STIs, HIV and AIDS and TB: Progress and Challenges

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Abstract

This chapter presents the progress and challenges in sexually transmitted infections, HIV and AIDS, and tuberculosis in South Africa. Issues such as the epidemiology and management of sexually transmitted infections are presented, as well as a number of interventions, which need to be carried out in order to address current problems. The new HIV & AIDS and STI National Strategic Plan for South Africa, 2007-2011, which is the national response to the epidemic is presented. The linkages between HIV and tuberculosis are discussed, as well as recommendations around the integration and collaboration between tuberculosis and HIV and AIDS activities. The chapter concludes with suggestions on implementing control programmes for these diseases, as well as ideas around strengthening effective interventions.

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Introduction

Southern Africa has one of the highest burdens of HIV and AIDS, and tuberculosis (TB) in the world. Sexually transmitted infections (STIs) play a significant part in the spread of HIV and TB. While much is known about effective interventions, the implementation of these remains disappointing in South Africa. Identifying where interventions are needed, and how current practices should be changed is key to the ongoing struggle to respond effectively. At the same time, this should not disproportionately distort the provision of appropriate health care across all areas of Primary Health Care (PHC). The PHC approach, as articulated in the Alma Ata Declaration 30 years ago, remains the gold standard for health care.

Sexually transmitted infections

Epidemiology

The prevalence and incidence of STIs is determined by social, economic and behavioural factors, and by the type and quality of health care offered to infected and affected persons. In the past 10-20 years, the incidence and prevalence of bacterial STIs have declined in western developed countries, and it appears to be levelling in poorer developing countries. The latter may be attributed to the widespread implementation of syndromic management for STIs, and possibly due to a shift to safer sexual behaviour owing to the HIV epidemic.

The World Health Organization (WHO) stated that in 2001, there were 32 million infected adults with curable STIs in sub-Saharan Africa, giving an infection rate of 119 per 1 000 adult population. Data available for latent syphilis in pregnant women obtained through the Department of Health's (DoH) National HIV and Syphilis Prevalence Survey, reflect consistent trends for the past several years, though these are still very high compared to those in developed countries.

There are no accurate and reliable national surveillance data in South Africa for the epidemiology and antimicrobial susceptibility profiles of important STI pathogens. However, studies from major centres (Johannesburg, Durban and Pretoria) provide information about epidemiological shifts that are significant for programme purposes. One such study shows changes in the aetiology of genital ulcers. This is attributed to the HIV epidemic, which has also played an important role in the causes of genital ulcer disease, with herpes simplex virus becoming the commonest infecting agent replacing Haemophilus ducreyi and Treponema pallidum.

Management

Syndromic management for STIs has been implemented on a national basis in South Africa since 1996. During the initial stages of this approach, treatment guidelines were formulated and widely distributed, and training programmes for implementation were conducted in all provinces. However, as with all guidelines these need to be constantly updated in view of changes in the prevalence of pathogens, as well as changes in antimicrobial susceptibility profiles of common causative organisms. Furthermore, in recent years, Neisseria gonorrhoeae, which was susceptible to the quinolones (ciprofloxacin was the drug of choice for therapy in the 1996 guidelines) has now become resistant and the current drug of choice is ceftriaxone or cefixime. In view of STIs being major contributors to the HIV epidemic, there is a need to be vigilant in ensuring optimal management of STIs. Data on resistance show the urgency of updating current treatment guidelines.

What must be done?

There are a number of interventions, which need to be carried out in order to address the problem of STIs in South Africa in a meaningful manner. These interventions are as follows.

1. National surveillance for prevalence of aetiological agents and their antimicrobial susceptibility profiles needs to be undertaken on a regular basis.

2. There is urgent need for skills updating in provincial and academic centres, given the advent of newer molecular diagnostic technologies, which allow for more sensitive and accurate analyses.

