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The evolving HIV epidemic in South Africa

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In this paper we trace the evolution of the HIV epidemic in South Africa, placing it in historical context, and including an insider's view of the national response to it. The paper is written as a tribute to our mentors Zena Stein and Mervyn Susser, for whom the eighth decade of their lives—the 1990s—was the most challenging of all. Immersed in the struggle against the AIDS epidemic in their native South Africa, they had to bring to bear all of their past experience, and then some. While working with the opposition to the old Apartheid regime, Zena and Mervyn had already anticipated a need for general training and remodelling in public health after the transition to a democratic society. It soon became clear, however, that history was overturning these plans. As South Africa came under the threat of a catastrophic AIDS epidemic, Zena and Mervyn found their lives largely taken over by a new struggle, the control of HIV/AIDS. By the time of Nelson Mandela's release from prison, it was clear that in the absence of a sustained courageous national intervention, HIV/AIDS was going to have a devastating impact, especially among Black Africans, due to the migrant labour

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system. Zena and Mervyn were among the first to try to alert the government-in-waiting to the pattern of the epidemic. Their key roles and contributions in the Maputo conference of 1990 remain a testimony to their commitment to the problem of AIDS in South Africa (see below; also see companion paper by Ida Susser focusing on women and HIV/AIDS). Since then, and continuing into the present, the largest part of their time has been dedicated to this foremost public health problem of our times, especially training of HIV epidemiologists in South Africa (including the authors).

Historical Context

In what follows, we describe the circumstances governing the evolution of the epidemic. We note first that, as expected, the particularity of the epidemic is a matter of the history of the country and of the evolution of its economic and social structure.

After the Cape of Good Hope was first colonized in 1652, political domination of the indigenous peoples grew steadily and their social segregation became more complete. The discovery of underground wealth, of diamonds in 1866 and gold 10 years later, led to the region developing a strategic value. The ensuing flood of immigrants and capital transformed the whole pastoral society of both Afrikaner farmers and those black tribes still unsubdued by the colonists. Around these riches, the new mining tycoons, perhaps best represented by Cecil Rhodes, had to build a workforce. To do this, in addition to enticing a rush of European immigrants to the area, they needed to convert black tribesmen, who were subsistence farmers, into labourers. Hut taxes and poll taxes and the desire for manufactured products coerced tribal warriors into the necessities of a monetary economy. New enticements and needs induced them to live in male-only 'compounds' (essentially single-sex barracks) during almost year-long stints as underground workers in the mines—creating the migrant labour system, an essential element of the apartheid design.

Patterns of Work and Migration

Black workers were only allowed to visit, but not stay with, their families in the cities, and to work under the terms of the pass laws. The relatively few black women in this new urban environment found work serving the households of white families; and a few survived by providing the sexual needs of the men in the mine compounds. This back-and-forth form of migration led to widespread prostitution or, in some cases, 'town-wives' at the mines, with black men returning to their tribal wives only during their periods of leave.[1,2]

Such conditions were fertile ground for the rampant spread of sexually transmitted diseases. In a classic paper of 1949 on the social pathology of syphilis, Sidney Kark[3] first spelled out the mode of transmission of epidemic sexual disease and provided the dismaying data to demonstrate it. The route of migratory labour from city to tribal reserve created the trellis for transmission of syphilis.

The social conditions of migratory labour described by Kark were one of the foundations for the later spread of HIV in southern Africa. To this, for HIV, one must add a secondary route of increasing importance across all sub-Saharan Africa—transportation routes. In Uganda and Tanzania, for instance, the epidemic followed the tracks of the main truck routes. In South Africa, one illustrative study that enlisted sex workers at truck stops in the KwaZulu-Natal province of South Africa clearly demonstrates the multi-country distribution of the drivers across the whole region to the north of South Africa.[4] Hence, when in 1985 a survey of workers in the gold mines (drawn from the whole Southern African region) showed HIV to be rare in South African miners but already at 3% prevalence in Malawians, it was a warning that South Africa was yet to see the worst given the inter-linked nature of southern African economies.[5]

The Anti-Apartheid Movement and HIV

The Apartheid regime saw the HIV epidemic as a problem in blacks or gays and saw neither as a priority deserving of serious attention. Hence, during its embattled last days, it remained indifferent. At the same time, it was not uncommon for black communities to attribute the epidemic scare to the evildoing of a hated government. Any effort to take up the challenge of the immense task of changing patterns of sexual liaison was doomed as it would have to overcome the stigma of the Apartheid government's unpopular population control programme, which targeted the black communities.

