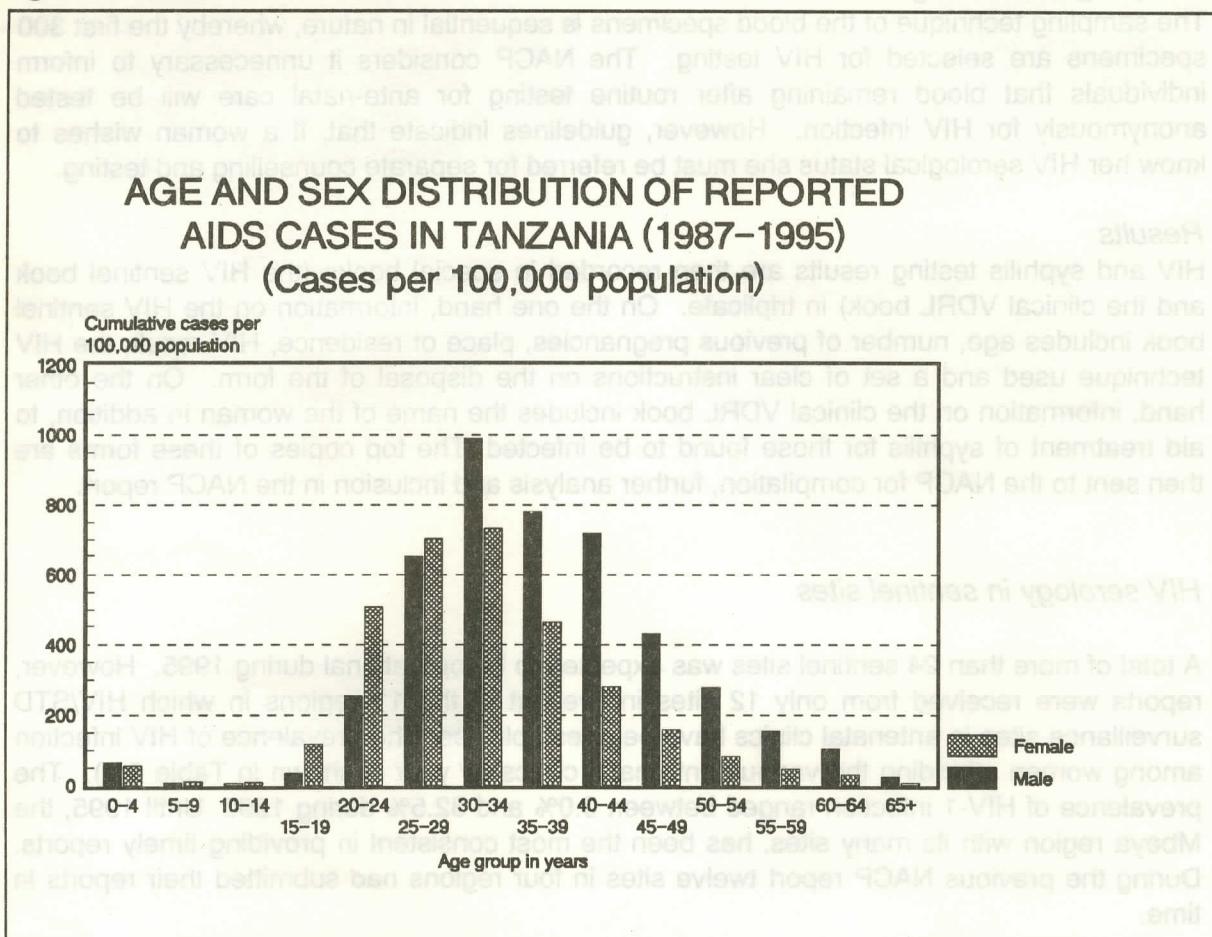
Figure 3 shows the age and sex cumulative AIDS case rate for Tanzania (1987-1995). During 1995 we have noted generally higher case rates for both sexes throughout the age groups compared to those in 1994. As has been the case in the past, the figure indicates that a higher proportion of female cases is being reported at earlier ages (15-29 years) than male cases while the reverse is true for male cases at later ages. The figure therefore suggests that the AIDS epidemic is continuing to affect women at an earlier age than males. The Programme is aware of this gloomy situation and continues to encourage all efforts to curb the problem among youth and especially the women.

Many factors have been speculated as being responsible for this age-sex difference in HIV infection such as the earlier sexual maturity of females, and the tendency for older and probably infected men to seek sexual relations with young girls in attempts to avoid infection thereby further spreading it. Furthermore, it is possible that economic considerations have lured these young girls into giving sexual favours to older and well to do men. Studies have also shown that on the average women marry 5-10 years earlier than men. All these are possible explanations for the observation in Figure 3.

Table 5
Distribution of cumulative AIDS cases by age and sex, 1987 - 1995 (Age-specific population is also provided)

Age	Male			Female			Total			
	Cases	% Population	Rate	Cases	% Population	Rate	Cases	% Population	Rate	
0-4	1,488	5.1	65.7	1,280	4.4	2,297,615	55.7	2,768	4.8	
5-9	160	0.5	2,124,460	7.5	213	0.7	2,120,643	10.0	373	0.6
10-14	103	0.4	1,810,466	5.7	144	0.5	1,803,074	8.0	247	0.4
15-19	487	1.7	1,448,737	33.6	1,791	6.2	1,532,082	116.9	2,278	3.9
20-24	2,480	8.5	973,457	254.8	6,281	21.7	1,237,709	507.5	8,761	15.1
25-29	6,159	21.1	943,743	652.6	7,904	27.3	1,123,638	703.4	14,063	24.2
30-34	6,798	23.3	686,344	990.5	5,650	19.5	772,041	731.8	12,448	21.4
35-39	4,785	16.4	612,787	780.9	3,094	10.7	665,422	465.0	7,879	13.5
40-44	3,129	10.7	435,562	718.4	1,396	4.8	497,047	280.9	4,525	7.8
45-49	1,815	6.2	419,806	432.3	689	2.4	433,908	158.8	2,504	4.3
50-54	945	3.2	338,427	279.2	320	1.1	387,883	82.5	1,265	2.2
55-59	438	1.5	283,122	154.7	123	0.4	267,906	45.9	561	1.0
60-64	249	0.9	239,904	103.8	79	0.3	274,300	28.8	328	0.6
65+	140	0.5	602,359	23.2	29	0.1	558,516	5.2	169	0.3
Total	29,176	100.0	13,183,700	221.3	28,993	100.0	13,971,780	207.5	58,169	100.0
Unknown	901	3.0 % of the total			907	3.0 % of total			1,808	3.0 % of total
Overall	30,077		228.1	29,900			214.0		59,977	
Total										220.9

M:F case ratio 30,077/29,900
M:F rate ratio 228.1/214.0

Figure 3

7. HIV Sentinel surveillance using ante-natal clinics

Methodology of Sentinel Surveillance

In order to standardize the method of obtaining sentinel surveillance data on HIV/Syphilis infections across countries, the NACP has adopted the WHO/GPA recommendations for sentinel surveillance since 1990. To date, sentinel surveillance services in Tanzania have been initiated in 11 out of the 20 regions of the country. The main purpose of sentinel surveillance is to monitor changes in the level of HIV infection in the community with the assumption that the sentinel populations (ante-natal women in this case) are representative of the general population in the reproductive age groups. The monitoring process established by the Programme in many parts of the country is therefore expected to involve the people in understanding the process of infection and why it is important to monitor infection rather than the disease itself in assessing the impact of the interventions.

