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Science

HIV/AIDS in America

 AAAS



INTRODUCTION

HIV/AIDS In America

THE EPIDEMIC OF ACQUIRED IMMUNODEFICIENCY SYNDROME WAS FIRST recognized in the United States. As clinicians from Los Angeles, California, reported in the 5 June 1981 issue of *Morbidity and Mortality Weekly Report*, they had seen odd immune problems and opportunistic infections in five young “active homosexuals.” Similar reports soon came in from all over the country and the world, making it clear that AIDS affected heterosexuals and homosexuals alike and also spread from mother to child and via tainted blood products and dirty needles. In the following years, U.S. researchers helped prove that HIV causes the disease, which led to a critical blood test to detect the novel retrovirus. The U.S. National Institutes of Health and the Centers for Disease Control and Prevention—prodded by AIDS activists such as Mark Harrington of the Treatment Action Group (pictured here)—steadily ramped up support for basic research as well as efforts to develop and test treatment and prevention interventions. In the early 2000s, the U.S. government poured billions of dollars into programs that now bring life-saving antiretrovirals to millions of people in cash-strapped countries.

By any measure, the United States has played a vital global role in unraveling HIV’s mysteries, providing help to the infected and protecting the vulnerable.

It may seem odd, then, that since 1990 this country has not hosted the International AIDS Conference, a megameeting that has gathered 20,000 participants every other year. But that will change on 22 to 27 July, when the gathering will take place in Washington, D.C. The meeting organizers shunned the United States because of an immigration ban on HIV-infected people imposed by Congress in 1987, which President Barack Obama ended in 2010.

In keeping with that shift, *Science* is focusing this special HIV/AIDS issue on America, now home to an estimated 1.2 million HIV-infected people—many of whom have little in common with the original five gay men in Los Angeles. The Deep South has become the epicenter; blacks—gay and straight—face a far higher risk of becoming infected than whites, and poverty is a major driver for all races. The biggest challenge the country faces today is diagnosing all of its HIV-infected people and helping them take full advantage of the existing treatments, which both stave off disease and make people less infectious. It is a problem shared worldwide.

Correspondent Jon Cohen, working with photographers Malcolm Linton and Darrow Montgomery, visited 10 U.S. cities this spring, and the package of stories that begins on p. 168 describes the varied epidemics and responses. A News Focus by Cohen spends a day with Anthony Fauci, who leads the NIH branch that funds more HIV/AIDS researchers than any institution in the world (p. 152). This special issue also includes an Editorial by Salim Abdool Karim (p. 133), who highlights problems rolling out what’s known as pre-exposure prophylaxis, as well as an update on HIV antibody research by Dennis Burton and colleagues (p. 183) that promises to inform AIDS vaccine development. Online, a slideshow offers more images and stories about the country’s epidemic, and *Science Careers* features profiles of two young HIV/AIDS public health workers making a big dent in big-city epidemics.

— LESLIE ROBERTS

A Tale of 10 Cities

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Science



Detention/retention. HIV-infected inmates such as Rhode Island's Robert Quintana benefit from programs that link care on the inside and outside.

tive" of his life. "On the one hand, I had the stigma of the virus itself, and on the other hand, people in church said you're damned because you're gay," says Alexander, a devout Baptist. "There were some very, very gloomy times when I'd sit at home and get to thinking, 'Why is this happening to me? I'm fighting a constant battle that I can't win.'"

Alexander soon vomited the overdose of antiretroviral drugs, and he now laughs about his "oxymoronic" attempt to commit suicide with the very drugs that he depends on to stay alive. But he, like many others, struggles to take antiretroviral drugs day after day, year after year. Efforts to help people like Alexander deal with their challenges have now moved to the top of the HIV/AIDS agenda in the United States.

Taking antiretroviral drugs as prescribed can fully suppress an HIV infection, keeping disease at bay for decades. There's another huge benefit, as well: A large study completed in 2011—*Science's* "Breakthrough of the Year" (23 December 2011, p. 1628)—provided irrefutable evidence that people who have undetectable levels of the virus in their blood rarely spread the infection to others. Yet as wealthy as the United States is, antiretroviral drugs are having nowhere near the treatment or prevention impact they could have on the country's epidemic. "We only have a little more than 1 million infected people in the United States, and per case, we probably have one of the highest expenditures in the world," says Carlos del Rio, a clinical researcher based at Emory University in Atlanta. "We ought to be able to do something to stop the epidemic. But the problem is that it's not just a medical disease. In fact, the least of the difficulty is the medical part of the disease. It's the social, structural things that are driving the epidemic."

