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## Perspective

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### Fighting HIV — Lessons from Brazil

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In Brazil this past February, during the week before Carnaval, the pre-Lenten bacchanal of parades and street parties, citizens who ventured out to catch a bus, buy a beer, or mail a letter were

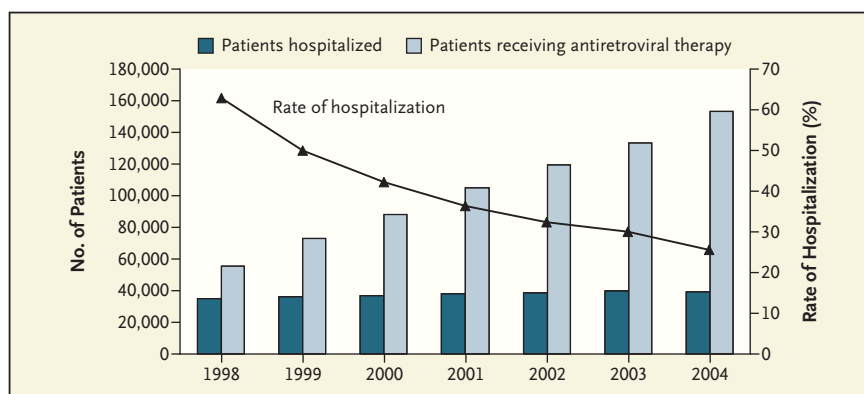
likely to be reminded by their government to use condoms. Postal customers received condom brochures along with their stamps. Public health officials contracted with Coca-Cola distributors to deliver condom posters to bars along with the soft drink. In a television commercial on the country's most popular soap-opera network, a famous comedian riffed on strategies for remembering not to leave home without a condom. In the northeastern city of Recife, banners on buses proclaimed, "On or off the float, *camisinha*!" (literally, "little shirt," the street term for condom). During one lunch hour in Recife's business district, a prostitutes' organization working with the local health department on prevention of human immunodeficiency virus (HIV) infection

staged a pro-*camisinha* demonstration, passing out free condom samples to spectators.

In the history of the response to the HIV pandemic, Brazil is best known for its pioneering decision in 1996 to offer free combination antiretroviral therapy to all citizens with AIDS (see graph). The government-funded treatment program, which some critics predicted would lead to rampant drug resistance, has been hailed internationally as a milestone in the fight against AIDS. The program has improved the health and extended the survival of tens of thousands of Brazilians, has saved the country an estimated \$2.2 billion in hospital costs between 1996 and 2004, and has inspired similar efforts elsewhere — including the President's Emergency Plan for

AIDS Relief (PEPFAR), whereby the United States provides AIDS drugs to African and Caribbean countries, and the World Health Organization's 3 by 5 initiative, which sought to provide HIV treatment to an additional 3 million people by the end of 2005.

Yet Brazil's persistent and aggressive efforts to prevent new HIV infections have probably played an equal or greater role in slowing the spread of the virus and containing the country's epidemic. At the beginning of the 1990s, the epidemics in Brazil and South Africa, both ranked as middle-income countries, were at a similar stage, with a prevalence of HIV infection of about 1.5 percent among adults of reproductive age. But by 1995, the year before Brazil's treatment program was established, the HIV epidemic in South Africa had begun to explode, with a prevalence already greater than 10 percent, whereas the infection rate in Brazil had declined by half.



**Numbers of AIDS-Related Hospitalizations and Patients Receiving Antiretroviral Therapy in Brazil and Rates of Hospitalization among Such Patients, 1998–2004.**

Data are from Brazil's DATASUS (the database of the central health system) and National STD and AIDS Program.

“What [Brazil] did in the early '90s was to really head this epidemic off at the pass,” said Chris Beyrer, an associate professor of epidemiology at the Johns Hopkins Bloomberg School of Public Health in Baltimore, who recently helped to assess Brazil's National STD [sexually transmitted diseases] and AIDS Programme (NAP) for the World Bank.<sup>1</sup> “By the time treatment became available, Brazil had already had remarkable success, had controlled epidemic spread, and had a relatively low and stable prevalence.” The early success of Brazil's prevention efforts, Beyrer said, allowed its national treatment program “to actually be feasible” logistically and financially, by limiting the number of people infected. In turn, access to free AIDS treatment has made Brazilians more willing to be tested for HIV infection and has made it easier to address the types of behavior associated with transmission.

