like Kiloko, Mitchell believes it could revolutionize the delivery of healthcare in resource-poor settings, making care available to vastly greater numbers of people for a low price. When workers complete an appointment or their daily shift, they upload the data they've gathered over the mobile-phone network. When used at clinics, the devices automatically create electronic health records, and if implemented widely enough, a network of them could provide disease surveillance, allowing for immediate and precise tracking of epidemics—tasks that are challenging even in the best of conditions. Mitchell believes the Tanzanian government's willingness to try something new—to let D-Tree (the NGO he founded to carry on the treatment work that falls outside the limits of research studies, which are funded by U.S. government grants through Harvard) into government clinics to test the devices without bureaucratic hassles—may enable its healthcare system to leapfrog ahead of some developed countries. "In the United States, everybody wants the perfect system," he says. "In Tanzania, people are willing to accept a system that works."

The device itself is the most salient feature of the program,

THE POLITICS OF PAYING FOR HIV CARE

A S ONE OF FOUR INSTITUTIONS chosen in 2004 to administer the President's Emergency Plan for AIDS Relief (PEP-FAR), Harvard oversees patient care at 10 hospitals and a network of clinics, and operates a drug distribution network, in Nigeria. Faculty members work with the Dar es Salaam City Council and a local university to provide care through clinics in Tanzania. And in Botswana, Harvard scholars advise the ministry of health on quality of care and data management and train health professionals.

Some of these activities—specifically, those that involve patient care rather than training and research—fall outside the University's traditional mission, but drastic times call for drastic measures, says Jacobson professor of public health Barry Bloom, who was dean of Harvard School of Public Health (HSPH) when PEPFAR began. "The world had a big problem. Harvard is a great university," he says. "Anybody who had expertise to contribute had an obligation to try, and that's what we did."

Shortly after Bloom became dean, he asked professor of immunology and infectious diseases Phyllis Kanki—who later became faculty director of Harvard's PEPFAR program—to cowrite a grant with him for healthcare worker training and HIV prevention efforts in Nigeria. It was a departure for Kanki, whose previous work was in Senegal. But a 2000 report on HIV from the World Health Organization made a deep impression on Bloom. It said that Africa's smaller and better-developed countries—Botswana, for example—provided good settings for creating model programs. But to ignore the epidemic in the continent's largest countries, such as Nigeria, Ethiopia, and South Africa—to decline to try because the obstacles were too daunting—would mean losing the battle against AIDS in Africa entirely.

When PEPFAR was announced in late 2003, Kanki applied; the grant required that each application cover three countries where the applicant had already worked, so Lasker professor of health sciences Myron "Max" Essex and professor of nutrition and epidemiology Wafaie Fawzi—HSPH faculty members with projects in Botswana and Tanzania, respectively—joined the application, which Bloom critiqued before its submission.

University administrators were blindsided when they learned that Harvard had been awarded the funds, says Mark Barnes, the former executive director of the University's PEPFAR program, who now holds faculty appointments at the schools of law and public health and directs the Office of Sponsored Programs. Harvard draws a clear line between the activities of teaching (for which it appoints and pays professors of medicine) and clinical care (for which those professors are paid by hospitals affiliated with, but not owned by, Harvard).

Administrators considered declining the grant award. Unlike the other three recipients in the initial round—Columbia, Catholic Relief Services, and the Elizabeth Glaser Pediatric AIDS Foundation—Harvard was not used to delivering direct clinical care, and had pledged to do so in countries without smoothly functioning healthcare infrastructure. But it ultimately decided to accept the funds on the grounds that treating HIV in sub-Saharan Africa "was an emergency, and Harvard would respond to the emergency," says Barnes.

The central administration specified several conditions. This would be an exception for Harvard, not a new function it intended to expand. The faculty investigators on the grant would need to pull in people with expertise in healthcare delivery. Over time, even with PEPFAR, Harvard would shift its focus from providing care to its more typical roles of advising and research. And the grant money would be routed through not-forprofit entities based in each PEPFAR country, founded for this purpose.

This last requirement not only shields Harvard from liability, Bloom notes: "It opens up the possibility, in the long run, of sustainable programs" by making it possible for those organizations to receive funds from sources besides PEPFAR. Noting that the program as a whole took a cue from Harvard and adopted this approach for all grant recipients, he says, "whenever a country's health programs depend on foreign aid and on a foreign university, those programs are not sustainable in the long run."

Barnes believes the caution Harvard exercised was appropriate: "It would have been irresponsible to accept the grant without adequate planning," he says. "The program could have fallen on its face, resulting in poor care being delivered, or massive amounts of money being wasted, or long delays." Although the University's handling of PEPFAR caused conflict at the time, Bloom now agrees some of those concerns were valid. But he says Harvard must take risks as it strives to become "a truly great global university."