Population

All pregnant women attending a clinic for the first time during any pregnancy constitute the sentinel surveillance population. The women are provided with routine ante-natal care, and venous blood (5-10 mls), which is routinely taken for ante-natal investigations, is utilized in testing and guiding treatment for syphilis infection and anaemia. In addition, the same blood sample is tested for HIV infection in such a way that results cannot be traced back to the individual women, i.e. the testing is anonymous and the data are permanently unlinked.

Sampling and testing

The sampling technique of the blood specimens is sequential in nature, whereby the first 300 specimens are selected for HIV testing. The NACP considers it unnecessary to inform individuals that blood remaining after routine testing for ante-natal care will be tested anonymously for HIV infection. However, guidelines indicate that, if a woman wishes to know her HIV serological status she must be referred for separate counselling and testing.

Results

HIV and syphilis testing results are then recorded in special books (the HIV sentinel book and the clinical VDRL book) in triplicate. On the one hand, information on the HIV sentinel book includes age, number of previous pregnancies, place of residence, HIV result, the HIV technique used and a set of clear instructions on the disposal of the form. On the other hand, information on the clinical VDRL book includes the name of the woman in addition, to aid treatment of syphilis for those found to be infected. The top copies of these forms are then sent to the NACP for compilation, further analysis and inclusion in the NACP report.

HIV serology in sentinel sites

A total of more than 24 sentinel sites was expected to be operational during 1995. However, reports were received from only 12 sites in five out of the 11 regions in which HIV/STD surveillance sites in antenatal clinics have been established. The prevalence of HIV infection among women attending the various ante-natal clinics by year is shown in Table 6(a). The prevalence of HIV-1 infection ranged between 0.0% and 32.5% during 1995. Until 1995, the Mbeya region with its many sites, has been the most consistent in providing timely reports. During the previous NACP report twelve sites in four regions had submitted their reports in time.

Computer simulations show that, at a constant rate of 5% of susceptibles becoming HIV infected each year, the prevalence will rise and ultimately stabilize at approximately 35%. This is consistent with data reported by Killewo *et al.* from Bukoba town in 1987. In the same series of studies in 1989 the incidence was reported to be 48/1,000 per year (approximately 5% per year) in Bukoba town, while the prevalence reported for 1987 was about 24% indicating that it was nearly reaching stability in the general urban adult population.

Vertical Transmission of HIV infection

Vertical transmission of HIV infection is emerging as an important mode of transmission as more and more HIV infected mothers become pregnant and subsequently deliver babies who carry a high risk of infection either pre-natally or post-natally. Assuming a 30% HIV transmission rate from pregnant women to their offspring (vertical transmission), the percentage of new-borns expected to be infected will therefore be up to 9.8% in the various sentinel sites (if the HIV prevalence range of 0.0% to 32.5% among pregnant women applies as shown in Table 6a).

Various studies on HIV infection are on-going in Tanzania specifically addressing the prevention of mother-to-child transmission. Zidovudine and lamivudine (specific anti-viral agents) and vitamin A are among the agents being tried in the various studies. It is hoped that useful results will emanate from these studies.

Table 6 (a)

Prevalence of HIV-1 infection (in %) using Sentinel Surveillance data from ante-natal clinics 1988-1995

Site of ANC Clinic	1988 %	1989 %	1990 %	1991 %	1992 %	1993 %	1994 %	1995 %
KAGERA (Bukoba)			22.2	20.0	27.7		17.3	
MWANZA URBAN	8.0	12.0	12.3	11.2	10.3	11.7	11.7*	8.9*
Mkula (Magu)				3.7	4.6	5.4		5.4*
MBEYA RURAL	2.9	11.6	—	—	14.1	13.9	—	—
Chimala	4.2	6.3	8.8	9.5	8.0	10.8	16.0	10.5
Isoko	2.9	2.0	2.4	6.6	18.0	8.5	8.0	10.3
Itete	1.7	9.1	6.4	3.9	5.3	15.5	5.1	14.8
Mwambani		12.0	8.5	12.9	8.0	10.7	13.0	17.5
Kyela		21.2	14.6	17.5	30.4	27.2	27.5	32.5
Mbozi						15.0	13.9	
MBEYA URBAN	9.4	13.0	12.2	15.3	17.7	19.6	—	20.3
Kiwanjampaka	7.0	10.6			17.0	22.3	19.5	
Mwanjelwa	11.0	7.3			11.0	23.2	19.6	
Meta	10.3	16.9			25.0	13.7	16.0	
DAR ES SALAAM								
Temeke				10.3		15.3		7.3
KILIMANJARO								
Umbwe				2.3	6.4			0.0
IRINGA (Mafinga)				21.0	25.0			
MTWARA								
Nanguruwe				4.4				0.0
MARA (Nyasho)				5.9	6.5	7.7		7.2*
RUKWA					11.7	23.2		
Namanyere					11.3			
Sumbawanga					12.0	23.2		
RUWUMA								
Madaba					6.6	12.9		
Songea					9.7	16.1		
Namtumbo					3.5	6.7		
SHINYANGA							10.9	

*This prevalence refers to that obtained using data from less than the four quarters of the year.

NB: Clinics which are currently operating but not listed have not submitted their reports to the NACP. Clinics with blanks during 1995 did not submit reports in time during the year.