Indeed, Brazil's emphasis on prevention as well as treatment has helped to keep its epidemic relatively contained and stable, providing a model for the expansion of treatment programs elsewhere. Access to treatment has led to greater implementation of HIV

testing and counseling in countries such as Kenya and Uganda, but mathematical models predict that delivering large-scale antiretroviral treatment without effective prevention measures would worsen the AIDS epidemic in many countries. Improved health allows people with AIDS to resume sexual activity, and studies among male homosexuals, heterosexuals, and injection-drug users in several developed countries have found that access to highly effective antiretroviral drugs has been associated with increases in unsafe behavior.<sup>2,3</sup> Among developing countries, Brazil is the “only example we have where there's universal access” to antiretroviral drugs, said Jim Yong Kim, former director of the World Health Organization's Department of HIV/AIDS and an associate professor of medicine and medical anthropology at Harvard Medical School in Boston. “I think what they did was to say, ‘We're going to scale up treatment, but we're going to scale up prevention along with it, because it doesn't make sense to do one without the other.’”

Although the World Bank predicted in the early 1990s that by 2000, 1.2 million of Brazil's 186 million people would be infected

with HIV, sentinel surveillance data suggest that only about 600,000 Brazilians are currently infected. In 2002, Brazil's NAP kicked off a national media campaign to promote universal HIV testing, featuring popular athletes, entertainers, and models; it is estimated that 20 percent of the country's sexually active population has been tested for HIV (as compared with about half of U.S. citizens between 15 and 44 years of age). About one third of HIV-infected Brazilians are aware of their status, and 170,000 are receiving government-sponsored antiretroviral treatment, with 20,000 more expected to enter treatment this year. (Although about 75 percent of HIV-infected people in the United States are aware of their status, the corresponding figure in the developing world is only about 10 percent, and only 7 percent of people in low-income or middle-income countries who need antiretroviral treatment currently receive it.) The prevalence of HIV infection among Brazilians 15 to 49 years of age has been stable at 0.6 percent since 2000, with about 25,000 new AIDS cases reported annually.

Prevention efforts in Brazil targeting high-risk populations have achieved some impressive success, particularly among injection-drug users and commercial sex workers. Needle-exchange and syringe-exchange programs, although at first politically controversial, have been broadly implemented, and in a large survey of injection-drug users conducted in 2004, 76 percent reported no sharing of needles or syringes. Cases of AIDS acquired through drug injection have correspondingly declined: in 2003, injection-drug users accounted for only 10 percent of newly reported cases, as compared with 28 percent a decade earlier.



**"Nothing Passes through a Condom. Use It and Trust It."**

The Brazilian Ministry of Health used this advertisement in a media campaign to respond to statements by religious leaders questioning the efficacy of condoms in reducing HIV transmission.

(In contrast, in the United States in 2003, the proportion was 22 percent.) In 2001, 74 percent of Brazilian commercial sex workers reported consistent use of condoms with clients, and despite Brazil's large and thriving commercial sex trade, the prevalence of HIV infection among female sex workers has remained relatively low and stable — about 6 percent, according to a 2005 report. (Condom use has also increased in the general population: in 2005, 35 percent of a representative sample of Brazilians 16 to 65 years of age reported regular condom use during the previous year, as compared with 24 percent in 1998.)

Brazil is also pursuing HIV prevention in prisons, a setting for viral transmission that can greatly influence a country's epidemic, but an environment that has been neglected in the United States and most other countries. During the World Bank assessment team's visit in 2003, Beyrer recalled, "Brazil was looking at the number of inmates, the number with known injection use," and

how many had access to needle-exchange programs and condoms. "It was about 60 percent coverage, and they were working on the remaining 40 percent. That's the kind of program that's going to ensure that they don't have rising infection rates and ongoing spread."