3. There is a need to improve health care delivery interventions, which include:
   - updating of national treatment guidelines as new information is made available;
   - inclusion of therapy for the control of herpes genitalis infection;
   - provider-initiated HIV counselling and testing among STI clients;
   - introduction of better and wider screening programmes for STIs, especially in those at increased risk (e.g. pregnant women, those attending voluntary counselling and testing (VCT) and those with a compromised immune system); and
   - concise indicators for monitoring and evaluating the integration of HIV, TB and STI programmes need to be developed to ensure this is taking place on the ground.
HIV and AIDS

The WHO and the Joint United Nations Programme on HIV / AIDS (UNAIDS) distinguish three stages of the HIV epidemic: the low level HIV epidemic; the concentrated HIV epidemic; and the generalised HIV epidemic. 7

Countries experiencing a low level of the HIV epidemic have an HIV infection rate that is largely confined to individuals with high risk behaviour (e.g. sex workers, men who have sex with men and injecting drug users) with an HIV prevalence in these subpopulations of less than 5%, and with no spread yet of HIV infection to the general population. 8

The second stage is that of a concentrated HIV epidemic, in which HIV infection is confined largely to subpopulations with risk behaviour, shows rapid spread of HIV transmission in these subpopulations and prevalence in at least one of these subpopulations exceeding 5%. A concentrated epidemic occurs when active networking of high risk behaviour in these subpopulations is rife. In concentrated HIV epidemics, HIV infection has still not spread widely to the general population and prevalence in pregnant women is less than 1%. The speed with which the epidemic spreads from its concentration in subpopulations with high risk behaviour through to the general population is determined by the frequency, and links between these subpopulations and the general population.

The third stage of the HIV epidemic is the generalised HIV epidemic, in which HIV infection is firmly established in the general population. The major method of HIV transmission is heterosexual networking in the general population, and prevalence of HIV infection in pregnant women is more than 1%. 8,9

There is a marked variation in prevalence levels among countries with generalised HIV epidemics, some with low and others with high HIV prevalence, which exceeds 15%. The southern Africa region has a generalised high prevalence HIV epidemic and carries the highest burden of HIV infections in the world. 9-11 In 2007, southern Africa accounted for 35% of new HIV infections and 38% of global AIDS-related deaths. 9 The national population-based HIV prevalence in eight countries in southern Africa (Botswana, Lesotho, Mozambique, Namibia, South Africa, Swaziland, Zambia and Zimbabwe) in 2005 exceeded 15% (a level that no other country in the world had reached). 10

Due to its relatively large population among the southern African countries, South Africa has the largest number of persons living with HIV infection in the world (4.9-5.7 million). 9 It is estimated that about a quarter of a million of these are children below the age of 15 years. An estimated 350 000 children and adults died in South Africa of AIDS in 2007 alone. 9

A recent population-based survey indicated that the risk of infection in women aged 20-29 years, was 5.6% (six times that of males of the same age group, which is 0.9%). 10 The survey also indicated that among youth 15-24 years, females accounted for 90% of all recent HIV infections. 10 The age differences in the burden of HIV infection is thought to be due to sexual patterns of young women having sex with older men. 12

The major drivers of HIV infection in South Africa are the prevailing high population prevalence of HIV infection, high risk heterosexual behaviour (i.e. multiple concurrent sexual partners, unprotected sex, sexual relations with persons of unknown HIV sero-status), high levels of STIs, population mobility patterns, recreational drug and alcohol use, high HIV viral loads associated with recent HIV infections or advanced HIV disease and high levels of vulnerability due to poor socio-economic conditions. 8,12-14

The global pattern of HIV infections shows a decline in the rate of new infections. The latest South African HIV and Syphilis Prevalence Survey suggests that prevalence of HIV infection may be levelling, as shown in Figure 1. There appears to be a decline in the national HIV prevalence in pregnant women from 30% in 2005, to 29% in 2006 and to 28% in 2007. 3 However, changes in the sampling techniques in the 2006 and the 2007 surveys make the interpretation of the apparent decline in HIV prevalence in those two years difficult. 3 Consequently, some caution should be exercised in drawing inferences from the trends reflected in the results of these recent surveys. 15
The HIV & AIDS and STI National Strategic Plan for South Africa, 2007-2011

The new HIV & AIDS and STI National Strategic Plan for South Africa, 2007-2011 (NSP) was launched in 2007 and drawn up through a highly consultative process, which included a wide range of participants from government, development partners, civil society organisations and the private sector. The South African National AIDS Council (SANAC), which was established in 2000, was restructured in line with the new NSP to provide policy direction and implementation of the various interventions, as well as for monitoring progress, outcomes and impact of these interventions. The primary goals of the NSP are to reduce the number of new HIV infections by half by the year 2011, and to reduce the impact of HIV and AIDS on individuals, families, communities and society.

The four key priorities identified in the strategic plan for the achievement of these goals are:

1. prevention of HIV infection;
2. provision of treatment, care and support;
3. access to justice and maintenance of human rights; and
4. monitoring, evaluation, surveillance and research to support the NSP.

