



Continuing communicable disease burden in Eritrea

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Background and methods. A retrospective study of the national health profile of Eritreans, focusing on acute respiratory tract infection (ARTI), tuberculosis (TB), diarrhoea, sexually transmitted diseases (STDs) and HIV/AIDS, was done on data from 1998 to 2003 through a health information management system. Records were included for patients of all ages receiving outpatient and inpatient hospital services during the study period. All incidence rates were given as cases per 100 000 population.

Results. The incidence of ARTI increased from 6 500 cases per annum in 1998 to 8 500 in 2003, representing a 30% increase. Diarrhoea rates remained unchanged, averaging 3 000 cases. For both ARTI and diarrhoea, rates were at least 3 times higher in children under 5 years of age than in those over 5 years of age.

The incidences of TB and STDs decreased from 370 and 220 in 1998 to 170 and 80 in 2003, respectively. HIV/AIDS incidence increased from 40 in 1998 to 65 in 2003, reflecting

a 60% increase. The case fatality rates (CFRs) for HIV/AIDS and TB were 12% and 2% in 1998, increasing to 14% and 3%, respectively, in 2001. The CFR for ARTI and diarrhoea remained low at 0.3%. CFRs were higher in children under 5 years than in those over 5 years for all the diseases but rates declined consistently, probably reflecting the positive impact of the introduction of the integrated management of childhood illness (IMCI). Although the incidence rate of HIV/AIDS was relatively low compared with rates for TB, ARTI and diarrhoea, the HIV/AIDS CFR was relatively high, posing a threat to the gains made in control of infectious diseases.

The disease burden from TB and STDs declined over the 6-year study period, while that from ARTI and HIV/AIDS increased. Consequently the overall disease burden from communicable diseases remained unchanged over the study period.

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Developing countries are experiencing a double burden of disease from both communicable diseases (CDs) and non-communicable diseases (NCDs).¹ In Africa, health systems have tended to focus on combating CDs because of the large numbers of people of all age groups affected, including those with acute respiratory tract infections (ARTIs), malaria, tuberculosis (TB), sexually transmitted diseases (STDs) and diarrhoea. Published data on the incidence of these diseases are limited,² and are applicable not only to CDs but to NCDs as well.³

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In most developing countries the incidence of TB had been declining before the emergence of HIV/AIDS.⁴ Since then the resurgence of TB coexistent with HIV/AIDS, including multiple-drug-resistant strains, has demanded further resources.^{5,6} The extent and trends of TB in its various forms have been documented in a few African countries.⁷

The heterosexual nature of HIV/AIDS transmission, especially in Africa, has clearly linked it to the increase in incidence of other STDs and justified the aggressive syndromic approach to STD treatment.⁸

Children in developing countries are vulnerable to infectious diseases, leading to a mortality rate 20 times higher than in developed countries.⁹ According to a 2001 UNICEF report,⁹ 70% of childhood mortality is due to leading childhood illnesses such as ARTI, diarrhoea, HIV/AIDS, TB, malnutrition, malaria and measles. Integrated management of childhood illnesses (IMCI) has been shown to be effective in reducing childhood mortality and morbidity. IMCI was introduced in 1995 to reduce morbidity and mortality among children under 5 years of age by improving health worker skills, the health system delivery, and family and community practices. Following the success of IMCI, integrated disease surveillance and response (IDSR) was introduced in Eritrea in 2002.¹⁰

We analysed the yearly trends in national health status using data on five diseases, namely TB, STDs, ARTI, HIV/AIDS, and diarrhoea as a proxy for the disease burden due to CDs in Eritrea.



Background and methods

Administratively, Eritrea is divided into 6 *zobas* or regions. It has 3 major geo-ecological zones, viz. the Western Lowlands, Central and Northern Highlands, and Eastern Lowlands. The country was engaged in 3 decades of struggle for self-determination from Ethiopia, culminating in formal independence in 1993. It is one of the poorest countries in the world, with a gross domestic product per capita of about US\$200, well below the average of US\$270 for less developed countries.

There are no accurate estimates of the population of Eritrea or of Eritreans living abroad. However, based on a population count, the Ministry of Local Government estimated the total population of Eritrea to be about 3.2 million in 2001.