This spring, *Science* met with HIV-infected people, at-risk communities, researchers, caregivers, health officials, and advocates in 10 cities, traveling to the Deep South and the West and East coasts to see the varied epidemics and the local responses up close. The package of stories on the following pages looks at everything from the social and structural issues to the medical and scientific challenges through the eyes of people on the front lines, as well as the research efforts under way to try to slow, if not one day bring to a halt, the spread of HIV.

The Many States Of HIV in America

Treatment as prevention promises to help the infected and dramatically slow the spread of the virus, but the epidemic's changing demographics present myriad challenges in this diverse country

IN THE SPRING OF 2006, A YEAR AFTER JOSHUA Alexander took part in an HIV testing day at his college and found out he was infected, he tried to kill himself. He did not do it with a gun, a noose, or the tailpipe of a car. He chose instead to gulp down his entire supply of the anti-HIV drugs Truvada and Viramune.

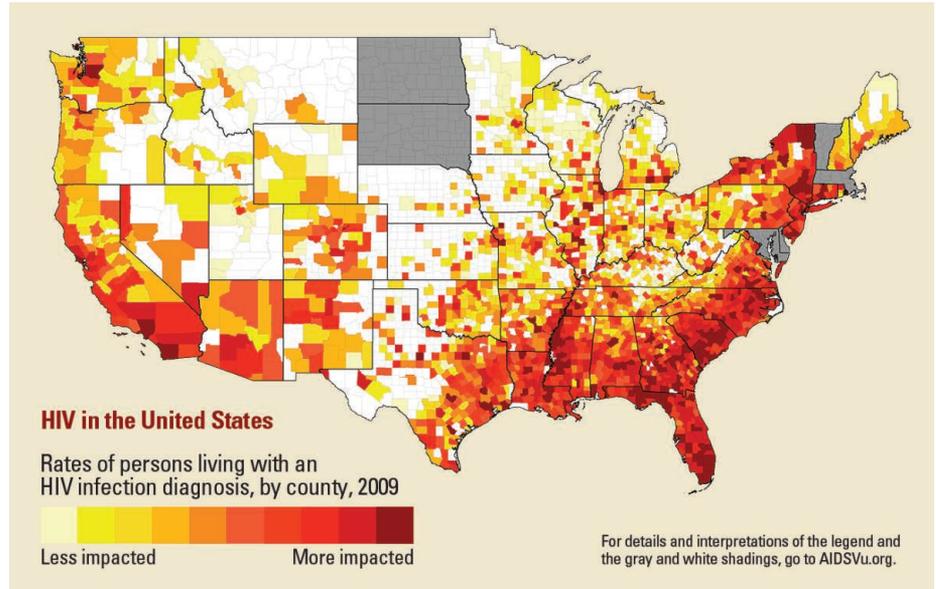
Alexander, then 19 (pictured at right with his family), had taken time off from Delta State University after he learned of his diagnosis and moved back to his

mother's home an hour away in Greenville, Mississippi, a small town bordered by cotton fields, catfish ponds, and an oxbow lake that branches off "Old Man River." About one-third of the town lives below the poverty line, and an abundance of boarded-up shotgun shacks and cottages tilt on the clay soil. But Alexander's mother had provided well for her five children, and money wasn't his main issue—his version of the Delta blues came from what he called "the double nega-

Treatment cascade

When AIDS surfaced in the United States 31 years ago, it was largely a disease of economically stable, white, gay men living in big cities on the West and East coasts. But today, HIV disproportionately infects African-American men who have sex with men (MSM), like Alexander, and the epicenter of the epidemic is in the poverty-stricken Deep South. In addition to confronting deep-rooted homophobia and stigma for being infected, many face the added burdens of unemployment, homelessness, mental illness, incarceration, substance abuse, and lack of medical insurance and access to qualified care providers—all of which pose obstacles to even getting an HIV diagnosis, much less taking pills every day. “What’s happening among young, black MSM in the United States jumps out and screams,” says Phill Wilson, a leading HIV/AIDS advocate who founded the Black AIDS Institute in Los Angeles. “We have the richest country on the planet, and you have a population impacted more than the poorest parts of the planet.”

Del Rio’s work has helped popularize the notion of a “treatment cascade,” a series of factors that create a vast gap between HIV infection and control of the infection. Roughly 20% of infected people in the United States do not know their HIV status. Among those who do, many never seek care. Some see a doctor but fail to show up for subsequent appointments. Of those who start taking antiretroviral drugs, many have difficulty staying on them. Building on del Rio’s earlier work, the U.S. Centers for Disease Control and Prevention (CDC) highlighted the treatment cascade in its 2 December 2011 issue of *Morbidity and Mortality Weekly Report (MMWR)*, showing that of the estimated 1.2 million infected people in the country, only 28% receive medication, adhere to their



prescriptions, and have fully suppressed viral loads (see graph, p. 171).