National response to the HIV and AIDS epidemic

There has been a marked injection of resources and a concerted effort has been made by government, development partners and civil society to combat the epidemic. However, notwithstanding this demonstrated commitment to the HIV control programme, success in the control of HIV remains a challenge.

Commitments and achievements:

- The national budget allocation for HIV and AIDS, which comprises 81.3% of the total resources committed by all role players has risen from R4.3 billion in 2006 to R5.2 billion for the 2007/08 financial year.
- A population survey shows an increase in condom use, from 48% in 2003 to 56% in 2005.
- All (100%) schools are reported to have provided life-skills-based HIV and AIDS education in 2007.
- Government health care facilities offering VCTs increased from 88% in year 2005/06 to 90% in year 2006/07.
- Access to prevention of mother-to-child transmission (PMTCT) has been extended to all PHC facilities in the country.
Dual therapy for PMTCT to further reduce the percentage of infection in babies born of HIV-infected mothers was made policy with effect from the beginning of 2008.\textsuperscript{18}

In 2007, among the estimated 889 000 HIV-positive persons in need of antiretroviral therapy (ART), 371 731 (42\%) were reported to have started treatment in that year. This is an increase from 36\% for 2006.\textsuperscript{17}

Challenges:

- The level of condom use is low for a population with such a high prevalence of HIV.\textsuperscript{9,17}
- The uptake of VCT among antenatal clinic attendees is low in a climate of high HIV prevalence and availability of effective prophylactic intervention for the exposed newborns. The percentage of HIV-positive pregnant women who actually received antiretrovirals (ARVs) for PMTCT is only 66\%.\textsuperscript{17}
- Only about half of the people with advanced HIV infection who need ART, actually receive it.\textsuperscript{17}
- The persistently high mortality from the HIV and TB dual epidemic aggravates the country’s high burden of orphans and other children made vulnerable (OVC).\textsuperscript{9}

Role of circumcision

There is good evidence to show that circumcision reduces the risk of HIV infection in men, when exposed to intimate sexual intercourse with an infected female sexual partner.\textsuperscript{19,20} However, the same risk reduction does not apply to partners of circumcised men.\textsuperscript{16} Similarly, a meta-analysis of studies from a variety of continents on circumcision in gay men and men who have sex with men, found no sufficient evidence that being circumcised reduced their risk of acquiring HIV.\textsuperscript{21} It also seems from a recent study in Kenya, that circumcision does not necessarily increase risky behaviour.\textsuperscript{22} The promotion of voluntary, safe and informed male circumcision under healthy conditions (i.e. in appropriately-staffed health care facilities) is one of the interventions that should be added to the existing range of interventions.

Occupational HIV exposure

Needle-stick injury is the commonest form of occupational exposure in health care settings. Prevention of needle-stick injuries must be striven for among all categories of health care workers, including emergency care workers, cleaners, porters, laboratory staff, as well as nursing and medical professionals. Preventive measures include: continued education; the use of safe disposal methods and containers; and the monitoring of safe needle and waste disposal practices by individuals as well as by units. The application of the standardised post-exposure prophylaxis measures must be monitored and reported in all health care facilities and settings.

What must we do to be effective? The public health approach

The public health approach recommended by the WHO for countries with a generalised HIV epidemic, identifies the main steps aimed at improving access for those in need and for strengthening the capacity of PHC, which together are essential for effectively combating the HIV epidemic.\textsuperscript{23} The steps should be implemented as a collaborative and sustained process by the different sectors of society in order to make an impact. These steps are:

1) Identify and prioritise interventions that are proven to be effective:
   - These include the treatment of STIs, promotion of provider-initiated counselling and testing, promotion of correct and consistent use of male condoms during sexual intercourse, increasing the uptake of PMTCT, promotion of safe informed voluntary circumcision, as well as combating stigma and discrimination.\textsuperscript{8,14,23}

2) Standardise and simplify treatment protocols and tools:
   - This should be accompanied by broad delivery of services in the public and private sector, with regular clinical assessments of persons who live with HIV and AIDS.\textsuperscript{23} Treatment preparedness and client-centred behavioural interventions are essential for successful clinical management, support and behavioural change. The emergence of HIV resistance must be minimised by ensuring that the first line regimens provided are highly effective, promoting treatment adherence through the use of regimens with fewer pills and simple dosing schedules, as well as social support for treatment adherence.\textsuperscript{23}

3) Optimally utilise the available resources to increase access to treatment and care:
   - This should be done to deliver appropriate and effective interventions for the greater good of as many people as possible through decentralised, integrated delivery of care.\textsuperscript{19,23} This means PHC teams should be appropriately trained in the management of chronic conditions and the active involvement of patients and treatment supporters.\textsuperscript{23}
**Special groups**

**Discordant couples**

Identifying and preventing HIV transmission in discordant couples (i.e. one partner being HIV-positive, while the other is HIV-negative) is an important intervention in a generalised epidemic situation such as in South Africa. Counselling for beneficial disclosure and promotion of adherence to correct and consistent use of condoms have been shown to be very effective in preventing infection of the HIV-negative partner.