The bottom line, says Bloom, is this: "hundreds of thousands of people, without this program, would not have had access to care." Harvard's PEPFAR program has paid for antiretroviral therapy (ART) for more than 130,000 people, and regular medical care for many more. It has funded training for more than 16,000 healthcare workers in the three countries. Not counting

Reprinted from Harvard Magazine. For more information, contact Harvard Magazine, Inc. at 617-495-5746

but Mitchell views his work as being more about healthcare quality than about technology. "The goal," he says, "is that this will become the way all healthcare is delivered"-not just HIV care. About 40 healthcare workers have phones running D-Tree software right now; within a year, Mitchell expects that number

to reach 300 or 400, and to begin to grow "exponentially" and to extend into other countries.

Although D-Tree's software initially focused on specific condi-

separate PEPFAR grants overseen by HMS faculty members whose primary appointments are through the hospitals, this is still by far the largest government grant Harvard has ever received: \$65 million this year.

DUT AS HARVARD has become Dcomfortable in its role, the program's overall status may be waning. In late 2008, Congress authorized spending \$48 billion through 2013, a major expansion over the \$15 billion allocated for the first five years, but President Obama has since spoken of plans to level-fund PEPFAR and focus instead on maternal and child health.

And so, what had been an encouraging trend—treatment rolls expanding, free drugs becoming available to more and more people who need them—is starting to reverse. David Bangsberg, a lecturer on medicine at HMS who directs the Center for Global Health at the Harvard-affiliated Massachusetts General Hospital (MGH), has seen waiting lists develop at clinics in southwestern Uganda, where he has a research project. MGH recently resumed fundraising through its Family Treatment Fund, which was the only source for new ART enrollments at this site in April and May, due to funding shortfalls in multinational programs. (A new patient is put on treatment every time \$1,500—enough to treat one patient for five years—is raised.) "The irony and the tragedy," says Bangsberg, "is that it looks like we're back to the same place we were in 2003, before the beginning of PEPFAR, where we're asking private individuals for \$20 and \$50 to piece together enough money to treat one person at a time. PEPFAR has probably been the most successful publichealth initiative in the last century. We built it, and now as the need outstrips the funding supply, it is breaking apart at the seams."

When professor of medicine Bruce Walker, who oversees a team researching vaccine prospects and the immune response to HIV, started setting up his laboratory in Durban, South Africa, in 2002, it didn't take long for him to decide that it was irresponsible to conduct research without also offering treatment in some capacity. "I was unprepared for the enormity of the epi-



tions—HIV, malaria—broadening the focus is a top priority; workers have already begun delivering family-planning services, prenatal and neonatal care, and child healthcare on their visits. A well-rounded approach makes more sense than a narrow one, because a child who's HIV-positive might also have malaria, says

Mitchell: "You can't have separate systems for each disease."

The D-Tree workers are involved in research that aims to change the way healthcare is delivered, but

In Mbarara, Uganda, David Bangsberg, director of the Center for **Global Health at Massachusetts** General Hospital, is using microfinance to help people with HIV afford food, their children's school fees, and transportation to clinics for treatment. He also heads the Harvard Global Health Scholars program, which is helping to train the next generation of Ugandan scientists. (Read more at harvardmag.com/AIDS-in-Africa.)

demic," he says. "It was just staggering. HIV permeated all aspects of daily experience. There were so many people infected, so many people affected." PEPFAR did not exist yet and the South African government was not yet paying

for drugs, so Walker, professor of medicine and a physician at MGH, sought funding from private donors. "We felt that we couldn't keep doing research unless we started treating people," he says, "because they were dying left and right."

Even the PEPFAR expansion Congress authorized would not be enough to treat all who need it. Despite all the prevention efforts under way, UNAIDS still estimates that the number of new infections is growing far faster than the number of people initiating treatment. Walker sees the crisis firsthand: more than 300,000 South Africans die of AIDS each year. An estimated 5.7 million South Africans—12 percent of the population—are infected. Only one-third of those sick enough to need ART are receiving it. And 70,000 HIV-positive babies are born every year. "There's no way we are going to be able to treat our way out of this epidemic," says Walker. "There just isn't enough money."

This is why it's crucially important to find ways to improve the efficiency of healthcare in the developing world—as with the work of Marc Mitchell, an HSPH lecturer whose research in Tanzania aims to extend care to more people by equipping community health workers to conduct HIV patients' monthly checkups (see main article). Says University Provost Steven Hyman: "As federal funding gets scarce, if we haven't learned from previous attempts and developed the best ways of doing things," there will be no way to know how best to distribute the limited funds available. "I think that's where Harvard makes its greatest contributions."