In July 2010, the Obama Administration issued the first-ever National HIV/AIDS Strategy, which lays out a plan for increasing the proportion of diagnosed MSM with undetectable viral loads by 20% within 5 years. The plan has the same goals for blacks and Latinos who are not MSM. “We need to focus our resources where the epidemic is,” says Grant Colfax, who directs the White House Office of National AIDS Policy. An openly gay clinician who formerly ran the prevention and research section of the widely praised San Francisco Department of Public Health, Colfax says hard-hit locales also have to spend more of their own money addressing the problem in their most affected communities. “There is no magic bullet here,” Colfax says. “Every epidemic is local, and we need to look at local solutions.”

Diverse drivers

With an adult HIV prevalence of 0.6%, the United States ranks 39th in the world, on par with many countries in Europe and Latin America. But because of the relatively large U.S. population of 311 million, only six countries have more HIV-infected people, and its burden matches that of Zimbabwe and Uganda. “I’m always taken aback by that,” says Wafaa

El-Sadr, an epidemiologist at Columbia University’s Mailman School of Public Health in New York City. “We don’t see it that way because it’s not evenly distributed: There are hot spots. There also are some populations, especially MSM, who have risks of acquiring HIV that are higher than in sub-Saharan Africa. Ask

Online

sciencemag.org
Slideshow and podcast (<http://scim.ag/hiv2012>).

people on the street, and nine of 10 would say, ‘We took care of HIV, it’s not a problem any more.’ And *that’s* the problem.”

MSM accounted for 61% of the estimated 50,000 new infections in the country in 2009, according to the latest CDC figures. Heterosexuals made up the second-largest risk group, with 27% of new infections, and the remaining 12% were injecting drug users, or IDUs (3% of whom were also MSM). Although blacks make up only 14% of the population, they accounted for 44% of new infections. Rates of infection are six times higher for black males than white males, and black females have a whopping 15 times higher rate of infection than white females. Black MSM between the ages of 13 and 29 were the only group that saw an increase in new infections between 2006 and 2009; the number climbed by 48%. One in five newly infected people were Latino, which is also disproportionately high compared with whites.

CDC divides the United States into four regions—Northeast, South, West, and Midwest—to assess HIV/AIDS. “There are striking geographic differences,” says CDC



Sitting tall. With his family’s support, Alexander (right) has overcome his HIV-induced gloom.

PHOTO: MALCOLM LINTON; MAP SOURCE: AIDSvU.ORG

epidemiologist Jonathan Mermin.

The Midwest has the fewest cases. In the West, five small neighboring states that together are home to under 5 million people—Wyoming, North and South Dakota, Idaho, and Montana—each report fewer than 1000 people who have a diagnosed HIV/AIDS infection, but California has 106,000, making it second to only New York (128,000). The South has the heaviest burden, with 43% of the country's HIV-infected people. A recent report about the HIV/AIDS "crisis" in the South by the Duke University Center for Health Policy and Inequalities Research in Durham, North Carolina, analyzed CDC data and found that the region has eight of the 10 U.S. states with the highest rate of new infections and the highest death rates from AIDS. Several cities outside the South have been hit especially hard by HIV, including New York, Los Angeles, San Francisco, Chicago, Philadelphia, and Baltimore, which together in 2007 accounted for 30% of all people living with HIV/AIDS. The virus also readily moves back and forth across the U.S.-Mexico border.

The drivers of spread in the country similarly differ from place to place. "It's not one U.S. epidemic; it's multiple microepidemics," says Kenneth Mayer, medical research director at the Fenway Institute in Boston, which specializes in HIV-prevention studies. Mayer notes that transmission in many white and Latino MSM has links to methamphetamine and cocaine use, but drugs play only a small role in the Southern epidemic in black MSM, who often have their own insular subcultures and sexual networks. Women accounted for nearly 70% of the heterosexual spread, and 60% of those infections in 2009 were in black females, who have distinct sexual networks themselves. Needle-exchange programs have dramatically slowed the spread



Plan man. Grant Colfax oversees the Obama White House's HIV/AIDS strategy.



Reaching out. As men at the Sippi Citi club in Jackson, Mississippi, do a "strolling" line dance, a table in one corner staffed by My Brother's Keeper promotes HIV prevention.

among IDUs in some cities, but bans on the use of federal and state funds for such efforts means that they are scarcely used elsewhere. Commercial sex work does not seem to be a major factor in the country, but recent studies are "sorely lacking," Mayer says. Studies of transgenders are few, too, but those that exist indicate extremely high prevalence.

