



## The relentless spread of tuberculosis in Zambia — trends over the past 37 years (1964 - 2000)

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**Objective.** To review trends in the rates of tuberculosis (TB) case notifications over a 37-year period.

**Design.** A retrospective study of Ministry of Health records on TB notifications between 1 January 1964 and 31 December 2000.

**Setting.** Zambia, sub-Saharan Africa.

**Methods.** Retrospective analysis of case-notification data for TB of the Zambia Ministry of Health annual returns.

**Outcome measures.** Annual TB case-notification rates and trends over the past 37 years.

**Results.** TB case-notification data from 1964 to 2000 show a 12-fold increase over the past two decades, and apparent gains in controlling TB seen in the 1960s and 1970s have been reversed over the past two decades. A stable situation during the period 1964 - 1984 (case-notification rate remained around

100 per 100 000 population) was followed by an exponential increase since the mid-1980s. The absolute number of new TB cases increased from 8 246 in 1985 (124/100 000) to 38 863 (409/100 000) in 1996 and 52 000 (512/100 000) in 2000. Comparison of case-notification rates over the past 2 decades with neighbouring countries (Zimbabwe, Malawi and Tanzania) show that Zambia has one of the highest case-notification rates in the region.

**Conclusions.** Zambia, like many countries in Africa, is in the midst of a serious TB epidemic and there are no signs that it is abating. This increase was most likely due to the impact of the HIV/AIDS epidemic and subsequent breakdown of TB services. Concerted donor-government efforts should invest appropriately in long-term plans for TB control.

*S Afr Med J* 2003; **93**: 149-152.

Zambia is a land-locked country in central Africa with a population of approximately 10 million people. Tuberculosis (TB) control activities were initiated by the British colonial administration in the then Northern Rhodesia. After independence in 1964, the National Tuberculosis control Programme (NTP) was launched by the new Government of the Republic of Zambia (GRZ) to strengthen TB control activities. In 1980 the programme was reorganised and combined with the leprosy control activities into the National Tuberculosis and Leprosy control Programme (NTLP). Short-course chemotherapy for TB was introduced countrywide from 1983 onwards. In 1988 a revision of the programme reporting system was undertaken linking the drug supply to quarterly case finding reports sent by the diagnostic centres. In line with

the health reforms, which commenced in 1991, the GRZ decided in 1993 to combine the NLTP with the National AIDS and sexually transmitted disease (STD) programmes into one programme known as the National AIDS/STD/Tuberculosis and Leprosy control Programme (NASTLP).

Despite the establishment of this programme and the introduction of health sector reforms, current observations from clinical practice and data from specific TB research projects indicate that there are no signs of the TB epidemic abating. To place the significance of the clinical observations into perspective we undertook this study to assess the trends in the evolution of the TB epidemic in Zambia over the past 37 years assessed from the best available data from Ministry of Health annual returns.

### Methods

Ministry of Health records on TB case-notification data from all provinces were studied from the period 1 January 1964 to 31 December 2000. The total number of new TB cases were noted, including the number of extrapulmonary TB (EPTB) cases. The standard World Health Organisation (WHO) definition for EPTB was used (patients with TB of organs other than the lungs). The case-notification rates per 100 000 were worked out based on the best available population census data. Case-notification rates were compared with those of neighbouring countries, namely Malawi, Zimbabwe and Tanzania.<sup>1</sup>

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## Results

Case-notification data from 1964 to 2000 are shown in Table I and Fig. 1. There appear to be two main discernible periods in this analysis.

1. A relatively stable situation during the period 1964 - 1984. During this period the total number of notified TB cases increased from 4 572 in 1964 to 7 272 in 1984 reflecting the increase in the population, on average about 3% per year. During this period the case-notification rates remained relatively constant (99/100 000 in 1966 and 113/100 000 in 1984).

**Table I. Case-notification rates for new tuberculosis cases in Zambia, 1964 - 2000**

Year	Total	Case-detection rates/100 000
1964	4 572	127.6
1965	4 468	121.8
1966	3 746	99.6
1967	3 502	90.8
1968	3 972	97.9
1969	3 600	88.8
1970*	3 660	87.7
1971	4 022	92.3
1972	4 750	106.0
1973	5 117	112.5
1974	5 056	108.1
1975	4 704	97.7
1976	4 661	93.8
1977	5 137	100.2
1978	5 201	99.0
1979	5 243	95.7
1980†	5 321	94.0
1981	6 162	105.5
1982	6 525	108.2
1983	6 860	110.2
1984	7 272	113.2
1985	8 246	124.4
1986	8 716	127.4
1987	10 025	142.0
1988	12 876	176.8
1989	14 266	189.8
1990‡§	16 863	215.7
1991	21 550	244.0
1992	25 448	309.0
1993	28 842	335.0
1994	33 492	378.0
1995	33 553	367.0
1996	38 863	409.0
1997 - 99¶	N/A	N/A
2000	52 000	512.0

\* 1970 population estimated 4 173 318.