Table 6 (b)

Prevalence of Syphilis infection (in %) using Sentinel Surveillance data from ante-natal clinics, 1990-1995

Site of ANC Clinic	1990	1991	1992	1993	1994	1995
	%	%	%	%	%	%
KAGERA (Bukoba)		2.7	3.6			
MWANZA URBAN Mkula (Magu)		7.0	8.7	6.5	7.9	11.0
MBEYA RURAL			13.3			
Chimala	4.4		10.0		14.0	8.5
Isoko	7.5	7.3	22.0		5.5	0.7
Itete			8.0		10.1	7.4
Mwambani	6.6		8.0		17.5	11.0
Kyela		4.8	17.9		7.5	1.0
Mbozi					8.0	6.2
MBEYA URBAN	9.1	8.6				7.3
Kiwanjampaika		26.6	10.0		13.5	
Mwanjelwa	20.0		14.0		10.6	
Meta	11.9		5.0		13.0	
DAR ES SALAAM		4.2	7.6			
Temeke			4.1			
*Mwananyamala			1.6			
*Aga Khan Clinic			13.6			
*COAST			10.8			
Bagamoyo			12.0			
Kisarawe			6.8			
Kibaha			11.2			
KILIMANJARO						
Umbwe	1.7	3.6	0.9		1.1	
IRINGA						
Mafinga	19.9	21.7	28.3		1.2	
MTWARA		4.2				
Nanguruwe			8.3		0.0	
MARA (Nyasho)	1.2	7.0	3.9		5.0	
RUKWA			16.8			
Namanyere			18.0			
Sumbawanga			15.7			
RUUVUMA						
Madaba	51.9	3.6				
Songea		3.3			4.0	
Namtumbo		7.1			1.7	
SHINYANGA			5.1			

*These are clinics not operating as sentinel surveillance sites but submitted syphilis data to NACP.

NB. Clinics which are currently operating but not listed have not submitted their reports to the NACP. Clinics with blanks during 1995 did not submit reports in time during the year.

Syphilis serology in sentinel sites

Together with HIV surveillance among pregnant women in selected sentinel sites, RPR or VDRL testing for syphilis has been going on for all pregnant women during their first attendances to ante-natal clinics in various parts of the country (see Table 6b). During 1995 the prevalence of RPR or VDRL positivity ranged between 0.0% and 11.0% as calculated from data received from 12 sites. These percentages include various degrees of false positivity to the screening tests used. However, all women found to be serologically positive are given treatment.

8. HIV Sentinel surveillance using blood donors

Reporting on HIV serostatus of potential blood donors in the country has been taking place since 1987. Initially, screening for HIV infection took place in regional hospitals only. However, since 1990 all the 182 hospitals in the country have been screening blood from donors to ensure safe transfusion. Table 7 shows the proportion of hospitals reporting during each year since 1987. In 1994 this proportion was 23% while in 1995 it was 34% indicating a slight increase. The highest proportion (87%) was recorded in 1991.

Table 7. Distribution of reported blood donations by year of donation

Year	Total reported blood donations		Reported blood donations with known age and sex		Reporting hospitals	
	Number	% of total transfusions	Number	%(c4/c2)	Number	% (in C6)
C1	C2	C3	C4	C5	C6	C7
1987	4,285	3	555	13	6/182	3
1988	13,807	10	3,680	27	14/182	8
1989	35,049	24	12,251	35	103/182	57
1990	28,399	20	24,885	88	123/182	68
1991	81,325	56	78,549	97	158/182	87
1992	64,294	45	62,489	97	140/182	77
1993	59,743	41	58,594	98	100/182	55
1994	37,156	26	35,638	96	42/182	23
1995	22,570	16	22,029	98	61/182	34

C1 = 1st column; C2 = 2nd column etc.

Table 7 also shows the time trend in the number of reported blood donations and the respective number of reporting hospitals. It also shows the percentage of total reported blood donations during a given year out of the total number of estimated transfusions during the same year given that the number of blood transfusions taking place in the country is estimated at 6 per 1,000 per year, i.e. a total of approximately 144,000 transfusions in the country. The percentage of reported blood donors with known age and sex has been increasing year by year probably due to improvements in the recording system of blood donation services.

It has been reported from other countries, that HIV sero-prevalence among blood donors might decrease with time due to improved selection of blood donors, while prevalence in the general population continues to rise. As most blood donors in Tanzania are relatives of blood recipients, blood donor data are believed to be only moderately biased. This was confirmed by a study from the Mwanza region by Borgdorff *et al.* As all regions and most hospitals do report on the HIV sero-status of donors, these data give the most reliable

estimates available for sero-prevalence in the population at large.² However, HIV sero-prevalence and its trend over time differ markedly in various regions, and between age and sex groups. During 1991 blood transfusion records improved considerably reaching their best levels. The table shows that the number of unreported blood transfusions is on the increase since 1991 while the percentage of reporting hospitals is decreasing. This situation will certainly affect the estimates of HIV infection in the general population.

Regional Differences in HIV infection using blood donor data

Overall time trends in HIV infection by region before 1989 are difficult to assess using blood donor data, as data were available from only a few regions. However, as the number of reporting regions increased, blood donor data became more reliable as a surveillance tool. Data from the different regions are assumed to be equally biased as problems related to donor selection are probably uniform in all the regions. Hence regional differences in HIV prevalence are likely to be real. Table 8 shows the prevalence of HIV-1 infection among blood donors by region and by sex between 1987 and 1995. The table shows that in some regions the prevalence was unusually high during the earlier years when very few regions reported. However, after 1990 separate blood transfusion service registers were available in all reporting centres. The table also shows that the highest HIV prevalences (7.0% and over) were found in the following regions during 1995; Iringa, Kagera, Shinyanga, Mtwara, Kilimanjaro, Mbeya, Mwanza and Tanga.

Reporting region (in 1995)	Reported blood donations Number (%)		Reported blood donations Number (%)		Reported blood donations Number (%)		Reported blood donations Number (%)		Total Number (%)	
	With known age and sex Number (%)		With known age and sex Number (%)		With known age and sex Number (%)		With known age and sex Number (%)			
	C1	C2	C3	C4	C5	C6	C7	C8		
A	SARIA	13	22	22	3	88	4	58	18.1	
B	SARAF	55	60.5	61	01	303.51	51	88.1	88.1	
C	1031185	22	103.51	45	20	80.28	28	88.1	88.1	
D	1581185	88	88.51	82	98.55	98.55	98.55	98.55	98.55	
E	1881185	72	64.81	82	85.78	85.78	85.78	85.78	85.78	
F	1400185	78	68.48	24	105.78	105.78	105.78	105.78	105.78	
G	1001185	99	86.88	14	61.02	61.02	61.02	61.02	61.02	
H	GENSA	80	88.28	85	98.15	98.15	98.15	98.15	98.15	
I	SENZA	88	650.55	81	107.55	107.55	107.55	107.55	107.55	

2. The first column (C1) is the number of blood donations reported by each region. The second column (C2) is the percentage of blood donations reported by each region. The third column (C3) is the number of blood donations with known age and sex reported by each region. The fourth column (C4) is the percentage of blood donations with known age and sex reported by each region. The fifth column (C5) is the number of blood donations with known age and sex reported by each region. The sixth column (C6) is the percentage of blood donations with known age and sex reported by each region. The seventh column (C7) is the number of blood donations with known age and sex reported by each region. The eighth column (C8) is the percentage of blood donations with known age and sex reported by each region. The ninth column (C9) is the total number of blood donations reported by each region. The tenth column (C10) is the total percentage of blood donations reported by each region.