**Adolescents**

Adolescents and school-going children, as well as youth (15-24 years) are a high risk group with special needs for information and peer counselling. This is required to strengthen responsible decision making including the correct and consistent use of condoms for those who are sexually active, as well as for alcohol- or drug-related risks and harm reduction.

**Displaced, migrants and other vulnerable groups**

Deliberate efforts must be made to reach vulnerable groups such as those who are displaced, marginalised or migrant. Such people often have difficulties in accessing health services. Similarly, sex workers and men who have sex with men, need appropriately targeted interventions. Involving members of such subgroups can strengthen such efforts.

**Tuberculosis**

The prevalence rates of TB in southern Africa are the highest in the world. Migrant labour linked to the discovery of diamonds and gold, the industrialisation of what is now called Gauteng in the 1880s and the spread of HIV in the population in the 1990s are probably key contributing factors.

Table 1 illustrates how the numbers of notified TB cases in all southern African countries have increased dramatically. Currently, the TB epidemic is mostly located in the southern African region. While access to good quality health services is vital, upstream factors which affect the region as a whole need to be taken into account if we are to better control the epidemic. Factors such as the increasing migration and rapid urbanisation, together with social factors such as unemployment, crime and social and economic hardship, must be actively and creatively managed using a fully articulated PHC approach.

TB is the leading cause of death in HIV-infected persons in South Africa. The annual incidence of TB in persons who live with HIV infection is about ten times that in persons who are not infected with HIV. Once infected with Mycobacterium tuberculosis the lifetime risk of developing TB disease is between 5-10%. This risk increases to over 10% annually in those also infected with HIV. Table 2 illustrates that over the past decade TB cure rates have improved marginally and ‘defaulter’ rates have declined, but treatment success has remained constant notwithstanding the threefold increase in notifications.

<table>
<thead>
<tr>
<th></th>
<th>1996</th>
<th>2006</th>
<th>2005</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All cases notified</td>
<td>All cases notified</td>
<td>New smear positive rate 100 000</td>
</tr>
<tr>
<td>Namibia</td>
<td>9 625</td>
<td>15 771</td>
<td>262</td>
</tr>
<tr>
<td>Botswana</td>
<td>1 814</td>
<td>8 519</td>
<td>175</td>
</tr>
<tr>
<td>Zimbabwe</td>
<td>35 735</td>
<td>47 774</td>
<td>96</td>
</tr>
<tr>
<td>Mozambique</td>
<td>8 443</td>
<td>35 632</td>
<td>87</td>
</tr>
<tr>
<td>Swaziland</td>
<td>2 364</td>
<td>9 195</td>
<td>224</td>
</tr>
<tr>
<td>South Africa</td>
<td>109 328</td>
<td>341 165</td>
<td>272</td>
</tr>
<tr>
<td>Lesotho</td>
<td>5 598</td>
<td>13 368</td>
<td>202</td>
</tr>
<tr>
<td>Sub-Saharan Africa</td>
<td>585 773</td>
<td>1 230 000</td>
<td>72</td>
</tr>
<tr>
<td>Global</td>
<td>3 700 000</td>
<td>5 400 000</td>
<td>38</td>
</tr>
</tbody>
</table>

Table 2: Treatment outcome for new smear positive pulmonary TB cases reported for the South African TB control programme, 1996-2005