A plethora of research has focused on analyzing why black MSM and heterosexual women, particularly in the South, have become especially vulnerable to HIV. CDC's Gregorio Millett has closely examined the spread in black MSM, and his findings have challenged many hypotheses. As Millett and co-workers explained in the 15 May 2011 issue of *AIDS*, no studies have shown convincing evidence that black MSM have more partners or more frequently have receptive anal sex without a condom, both known risk factors for HIV infection. Citing data from a survey of nearly 10,000 white and black MSM who agreed to take HIV tests, the researchers concluded that the racial disparity in HIV prevalence had no link to incarceration or circumcision, either.

Several studies have reported that black MSM are more likely to have partners of their own race than are white MSM, and Millett's group concluded that this played a key role in explaining their higher prevalence. The researchers found a link between risk of infection and not knowing a partner's HIV status, and they also discovered that black men who knew that they were infected before the study were less likely to be on anti-

retroviral drugs than white men. This double whammy means that uninfected black MSM are more likely to have sex with a highly infectious man than are their white counterparts. Studies have also shown higher rates of sexually transmitted infections such as syphilis in black MSM, which eases spread.

Epidemiologist Adaora Adimora of the University of North Carolina, Chapel Hill, contends that the high rate of HIV in Southern black women reflects higher rates of concurrent partnerships—relationships that overlap—which is linked to the frequent incarceration of men that splits couples. In the July 2006 issue of *Sexually Transmitted Diseases*, Adimora and colleagues describe several studies that support this thesis, including one they did that surveyed HIV-infected women in North Carolina who had no link to IDUs or MSM. Of these 128 women, 37% had had concurrent partnerships within the past year, 89% said one of their last three partners was having sex with someone else, and 82% said one of these men had been incarcerated. According to the U.S. Bureau of Justice Statistics, one in three black men will be incarcerated during their lives, in contrast to one in 17 white men.

As racially skewed as the epidemic is, important factors in the spread of HIV are not confined to race, cautions Kevin Fenton, who directs CDC's National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention. "When I think of the U.S. epidemic, it's easy to be seduced into the narrative of the epidemic in African Americans," Fenton says. "But the real narrative is poverty, disenfranchisement, and a fragmented health-care system weaving together to create big social challenges."

Fenton points to a CDC study published in the 12 August 2011 issue

of *MMWR* of nearly 15,000 heterosexual, non-IDU adults in 24 high-poverty urban areas. Study participants were predominantly black (72%), followed by Latino (18%) and white (5%). Nearly 2% turned out to be infected. The highest prevalence was seen in men and women who had lower socioeconomic status—regardless of race. Lack of a high school degree, household income below the poverty level, and unemployment were each independently associated with higher prevalence. “The social drivers are so powerful, and what’s exciting about this is when you think through the social-determinants lens, the solutions become different,” Fenton says. “You can’t just rely on testing, linkage to care, and treating people. It’s necessary but not sufficient. Unpack these social determinants and there are new ways to tackle the epidemic.”

Rebooting

In response to the National HIV/AIDS Strategy, CDC has begun to reallocate how it supports U.S. HIV/AIDS work. In 2012, CDC shuffled \$40 million of its \$338 million budget to have more of an impact in harder-hit locales, and plans call for similar shifts over the next 4 years. CDC also launched the 12 Cities Project that, by the end of 2012, will have pumped \$30 million of new money into improving the response in urban areas that have 44% of the AIDS cases. There’s a concomitant push to cut funding to behavioral modification programs and ideology-driven work such as abstinence education. Instead, CDC wants more high-impact, cost-effective, evidence-based programs that link people to care, target MSM and drug users, and conduct testing at high-incidence locales.

Wilson of the Black AIDS Institute

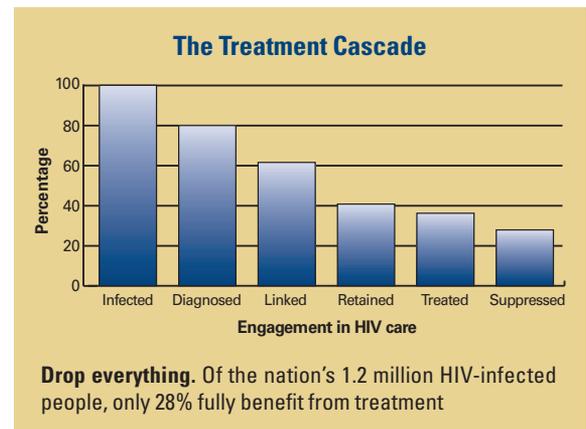
praises the national strategy for spelling out clear, interrelated goals, but he also worries about unintended consequences of the “medicalization” of prevention, as many of the black groups he works with don’t yet have the technical capacity to work with clinics and may lose funding, Wilson says. “With HIV and AIDS, the messenger matters. Having institutions that are from the community and have its trust are critically important,” says Wilson. In May, the Black AIDS Institute’s African American HIV University held a week long teach-in for community-based organizations from around the country to help them adapt to this new world in which treatment as prevention is king.

