Mother-to-Child HIV Transmission and ARVs

ANTITRETOVIRAL (ARV) THERAPY IS USED FOR both treatment and prevention of HIV infection. It decreases patients’ viral loads, dramatically improves their health, and delays death (1). ARVs also successfully reduce mother-to-child transmission of HIV (MTCT). Combined with avoidance of breast-feeding, ARV can almost completely prevent MTCT. A simple regimen is based on nevirapine (NVP) and was pioneered in Uganda (2). Efforts to make this intervention generally available to HIV-positive pregnant women are under way (e.g., by the UN Programme on HIV/AIDS, the World Health Organization, and UNICEF).

Initially, treatment costs were prohibitive to all but the wealthiest patients. Side effects and complex regimens have further constrained ARV use in resource-poor countries, where the HIV/AIDS epidemic is hitting hardest (3). The advent of generic drugs, often as simplified combination pills, has led to dramatic drops in costs. Bringing treatment to the millions who are currently denied access to it is considered a moral imperative by many. Brazil has taken the initiative by making ARVs available free of charge.

Despite its effectiveness in reducing viral replication, ARV therapy does not cure—it delays the onset of AIDS. Most patients will eventually develop drug resistance and thereafter progress to AIDS and death. Although ARVs have turned HIV into a chronic disease (4), the impression that it no longer kills is misleading. An important reason for the development of drug resistance is lack of adherence to demanding drug regimens (5). In tuberculosis (TB) control, the Directly Observed Treatment (Short-course chemotherapy) [DOT(S)] strategy has successfully improved compliance and prevented resistance (6). This strategy has also been advocated for ARVs (7). Unfortunately, whereas TB therapy is curative and DOT(S) is required for months, ARV therapy is not a cure and is required indefinitely.

Although ARV therapy benefits patients, its impact on sexual transmission is unclear and not necessarily positive. As long as strains are drug susceptible, patients’ viral loads can be suppressed, presumably reducing their infectiousness. However, infectiousness may increase again once resistance develops. The relative infectiousness of resistant strains remains largely unexplored. The empirical evidence that resistant strains can be transmitted effectively is overwhelming (8, 9). Mathematical modeling suggests that widespread use of ARV therapy may lead to >50% primary resistance within decades (10). In addition to interfering with treatment, this could affect MTCT prevention. For example, NVP is one of the three compounds of Triomune, a drug marketed in India (11). Resistance to Triomune may render NVP useless, which would be disastrous. In India, over 20 million children are born annually. If HIV prevalence among pregnant women grows to 5% (modest by African standards), then—assuming that NVP reduces vertical transmission by 10% (e.g., from 30% to 20%, with continuing breast-feeding) —it could prevent 100,000 HIV infections annually in India alone.

It has been argued that prevention and treatment should be complementary in the struggle against HIV (12). But if drug resistance becomes widespread, MTCT prevention will fail, and more children will die of AIDS. Then, instead of being complementary, treatment will hinder prevention. Should this be accepted as an inevitable consequence of the benefits that ARVs give to millions of adult HIV patients? This dilemma could be avoided if some ARVs are exclusively reserved for preventing MTCT. These drugs should not be affected by (cross) resistance to drugs used for treatment. There are similar examples: For 40 years, rifampicin has been largely reserved for TB and leprosy. Had it not, short-course chemotherapy would now be impossible.

SAKE J. DE VLAS, 1 NICO J. D. NAGELKERKE, 1,2,3 PRABHAT JHA, 4 FRANK A. PLUMMER 2

1Department of Public Health, Erasmus MC, University Medical Center Rotterdam, Post Office Box 1738, 3000 DR Rotterdam, Netherlands. E-mail: devlas@mgz.fgg.eur.nl 2Department of Medical Microbiology, University of Manitoba, 730 William Avenue, Winnipeg, Manitoba R3E 0W3, Canada. 3Medical Statistics, Leiden University Medical Centre, Post Office Box 9604, 2300 RC Leiden, Netherlands 4Centre for Global Health Research, St. Michael’s Hospital, 7070 Richmond Street East, 3rd floor, Toronto, Ontario M5C 1N8, Canada.

References and Notes
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Balancing Public Health and Civil Liberties

THE MODEL STATE EMERGENCY HEALTH Powers Act (MSEHPA), written by request of the Centers for Disease Control and Prevention, has galvanized the debate around the appropriate balance between public health and civil liberties (1). R. Bayer and J. Colgrove are widely known scholars who seek to...
offer a neutral commentary (“Public health vs. civil liberties,” Policy Forum, 13 Sept., p. 1811). However, some of their points require clarification.

Focusing on a vocal minority of critics, the authors imply that MSEHPA has not been well received. Yet, 36 states have introduced legislation based, at least in part, on some provisions of the Act, with 20 states (and the District of Columbia) passing bills. The Secretary for Health and Human Services recommends that states use MSEHPA as a checklist to ensure legal preparedness for bioterrorism.

The authors suggest that the Act provided a range of “extraordinary measures” that “radically enhanced the power of the state.” Yet, MSEHPA is based largely on existing state laws. Its powers regarding persons (e.g., testing, treatment, and isolation) and property (e.g., nuisance abatements and “takings,” i.e., the acquisition of private property by the state for legitimate governmental purposes) are a traditional part of state public health law. Nothing within MSEHPA is “extraordinary” or a “grave threat.”

MSEHPA safeguards personal liberty by providing clear standards governing state power rather than relying on officials’ discretion; ensures procedural due process rather than arbitrary actions without hearings; respects cultural, religious, and ethnic differences instead of tolerating discrimination; and entitles individuals to adequate information, basic treatment, and humane conditions during an emergency.

