

# Perspectives on KwaZulu-Natal

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## The social and viral origins of HIV/Aids

When the XIII International Aids Conference convened in Durban, South Africa last year, the HIV debate became increasingly politicised. **Paul R. Epstein** says that the apparent conflicts could be resolved and the obstacles blocking solutions may be removed through an examination of the social roots underlying the spread and, possibly, the origin of HIV/Aids.

Doubts about the viral origins of Aids have been reinforced by remarks of South African President Thabo Mbeki. Labour patterns dividing families, stalled urban development and conflicts have certainly contributed to the spread of HIV/Aids. Might social "co-factors" have contributed to the evolution of HIV itself?

Regarding the introduction of the virus, recent studies date the appearance of HIV in humans around 1931, making transfer via contamination of oral polio vaccines in the 1950s unlikely. A possible transfer did occur from an unusual series of experiments from the 1920s to the 1950s. Blood drawn from chimpanzees and sooty manglebeys was injected, first into the researchers themselves, then into prisoners in the Belgian Congo, in an attempt to determine whether animal malaria might re-infect humans if human malaria was eradicated.

But, however the transfer occurred, the question arises: Was the group of viruses first relatively benign for humans and did it become more virulent over time? While this hypothesis is difficult to study, exploring the plausible mechanisms behind it may help lead us out of the political quandary.

Malnutrition does interfere with the immune surveillance system - the suite of chemicals and cells that recognizes and rejects invading organisms. An experiment by Melinda Beck and others from the University of North Carolina, demonstrates that malnutrition can also influence the evolution of viruses. When mice are deprived of selenium, mutations of a Coxsackievirus occur more frequently, altering it from a benign type to one causing heart disease (cardiomyopathy). When the virus is transferred to healthy mice, it continues to cause disease.

Disease burden alters immunity and the colonization of Africa by Europeans also brought about enormous changes in the health of the African population. The years between 1880 to the 1930s has been described as the unhealthy period in African history, as "immunologically-naïve" populations were exposed to a host of introduced pathogens. The burden of disease was compounded by malnutrition produced through land seizures, export-driven monocultures and poverty. Transformation of population health may have allowed a relatively benign group of viruses to evolve in virulence, escaping the body's

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defenses in some of the individuals.

The doubts expressed by Thabo Mbeki arise in the context of renewed black/white distrust of western science and western promises and are supported by the views of Peter Duesburg. But openly addressing the social *and* viral basis for the spread - and possibly the origins - of HIV/Aids is imperative, for HIV/Aids is a growing threat to health, development and security.

Education and prevention, condom distribution, treatment of sexually transmitted diseases and provision of clean needles must all play parts in combating its spread. But we have medicines that put this disease on hold. Instead of the \$12,000 per year for a cocktail of three agents, however, the price must be on the order of \$12 a year, and the drugs combined into an easy-to-take, once-a-day pill. Two shocking reports by Doctors without Borders and UNAIDS document that many medications are far more costly in Africa than in developed nations!

Distribution systems and follow-up will remain problems, but cost and convenience issues are the necessary first steps. Ultimately, a multi-variant vaccine will undoubtedly be needed, probably involving gene therapy, and will require a coordinated international, "Manhattan"- like project to develop it.

The initial struggle then, is to wrest control of this issue away from the pharmaceutical industry, an enterprise that now lacks market incentives to manufacture inexpensive medications and vaccines. Intellectual property rights will have to be suspended because of this global health crisis and an international clearinghouse established to provide quality control.

Additionally, trust funds should be established to ensure markets for current producers to accelerate innovative research and vaccine development. And such funds may serve as models for other global needs to alleviate poverty, such as the production and distribution of clean energy sources.

The emergence, resurgence and redistribution of infectious disease in the 21<sup>st</sup> century will pose enormous challenges for global stability. Coming to grips with the social and biological determinants of disease - and with their dynamic interplay - is a necessary hurdle if we are to move in concert towards tackling the real causes and cures.

Regardless of the precise origins of diseases, new forms of development will be needed to reverse the accumulating social and environmental assaults on public health. Achieving clean, healthy and equitable development may even require a "Marshall"-like plan for the developing world. The challenge of HIV/AIDS offers a compelling place to test new forms of international cooperation.

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