† 1980 census population 5 661 801.

‡ 1990 census population 7 818 447.

§ 1980 - 1990 intercensus annual growth rate 3.2%.

¶ No data available because of breakdown in the TB programme.

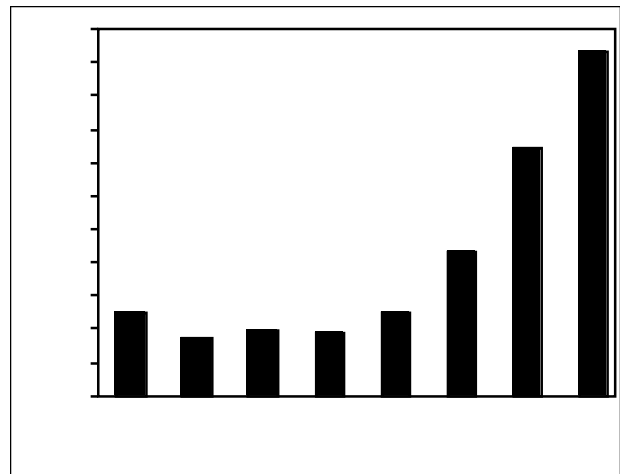


Fig. 1. Annual TB case-notification rates for Zambia.

2. An exponential increase from the mid-1980s to the present day. During this period the case-notification rates increased steadily from 113/100 000 in 1984 to 512/100 000 in 2000.

During this period the absolute number of notified new cases increased from 7 272 in 1984 to 52 000 in the year 2000. The case-notification rate increased nearly fourfold during this period.

## Discussion

In 1993 TB was declared a global emergency by the WHO, and it remains so today. Our observations confirm clinical observations,<sup>2,6</sup> namely that today TB remains a major cause of morbidity and mortality and a persistent threat to the health of the Zambian population. Zambia, like most sub-Saharan African countries, is in the midst of a major epidemic of TB and HIV/AIDS. The TB problem in Zambia is one of the most severe in Africa and efforts at TB control have so far failed to contain a growing epidemic. The annual incidence of TB has increased fourfold between 1982 and 2000. Fig. 2 illustrates the case notification rate data compared with data for neighbouring countries. Other central African countries with well-functioning directly observed TB short-course therapy (DOTS) programmes such as Tanzania have also experienced increased TB rates but not as dramatic as those in Zambia. Zambia currently has one of the highest case-notification rates in central Africa. The total estimated prevalence of TB for the year 2001 is approaching 100 000 cases and this may be an underestimate since no accurate data are available under the current reporting system.

The accuracy of the data used in this study to estimate trends in TB over the past 37 years is dependent on several factors. Returns to the Ministry of Health are always an underestimate because of several logistical and operational factors involved in

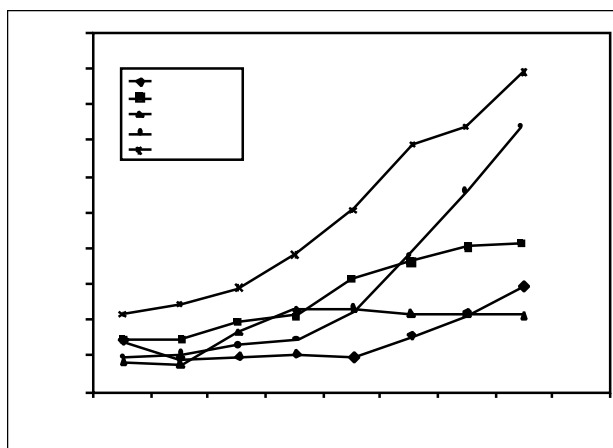


Fig. 2. Annual tuberculosis case-notification rates for central African countries.

the reporting process. Notwithstanding the limitations of analysing data from Ministry of Health records of annual returns from provinces, the available data clearly show that Zambia is in the midst of an extremely serious TB epidemic which is clearly out of control. Much of the increase probably reflects real changes in the incidence of TB, the increase being due to the HIV epidemic and the well-known factors influencing TB trends (poverty, malnutrition, and management failures in the treatment system<sup>7</sup>). There are also the usual problems of underreporting of TB because of problems with diagnosing TB in children, pregnant women, missed smear-negative patients and those with extrapulmonary disease. A recent autopsy study of children dying of respiratory disease in Zambia showed that 20% of them die of undiagnosed TB.