The table shows that the highest HIV prevalence (7.0% and over) was found in the following regions during 1995; Iringa, Kagera, Shinyanga, Mtwara, Kilimanjaro, Mbeya, Mwanza and Tanga. The table also shows that the number of unreported blood transfusions is on the increase since 1991 while the percentage of reporting hospitals is decreasing. This situation will certainly affect the estimates of HIV infection in the general population.

Table 8 (a)
Prevalence of HIV-1 infection (in %) among blood donors by region for males, 1987-1995

Region	1987	1988	1989	1990	1991	1992	1993	1994	1995	Rank for 1995
Arusha			0.0	1.9	2.3	2.6	2.6	2.7	6.1	10
Coast	0.0	5.0	4.6	4.5	4.4	4.1	5.9	6.6	5.5	12
Dodoma			1.9	5.6	3.5	2.8	1.7	0.0	0.0	17
DSM	1.5	7.5	2.5	7.7	6.9	8.5	-	-	4.9	13
Iringa			11.1	11.4	10.6	11.1	13.2	7.7	13.0	1
Kagera			10.5	10.2	10.3	10.9	5.8	7.9	10.8	4
Kigoma		7.5	1.2	1.2	2.5	1.9	7.0	3.4	4.9	14
Kili'jaro			1.3	5.2	2.7	2.4	3.4	1.5	10.7	5
Lindi			0.6	5.6	4.8	3.7	2.5	-	3.0	16
Mara			4.6	4.5	4.5	6.9	5.0	3.7	5.8	11
Mbeya	4.8	5.0	5.2	7.8	11.6	15.1	0.0	-	9.0	8
Morogoro		10.9	6.8	3.1	5.4	4.6	5.7	-	-	NR
Mtwara				4.9	2.1	4.2	5.2	9.5	15.2	10.1
Mwanza			15.3	5.5	6.2	5.1	4.0	2.9	12.5	2
Rukwa			11.6		8.1	6.7	-	-	-	NR
Ruvuma	3.5	4.9	4.4		7.1	6.2	7.3	2.0	3.3	15
Shinyanga	0.0	13.0	4.4		6.0	6.1	6.4	14.7	11.7	3
Singida		3.1	2.3		2.2	2.7	2.8	0.0	-	NR
Tabora		2.4	2.5		2.9	2.8	4.4	2.5	6.2	9
Tanga		6.6	6.2		6.9	7.1	4.4	-	10.4	6
TANZANIA	3.3	7.4	5.0	5.0	5.8	5.3	5.9	6.9	7.8	

Note: NR = not ranked since no blood donors were reported during the year.

Table 8 (b)
Prevalence of HIV-1 infection (in %) among blood donors by region for females, 1987 - 1995

Region	1987	1988	1989	1990	1991	1992	1993	1994	1995	Rank for 1995
Arusha	0.0	0.0	0.9	5.5	2.2	3.9	-	-	15.6	2
Coast		6.9	6.1	6.1	5.0	10.2	11.8	9.2	-	7
Dodoma	0.0		5.9	3.3	4.8	-	-	-	0.0	13
DSM	0.0	14.3		0.0	14.1	7.7	-	-	6.7	9
Iringa			16.7	15.8	8.7	8.1	17.6	20.0	7.8	8
Kagera			9.7	12.6	12.9	11.0	8.6	8.3	14.3	3
Kigoma		29.6	9.47	1.8	4.7	4.1	5.8	5.1	0.0	13
Kili'jaro			3.8	6.7	3.2	2.2	1.8	2.9	0.0	13
Lindi			11.8	10.9	4.4	2.3	1.9	-	1.6	12
Mara			13.8	7.6	5.4	8.2	2.9	10.0	9.4	6
Mbeya	9.5	2.0	10.2	11.8	11.8	20.3	-	-	11.4	5
Morogoro		12.5	1.8	4.6	5.1	5.7	10.8	-	-	NR
Mtwara			0.0	1.6	3.5	10.5	5.7	0.0	5.6	11
Mwanza			7.5	5.3	6.2	5.7	8.0	5.0	0.0	13
Rukwa			24.0	-	21.4	0.0	-	-	-	NR
Ruvuma		6.3	14.0	8.7	7.0	6.4	6.7	2.1	6.1	10
Shinyanga		33.3	17.4	18.1	10.0	21.6	33.3	0.0	-	13
Singida		10.5	2.1	2.2	4.5	4.6	0.0	-	-	NR
Tabora		2.5	2.0	2.8	2.7	5.8	0.0	12.9	-	4
Tanga		23.5	2.1	7.9	7.0	5.9	-	20.8	-	1
Tanzania	7.1	8.0	11.2	7.9	7.2	5.9	6.2	4.8	9.4	

HIV Prevalences for the following regions are based on very few blood donors: -Dodoma: 10 (9 males, 1 female), Mwanza: 23 (16 males, 7 females), -DSM: 76 (61 males, 15 females), -Shinyanga: 262 (256 males, 6 females)

Age and sex differences in HIV infection (Blood donors)

Table 9a and 9b show that the overall female HIV prevalence among blood donors is higher than that of males in all age groups. Since 1989 prevalence rates seem to be declining slowly among women, and increasing in men. It also seems improbable that increased donor selection would lead to opposite trends among the sexes. Even taking into account that female donors differ from male donors in their average age (females being younger), the prevalence among female donors is considerably higher than that in male donors. The M:F ratio of the prevalences has been ranging between 0.4 and 1.0 since 1987.