A key challenge for everyone working in the HIV/AIDS field is to find novel interventions that better address the treatment cascade. More and more clinics have begun working with navigators or mentors to help people overcome issues with housing, food, drug use, incarceration, and transportation. An increasing number of emergency rooms routinely test everyone for HIV. One large-scale clinical trial in Washington, D.C., and the Bronx funded by the U.S. National Institute of Allergy and Infectious Diseases (NIAID) is investigating whether offering financial incentives can help people control their infections. “This is a solvable problem,” says NIAID Director Anthony Fauci (see *News Focus*). “I mean, c’mon. It’s

a finite problem with a finite solution. So we can do it.”

Fauci, whose lab has made fundamental discoveries about HIV and the immune system, says researchers also have to adjust to this new era that is striving to figure out the best ways to apply existing tools. “The rush that

Homecare. San Francisco General found patient Vanessa Romo this housing.



Cascade brigade. Nurse Diane Jones’s team at San Francisco General Hospital specializes in retaining patients in care.

you get out of discovery of something that you didn’t know before is a very different feeling than the excitement you get when you see that if you implement proven things that you can actually turn the thing around,” Fauci says. “It isn’t that kind of eureka moment. It’s more of a cause.”

The cause also includes HIV-infected Americans, who from the start of the epidemic have had an astounding influence on both science and society’s response to the disease. Alexander, who is majoring in social work, is part of the new generation of advocates, and he sees himself devoting his career to his version of the cause. “When I first found out I was positive, the social workers were awesome,” he says. “Now there are no text messages, smoke signals, nothing.” If he were a social worker, he’s confident he could use his own experiences to help people through their tough times and to stay on their medication. “I’d like to do outreach to make people not feel bad about being infected,” Alexander says. “That’s where my heart is.”

—JON COHEN



A Tale of 10 Cities



BIRMINGHAM, ALABAMA

A Southern HIV/AIDS Program With All the Fixins

FEW PEOPLE WOULD CONFUSE THIS CITY, dubbed the Pittsburgh of the South because of the iron and steel industry that once boomed here, with San Francisco. Yet here in the heart of the Deep South, Michael Saag and his team at the University of Alabama, Birmingham (UAB), now the state's biggest employer, have built a full-service HIV/AIDS center modeled on the widely praised program at San Francisco General Hospital. Not only does UAB's 1917 Clinic, named after its original street address, perform cutting-edge research and pivotal clinical trials, but it has also helped patients overcome the stigma about HIV that is all too prevalent in this part of the country and stay in treatment and on their drugs.

Virologist Robert Schooley, an HIV/AIDS clinical researcher at the University of California, San Diego, says one of the most remarkable aspects of the 1917 Clinic is that it's in his hometown of Birmingham—which is not known for embracing diversity. “Mike has done a great job in putting together

something in a place that had the potential to be incredibly hostile to HIV and anybody with it,” Schooley says.

The 1917 Clinic treats 2000 patients in a multiservice building that features a dentist, social workers, peer mentors, counseling, a pharmacy, and a chaplain. A research team led by Saag, who started the clinic in 1988, has run trials that have helped bring almost every antiretroviral drug to market, tested vaccines, and analyzed critical issues such as stigma and retention in care. “It provides comprehensive, state-of-the-art care in a good environment, and it's one-stop shopping,” says Steven Deeks, a clinician and researcher at San Francisco General Hospital, who recently visited the 1917 Clinic.

In December 1986, Saag spent a day at Deek's hospital to learn from the best. During his visit, he noted how they trained providers all over the city and worked closely with the community. Their clinic, Ward 86 (see p. 175), had an unusually warm, welcoming environment. He asked what they

Test everyone. The ER at UAB's hospital checks the HIV status of all adults unless they opt out. Jamey Daniel came in for a toothache.

would do differently if they were starting over, and they said they would create a computer database to track patients, and keep specimens frozen for later study.

The 1917 Clinic now has electronic medical records on 8000 people. As a result of this close monitoring, Saag and his team can easily tap demographic and health information about their entire patient population: nonwhite (55%), white (45%), men who have sex with men (52%), heterosexuals (34%), and injecting drug users (8%). Overall, 71% of the patient population has a fully suppressed viral load, which is similar to San Francisco General's success rate.

