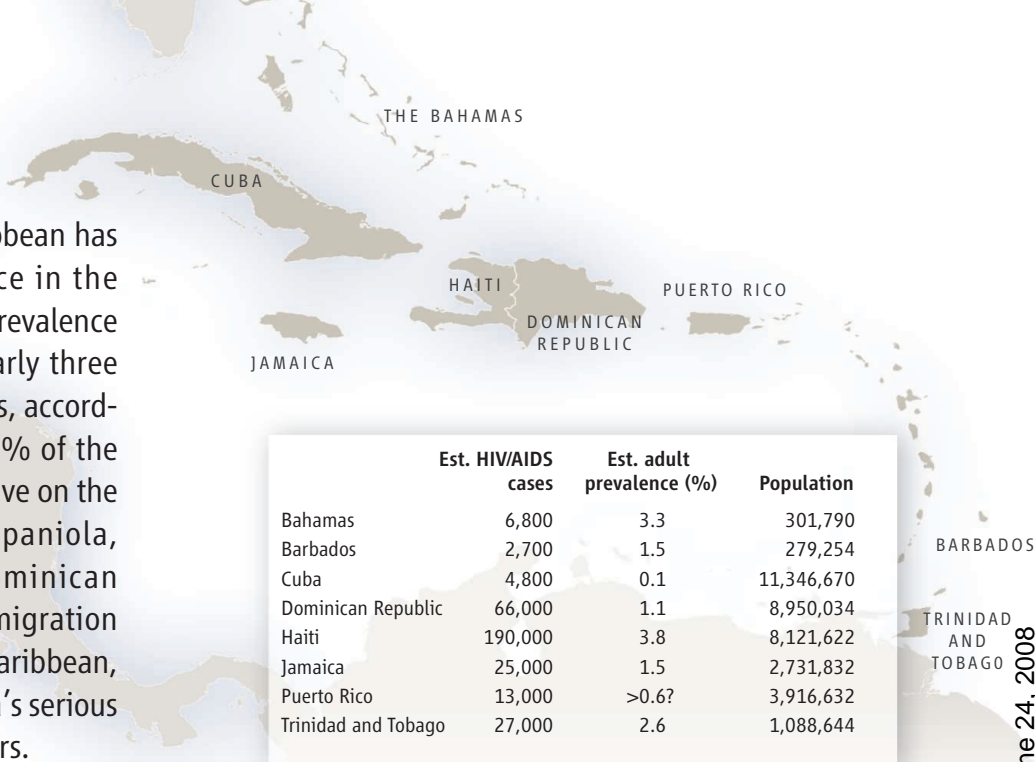


The Caribbean

After sub-Saharan Africa, the Caribbean has the highest HIV/AIDS prevalence in the world. At the end of 2005, adult prevalence in the Caribbean was 1.6%—nearly three times higher than the United States, according to U.N. figures. More than 85% of the HIV-infected people in the region live on the heavily populated island of Hispaniola, home to both Haiti and the Dominican Republic. Heterosexual sex and migration drive the spread throughout the Caribbean, save for Puerto Rico's and Bermuda's serious HIV problems in injecting drug users.



HAITI

Making Headway Under Hellacious Circumstances

This impoverished, conflict-ridden country is staging a feisty battle against HIV

PORT-AU-PRINCE, CANGE, AND CHAMBO, HAITI—Banners hang across the main thoroughfares in Port-au-Prince urging residents to report kidnappings. Blue-helmeted U.N. troops patrol the city in armored personnel carriers. The slums that border the once-elegant downtown have names like Cité Soliel and Bel Air that seem to mock their poverty and violence.

At an AIDS clinic called GHESKIO that sits at the edge of two of these slums, Cité L'Eternel and Cité de Dieu, the staff jokingly refers to the neighborhood as Kosovo. But the mood at GHESKIO (pronounced "jess-key-oh") is anything but hostile. The guards at the gates have no weapons, and as GHESKIO's founder and leader Jean "Bill" Pape likes to boast, "we have not lost one pencil" in the more than 20 years the clinic has operated there.

Pape climbs the stairs of the main clinic and enters the waiting room. About 100 patients, many spiffily dressed, sit in neat rows.

"*Bonjour,*" says Pape.

"*Bonjour!*" the patients reply in unison.