Table 9(a)
**Age-specific prevalence of HIV-1 infection (in %) among Male blood donors
(1987-1995)**

Age	1987	1988	1989	1990	1991	1992	1993	1994	1995
15-19	0.0	1.6	1.8	3.3	3.2	3.7	3.9	2.4	5.3
20-24	3.4	6.8	4.5	4.7	5.0	4.9	5.8	2.4	5.8
25-29	1.8	8.3	6.0	5.0	6.7	6.0	6.1	5.8	7.2
30-34	2.1	9.3	5.3	5.5	6.4	5.8	6.2	5.4	7.7
35-39	7.8	8.7	5.5	4.3	6.1	5.6	6.5	9.8	7.8
40-44	7.1	10.1	3.8	3.8	4.8	3.9	5.1	0.0	5.9
45-49	10.0	5.6	2.2	5.0	4.5	4.2	4.9	7.4	5.8
50-54	0.0	4.2	3.0	3.8	4.4	2.6	4.3	0.0	3.5
55+	0.0	15.4	3.6	5.0	4.0	2.3	5.2	12.5	2.5
Unknown			5.1	9.8	8.5	3.9	12.3	14.3	7.4
Total	3.3	7.7	5.0	5.0	5.8	5.3	5.9	4.8	6.7

The HIV prevalence among blood donors by age for both sexes (Table 9a and 9b) differs to some extent from the AIDS case rates by age and sex (Table 5). In previous years the cumulative peak case rate for females occurred earlier than that of males. However, in 1995 the cumulative peak case rates for both sexes were the same at age 30-34 years although the rate for males was higher.

Table 9(b)
**Age-specific prevalence of HIV-1 infection (in %) among Female blood donors
(1987-1995)**

Age	1987	1988	1989	1990	1991	1992	1993	1994	1995
15-19	0.0	0.0	7.9	7.5	4.9	4.2	2.9	5.6	5.3
20-24	0.0	4.6	13.5	9.5	7.7	7.2	7.5	5.4	9.4
25-29	14.3	11.8	8.2	9.0	8.7	6.6	7.2	7.1	11.6
30-34	16.7	14.3	8.9	6.2	6.5	5.7	6.6	6.9	10.0
35-39	0.0	21.1	8.0	6.2	4.8	5.7	6.7	10.1	8.8
40-44	0.0	16.7	9.6	2.9	6.3	3.6	1.7	5.4	7.6
45-49	0.0	0.0	7.7	1.2	3.4	4.4	3.7	7.5	4.8
50-54	0.0	0.0	0.0	0.0	5.6	5.4	5.9	6.2	*6.3
55+	0.0	0.0	0.0	10.0	6.7	4.2	5.3	3.3	*16.7
Unknown			13.6	11.4	13.0	2.8	7.7	12.5	7.9
Total	7.1	7.5	11.7	7.9	7.2	5.9	6.3	6.9	9.2
M:F ratio	0.5	1.0	0.4	0.6	0.8	0.9	0.9	0.7	0.7

* Based on very few subjects, hence the data should be interpreted with caution

HIV Infection in Adolescents

When blood donor data are broken down by age groups, it becomes apparent that the HIV prevalence among young adults (20-24, 25-29 and 30-34 year olds) is the highest (Table 9a-b). This suggests considerable rates of HIV transmission at earlier ages. This is in line with behavioural data which indicate that 50% of adolescents have made their sexual debut by age 15 (Source: Institute for Curriculum Development, 1992). Additional data on adolescents are available from a population based survey in 1990/91 in Mwanza. These data show a marked difference between rural, roadside and urban sites. At age 15, the prevalence of HIV-1 infection was found to be 3.7% for urban sites, 3.4% for roadside villages and 0.6% for rural villages.

9. STD Episodes

Monthly STD episodes and drug consumption reports have regularly been received from most STD centres since January, 1995. Reports covering the period January to December, 1995 have been compiled by the Programme. This information helps to monitor drug consumption and hence facilitate assessment of future drug requirements. It also provides epidemiological data for STD episodes in the project areas. The distribution of STD episodes by syndromic pattern according to regions and centres is shown in Table 10.

In 1995, there were 375 reports received from 54 sites over 12 months. On average they saw 2,372 cases a month, ranging from 11,864 cases found in men who accounted for 42% compared to 58% in women. The largest diagnostic category was Genital Discharge Syndrome (23.41% and 26.74% for males and females respectively). In total, 28,463 STD cases were recorded. If the months of reporting are representative of all months, about 48,894 cases have been treated under the project areas in about one year.

1995-1996 STD episodes by syndromic pattern			Month	Region	Centre	STD Category	January		February		March		April		May		June		July		August		September		October		
Count	Percentage	Count					Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	
200	4.60%	170	3.74%	140	3.08%	130	2.78%	110	2.37%	100	2.14%	100	2.14%	80	1.75%	70	1.52%	50	1.07%	40	0.85%	40	0.85%	30	0.67%	20	0.43%
180	4.05%	160	3.52%	130	2.88%	120	2.68%	100	2.21%	90	2.02%	80	1.78%	60	1.36%	50	1.11%	40	0.89%	30	0.67%	30	0.67%	20	0.45%	10	0.22%
160	3.63%	140	3.13%	110	2.54%	100	2.31%	80	1.83%	70	1.62%	60	1.38%	50	1.12%	40	0.91%	30	0.71%	20	0.47%	20	0.47%	10	0.23%	10	0.23%
140	3.13%	120	2.74%	100	2.31%	90	2.14%	70	1.62%	60	1.38%	50	1.12%	40	0.91%	30	0.71%	20	0.47%	10	0.23%	10	0.23%	10	0.23%	10	0.23%
120	2.74%	100	2.31%	90	2.14%	80	1.83%	70	1.62%	60	1.38%	50	1.12%	40	0.91%	30	0.71%	20	0.47%	10	0.23%	10	0.23%	10	0.23%	10	0.23%
100	2.31%	80	1.83%	70	1.62%	60	1.38%	50	1.12%	40	0.91%	30	0.71%	20	0.47%	10	0.23%	10	0.23%	10	0.23%	10	0.23%	10	0.23%	10	0.23%
80	1.83%	70	1.62%	60	1.38%	50	1.12%	40	0.91%	30	0.71%	20	0.47%	10	0.23%	10	0.23%	10	0.23%	10	0.23%	10	0.23%	10	0.23%	10	0.23%
60	1.38%	50	1.12%	40	0.91%	30	0.71%	20	0.47%	10	0.23%	10	0.23%	10	0.23%	10	0.23%	10	0.23%	10	0.23%	10	0.23%	10	0.23%	10	0.23%
40	0.91%	30	0.71%	20	0.47%	10	0.23%	10	0.23%	10	0.23%	10	0.23%	10	0.23%	10	0.23%	10	0.23%	10	0.23%	10	0.23%	10	0.23%	10	0.23%
20	0.47%	10	0.23%	10	0.23%	10	0.23%	10	0.23%	10	0.23%	10	0.23%	10	0.23%	10	0.23%	10	0.23%	10	0.23%	10	0.23%	10	0.23%	10	0.23%
0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%