As late as 1989, the progressive anti-Apartheid movement was more concerned with dealing with the immediacy of liberating the country than the possibility of a future AIDS threat. Some shift in sentiment followed the first formal meeting of anti-Apartheid health activists inside the country with those in exile and their international allies. This meeting, organized by the Committee for Health in Southern Africa (CHISA), which was chaired by Mervyn, took place in April 1990 in Maputo, Mozambique.[6] By chance, this was weeks after Nelson Mandela's release from imprisonment—after 27 years on Robben Island—which heralded the opening moves in the transition from Apartheid. A short while later, the National AIDS Convention of South Africa (NACOSA) was established and their work gave the impetus to the new government of 1994 to undertake the first serious endeavours to stem the epidemic.

Overview of the HIV/AIDS Epidemic

The first case of HIV infection in South Africa was reported in 1982 and this heralded the start of the first wave of the HIV epidemic, which was limited to the gay community, blood transfusion recipients and haemophiliacs. At least until1987, levels of HIV infection in the general heterosexual population remained relatively low, as shown in mineworkers,[7] voluntary blood donors,[8] and stored specimens from community-based surveys.[9] In 1990, prevalence in women attending public antenatal clinics hovered close to 1% with an estimated doubling time, based on mathematical models, of 14 months.[10] The heterosexual HIV epidemic is distinct in that it was due to subtype C HIV while the preceding epidemic among gay men was almost entirely due to a different subtype of HIV, subtype B.

Since establishing a foothold in South Africa, the heterosexual HIV epidemic has had a distinctive character—'explosive' spread with no sign of a 'saturation' plateau and predominance in women at younger age. The spread of HIV in South Africa is best described as explosive because of the rapid rise in HIV prevalence. National HIV prevalence rates, based on annual

anonymous antenatal surveys,[11] rose from 0.76% in 1990 to 10.44% in 1995 and 22.4% in 2000. The sharp epidemic curve shows no sign as yet of a plateau suggesting saturation and possible decline. Incidence and prevalence rates at the epicentre of the epidemic in KwaZulu were soon found, in an unremitting pattern, to be highest in young women in late adolescence and in men a decade older (Figure 1).

In later years, while imputed incidence remains exceptionally high in young women, the expected rise in prevalence among survivors of both sexes to older ages naturally followed.

Temporal trends in Hlabisa, a rural district in South Africa of KwaZulu-Natal, and across all the similar rural districts of KwaZulu-Natal also point to an explosive epidemic. Since 1992, anonymous HIV serosurveys in Hlabisa,[12] conducted among prenatal clinic attenders, showed a rise in prevalence from 4.2% in 1992 to 34.0% in 1999. Incidence rose from 2.3 per 100 person-years in 1993 to 15.0 per 100 person-years in 1999, as estimated from age-prevalence by statistical methods[13] and, more recently, from the use of the detuned assay (Table 1). Both prevalence and incidence rates for 1999 show 20–29-year-old women to be the most affected age group.

The assembly of various sources of data has enabled actuarial estimates and forecasts to be made of the longer-term trajectory of the epidemic**.** These macro-level models, although inevitably built on a number of assumptions, are as robust as careful analysis can ensure.[14] In the year 2000, it is estimated that 40% of all adult deaths in South Africa were due to AIDS. The ratios of deaths at ages 15 to 49 years to deaths at ages 50 years and over in 1990 versus 1999/2000 in males were 0.66 and 1.00 ,respectively, and in females were 0.31 versus 0.78. The projections for 2010 are even more devastating. In 1990, 38% of 15-year-olds died before age 60 while in the year 2010 it is expected that 80% of 15-year-olds will die before age 60.

Some illustrative data from a large tertiary referral hospital in Durban, KwaZulu-Natal demonstrate the burden on health care services of AIDS morbidity within the HIV epidemic.[15] In 1998, a cross-sectional survey of the in-patient population in the medical wards found that patients with HIV occupied 54% of the beds, and 84% of these met WHO AIDS case criteria. In keeping with HIV seroprevalence data, HIV infected patients were significantly younger than the uninfected (34.9 versus 47.1 years). Case fatality in HIV infected patients was 22%, and 9% in the uninfected. At this referral hospital 56% of HIV positive patients presented with pulmonary tuberculosis. In rural Hlabisa, ongoing HIV testing of newly diagnosed tuberculosis patients[16,17] shows that HIV prevalence rose from 36% in 1993, to 59% in 1995 and 65% in 1997. New tuberculosis cases have a similar age and gender profile to that seen in the HIV epidemic, a preponderance of women and the women are on average about 10 years younger than the men.