Improbable as it seems, today is a good day for many of the people here, who receive anti-retroviral drugs and state-of-the-art care they otherwise couldn't afford. It's also in many ways a good moment in the HIV/AIDS struggle in the

country at large. The poorest country in the Western Hemisphere, Haiti has more HIV/AIDS patients per capita than any locale outside sub-Saharan Africa. Yet HIV-infected people here often receive better care than many in the Caribbean and Latin America, thanks largely to GHESKIO and another widely celebrated program, Zanmi Lasante—Creole for "Partners in Health"—started by medical anthropologist Paul Farmer of Harvard Medical School in Boston. And recently, encouraging signs have emerged that the epidemic in Haiti is shrinking.

Then again, combating HIV/AIDS in Haiti, where the ever-changing and crisis-plagued government has largely handed off its responsibilities to GHESKIO and Zanmi Lasante, remains an uphill battle. And it's a steep hill.

4H club

In 1982, a year after AIDS had first been diagnosed but not yet named in a cluster of homosexual American men in Los Angeles, the U.S. Centers

for Disease Control and Prevention in Atlanta, Georgia, reported that a group of recent immigrants from Haiti had the strange opportunistic infections and immune problems that characterized the disease. Fears rose with reports of similar immune deficiencies among Haitians who still lived in that country. Soon, the mysterious ailment was being referred to as "the 4H disease," as it seemed to single out Haitians, homosexuals, hemophiliacs, and heroin users. "It was a disaster," says Pape, who at the time ran a rehydration clinic for children in conjunction with colleagues from Weill Medical College of Cornell University in New York City. "The tourism industry died. Nobody



Political outsider. GHESKIO's founder Jean "Bill" Pape strives to remain independent from the country's revolving door of political leaders. He says that has been a secret to GHESKIO's success.

TABLE SOURCE: UNAIDS/UNAIDS/UNAIDS WORLD FACT BOOK

Downloaded from www.sciencemag.org on June 24, 2008

wanted to come here. Even Haitians in the United States were afraid to come.”

With help from Warren Johnson of Weill Cornell, Pape started GHESKIO (which stands for Groupe Haïtien d’Etude du Sarcome de Kaposi et des Infections Opportunistes). In 1983, Pape, Johnson, and co-workers published a landmark report in *The New England Journal of Medicine (NEJM)* that described how Haitians with AIDS had the same risk factors as Americans: men having sex with men, recipients of blood products, links to sex workers, and high rates of venereal diseases. Still, the notion that Haitians were somehow at a higher risk of contracting the disease persisted; theories flourished about links to voodoo or the predominance of swine flu. Worse yet, speculation surfaced that Haiti was responsible for the spread of AIDS to the United States. “There was all this prejudice against Haiti,” says Pape, who still is visibly riled that epidemiologists pointed a finger at Haitians.

Although both Pape and Farmer have argued that HIV likely came to Haiti from the United States—gay men once flocked to the island as a tourist resort—molecular biological evidence suggests that HIV *did* arrive in Haiti earlier than anywhere else in the hemisphere. Further evidence connects the Haitian isolates to some found in Congo, a French-speaking country that recruited skilled Haitians after it gained independence in 1960. Two independent groups have published studies that date six early HIV isolates from Haitians to 1966–67, whereas the earliest non-Haitian samples in the United States trace back to the following year. “Both give the merest suggestion of Haiti being earlier—but with overlap in the error estimates,” says Bette Korber, whose group at Los Alamos National Laboratory in New Mexico did one of the analyses.

Michael Worobey of the University of Arizona, Tucson, has recently recovered five “fossil” samples of HIV from Haitians diagnosed in the United States in the early 1980s that he says provide “absolutely crystal-clear evidence that the virus was in Haiti first.” Worobey contends that understanding HIV’s evolution may one day help vaccinemakers tailor preparations for specific regions. “All the B-subtype virus outside of Haiti comes from a single introduction that got into the homosexual population in the States and then Europe and went wild. And it required that raging wildfire to be seen.”

Regardless of how HIV came to Haiti, the virus thrived, and by the end of 2001, the Joint United Nations Programme on HIV/AIDS (UNAIDS) estimated that 6.1% of the adults were infected. Studies by Pape and his co-workers in Haiti and at Weill Cornell have demonstrated that the vast majority of GHESKIO patients became infected through heterosexual sex. Disease progressed much more rapidly than in wealthy countries (7.4 years from infection to



Testing 1, 2, 3. GHESKIO’s well-equipped labs ran 35,000 HIV tests last year, as well as thousands of CD4 counts, TB stains, and rapid tests for syphilis.

death versus 12 years), TB—which speeds HIV replication and thus immune destruction—was the most common AIDS-defining illness, and 6% of those coinfecting with HIV and TB had dangerous, multidrug-resistant strains of the bacterium.