Since 1985 an exponential rise in the number of TB cases among children and adults has occurred in Lusaka. The steady increase of TB notifications since 1985 has coincided with the spread of the HIV epidemic in Zambia. The HIV-seroprevalence rates among TB patients at the University Teaching Hospital (UTH) in Lusaka increased from 24% in 1985 to 68% in 1995.<sup>4,6</sup> Clinical observations indicate that because of co-infection with HIV the mortality rate among TB patients on treatment has increased to over 20% in recent years. In Zambia the HIV epidemic has reached tragic proportions and it is one of the major factors responsible for the breakdown of the national TB control programme. According to sentinel surveys the HIV prevalence rate among antenatal clinic attenders increased from about 10% in 1985 to an average of 25% in 1995.<sup>8</sup> At UTH TB remains one of the most common causes of admission for infectious diseases among HIV-infected children and adults.

When properly administered and monitored, anti-TB treatment regimens lead to effective cure. The only way to interrupt the transmission of TB is by active case finding and

achieving high cure rates of open TB. However, the main failure in achieving this has been in the delivery of treatment. The quality of TB care and control in Zambia is still below the expected standard in many districts. The Ministry of Health has spent much effort in reorganising anti-TB activities since 1983, such as the introduction of DOTS for new smear-positive TB patients, followed by capacity building and technical support to the districts in 1994. While DOTS has not been applied strictly and the system does not meet the WHO's definition of DOTS implementation, there have been some notable results, with cure rates of 83% documented in Western Province in 1992. DOTS is important in controlling TB, but in the era of HIV it is not by itself going to control the TB epidemic. Despite some notable successes DOTS implementation has been slow and recent projections are that even if the rate of implementation was substantially increased, TB mortality could not be halved before 2030.<sup>8</sup> DOTS is unable to control TB in areas where there is a high prevalence of HIV infection,<sup>9</sup> and in other countries it has not achieved high cure rates.<sup>10</sup> Ideally the development of more sensitive TB diagnostics, and an effective preventive TB vaccine with shortened TB therapies could act synergistically with a DOTS programme, but this is a long way off. While global DOTS coverage is a short-term objective, political will is needed to develop newer TB control strategies.<sup>11</sup>

TB control is possible under routine conditions in Zambia provided that at district level well-organised primary health care services exist which integrate TB control in the general health services. A clear definition of objectives, strategies, activities, work plan, inputs and budget is required urgently to improve and support the TB control work at district and hospital levels. In 1991 the Zambian government embarked on a radical health reform process to redress problems that had troubled the health care system in the preceding years. A descriptive analysis of health sector reform in Zambia and its effects on the NTP during the period 1995 - 1997 showed that by the end of 1997 the NTP had stopped functioning.<sup>12</sup> The National Health Strategic Plan for 1995 - 1999 had no budget for special programmes like TB and the policy to integrate these into the general health services was a disaster for the TB programme. Thus there were no data on case notification rates for 1997 - 1999. The most serious effect of the transition was the interruption in the supply of TB drugs. A strategic plan for 1998 - 2000 was developed but never implemented. Another strategic plan is now in place (2001 - 2003) and one can only hope that this will be more effective than previous plans.

There appear to be no quick-fix solutions to the rapidly spreading TB epidemic in Zambia. Apart from HIV, TB is currently one of the most severe threats to the health of the population of Zambia. Careful planning, effective and accountable management and proper financing of TB control are required. There is an urgent need for donor countries to



redress the injustices of the current economic order.<sup>13</sup> Meanwhile, concerted donor-government efforts should invest appropriately in long-term plans for TB control. With a change in government and medical doctors in place in the Ministry of Health the future for TB control looks encouraging. More equitable investment in diseases of poverty by donor countries is also required.<sup>12,13,14</sup>

Dr Peter Mwaba, Professor C Chintu, Dr B Squire and Professor A Zumla acknowledge kind support from the Tuberculosis Programme Grant funded by the UK Department for International Development, Health and Population Division.

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Accepted 6 June 2002.