Table 10a
STD Episodes by Centres
January - December 1995

REGION	CENTRE	NO. OF MONTHS		GUD		GDS		PID		OTHERS		TOTAL		GRAND TOTAL		PROJECTED TOTAL
		M	F	M	F	M	F	M	F	M	F	M	F	M	F	
ARUSHA	Arusha	11	339	222	1187	1581	894	733	570	2259	3267	5526	6028			6028
DAR ES SALAAM	IDC	12	421	160	960	307	417	264	139	1645	1023	2668	2668			2668
	Muhimbili	12	14	10	49	22	0	13	6	76	38	114	114			114
	Magomeni	5	12	26	30	348	0	27	20	69	394	463	463			1111
DODOMA	Mpwapwa	7	190	251	256	324	402	175	72	621	1049	1670	1670			2863
DODOMA	Dodoma	11	28	13	230	246	410	67	31	325	700	1025	1025			1118
IRINGA	Mafinga	10	274	131	289	238	189	88	34	651	592	1243	1243			1492
KAGERA	Biharamulo	12	17	70	104	247	127	47	40	168	484	652	652			652
	Kaligara	2	6	2	4	11	2	1	0	11	15	26	26			156
	Bukoba	5	8	6	20	27	10	9	0	37	43	80	80			192
	Nyakahanga	8	17	13	70	146	29	9	3	96	191	287	287			431
KIGOMA	Maweni	5	22	10	131	252	9	8	5	161	276	437	437			1049
KILIMANJARO	Kasulu	6	19	8	58	0	0	0	0	77	8	85	85			170
MBEYA	Moshi	11	127	112	548	1200	550	113	130	788	1992	2780	2780			3033
MBEYA	Mbeya	2	30	26	26	14	60	20	24	76	124	200	200			1200
	Tukuyu	4	67	36	30	55	21	29	61	126	173	299	299			897
	Kwanjampaka	2	74	85	38	169	10	4	3	116	267	383	383			2298
	Isoko	2	8	11	15	17	3	11	4	34	35	69	69			414
	Igawilo	2	114	84	42	64	74	18	14	174	236	410	410			2460
	Igongwe	1	23	17	24	12	2	13	4	60	35	95	95			1140
	Mwambani	2	27	37	25	68	6	12	9	64	120	184	184			1104
	Ruanda	2	66	88	99	101	0	0	1	165	190	355	355			2130
	Kyela	2	12	13	26	37	24	11	10	49	84	133	133			798
	Rete	2	15	12	23	20	9	1	5	39	46	85	85			510
	Mbozi	2	20	17	30	36	10	5	7	55	70	125	125			750
TABORA	Kitete	11	40	23	418	230	439	102	66	560	758	1318	1318			1438
	Nzega	9	70	38	192	189	368	95	53	357	648	1005	1005			1340
	Urambo	5	163	110	286	187	195	40	4	489	496	985	985			2364
	Igunga	6	81	38	209	245	132	40	18	330	433	763	763			1526
	Sub-total for Table 10 a		2304	1669	5419	6393	4392	1985	1333	9678	13787	23465	23465	41446		

*Projected Total is the number of STD episodes if the monthly average was to be reported for all the 12 months of the year.

Table 10 b
STD Episodes by Centres
January - December 1995

REGION	CENTRE	NO. OF MONTHS		GUD		GDS		PID		OTHERS		TOTAL		GRAND TOTAL		PROJECTED TOTAL	
		M	F	M	F	M	F	M	F	M	F	M	F	M & F	M & F	M & F	M & F
Total brought forward from Table 10 a		2304	1669	5419	6393	4392	1955	1333	9678	13787		23465		41446		292	332
SHINYANGA	Shinyanga	10	52	63	53	46	12	8	9	113	130	243					
	Kahama	6	27	30	35	36	22	10	6	72	94	166					
TANGA	Bombo	9	31	31	112	135	99	15	6	158	271	429					
	Korogwe	11	253	253	285	386	451	44	32	582	1122	1704					
MWANZA	Bukiko	8	27	0	22	31	31	0	0	49	62	111					
	Bukondo	9	27	5	22	13	14	0	0	49	32	81					
	Bukonyo	9	20	11	35	76	17	1	0	56	104	160					
	Busolwa	12	5	6	20	21	0	2	0	27	27	54					
	Bwisywa	6	15	8	42	48	58	0	2	57	116	173					
	Chifule	6	14	5	35	14	35	1	0	50	54	104					
	Chigunga	9	30	34	46	155	49	1	0	77	238	315					
	Chikobe	11	34	48	53	118	27	11	4	98	197	295					
	Igalla	5	28	21	59	62	31	2	1	89	115	204					
	Kasang'wa	10	33	9	28	9	39	0	0	61	57	118					
	Lutale	1	6	1	5	7	1	4	1	15	10	25					
	Muriti	6	30	12	58	49	61	0	1	88	123	211					
	Nyang'wale	11	20	12	65	54	20	6	5	91	91	182					
	Nassa	9	45	11	69	43	53	8	6	122	113	235					
	Nyaguge	6	19	9	14	24	17	5	1	38	51	89					
	Nyamanga	3	1	2	9	10	5	1	1	11	18	29					
	Nyasenze	4	3	4	5	1	1	0	0	8	6	14					
	Nyiljundi	8	19	19	46	34	2	5	2	70	57	127					
	Rubya	6	15	8	36	22	10	8	1	59	41	100					
	Sekou Toure	5	12	7	12	35	18	1	0	25	60	85					
	Yamikoma	5	13	4	23	24	12	2	2	38	42	80					
	Shabaka	10	18	4	27	8	15	0	0	45	27	72					
	Shigala	9	32	7	37	58	36	1	5	70	106	197					
Sub-total for Table 10 b		829	624	1253	1519	1136	136	85	2218	3364		5603				8203	
Overall Totals		3133	2293	6672	7912	5528	2091	1418	11896	17151		29068				49649	

*Projected Total is the number of STD episodes if the monthly average was to be reported for all the 12 months of the year.

10. The Mwanza trial on STD management and reduction of HIV incidence.

Many studies have documented an increased risk of HIV infection among individuals already infected with STDs. This problem is particularly significant in sub-Saharan Africa where rates of untreated STDs are high. This situation prompted the commencement of a collaborative study of AMREF in Mwanza, NIMR in Mwanza, the Tanzanian MOH, LSHTM in London and the Institute of Tropical Medicine in Antwerp under financial support by the Commission of the European Communities, the UK Overseas Development Administration (ODA), WHO and the Centre for international Migration in Germany.