Three decades of the war for independence destroyed almost all health facilities, medical supplies were disrupted, and health professionals abandoned their posts. Since independence, the Ministry of Health has made significant progress in ensuring access to health care services. Important programmes introduced include malaria control, IDSR, IMCI, policies on TB and HIV/AIDS.

Since 1998 the Eritrean Ministry of Health has created extensive datasets in the central registry through a health management information system. Doctors and other health workers create records for all patients presenting for medical services and relay this to the regional centre or *zoba* and subsequently to the central registry for monthly compilation. An assessment by the World Bank reported consistently high levels of data completeness and timeliness above 80% since 1998 (unpublished information).

Results

The incidence of ARTI increased by about 30% from 1998 to 2003, while that of diarrhoea was unchanged, averaging 50% of ARTI incidence (Fig. 1). In 1998 the incidence of ARTI was found to be at least 3 times higher in children under 5 years of age than in those 5 years and over. This age differential in ARTI incidence remained throughout the study period (Table I).

The incidence of diarrhoea was 4 times higher in children under 5 years of age than in those over 5 years. The rate of increase in the incidence rate was higher in under-5-year-olds than in those over 5 years, among whom the rate remained unchanged during the study period (Table I).

The CFR for ARTI declined by about 50% for children under 5 years and by 20% in those 5 years and over during the study period (Table II). The CFR for diarrhoea declined by more than 50% in both age groups during the study period.

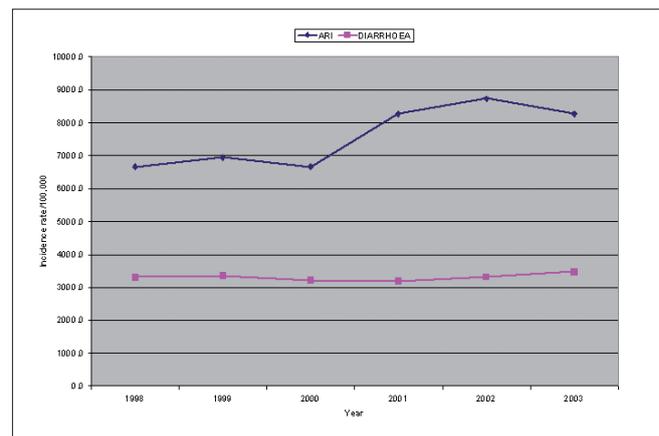


Fig. 1. Trends in incidence of ARTI and diarrhoea (all ages).

Table I. Trends in incidence rates of selected infectious diseases

	Year						R ²
	1998	1999	2000	2001	2002	2003	
Acute respiratory tract infections							
< 5 years	14 100.4	15 416.3	15 254.3	16 596.2	17 769.7	18 424.6	0.956
> 5 years	4 797.7	4 831.2	4 500.6	6 172.2	5 271.2	5 726.4	0.414
All ages	6 658.3	6 948.2	6 651.4	8 257.0	8 719.7	8 266.0	0.747
Diarrhoea							
< 5 years	8 219.2	8 929.8	8 958.7	8 402.9	8 184.1	9 484.9	0.135
> 5 years	2 089.6	1 967.3	1 779.3	1 887.6	1 718.3	1 960.9	0.256
All ages	3 315.5	3 359.2	1 779.3	3 190.7	3 320.5	3 465.7	0.029
Tuberculosis							
< 5 years	180.2	197.6	117.9	150.2	97.4	82.4	0.771
> 5 years	407.0	370.5	354.7	299.9	182.9	204.6	0.90
All ages	361.6	335.9	307.3	270.0	198.7	180.1	0.970
HIV/AIDS							
< 5 years	11.7	18.7	15.6	24.0	25.2	24.7	0.795
> 5 years	51.7	83.6	63.2	69.1	71.9	71.9	0.131
All ages	43.7	70.7	53.7	60.1	57.2	62.5	0.125
Sexually transmitted infections							
All ages	213.8	173.1	125.3	114.5	117.8	91.2	0.867