What is the appropriate balance between individual rights and public goods in response to bioterrorism? Critics contend that no conflict exists. Past experiences, however, show that fighting serious health threats sometimes interferes with individual interests (2). Law alone cannot ensure that power is appropriately exercised; preparedness and competencies of judges, health officials, and citizens are essential. The Act offers clear criteria, fair procedures, and robust entitlements that are conspicuously absent from existing, antiquated infectious disease statutes.

Response

WE AGREE WITH GOSTIN AND COLLEAGUES that “fighting serious health threats sometimes interferes with individual interests.” Indeed, this conflict has been at the heart of American public health and is reflected in the views of groups concerned with privacy rights and civil liberties who objected to provisions of MSEHPA in both its original and revised forms. Our intent was not to judge the validity of the claims made by MSEHPA’s supporters or critics about the extent to which the act would or would not violate individual rights or about the extent to which the proposed legislation entails an advance over the current legal regime in terms of the rights that would be accorded to individuals in the face of a public health emergency. Rather, it was to describe an enduring tension that lies at the heart of public health in the United States and the resulting challenges that face those who attempt to strike a balance between privacy rights and the common good when crafting policy and law. It is, however, worth noting that organizations such as the New York Civil Liberties Union that have a historic commitment to liberty and privacy remain unconvinced by the analysis of the current legal regime undertaken by Gostin and colleagues, and by the remedy they offer (1).

RONALD BAYER AND JAMES COLGROVE

Center for the History and Ethics of Public Health, Department of Sociomedical Sciences, Mailman School of Public Health, Columbia University, New York, NY 10032, USA.

Reference

themselves in this manner, coral hybrids need not invent new developmental machinery to persist without sexual reproduction.

Clearly, the evolutionary scenario in which interspecific hybrids become secondarily clonal, either parthenogenetically or vegetatively, has played out numerous times in a diversity of organisms. Because they are endowed with the genomes of their parent species fixed in a hybrid state, the future of these clones is dim and their existence transient. Thus, they are genetic lines with no past and no future beyond that afforded a temporary winner in the ecological lottery. Because these hybrid clones make a virtually instantaneous jump to open ecological niches—in effect side-stepping the usually long process of speciation—their real evolutionary potential is to provide us with a window into processes of ecological diversification, highlighting the open niches that remain to be explored by their bisexual relatives.

**Steven V. Vollmer** and **Stephen R. Palumbi**

1. Department of Organismic and Evolutionary Biology, Harvard University, 16 Divinity Avenue, Cambridge, MA 02138, USA. E-mail: svollmer@oeb.harvard.edu. 2. Department of Biological Sciences, Stanford University, Hopkins Marine Station, Pacific Grove, CA 93950, USA.

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**Industry-Government Collaboration**

**DAN FERBER’S ARTICLE “NIEHS TOXICOLOGIST receives a ‘gag order’” (News of the Week, 9 August, p. 915) refers to a $4-million research collaboration between the National Institute of Enviromental Health Sciences (NIEHS) and the chemical industry, but does not explain the rigorous standards and procedures that guide this vital industry-government research collaboration. This funding partnership will accelerate scientific research into a crucial public health issue, the potential impact of chemicals on human reproduction and early development, while preserving the independence necessary to ensure the credibility of this joint effort.

Under this collaborative program, the American Chemistry Council’s (ACC’s) Long-Range Research Initiative (LRI) is providing $1 million and NIEHS is providing $3 million to stimulate independent research on developmental toxicants using state-of-the-art tools (e.g., genomics and novel model organisms). ACC and NIEHS collaboratively developed the published program’s scientific aims and goals, drawing from the findings of a comprehensive review by the National Academies (1). This collaboration was conducted under Department of Health and Human Services Public Health Service (PHS) and NIH policies, rules, and regulations for sponsored research, which clearly define and limit the role of the ACC. Only NIEHS staff reviewed all applications to determine if they responded to the program’s intent. NIEHS staff were solely responsible for organizing and conducting an independent peer review, as well as for making final decisions on membership of the peer review panel. The peer-review was conducted in accordance with PHS and NIH policies and regulations for NIH extramural advisory peer review activities. After the independent NIH peer-review, NIEHS constructed a funding plan for applications, without deviation from the merit roster order as determined by the independent NIH peer-review process. In all cases, the research will be conducted according to typical NIH guidelines of independence, including the responsibility of the investigator to submit the results to respected journals for publication—without any oversight or comment from ACC or NIEHS. The LRI has similar guidelines.

**CAROL J. HENRY**

Vice President, Science and Research, American Chemistry Council, 1300 Wilson Boulevard, Arlington, VA 22209, USA.

**References**


**CORRECTIONS AND CLARIFICATIONS**

**NEWS OF THE WEEK:** “California astronomers eye 30-meter scope” by R. Irion (8 Nov., p. 1151). The right-hand label in the accompanying figure should read “Keck,” not “VLT.”

**NEWS FOCUS:** “Bracing for the shocks of the future” by K. Brown (8 Nov., p. 1161). GeoHazards International has received a $1.5 million grant from USAID, not $15 million, as stated in the article.

**THIS WEEK IN SCIENCE:** “And in Brevia...” (1 Nov., p. 919). In the third line, “30% of all plant species” should instead read “22 to 47% of all plant species.”

**NETWATCH:** “The happy cadaver” (25 Oct., p. 709). The anatomist Andreas Vesalius was not Italian, but Flemish.

**NEWS OF THE WEEK:** “Survey confirms coral reefs are in peril” by E. Pennisi (6 Sept., p. 1622). The caption beneath the photograph on p. 1623 had misidentified a fish as a Nassau grouper. The probable species is a saddleback grouper.