To a visitor from the United States, where explicitly worded government HIV-prevention messages have sometimes ignited political controversy, met with censorship, and even led to the firing of federal officials, the videos, posters, and advertising campaigns created by Brazil's NAP seem startlingly forthright. One media campaign featured Kelly Key, a sexy Brazilian singer, telling her high-school-aged fans, "Show how you've grown up. This Carnival, use condoms." Another recent campaign was developed in response to statements by Catholic leaders questioning the efficacy of condoms in preventing HIV infection. Posters showed a photograph of a goldfish (see illustration) swimming inside a water-filled,

knotted condom. "Nothing passes through the condom," reads the slogan. "Use it. Trust it."

Some of the NAP media campaigns and other prevention programs have triggered complaints, but the creators tailor the images and language to the group being targeted, said Emivaldo Sousa, an advertising adviser to the NAP. "When we put out a mass campaign to talk very explicitly about homosexual relations, we had a huge negative response from the general public but high praise from homosexuals," he said. Health officials said that the conservative attitudes held by Brazilian parents about teenagers and sexuality have hampered HIV-prevention efforts in schools: only about 45 percent of schools currently have sex-education programs, and only 17 percent of high schools distribute condoms. Expanding such programs is a priority for the NAP. "It's something that is changing," said François Figueirôa, coordinator of STD and AIDS prevention for the state of Pernambuco. Parents "know that if they don't talk to their kids, they are going to . . . get sick."

The egalitarian approach to preventing and treating HIV infection is rooted in Brazil's recent political history. When AIDS first appeared, Brazilians were engaged in a national democratic movement that culminated, in 1985, in the downfall of a repressive military dictatorship. Universal health care was declared a "right of all and the duty of the state" in the country's 1988 constitution, and activist groups quickly became involved in the national response to AIDS. Under the country's Unified Health System, state and local health councils with consumer representatives participate in setting governmental health priorities, plan-





**"Condom — Don't Go without It."**

A music truck staffed by government AIDS-prevention workers rolls through the streets of Recife, Brazil, in the opening parade of Carnaval this past February.

ning programs, and allotting resources. Health-advocacy organizations, including groups working on HIV prevention among homosexuals, commercial sex workers, and injection-drug users, regularly receive government funding for their activities. In recent years, NAP leaders have clashed with U.S. health officials over the Bush administration's emphasis on abstinence as preeminent in HIV prevention, and last year the Brazilian program refused up to \$40 million in funding for condoms from the U.S. Agency for International Development, rather than condemn prostitution as required by U.S. law. "Prostitutes are very major partners in this program. They work along with us," said Katia Guimaraes, a technical assistant in the NAP prevention unit. "We could never say that we are against prostitution, because it is not illegal in Brazil. It's a tolerated, regulated profession."

The establishment of Brazil's treatment program fundamentally changed the national response to the AIDS epidemic. Back in 1996, when international studies showed that three-drug antiretroviral therapy improved survival and quality of life, Brazil's

Congress enacted the law providing free treatment to people with AIDS. Between 1997 and 2005, the government spent a total of \$3.5 billion in response to HIV and AIDS, including \$2 billion for antiretroviral drugs. All the money for drug treatment has come from internal funds; about 11 percent of total HIV-AIDS expenditures have come from World Bank loans, spent chiefly for prevention programs and to establish a national laboratory network for the clinical monitoring of

patients and tracking of the epidemic.

Doctors and patients say that access to free treatment transformed public attitudes about HIV. Previously, people with HIV infection "hid it from their families and at work," said pediatrician Ana Maria Albuquerque, who works with the state of Pernambuco's AIDS-prevention program in Recife. "Now, they tell everybody that they have the virus. They claim their rights. They know they can have the medicine, so they reveal themselves, to live better." Between 1996 and 2002, mortality from AIDS was reduced by 50 percent, and AIDS-related hospitalizations fell by 80 percent.<sup>4</sup> Many Brazilians with AIDS have difficulty earning enough to pay for food and housing, but they can still get antiretroviral drugs, said Valdimir Reis of Recife, who has been HIV-positive for 13 years and belongs to a support group for infected people. "We have first-world medicines. This is very important for us," he said. Johns Hopkins' Beyrer said the treatment program is "widely perceived, both by the public and the media, as an example of how government programs can get things right in a country with a history of govern-

ment programs getting things wrong."