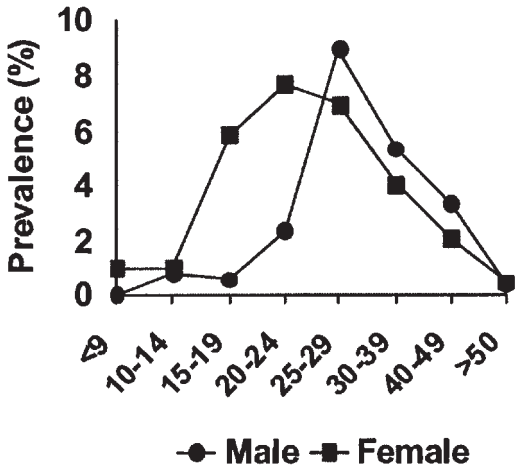

Figure 1 Age and gender differences in HIV infection in rural KwaZulu-Natal 1992

Source: Ref. 19.

Table 1 Prevalence and incidence of HIV infection among prenatal clinic attenders, aged 15–49 in Hlabisa: 1992–1999

Year	N	Prevalence of HIV (95% CI)	Incidence per 100 person-years
1992	884	4.2% (3.0–5.7)	
1993	709	7.9% (6.0–10.1)	2.3
1995	314	14.0% (10.4–18.4)	7.2
1997	4731	27.2% (25.9–28.5)	8.2
1998	3166	29.9% (28.4–31.6)	9.9
1999	3014	34.0% (32.3–35.7)	15.0

Source: Ref. 13.

Conclusion

In 1990, Chris Hani, chief of the ANC guerilla force (known as 'Spear of the Nation') said, 'Those of us in exile are in the unfortunate situation of being in the areas where the prevalence is high. We cannot afford to allow the AIDS epidemic to ruin the realization of our dreams. Existing statistics indicate that we are still at the beginning of the AIDS epidemic in our country. Unattended, however, this will result in untold damage and suffering by the end of the century.' Chris Hani was tragically assassinated shortly before democracy was achieved.

Since political liberation in 1994 many have commented on 'what went wrong'.[18] What could have been done and was not? We see four possibilities of 'what might have been'. First, the government might have given strong moral leadership, calling on citizens, community-based organizations, and non-governmental organizations to join forces and on those working in health, social and educational institutions to initiate and oversee the critical steps of education, facilitation and prevention. A concerted social movement, which created new norms in sexual behaviour, was needed. Without strong political leadership this movement could not be realized and prevention efforts remained fragmented and their effects dissipated. Second, government needed to take concerted action, using its extensive resources to focus especially on the main source of spread, after the successful 100% condom use in sex workers model of Thailand. This type of intervention, promoting 100% condom use among South African youth early in the epidemic, could have had a dramatic impact on the epidemic curve. Third, those in charge of economic policy should have targeted the migrant labour system for change, appreciating that it was a major factor. Finally, a sustained effort could have been made to introduce effective treatments that became available at low cost, at the very least nevirapine for prevention of maternal to child

transmission. Probably a combination of all these steps would have been required to bring the epidemic under control.

In practice none of these steps were approached with the foresight, vigour and urgency that were called for. The historic change achieved by liberation forces was not harnessed to confront the epidemic, and the prophetic words of Hani went unheeded. We must continue to campaign for the goal he put forward, for until we achieve it, the untold suffering of HIV/AIDS will continue in southern Africa.

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From Susser's causal paradigms to social justice in Australia?

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There are significant implications for epidemiology, public health and social justice from the recent critiques of modern risk factor epidemiology by Susser and others. The need to move away from a focus at the proximal end of causal pathways and from single risk factors in individuals to looking at populations and the social and environmental contexts in which risk factors arise, points us more towards the social antecedents of diseases and other poor outcomes. In this paper I argue that we must pursue this broader agenda if we are to address the increasing burden of social morbidity in our communities, particularly amongst children and youth.

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Susser's Critique of Modern Epidemiology

The need for a new era

'The present era of epidemiology is coming to a close. The focus on risk factors at the individual level—the hallmark of this era—will no longer serve. We need to be concerned equally with causal pathways at the societal level and with pathogenesis and causality at the molecular level.'[1]

The recent criticisms of modern epidemiology[1–9] stem from its focus on single risk factors in individuals and the tendency to ignore the social, behavioural and ecological contexts in which risk factors arise. Study after study describes the associations of many disease outcomes with social or economic factors and then proceeds to control for them in analyses that focus on more proximal risk factors in the causal pathway, some of which