UAB's Michael Mugavero has used the database to study retention and linkage to care and assess how the 1917 Clinic and the rest of the country can do better. “We've focused a lot on testing and treatment and forgotten about what's in between,” says Mugavero, a clinical behavioral epidemiologist. A study he co-authored in the 15 January 2009 issue of *Clinical Infectious Diseases* assessed the 60% of patients who missed appointments in the year following their first one—an indicator of health behavior—and found that they subsequently died at twice the rate of patients who kept all appointments. “The fundamental challenge is that at a local, state, and national level we've had inadequate surveillance of individuals after diagnosis, which makes it difficult to determine who is retained in care and then take action,” he says.

Mugavero and other HIV researchers at UAB, which until 2011 included the powerhouse husband-and-wife team of George Shaw and Beatrice Hahn, have made their mark in almost every part of the field from the lab to the clinic to shaping guidelines and policies. Saag has published 240 papers about HIV/AIDS, co-authoring landmark studies about the diversity of viral genotypes in each infected person and the value of measuring viral levels to help manage a person's disease.

Clinicians and staff members at the

1917 Clinic have taken several progressive approaches to addressing the local epidemic. UAB's hospital emergency room runs HIV tests on all patients 19 to 64 years old unless they opt out. "It's an unusual opportunity to counsel, test, and link to care," says ER specialist James Galbraith, who spearheaded the program. A new machine at the hospital, the Abbott ARCHITECT, can detect signs of HIV in people within 8 days of infection, during the acute phase in which people have extremely high viral loads and are more likely to transmit. The nonprofit group AIDS Alabama provides housing for clinic patients, drives them to medical appointments, helps recruit people for AIDS vaccine trials the clinic runs, and conducts media campaigns for testing.

Each week, the clinic holds a discussion group for patients, called Heartsong@1917, and the people who attend tell heartbreaking stories of stigma and discrimination. Lisa J., an African American who served in the Army, says she travels 137 kilometers to come to the clinic because she lives in a small, white town that has enough trouble



Peer mentor Janet Johnson (center) with two HIV-infected peers she helps.

with her race. "I'm from New York City and everything is open," Lisa says. "Come down to the Bible Belt and everything's not like that. I have two children, and I don't want them to be shunned." She says if people in her town knew she was infected, "I'd have to watch how I crossed the street."

Janet Johnson, who sits on the clinic's patient advisory board, says she became infected by injecting drugs, transmitted the virus to her newborn in 1986, and then went clean. She lived in the small town of Arab, 105 kilometers from Birmingham, where "I had to fight for him to go to school and go to the Baptist Church because he might scratch, bite, or poop," she says. Their infections caused such divisions in their church

that they left for a Pentecostal congregation. "My little boy passed away in '99 from AIDS, and he never weighed more than 50 pounds [23 kilograms]," says Johnson, whose husband also died from AIDS. She started using again. By 2002, her CD4 white blood cells, which HIV destroys, had dropped from the normal range of more than 600 per microliter to a life-threatening four.

Johnson started on antiretroviral drugs, entered drug treatment, and found housing with AIDS Alabama. Today, she has an undetectable viral load and a normal CD4 count. She joined a clinical trial at 1917 Clinic, which subsequently began to provide her dental care, and she then joined the staff as a peer mentor who helps others find housing, transportation, and the like. "For us to win the HIV battle, we have to take care of the whole person, not just bits and pieces," Johnson says.

That could be 1917 Clinic's motto.

—JON COHEN

JACKSON, MISSISSIPPI

By the People, For the People

AROUND MIDNIGHT ON A RECENT weeknight, a gay club on the west side of town called Sippi Citi suddenly came alive with troupes of dancing men. Some appropriated choreographed routines called J-setting from the majorettes at Jackson State University, while others line-danced in the strolling fashion made popular by the Greek sororities and fraternities at historically black colleges. Adding to the wild incongruity, they shimmied and strutted to a misogynistic hip-hop song about a scheming woman taking advantage of her boyfriend. All in all, it was a perfect place to have outreach workers from My Brother's Keeper stationed in front of a table littered with pamphlets about HIV and other sexually transmitted diseases, advertisements to get tested, and male and female condoms.

My Brother's Keeper is the only community-based organiza-

tion in the state that focuses on those who bear the brunt of the HIV/AIDS epidemic in Mississippi: young black men who have sex with men (MSM). At the end of 2009, 78% of Mississippi's 8142 people living with HIV were black, even though blacks



Community center. My Brother's Keeper taps the bar scene to get out its message.

make up only 37.5% of the population, according to the latest data from the U.S. Centers for Disease Control and Prevention (CDC). A 2008 report from the Mississippi Department of Health found a 48% increase between 2005 and 2007 in HIV in young black men. Mississippi has a higher rate of gonorrhea and chlamydia than any state, and according to a report in the 2 January 2012 issue of *AIDS* co-authored by CDC researchers, it had the country's highest HIV case fatality rate between 2001 and 2007.