By the end of 2005, reports UNAIDS, Haiti’s adult prevalence had dropped to 3.8%. Pape contends that behavior change has led to this decline. Annual condom sales, he notes, jumped from less than 1 million in 1992 to more than 15 million a decade later. And GHESKIO studies show that sexually transmitted infections such as chancroid and genital ulcers, which can facilitate HIV transmission, have fallen steeply in their patients.

Analysis of these and other data conducted by Eric Gaillard of the Futures Group, a consulting firm funded by the U.S. government to help Haiti set HIV/AIDS policy, suggests that disease prevalence in the country has indeed dropped. But the researchers note that new infection rates—the incidence as opposed to the prevalence—started to decline about 15 years ago. This means that these behavior changes may have had less to do with the prevalence drop than other factors. “Overall, people died at a faster rate than others became infected,” Gaillard and colleagues write in a paper in the April issue of *Sexually Transmitted Infections*. They also note that the prevalence drop coincides with the country’s effort to prevent HIV transmission through blood transfusions (see graphs, p. 472).

Town and country

As a psychologist meets with rape victims in one of GHESKIO’s cramped offices, lab techs in a nearby classroom watch a PowerPoint

presentation about how HIV is transmitted. In another office, volunteers offering to join a trial of an experimental AIDS vaccine made by Merck take a test to make sure that their consent is truly informed. Technicians test samples of *Mycobacterium tuberculosis* for drug resistance in a lab outfitted with a special ventilation system. In another, sophisticated machines measure the level of the CD4 white blood cells that HIV preferentially targets and destroys. A long line of people, worried that they may have contracted HIV, syphilis, or another sexually transmitted infection, wait to have their blood drawn.

GHESKIO has slowly grown from a research-oriented AIDS clinic into something of an academic medical center that receives substantial funding from the U.S. National Institutes of Health. Pape ascribes part of GHESKIO’s success to the fact that it’s not part of the government. “If we were part of the Ministry of Health, we would have been dead,” says Pape, explaining that it’s had 24 ministers since 1986.

More than 3000 patients now receive anti-HIV drugs through GHESKIO. One of them is Elizabeth Dumay, a counselor and nurse assistant there. “Look at me,” says an obviously robust Dumay, 42, who came to GHESKIO after losing both her husband and father to AIDS. At the time, her CD4 count was a mere 73 (600 to 1200 is normal). Today, Dumay has 603 CD4s, and virus levels in her blood are undetectable.

As the GHESKIO clinicians described in a December 2005 *NEJM* article, 90% of the 1000 AIDS patients they treated with potent antiretroviral drugs were alive after 1 year. Without the treatment, studies suggest that 70% of them would have died.

HIV/AIDS: Latin America & Caribbean

Pape has received a slew of accolades, including France's Legion of Honor. So has Farmer, who pioneered AIDS treatment in Haiti's rural Central Plateau. Farmer, who lives part-time in Haiti, is a MacArthur fellow, the subject of a popular biography, and the recipient of generous support from philanthropists. His group, Zanmi Lasante, now also has projects in Peru, Mexico, Guatemala, and Rwanda.

For more than 2 decades, Farmer has focused on improving health care in an impoverished part of the country that is only 56 kilometers from

to make home visits every day to observe patients taking their antiretroviral drugs. If doses aren't missed, they explain, HIV is less likely to develop resistance to the drugs.

Zanmi Lasante spent more than \$10 million in Haiti last year, nearly twice GHEKIO's budget. Principal financial support for AIDS treatment for both groups comes from the Global Fund to Fight AIDS, Tuberculosis, and Malaria and the Bush Administration's President's Emergency Plan for AIDS Relief. Both GHEKIO and Zanmi Lasante also offer extensive training

and builds new homes for people who live in shacks made of corrugated tin or wattle. "We're just using AIDS as our battle horse to get at poverty reduction. If we had the capacity to deliver the same quality of service we do now and do clinical trials, we would. One day, we're going to get there."