Table II. Trends in case fatality rates (%) for selected infectious diseases

	Year						R ²
	1998	1999	2000	2001	2002	2003	
Acute respiratory tract infections							
< 5 years	0.32	0.20	0.18	0.13	0.19	0.18	0.430
> 5 years	0.13	0.14	0.10	0.10	0.10	0.10	0.619
Diarrhoea							
< 5 years	0.57	0.43	0.29	0.18	0.31	0.21	0.691
> 5 years	0.19	0.11	0.09	0.07	0.28	0.29	0.349
Tuberculosis							
< 5 years	2.08	2.72	1.89	1.56	1.48	0.64	0.751
> 5 years	1.99	1.81	1.32	2.39	2.87	2.92	0.299
HIV/AIDS							
< 5 years	25.42	29.17	14.29	20.30	16.43	14.79	0.56
> 5 years	10.99	10.53	12.95	13.44	13.65	10.92	0.129

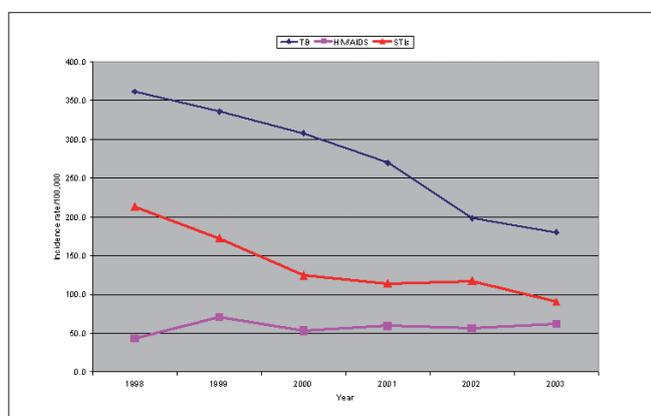


Fig. 2. Trends in incidence of TB, HIV/AIDS and STDs (all ages).

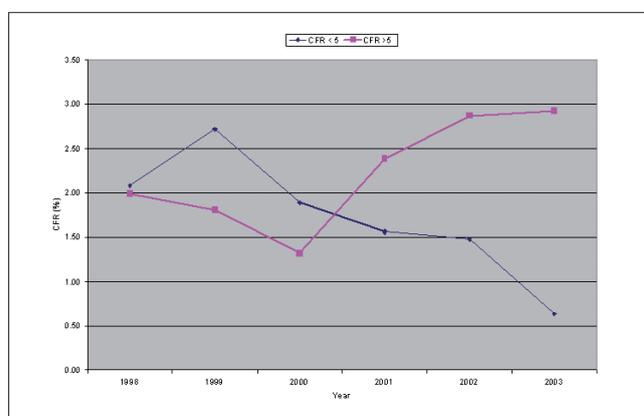


Fig. 4. Trends in CFR for TB among those aged < 5 years and > 5 years.

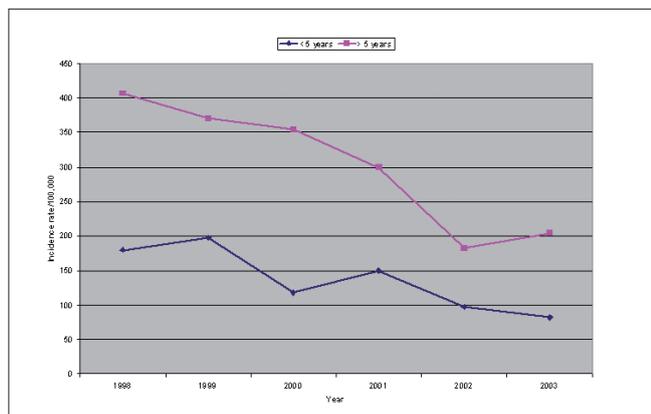


Fig. 3. Trends in TB incidence among those aged < 5 years and > 5 years.

The overall incidence of TB and STDs declined by over 50% from 1998 to 2003, while that for HIV/AIDS increased by more than 60% (Fig. 2).

Throughout the study the incidence of HIV/AIDS was more than 3 times higher in people 5 years and over than in children under 5 years. HIV/AIDS incidence increased at a higher rate in children under 5 years than in those over 5 years (Table I).

In 1998 the incidence of TB was more than double in people over 5 years than in children under 5, and in 2003 it declined by more than 100% in both age groups (Fig. 3 and Table I).

In 1998 the CFR for HIV/AIDS among children under 5 was twice that of people over 5. The CFR declined in children under 5 years, while it increased in people over 5 so that the rates were similar in 2003 (Table II).