Mississippi is one of the poorest states in the nation, and as Human Rights Watch noted in its 2011 report on HIV/AIDS in Mississippi, *Rights at Risk*, half of the residents who know their HIV status do not receive basic health care for their disease. "Save yourself a transatlantic airline fare to a developing country," Craig Thompson, head of the STD/HIV Office for the state's health department, told Human Rights Watch. "Just come to Mississippi, where we have a vast underserved population."

In addition to doing outreach work at clubs like Sippi Citi, My Brother's Keeper offers HIV counseling and testing, trains young men to modify their risky sexual behavior, and partners with CDC and others to do research about the vulnerable young black MSM the

group serves. Founded in 1998 by HIV/AIDS advocate Mark Colomb (who died last year), the group has also tried to combat homophobia in this most conservative city, holding an annual gay pride event—but they do it at a hotel, not in the street. “To be gay here is just not the thing to do,” says June Gipson, who runs My Brother’s Keeper and has a Ph.D. in urban higher education. “We had our biggest Pride last year, and we had 200 people in the room. We hadn’t had but 20 in the past. We probably never will have a parade.”

To better address the health-care needs of African-American MSM, Gipson has teamed up with Leandro Mena, an infectious-disease specialist and researcher at the University of Mississippi Medical Center. Together, they’re creating the state’s first clinic designed for lesbian, gay, bisexual, and transgender people.



Overtime. June Gipson (left), shown here outside of a gay club, does prevention education late into the night.

“We want to establish a culturally competent, logistically appropriate place to transfer information,” Mena says. They hope to open the clinic by year’s end. “There’s a significant gay-identified, younger population that has stig-

because of their credibility. “I don’t see any other organization in this state that has a similar potential to establish a relationship with that community,” Mena says. “And that’s because they are part of it.” **—JON COHEN**

ATLANTA, GEORGIA

And the Band Played On, Vol. 2

AND THE BAND PLAYED ON, THE 1987 EPIC tome about the early years of the AIDS epidemic, featured Atlanta prominently, largely because what is now called the U.S. Centers for Disease Control and Prevention (CDC) is based here. But author Randy Shilts, who died of AIDS 7 years later, made nary a mention of the city’s epidemic: At that point, the virus had made little headway here. Today, if its large public hospital, Grady Memorial, is any measure, Atlanta has one of the most out-of-control epidemics in the country. “We see a lot of people coming in with three or four T cells and life-threatening opportunistic infections,” says Jeffrey Lennox, chief of infectious diseases at Grady. “We’re seeing a surge in very young men who have sex with men [MSM] who, like most teenagers, don’t take many precautions.”

On a balmy morning in late May, Lennox, who is also on the faculty at Emory University, leads the daily rounds at Grady with eight young doctors rotating through



Grassroots messaging. Evolution Project’s Markese Sanders, prevention promoter.

what’s called the Special Immunology Service. Grady, which receives patients from all over the state, averages about 40 beds a day occupied by AIDS patients. The cases today include horrific opportunistic infections that, since the advent of powerful antiretroviral drugs, are rarely seen in U.S. hospitals nowadays: the skin-blotching Kaposi’s sarcoma, blinding *Mycobacterium avium* complex, seizure-inducing toxoplasmosis, and brain-damaging progressive multifocal leukoencephalopathy. Several patients have dementia and mumble, one is on a respirator, and a few have dangerous forms of tuberculosis that require the doctors to don facemasks. “It’s the ignored epidemic,” Lennox says. “Atlanta is the black San Francisco. It’s a huge mecca for gay black men.”

Pregnant HIV-infected women provide another window into the severity of the local epidemic. Ponce de Leon Center, Grady’s sister outpatient HIV/AIDS clinic that treats a stagger-

ing 5000 patients a year, has seen six women in the past 6 months who recently transmitted the virus to their babies—which antiretroviral drugs coupled with C-sections can almost always prevent.

Clinic pediatrician Rana Chakraborty says the root of the problem is that Georgia doesn’t enforce its own laws. He points to a study presented at the American College of Obstetrics and Gynecology meeting in 2010 that surveyed 64 obstetrical hospitals in the state to see whether their HIV-screening policies comported with Georgia law. More than half of the hospitals did not have the proper HIV rapid test needed during labor and delivery, and fewer still had the proper antiretroviral drugs on hand to intervene. “It goes hand in hand with stigma down here,” Chakraborty says, noting that this is the Bible Belt. “It’s just one of those things people don’t want to talk about.”

Similar issues complicate prevention work with MSM. “It’s really difficult to get people involved in prevention,” says Markese Sanders, who recently completed a neuroscience undergraduate degree at Emory and now works at the Evolution Project, a drop-in center for young, black MSM. “You can’t convince them that HIV is a problem and that it’s their community. I had a trans lady get offended when I offered her a test.”