The study was carried out in Mwanza in 1992 involving 12 selected rural communities in each of which HIV prevalence was recorded in a cohort of 1,000 adults. The overall prevalence of HIV infection was about 4%. In order to determine the impact of STD treatment on the incidence of HIV infection, STD services were improved in six of the communities which were randomly selected from the 12. The improved services included training of health workers, health education for STD patients, provision of more effective drugs and better supervision.

Two years later, in 1994, a follow-up study was carried out involving the cohort of six communities, and then improved services were extended to the rest of the 12 communities. The incidence of HIV infection over the two-year period in the communities with improved services was 1.2% compared to 1.9% in the communities without improved services. From these results it was concluded that the intervention reduced the incidence of HIV infection by 42% after adjusting for the effects of other risk factors. This means that a large proportion of HIV infection is a result of a possible link between STDs and HIV. This may also explain the rapid heterosexual spread of HIV in many parts of sub-Saharan Africa where STD prevalence is also high.

The study also showed the largest impact of the intervention to be in women in the age group 15-24 years and men in the age group 25-34 years. These age/sex groups were also the ones in which the highest incidence of HIV infection was recorded in the communities which did not have improved STD services.

The Mwanza trial was the first of its kind (randomized controlled trial) to show a significant impact of an HIV prevention strategy on the incidence of HIV infection. The study therefore concluded that an STD treatment programme, designed to be replicable and sustainable within the existing primary health care services of a developing country such as Tanzania has succeeded in reducing the incidence of HIV infection by a significant level in a rural population. The Programme has received the report with great interest and plans are under way to seek support to implement its results on a wider scale.

10. HIV/AIDS and tuberculosis

HIV prevalence among tuberculosis patients

The prevalence of HIV infection among 4,146 new cases of Tuberculosis seen in six regions during 1994/95 was 47%; while the prevalence observed in the same six regions during 1991/92 among 2,441 tuberculosis patients was 36%. This information is based on hospital data obtained from surveys conducted in six regions, namely Dar es Salaam, Kilimanjaro, Mbeya, Mwanza, Tanga and Kagera. Table 11 displays this information and shows that, the prevalence of HIV among TB patients was persistently higher in Mbeya region during both surveys i.e. 53% during 1991/92 and 70% in 1994/95 compared to other regions. The table

also shows the prevalence of HIV infection according to different categories of patients e.g. place of residence, gender, age group and type of TB.

Table 11: Trend Of HIV Seropositivity Among Tuberculosis Patients In Six Regions of Tanzania: 1991/92 And 1994/95

Region	1991/92		1994/95			
	Total New TB Cases	HIV Positive	HIV Prevalence %	Total New TB Cases	HIV Positive	HIV Prevalence %
Dar es Salaam	829	361	44	825	418	51
Kilimanjaro	152	63	41	535	238	45
Mbeya	198	104	53	598	418	70
Mwanza	557	150	27	748	251	34
Tanga	402	81	20	1029	448	44
Kagera	303	112	37	411	156	38
Residence						
Urban	1341	575	43	2001	991	50
Rural	1100	296	27	2145	938	44
Gender						
Male	1581	528	33	2628	1144	44
Female	860	343	40	1518	785	52
Age Group						
15-24	457	129	28	734	284	39
25-34	880	447	51	1427	837	59
35-44	491	185	38	949	501	53
45-54	286	61	21	510	189	37
55+	327	49	15	526	118	22
TB type						
Pulmonary SM+	1567	511	35	2362	1017	43
Pulmonary SM-	495	214	43	1030	495	48
Extrapulmonary TB	252	105	42	608	348	57
Relapse	127	41	32	146	69	47
Total	2441	871	36	4146	1929	47

12. HIV Sero-prevalence in the general population

Population-Based Surveys

To-date there have been four major population-based surveys on HIV infection in Tanzania utilising random samples of the general population. Results of two of these surveys have been reported earlier (for Kagera in 1987 by Killewo J. Z. J. *et al* and for Mwanza in 1991 by Barongo L. R. *et al*). A population-based survey on HIV infection in Arusha in 1992 indicates that the prevalence was 10.7% in the low socio-economic status urban area, 5.2% in the high socio-economic status urban area, 2.2% in the semi-urban and 1.6 in the rural areas. The prevalence was significantly higher among women (6.5%) than men (1.7%). The study also showed that significantly more individuals with multiple sexual partners reported regular condom use (19.3%) than those with one sexual partner (6.4%) (Mnyika *et al*, 1994).

Another population-based study in the North Mara district of Tanzania in 1989/90 showed an overall prevalence of 7.3% with a gradient of seropositivity from 13.0% among high risk

individuals, 8.8% among urban individuals, 6.5% among peri-urban residents and 2.6% among rural populations. The study also showed that recent treponemal infection, measured by the rapid plasma reagin test (RPR), was not associated with HIV infection (Shao J. et al 1994). Unfortunately most of the above studies have concentrated on the northern zones of the country and rendered the rest of the country deficient of equally reliable data. However it is expected that cheaper and accurate methods of estimating the HIV prevalence in the general population such as those of sentinel surveillance will become more widespread and hence regularly avail the NACP with accurate data from all parts of the country.

Decreasing prevalence among young women in Bukoba

A cross-sectional study was done in Bukoba in 1993 to compare data obtained from the general population in 1987. In order to assess the time trend of HIV infection the overall age adjusted HIV prevalence in Bukoba urban decreased significantly from 24.2% in 1987 to 18.3% in 1993. The sex-specific prevalence dropped significantly among females from 28.6% to 18.0%. Among females the maximum drop was observed in the age group 15-24 years from 27.6% to 11.2%. Prevalence among males, however remained constant at 16.9% in 1987 and 16.7% in 1993. Although the prevalence is still high, this significant drop cannot easily be explained without further studies to determine the type of interventions that could be responsible.

Estimated HIV sero-prevalence in the General Population

Table 12 shows the distribution of blood donors by category of donor and relationship to blood recipient for 1993 and 1994. Since the majority of blood donors are relatives of blood transfusion recipients (97%), the HIV sero-prevalence among blood donors can reasonably be said to be representative of the sero-prevalence in the general population.

Table 12
Distribution of blood donors by category of donor and relationship to recipient (1994/95)

Category	1994			1995		
	No	% of Total	% HIV positive	No	% of Total	% HIV positive
Relatives	5,369	96.6	6.4	21,728	96.0	7.0
Institutional donors	66	1.2	4.5	409	1.8	2.7
Paid donors	1	0.0	0.0	235	1.0	12.3
Unknown relation	124	2.2	15.3	252	1.1	13.1
Total	5,560	100.0	6.6	22,624	99.9	7.1

*Institutional donors are mainly secondary school students.