Meeting demand

Shortly before dawn on a March morning at the Zanmi Lasante campus, a few hundred people who have spent the night sleeping on the concrete benches and sidewalks that meander around the hilly grounds begin to rise. Some spent the night at this odd oasis—which features clinics, a hospital with two operating rooms, laboratories, training classrooms, a primary school, a church, and a warehouse filled with pharmaceuticals—because they saw a doctor too late in the day to return home; others wanted a good spot in line this morning. "We're being overwhelmed," says Farmer. "That's been the hardest part of our work."

At a new clinic that Zanmi Lasante recently opened about an hour's drive from Cange in Chambo, patients jam the waiting room all day for a chance to see one of two doctors on staff. Many of the patients are infected with HIV, but most have the same complaint: stomach pains. "I think it's just hunger," says Louise Ivers, a native of Ireland who treats HIV-infected people both in Haiti and at Massachusetts General Hospital in Boston. And her patients don't mince words. "I'm going to die if I don't get food to take with my medicine," complains an HIV-infected 24-year-old mother with three children in tow. A one-armed boy suddenly barges into the room unannounced. "The doctors told me to talk to you," says the boy, who explains that he lost his arm and his father in a car accident. Ivers refers him to the clinic's social worker. "It's very hard to know what to do," she says.

The inpatient hospital at Cange presents more wrenching dilemmas. The facility has several adults in the late stages of AIDS who are not eligible for anti-HIV drugs because Zanmi Lasante only offers antiretroviral drugs to people who live in areas where the group has *accompagnateurs*. "Until there's good care all across the country, we're going to get people coming from all over—and more from Port-au-Prince, ironically, than anywhere else," says Farmer. Last year, Zanmi Lasante's staff had 1.1 million visits with patients at clinics, and the *accompagnateurs* made 1.4 million more trips to patients' homes.

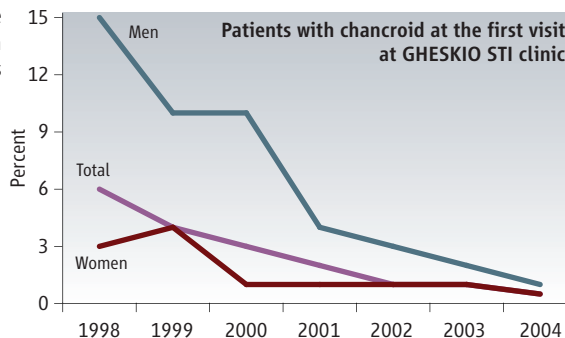
Although Zanmi Lasante has steadily won donor support and attracted local and foreign



Full house. Zanmi Lasante's inpatient ward in Cange doesn't have a bed to spare—and unfortunately can offer antiretroviral drugs only to the AIDS patients who live nearby.

Port-au-Prince—but is a 3-hour journey by car on the rutted, mountainous roads. In 1998, Farmer launched an "HIV Equity Initiative" and began to treat poor, HIV-infected Haitians with antiretroviral drugs. When starting Zanmi Lasante, Farmer and his co-workers assailed the then-common wisdom that costs and lack of infrastructure made it impractical to use these medicines in poor countries. And, they wrote, if they can provide antiretroviral drugs "in the devastated Central Plateau of Haiti, it can be implemented anywhere."

Zanmi Lasante today has a sprawling medical campus in the rural town of Cange, which has been visited by the likes of Bill Gates Jr. (who flew in by helicopter). Farmer and his team of Haitian and Harvard doctors now provide antiretroviral treatment to 2000 patients at Cange and seven other sites. Zanmi Lasante also provides inpatient care, which GHEKIO doesn't. And, in an innovation borrowed from TB treatment, Zanmi Lasante assigns *accompagnateurs*



Dramatic drop. At GHEKIO's clinic for sexually transmitted diseases, diagnoses of chancroid, which eases transmission of HIV, have steadily declined.

of health care workers, and they perform a combined 75,000 HIV tests each year.

Although their agendas overlap and they have much admiration for each other's work, Farmer and Pape have never published a paper together. "They have a research focus and we have a service focus," says Farmer, who has mainly written on issues of social justice and providing quality care in poor settings and whose group also offers comprehensive maternal care



Patient patients. Shortly after sunrise at Zanmi Lasante's Cange campus, long lines form at the clinic door.

end," says Farmer. "We went in for the other 's' word: solidarity."