In 1998 the CFR for TB was similar in both age groups. The rate increased by 50% in people over 5 years while it decreased by 70% in children under 5 (Fig. 4 and Table II).

The strength of the association between the change in fatality rates over the study period was determined using R² (Table II).

Discussion

The disease burden from TB and STDs declined over the study period, whereas the overall CD burden remained essentially unchanged due to increases in ARTI and HIV/AIDS incidence rates, while that of diarrhoea remained stable.

The resurgence of TB in developing countries has been attributed to the HIV/AIDS pandemic.^{5,6} In our study, incidence trends for the two diseases were diametrically opposite, which is paradoxical because HIV/AIDS and TB have been reported elsewhere to coexist in a substantial fraction of the infected populations.¹¹ There was a decline of more than 100% in CFR for children under 5 years compared with 50% in people over 5. Since CFR is a proxy of quality of disease management while incidence rates are a measure of disease



control, it is probable that the introduction of IMCI played a role in the improvement.¹⁰ Africa faces many challenges in controlling and managing TB, including weak public health care systems, the impact of health care reform, delays in diagnosis, non-completion of treatment, HIV co-morbidity and poverty.¹² The increase in CFR for TB in most developing countries despite the introduction of directly observed short-course therapy (DOTS)¹³ reflects poor case management, poor compliance, co-infection with HIV/AIDS, and possible disease resistance to anti-TB drugs.⁶ DOTS management is labour-intensive, especially where there are high caseloads, dwindling human resources and emerging multiple drug resistance.⁴ Our finding of a decline in the incidence of TB reflects positively on effective disease control.

The disease burden from HIV/AIDS has been increasing in Eritrea but at a slower rate than in sub-Saharan Africa.⁶ In 1998 the incidence of HIV/AIDS was 5 times higher in people over 5 years of age than in children under 5. This difference narrowed owing to a faster increase in the incidence rates for children under 5 years, which calls for intervention using nevirapine in pregnant mothers.¹⁴ The apparent stabilisation in incidence of the disease over 5 years could be related to the observed decline in STDs, and consequent decline in its heterosexual route of transmission.¹² The CFR for HIV/AIDS among children under 5 was more than double that in people 5 years and over. In 2003 there was a 40% decline in the CFR in both age groups, reflecting improved outcome measures from IMCI and IDSR. Poor nutrition in some areas may contribute to the faster increase in the HIV/AIDS disease burden in future. The military conflict between Eritrea and Ethiopia, which ended in 2002, led to internal displacement of people and destruction of infrastructure.¹⁵ The resultant poverty, disruption of the health system and malnutrition add to the challenges facing national health status of the people. The strife emanating from the threat of war over the disputed border may be another contributory factor.¹⁵ Stressful situations are known to depress immunity,¹⁶ and HIV/AIDS will accelerate the number of immunocompromised people.⁹

The decline in incidence of STDs is the reverse of the trend for HIV/AIDS. This is a favourable health indicator and is supported by the increased distribution of condoms, in excess of 12 million in 2003 ('Distribution of condoms in Eritrea' – unpublished discussion paper at HIV/AIDS training workshop for United Nations employees in Eritrea, 2004). The introduction of a syndromic approach to the treatment of STDs may have contributed to their decline through IDSR.⁸

While the incidence of other CDs is declining, ARTI incidence increased for children under 5 years but remained unchanged in people over 5. This increase could have been due to factors such as increase in population size, increased use of services, and better diagnostic accuracy. If the increased rates were a true reflection of increased disease exposure, then contributory factors might include low levels of nutrition, increased stress and HIV infection.^{16,17}

Although the incidence of ARTI increased, the CFR declined steadily more in those under 5 years than in those over 5, implying poor control with good case management. The decline in CFR was evident in children where programmes such as IMCI, IDSR and the Extended Program of Immunization (EPI) contributed to the commendable reduction in mortality.^{9,10} Since Eritrea is a poor country and malnutrition and poverty are prevalent, children there are prone to infections.^{18,19} However, EPI coverage in excess of 70% tended to limit the disease burden through increasing the immunity of the children (unpublished data from the Ministry of Health of Eritrea).

The high incidence of diarrhoea was mostly confined to children under 5 years of age. Although the incidence increased there was a decline in CFR that could have been attributable to better management, competence and facilities.^{9,19}

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