<table>
<thead>
<tr>
<th>Year</th>
<th>New smear positive pulmonary TB (%)</th>
<th>Cure rate (%)</th>
<th>Successful completion rate (%)</th>
<th>Death rate (%)</th>
<th>Failure rate (%)</th>
<th>Defaulter rate (%)</th>
<th>Transfer rate (%)</th>
<th>Not evaluated (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996</td>
<td>39 258</td>
<td>54</td>
<td>73</td>
<td>5.6</td>
<td>3.5</td>
<td>18.1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>1997</td>
<td>41 274</td>
<td>57</td>
<td>73</td>
<td>6.3</td>
<td>2.4</td>
<td>18.6</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>1998</td>
<td>42 732</td>
<td>60</td>
<td>73</td>
<td>6.7</td>
<td>2.1</td>
<td>18.6</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>1999</td>
<td>61 564</td>
<td>60</td>
<td>72</td>
<td>8.9</td>
<td>1.7</td>
<td>17.2</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2000</td>
<td>86 276</td>
<td>54</td>
<td>63</td>
<td>6.5</td>
<td>1.3</td>
<td>12.7</td>
<td>13.5</td>
<td>-</td>
</tr>
<tr>
<td>2001</td>
<td>100 555</td>
<td>50</td>
<td>60</td>
<td>6.7</td>
<td>1.5</td>
<td>11.1</td>
<td>12.7</td>
<td>7.5</td>
</tr>
<tr>
<td>2002</td>
<td>110 696</td>
<td>50</td>
<td>63</td>
<td>7.5</td>
<td>1.2</td>
<td>11.9</td>
<td>9.0</td>
<td>7.5</td>
</tr>
<tr>
<td>2003</td>
<td>115 876</td>
<td>51</td>
<td>63</td>
<td>7.5</td>
<td>1.2</td>
<td>11.2</td>
<td>7.0</td>
<td>10.2</td>
</tr>
<tr>
<td>2004</td>
<td>133 685</td>
<td>51</td>
<td>65</td>
<td>7.1</td>
<td>1.5</td>
<td>10.3</td>
<td>5.8</td>
<td>9.9</td>
</tr>
<tr>
<td>2005</td>
<td>141 667</td>
<td>58</td>
<td>71</td>
<td>7.2</td>
<td>1.7</td>
<td>10.4</td>
<td>5.5</td>
<td>4.2</td>
</tr>
</tbody>
</table>

Source: Department of Health, 2007.31

Tuberculosis control programme outcomes

In Figure 2 and Figure 3, it is clear that case holding after the intensive phase, represented by the smear conversion rate, tends to predict treatment outcome. a If more attention was paid to case holding (i.e. managing the treatment of patients appropriately and effectively) and collecting sputum at the completion of treatment, the desired treatment outcomes could be substantially improved with relatively minor, but focused effort. This has been demonstrated in the TB programme in Khayelisha, Cape Town. b

Figure 2: Smear conversion rates (%) for new smear positive cases at 8-12 weeks, 2006

Note: Black line in graph represents the international and national target.

Source: Department of Health, 2007.31

a The number of highly infectious TB patients with the TB bacteria in their sputum, who after two months through means of a ‘sputum smear’, are no longer infectious (i.e. the bacteria have disappeared from their sputum).

b Personal communication, V. Azevido, City of Cape Town TB Programme, 2008.
Earlier diagnosis may be vital to successfully implementing the DOTS strategy

The 2008 WHO Global TB Control Report suggests that although the Directly Observed Treatment, Short-course (DOTS) strategy has been successful in reducing TB deaths and prevalence rates, it has not made a major impact on TB transmission and trends in incident rates in the world. Thus, both high cure rates and early diagnosis is the key to better control in high prevalence areas.

The primary method of diagnosing pulmonary tuberculosis (PTB) is through sputum smear microscopy and chest X-ray. The risk of TB infection is associated with prolonged exposure to smear positive sputum, but persons with smear negative sputum are still infectious. This is especially important given the high prevalence of HIV infection in many communities. It emphasises the importance of establishing earlier diagnosis even in smear negative individuals. Screening of contacts and making them aware of early symptoms, improving access to diagnostic facilities and ensuring that health care staff vigorously pursue the diagnosis are equally important.

Sputum culture has become more important in those with possible TB drug resistance. The more widespread use of culture in the diagnosis is somewhat constrained by the cost and access to facilities that have culture and drug sensitivity testing (DST). South Africa has 143 microscopy laboratories, 13 with culture facilities, nine able to conduct first line DST and four with second line DST capacity. Increased capacity is being planned.

Interventions

While the DOTS strategy target of a case detection rate of 70% has been met, the country still falls short of the cure rate target of 85% and a treatment success rate of over 85%. In recognition of this, the Draft Tuberculosis Strategic Plan for South Africa 2007-2011, clearly describes the context and current state of the epidemic, and outlines how the programme needs to be strengthened. It should be considered essential reading for those interested in TB control in South Africa. The plan is in line with the Global Plan to Stop TB 2006-2015.