Increasing demand has burdened GHESKIO, too, which in October 2005 opened a second clinic in a less heavily traf-

ficked part of Port-au-Prince. The pristine clinic abuts a vast, hardscrabble field, and a guard with a shotgun stands at its gate. "The neighbors don't know us here," shrugs Marie-Marcelle Deschamps, a clinician who helped Pape

build GHESKIO. Already, the clinic is treating 400 HIV-infected people with antiretroviral drugs.

Despite all the progress, Pape estimates that at least 10,000 HIV-infected Haitians who need antiretroviral drugs immediately have yet to receive them. Still, like many other Haitians, he's hopeful that the election of René Prével in February will bring a measure of stability to the country—which should make it easier to combat HIV as vigorously as Pape, Farmer, and others would like. "You have to be an optimist here, despite all the odds," says Pape. "Otherwise, pack your bags and leave."

—JON COHEN

doctors who want to work in rural Haiti, skeptics question whether the effort can be sustained. "Even if sustainability raises problems in 20 years, we didn't go in for a set timeline or to have projects with a beginning and an

DOMINICAN REPUBLIC

A Sour Taste on the Sugar Plantations

Haiti's wealthier next-door neighbor is struggling to provide treatment to many HIV-infected people, and the problem's especially acute on the *bateyes*

SANTO DOMINGO, SAN PEDRO DE MACORÍS, MONTE PLATA, DOMINICAN REPUBLIC—The Dominican Republic shares the island of Hispaniola with Haiti, but the two countries could be across the globe from each other. Dominicans are Latin and pride themselves on their Spanish roots, whereas Haitians speak Creole and are largely descendents of freed African slaves. As tourists flock to the Dominican Republic each year, Haiti has seen its tourist industry evaporate over the past 2 decades. Dominicans have a vastly higher gross domestic product than their Haitian neighbors, whose average life expectancy is nearly 20 years shorter. And it follows that the two countries have starkly different HIV/AIDS epidemics that have attracted dramatically different responses. In an unusual twist, poorer and less stable Haiti is being celebrated for its pathbreaking AIDS efforts, largely led by two prominent nongovernmental organizations (NGOs). The Dominican Republic, on the other hand, is being lambasted for its shortcomings—the result, critics say, of government disinterest and outright obstructionism.

At the end of 2005, the Joint United Nations Programme on HIV/AIDS (UNAIDS) estimated that the virus had infected 1.1% of the adults in the Dominican Republic—a prevalence less than one-third of Haiti's. But according to insiders and

outsiders alike, the Dominican Republic's HIV/AIDS programs in comparison are sorely lacking. "It's 1000 times better in Haiti," says Keith Joseph, a clinician at Columbia University



who has done HIV/AIDS care in both countries. "It's astounding that a place with so much is unable to get things going."

Nowhere is this more evident than in the *bateyes*, where the Dominican epidemic is disproportionately concentrated. Originally built to house workers from Haiti on the sugar cane plantations, *bateyes* have become shantytowns largely filled with descendents of the original migrants or new Haitian immigrants. "People with AIDS in the *bateyes* are just dying without any kind of help," says Sister Concepcion Rivera, a nurse with the Sisters of Charity who runs a mobile health clinic.

The clinic attempts to care for people living in the many *bateyes* near San Pedro de Macorís, a port city on the southeast coast of the Dominican Republic. Although the van is stocked like a minipharmacy, Rivera, who has a master's degree in bioethics, on this March day has no anti-HIV drugs, nor can she treat tuberculosis, one of the biggest killers of people with AIDS. "On paper, the government does things, but in practice, they really provide nothing," says Rivera, adding that for the past 3 months the government has not even paid the small subsidy it promised her group.

Although the Dominican Republic now offers anti-HIV drugs in major cities such as Santo Domingo, Rivera's complaint repeatedly surfaces in the *bateyes*. Government studies showed that adult HIV prevalence was 5% in the *bateyes* in 2002 and jumped as high as 12% in men between 40 and 44 years old. And even where antiretroviral drugs are available, the government has faced intense criticism for moving slowly. UNAIDS estimates that 17,000 Dominicans need anti-HIV drugs, but as of December 2005, only 2500 received them through public programs.

Critical care. Sister Rivera provides *bateyes* with some medicines but does not have the anti-HIV or TB drugs that Miguel "Bebo" de Jesus needs.