When the age- and sex-specific prevalences found in blood donors are applied to the general adult population as projected for 1995 (15,000,000), one arrives at an estimated number of 470,000 infected adult males and 730,000 adult females, totalling 1,200,000 sero-positive adults in mainland Tanzania during 1995.

13. Orphans

Orphans resulting from the death of one or both parents from AIDS constitute a significant social problem in the Tanzanian society today. The NACP defines orphans as those children aged below 18 years who have lost one or both parents. At present the national estimate stands at 200,000 orphans. Regional data on estimates of orphans is lacking except where specific community-based programmes on orphanage have been initiated. Kagera is such a region where the number of orphans is currently estimated to be over 100,000. However, the definition of an orphan in the Kagera situation is based on those aged below 21 years. Furthermore, the number of orphans is cumulative since those older than 21 are included in subsequent estimates. If the current rate of infection and progression to AIDS continues, it is estimated that by the turn of the century there will be about the same number of orphans as the number of AIDS cases (i.e. 1,000,000).

14. Projections

The theory of projections

Projections are mathematical extrapolations of current trends and assumptions about the future. Projections are frequently regarded as predictions, i.e. statements about what is likely to occur under various situations. In this report we are concerned with the population of reported AIDS cases and how we may use these to forecast the number of AIDS cases likely to be reported after a given time period. In making projections we start by specifying a model for the growth of AIDS cases and in the current situation we assume a constant exponential growth. According to this theory, if P_0 is the current total number of AIDS cases, the total number P_t , t years from now, is given by the equation $P_t = P_0 \exp(rt)$ (1) where r is the growth rate.

The growth rate r during a given period t can be calculated by solving for r in equation (1) above when the total populations at the two different times, P_0 and P_t and the length of the period, t are known. In the special case of the length of period being one year (i.e. $t=1$), and if the numbers of AIDS cases at the two time points are P_1 and P_2 respectively, then

$$r = \ln(P_2/P_1)(2)$$

where \ln is the natural logarithm.

Of interest in projections however, is the length of time required for the number of AIDS cases to double. This is known as the doubling time. We put $P_t = 2P_0 = P_0 \exp(rt_D)$ and it follows immediately that the doubling time t_D is given by the equation

$$t_D = \ln 2/r = \ln 2/\ln(P_2/P_1)(3)$$

We have adopted this theory in estimating the doubling times and in projecting the total populations in Tables 2 and 5 in this report. In summary, the basic equation (1) can be used to answer three sorts of questions:

- I. How large would the population of AIDS cases become if it increased at some given rate, r , for a definite period of years, t , beginning with some known size, P_0 ? (solve the equation for P_t)
- II. What is the rate of growth in some known period, when P_1 and P_2 , and the length of the period, t , are known? (solve the equation-for r)

How many years would be required for the population to increase/decrease by some definite amount if it changed steadily at the rate r ? (solve the equation for t).

Projection of Adult HIV infections and AIDS Cases

If the (estimated) number of sero-positives is known, it is possible to calculate the number of future AIDS cases, as the natural history of HIV infection is well known. From cohort studies in the USA, it is well established that 50% of HIV infected individuals will have converted to AIDS within a median duration of 10 years after infection. In the absence of better AIDS progression data from Africa, the same rate of progression is assumed for Tanzania even though it is believed that it might be shorter due to the higher exposure to endemic diseases, poor nutrition and reduced accessibility to effective medical care.

The epidemic of AIDS cases started in 1983 and will become strikingly predominant during the 1990's reaching a cumulative number of 430,000 AIDS cases by the turn of the century, if HIV transmission is assumed to have halted completely as from 1990. Based on the estimate of 700,000 sero-positives in 1990, and the estimated cumulative number of 80,000 by 1990, the projected number of AIDS cases by the year 2,000 will be 430,000 (i.e. 50% of 700,000 plus 80,000). This is in the absence of any further HIV infection and substantial deaths from AIDS after 1990 (The year 1990 is conveniently used here because it is 10 years before the year 2000). Of course the picture is expected to be worse than this due to continued infections. For example, if transmission continues at a rate of 1% per year up to 1996, this will result in 1,500,000 more infected adults by the turn of the century, and 750,000 more AIDS cases by the year 2006 (10 years after 1996). Thus, the current projection of AIDS cases for the year 2000 will be about 1,000,000 and three times as many infections. The above calculation is based on an adult population (15 years +) of 15,000,000 in mainland Tanzania.

Estimated number of HIV infections

Table 13 summarises the estimated number of HIV infections from 1987 to 1995. These estimates are based on age adjusted HIV prevalence among blood donors. It can be seen that the estimated number of HIV infections has increased relative to that of 1993.

Table 13

Summary of estimated number of HIV infections 1987 - 1995. (based on age adjusted blood donor prevalence)

	1987	1988	1989	1990	1991	1992	1993	1994	1995
Males	173,656	443,054	238,683	269,713	296,782	268,177	324,108	374,468	395,241
Females	236,102	468,411	517,274	452,853	412,858	319,394	303,830	459,595	730,508
Total	409,758	911,465	755,957	722,566	709,640	587,571	627,938	834,065	1,125,749

15. Recent publications

The following are references to recent publications on HIV infection and AIDS in Tanzania. Literature search has shown that during 1995 there were 36 articles about the problem of AIDS/HIV and STDs in Tanzania. Most of these articles were published in international journals and copies of most of them have been submitted to the MOH for information and action. Authors who have not submitted reprints or copies of their articles are asked to do so as soon as possible in order to enable the Ministry to disseminate the information and to take appropriate action towards the control of the epidemic. Copies of these publications may then be made available to others on request from the NACP. Information leading to acquisition of certain rare or bulky publications may also be available.

Publications during 1995

1. Agostini HT, Brubaker GR, Shao J, Levin A, Ryschkewitsch CF, Blattner WA, et al. BK virus and a new type of JC virus excreted by HIV-1 positive patients in rural Tanzania. *Arch Virol* 1995;140:1919-34.
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15. Howlett WP, Nkya WM, Kvale G, Nilssen S. The snout and palmomental reflexes in HIV disease in Tanzania. *Acta Neurol Scand* 1995;91:470-6.
16. Kapiga SH, Lwihula GK, Shao JF, Hunter DJ. Predictors of AIDS knowledge, condom use and high-risk sexual behaviour among women in Dar-es-Salaam, Tanzania. *Int J STD AIDS* 1995;6:175-83.
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