Integration of services

The HIV pandemic drives the TB epidemic, and TB drives HIV disease progression and mortality. ART markedly improves TB treatment outcomes and survival rates to levels above 80% in HIV and TB coinfected patients. It is now almost common cause that these are two diseases that require one intervention strategy through a strengthened PHC approach. In a study looking at the TB and HIV and AIDS clinics in a busy community health centre in Khayelisha, Cape Town, Coetzee et al. showed that there was
an overlap of activities, duplication of services and under-utilisation of staff in both programmes. They outlined the missed opportunities for TB and HIV prevention, diagnosis and management. It should be noted that integration of existing systems may not be an easy process and that different situations often require different solutions and approaches. An examination of integration of HIV and AIDS and TB services at three sites; one at national level in Malawi and two local sites in South Africa, showed that integration programmes can work, but they face programmatic, medical, staffing, resource and scale-up challenges. Recommended collaborative TB and HIV and AIDS activities are shown in Box 1.

**Box 1: Recommended collaborative TB and HIV and AIDS activities**

<table>
<thead>
<tr>
<th>Framework for collaboration</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Placing a coordinating body at each level, doing joint planning and monitoring prevalence of HIV in TB patients, programme support and outcomes.</td>
</tr>
<tr>
<td>B. Reducing the burden of TB in those living with HIV disease by intensifying TB case finding, identifying and treating latent TB and ensuring effective infection control.</td>
</tr>
<tr>
<td>C. Reducing the burden of HIV in TB patients by promoting HIV testing and counselling, HIV prevention, Cotrimoxazole chemoprophylaxis, HIV and AIDS care and support, and the early introduction of ART.</td>
</tr>
</tbody>
</table>

Source: Adapted from Gunneberg et al., 2008.

The Mseleni experience in KwaZulu-Natal has demonstrated that ARV treatment of HIV patients can successfully be integrated into the PHC services, therefore increasing both coverage and access to treatment with remarkable results (see Box 2). The encouragement of initiatives like this will help bring about a much greater impact of HIV and TB intervention programmes.

The key lessons from the Mseleni experience seem to be that those wishing to implement such a strategy need to:

- see the people in the health service catchment area as a community of sorts;
- assess their health needs and allocate resources accordingly;
- plan services especially at primary care level so that those with HIV and AIDS and TB are managed routinely by a primary care team using a local problem solving approach which is patient- and family-centred;
- encourage continuity of care so that the patients and families are seen by the same team and build the trust needed to change habits and improve adherence;
- review periodically the quality of service and their outcomes; and
- develop an ethos of stewardship and accountability.

**Multi drug-resistant TB and extremely drug-resistant TB**

The reporting of an extremely drug-resistant TB (XDR-TB) outbreak in the Church of Scotland Hospital at Tugela Ferry in 2006 made world news.

The best estimates of multi drug-resistant-TB (MDR-TB) in South Africa comes from a national survey of anti-TB drug resistance conducted by the South African Medical Research Council in 2002, showing a MDR-TB prevalence of 1.6%. This same study estimated that over 6,000 new cases of MDR-TB would be seen in South Africa. In 2006, 6,716 MDR-TB cases were reported, and in some provinces MDR-TB seems to be significantly under-reported.

Current national policy prescribes that all cases of MDR-TB should be admitted for treatment for at least six months in MDR-TB units with a sophisticated team managing these patients with carefully managed follow-up for another 18 months. However, the DoH’s policy of hospitalisation of all cases of MDR-TB has, for logistic reasons, not been applied consistently throughout the country. This is demonstrated by the Tugela Ferry experience (see Box 3). The pragmatic approach followed in Tugela Ferry may be needed in many areas in the country, particularly for the sputum smear negative MDR-TB patients.
### Box 2: Case study – The Mseleni experience

#### The Mseleni experience: The ART roll out and Primary Health Care!

The purpose of the public health system is to make the people feel better, stop them getting ill, mend them when they are broken and help them live with disabilities when they cannot be mended.

Mseleni health ward serves 85,000 people. There are eight residential clinics and two mobile teams visiting 32 sites. Between seven to 12 doctors provide medical services along with PHC nursing staff. There are 2.7 visits per person and 1,900 deliveries a year. Mseleni Hospital admits 7,000 inpatients per year to 90 beds with an occupancy of 70%.