An important factor in making the program affordable in Brazil was the expertise of the domestic pharmaceutical industry, which allowed the country to produce generic versions of antiretroviral drugs with patents that had been registered before 1996, predating Brazil's signing of the international Trade-Related Aspects of Intellectual Property Rights (TRIPS) agreement. Of 16 antiretroviral drugs currently purchased by the government, Brazil manufactures 8. Relying chiefly on domestic generic AIDS drugs and negotiating discounts for drugs that were to be imported have helped the government to steadily reduce its average annual cost for antiretroviral therapy, from \$6,240 per patient in 1997 to \$1,336 in 2004. In 2005, however, the average cost rose to \$2,500, reflecting growing drug resistance and the resultant need for newer and costlier medicines. Imports now account for 80 percent of government expenditures on antiretroviral agents, and if current trends continue, total annual expenditures for these drugs could increase from \$203 million in 2004 to more than \$500 million by 2007.<sup>4</sup>

In 2001, ministers attending a World Trade Organization (WTO) meeting in Doha, Qatar, signed a declaration stating that the TRIPS agreement, which provides patent protection for internationally marketed pharmaceuticals, should be interpreted and implemented by member countries "in a manner supportive of WTO members' right to protect public health, and in particular, to promote access to medicines for all." Citing this right, Brazil began proceedings in 2003 to issue compulsory licenses for three imported antiretroviral drugs, a step that



**"Generations of Young People Have Dressed to Defend Their Convictions. Now It's Your Turn. Use a Condom."**

Brazil's National STD and AIDS Program used this advertisement in a recent campaign to increase condom use by teenagers and young adults.

would have allowed it legally to override the patents and to manufacture generic versions. However, so far it has not actually issued a compulsory license for any drug. Instead, the government reached an agreement last year with Abbott almost halving the price of the drug Kaletra (lopinavir–ritonavir), and it continues to try to negotiate discounts from other companies or voluntary licenses that would permit Brazilian manufacture of patented drugs.

Last year, Brazil's economic clout helped to push through a landmark agreement between the governments of 11 Latin American countries and 26 drug companies to lower the cost of antiretroviral drugs in the region.<sup>5</sup> Brazil is also forming a network for technology sharing with Argentina, China, Cuba, Nigeria, Russia, Ukraine, and Thailand to improve each country's capacity to manufacture medicines, condoms, and laboratory reagents needed to fight AIDS and other diseases. Brazilian officials hope,

for example, to receive technical assistance needed to begin manufacturing female condoms, to build a condom factory in the Amazon region, and to manufacture additional AIDS drugs. In the future, Brazil may still decide to issue compulsory licenses for some imported drugs, said Mariângela Batista Galvão Simão, the new director of the NAP. "It's possible and it's legal," she said. "We still think that Brazil could benefit from strengthening local capacity to produce second-line drugs."

Will Brazil be able to sustain its remarkable treatment and prevention programs in the face of a growing population of patients with AIDS? Health officials are worried about increasing levels of drug resistance and rising costs. The World Bank's assessment faults the NAP for failing to carry out systematic surveillance of HIV prevalence and high-risk behavior, thus making it difficult to measure the cost-effectiveness of various interventions and their relative effects on the spread of the virus. Doctors in Brazil say the

absence of a system for monitoring patients' drug regimens and correlating them with laboratory and clinical data also makes it impossible to tell whether inappropriate use of antiretroviral drugs is contributing to viral resistance. Mauro Schechter, a professor of infectious diseases at the Federal University of Rio de Janeiro, told me that at his hospital, admissions of HIV-infected patients are on the rise again, and he does not yet know why. "Are they people who presented too late for treatment? Or have they failed five lines of therapy? I don't know," he said. "I'm not aware of any hard data on what's going on."

Schechter said he is proud of what Brazil has accomplished, but he wishes there were more research revealing which aspects of the country's program have been most responsible for its success so far. "What Brazil has done is amazing," he said. "Brazil led the way, Brazil showed unmistakably that it can be done. But now, 10 years later, when people say, 'Tell us how to do it,' we cannot tell them."

Dr. Okie is a contributing editor of the *Journal*.

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