The major problems in the district are AIDS, TB, drug and alcohol abuse, violence, stroke, cardiovascular disease, gastroenteritis, pneumonia, occasional epidemics like cholera and malaria, as well as underlying unemployment and poverty.

In 2004, 10,200 (12%) of the 85,000 people living in the Mseleni catchment area were estimated to be infected with HIV (20% of adults and 2% of children); and 2,040 were estimated to have a CD4 count below 200.

In July 2004, we got the go ahead to start the roll out. We worked out that the ART budget would be 75% of the district total drug expenditure and we were concerned that it (ART) could distort the whole service by drawing in most of our resources and deprive those with other health problems of essential services. So we wanted to try to make sure we got the best deal for the whole population.

We set up ARV sites at eight clinics and the hospital. Lay counsellors were placed at each site, with a doctor, pharmacist, social worker and dietician visiting on a regular basis. There was a daily collection of lab specimens and delivery of results, but the service was integrated into the primary care service.

Blood for CD4 count was taken at the time the HIV-positive diagnosis was made at the clinic. The transport system from clinics to lab services was strengthened. Patients were referred to the visiting doctor with completed file to start or if the patient needed treatment for an opportunistic infection. Counsellor coordinated follow up visits by keeping track of testing dates and results. There are no AIDS nurses or doctors. Patient follow up is shared with PHC nurses and doctors and they are all seen in the clinic along with other chronic disease problems.

Each doctor has responsibilities in the hospital for particular wards, outpatient duties and a residential clinic, which they visit weekly.

Advantages were that more support was given to the clinic staff. All consultations considered HIV as part of the condition; this reduced the stigma, improved access and reduced bottlenecks. The care was family-centred and community awareness of health and HIV increased. As the PHC clinics are integrated family clinics near to people’s homes, people could see the outcomes in front of their own eyes.

By March 2008, there were 3,375 people on ART; 3,087 adults [female 65%; male 35%] and 288 children. By our estimates, we have basically achieved universal access, which means that 8% of adults and 0.6% of children are on ART.

To maintain this cover, we estimated that we need to add 20 people per week until the infection rate was reduced. Ten percent of the population had an HIV test in the last (the preceding) year. Over 95% of pregnant mothers had an HIV test and over 95% of those who tested positive, had PMTCT with Nevirapine.

Over 75% of those tested positive had CD4 count results in their (antenatal) notes when arriving in labour ward. Azidothymidine (AZT) is now available in all clinics.

Two thousand five hundred had (earlier) died as we struggled to reach them over the last (preceding) four years, but now instead of the 20 AIDS deaths a week, we have only two or three. Approximately 1,500 people (4% of our adult population) are alive who would have otherwise died.

The PHC structure has benefited through increased staffing, professional supervision, strengthened infrastructure and better laboratory services, and we are in a better position to tackle other public health concerns. In addition, donors are keen to help.

All the major problems can be addressed at the PHC level. If we are going to make a real impact on mortality and morbidity, we need to reach the vast majority rather than some of the people with a highly specialised service. 7,400 people were tested for HIV in 2007, together with 98% of pregnant women.

During the early years, the death rate in the first year of treatment was 10% and mainly amongst those starting below a CD4 count of less than 50. Among those not dying, the treatment default rate is less than 5%. Actual overall mortality figures are hard to come by. However, the expectation of a person sick with HIV is that they will get better with treatment and not inexorably progress to death as in the past.

The ART roll out is life saving, but it is a big budget item that has the potential to swamp other areas of health care and draw staff away from general care.

Integration of the ART programme into the PHC clinic-based service delivery offers the opportunity to provide the full spectrum of care for the whole community. It also invigorates the staff to see their effectiveness. Our performance data demonstrate the effectiveness of this approach.

**Systems do not work - people do!**
Box 3:  Case study – Tugela Ferry XDR-TB outbreak

**Tugela Ferry XDR-TB outbreak: Lessons for infection control**

The large outbreak of XDR-TB in the Church of Scotland Hospital, Tugela Ferry, in which 52 of 53 patients with XDR-TB patients died, sent shock waves around the world. A further 205 cases of MDR-TB were discovered, including eight staff members.

Infection control measures had been taken at the hospital to reduce the spread of MDR-TB and XDR-TB, but the hospital was not designed for airborne infection control, it was designed more with bloodborne infections in mind, and there was no airborne infection control policy at the time XDR-TB surfaced in patients. The standard recommendation of referring all MDR-TB and XDR-TB patients to a provincial MDR-TB treatment centre was not possible to implement due to lack of available beds. Therefore, such patients with MDR-TB and XDR-TB had to be managed at the hospital.

The most basic measure, the separation of highly infectious TB patients and highly vulnerable HIV patients was then instituted, both in wards and in outpatient facilities. HIV-positive TB patients no longer attend the same ARV literacy sessions as other HIV-positive patients prior to starting ARV treatment.

Separating XDR-TB and drug susceptible TB patients in the wards of the hospital has proved challenging due to the pressure on hospital beds. The design of the hospital makes it difficult to ensure adequate fresh air changes. During the summer months windows can be opened widely, but winter nights in Tugela Ferry are very cold, therefore mechanical ventilation was installed.

The staff became very concerned about the risk of MDR-TB and XDR-TB and some were wary of being tested for HIV even if offered the opportunity to move to a safer work area. Testing procedures were made more acceptable when ART was offered if their CD4 count was found to be less than 350.

Due to the numbers involved, once reasonably well, patients had to be treated in the community with daily injections either at home or at local primary health clinics.

It is also important to note that the follow-up of household and close contacts of the MDR-TB and XDR-TB patients revealed limited community spread, despite prolonged close contact. Only 1.3% of 2 240 community contacts followed up have been found to have MDR-TB. It is likely these contacts were infected with MDR-TB well before the index case was recognised.

Source: Adapted from Acorn, 2007.43

### Airborne infection control for TB for clinics and community health centres

Control of nosocomial TB infection entails the practice of administrative control measures to reduce exposure to infection, environmental control measures to reduce the concentration of infectious droplet nuclei in the working environment, and practical personal protective measures for those exposed who are at high risk.44

A study conducted in eight hospitals in Lima, Peru compared 70 naturally ventilated clinical rooms where infectious patients are likely to be encountered, with 12 mechanically ventilated negative-pressure respiratory isolation rooms.45 It was found that opening windows and doors maximises natural ventilation, so that the risk of airborne contagion is much lower than with costly maintenance-requiring mechanical ventilation systems. Old-fashioned clinical areas with high ceilings and large windows provide greatest protection. Natural ventilation is also applicable in non-clinical environments, such as prisons and homeless shelters, where rates of institutional TB transmission are high.

There should be a clear written protocol on a wall in a prominent place in each health facility coupled to periodic training and quality audit. The protocol should include: cough management; safe sputum collection and transport; patient flow and crowding procedures; appropriate ventilation; appropriate use of masks and protective clothing; hand washing; and problem solving.44

The challenge for those running health care facilities and other places where susceptible and infectious people crowd and ventilation is inadequate, such as jails and prisons, homeless shelters, shebeens and minibus taxis, is to find ways to assess and promote in an ongoing way, how to identify and decrease the risk of infection. This should be done by promoting standard precautions appropriately and thoughtfully with good understanding of the principles involved.

Effective respiratory infection control need not be expensive. While knowledge is the basis of practice, principles, rather than methods are the basis for effective practice. Health care workers should be encouraged to develop confidence in carrying out their infection control duties.46

### Conclusion

The high burden and ongoing spread of HIV and TB disease affects the lives of all South Africans. Significant strengthening control programmes is being planned and to some extent rolled out. The integration of HIV and TB programmes in the context of the PHC approach needs to happen sooner, rather than later. Both TB and HIV control programmes need to reinforce and adapt chronic care
models, which are patient rather than process orientated and linked with information systems that are user-friendly and which strengthen problem solving at primary care level.

Expansion of ART services to increase access is essential if this programme is to make more of an impact. PHC services have increased access to general health care. PHC should be utilised effectively to increase access to ART as well. Current policy restricts access to ART and thus negates the goals of the NSP. Effective ART should, in addition to reducing the burden of disease from HIV (by reducing viral load), also reduce HIV transmission. Particularly in a high HIV burden country like South Africa, where there are likely to be many HIV sero-discordant couples, it is important to find ways to assess and promote how to identify and decrease the risk of infection. This should be done together with promoting standard precautions appropriately and thoughtfully with good understanding of the principles involved.

Many people will die of AIDS and TB in the next few years. Rapid expansion of access to diagnostic, treatment and support services, as well as our capacity to prevent the spread of infections and regularly evaluate programmes, will save many lives and many families.

**Acknowledgements**

The authors would like to thank Dr Victor Fredland from the Mseleni District for sharing his valuable experience.
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