Scant data are available from Grady and Ponce to help Lennox and his colleagues assess whether treatment might be having an effect on prevention, as they’ve just started to build an electronic patient database, Lennox says. “We have this overwhelming

tidal wave of patients hitting us day after day,” he says. “We could have written a ton of papers, but we’re drowning.”

Yet researchers here do often collaborate on national studies that are helping to clarify why so many patients have difficulty fully suppressing HIV. Emory’s Carlos del Rio, who heads clinical research at Ponce, co-authored a widely referenced paper published online 15 March in *Clinical Infectious Diseases* that closely examines the gaps in the continuum of care, or “treatment cascade” (see p. 168). For the difficult populations they treat—including young black MSM, teens who were infected at birth, and many crack cocaine users—del

Rio says they need new models of care, such as clinics that don’t require appointments and that offer food or coffee. He is now helping to run a 10-city study, Project Hope, that asks how best to achieve viral suppression in HIV-infected substance abusers. The study will evaluate the effectiveness of adding a “patient navigator” to the standard care, to help patients deal with clinic visits and the like, and giving financial rewards for treatment compliance. “We need to rethink our approach to the epidemic,” he says.

Lennox says Atlanta clearly has benefited from the introduction in late 1995 of potent combinations of antiretroviral drugs: AIDS deaths peaked at Grady in 1994, dropping

from 990 a year to about 200 now. Still, he’s disappointed that the city hasn’t made more progress. “As frustrating as it was back then to try and help people you couldn’t help, it’s more frustrating now because a significant part of our populations are those who are hardest to engage in treatment,” Lennox says. “If they had been tested earlier when they weren’t sick and there was a network to get them into treatment and give them rides to the clinic and not lose them to follow-up, none of this would be necessary. I would love to close down the AIDS ward at Grady Memorial Hospital. I just don’t see it happening anytime soon.”

—JON COHEN

SAN FRANCISCO, CALIFORNIA

A Concerted Effort to Lighten the Load

MOUPALI DAS AND HER COLLEAGUES AT THE San Francisco Department of Public Health (DPH) were struck by something missing in a provocative article, “AIDS in America—Forgotten but Not Gone,” that ran in the 18 March 2010 issue of *The New England Journal of Medicine*. A bar graph in the perspective made a stark point: The prevalence of HIV among men who have sex with men (MSM) and other at-risk populations in some U.S. cities on the East Coast approaches that seen in eight sub-Saharan African countries. But if the graph had included San Francisco MSM, as Das and her colleagues later showed in an adaptation of the figure, the bar would have stood taller than the hardest hit country on the graph, South Africa.

San Francisco has a population of 800,000, which is tiny compared with South Africa’s 50 million, but the city has suffered as mightily from HIV as anywhere in the world. As of 2010, 15,861 HIV-infected people lived here, 85% to 90% of whom are male. According to DPH studies, 87% of the males infected with HIV are MSM, and one in four MSM in the city lives with the virus. “This is very different from other epidemics in the United States,” says Das, who directs HIV-prevention research for DPH. So is the response.

The city has made great strides on several fronts over the past few years. After DPH ramped up testing efforts, the percentage of HIV-infected MSM who didn’t know their status dropped from 23 in 2004 to six in 2011. The average CD4 count of 400 at diagnosis is more than twice as high as the rest

of the nation, where many people seek treatment at such late stages that it becomes difficult to save them. DPH works closely with San Francisco General Hospital—Das sees patients there once a week—and, following its lead, issued a policy in 2010 that made San Francisco the first U.S. city to endorse antiretroviral treatment for all HIV-infected people, regardless of their CD4 counts. The hospital’s venerable HIV/AIDS clinic, Ward 86, has pioneered aggressive efforts to link some of the city’s poorest and most troubled people to top-notch care and keep them on the antiretroviral drugs. And in one of its latest innovations, DPH has mapped the amount of virus—the so-called community viral load—in every neighborhood and risk group, which helps guide both treatment and prevention efforts.

California requires labs to report viral load tests of all HIV-infected people, which allowed Das and colleagues—including Grant Colfax, who has since become the Obama Administration’s top domestic HIV/AIDS official (see p. 168)—to analyze com-

munity viral load between 2004 and 2008. In a groundbreaking study published in June 2010 in *PLoS ONE*, they reported a drop in the city’s HIV levels that corresponded with a decrease in the number of new infections. But transgenders, who predominantly live in the neighborhoods known as the Tenderloin and South of Market, had a three times higher viral load than average. “Community viral load is one marker that gives a snapshot of the whole continuum” of success and failures, Das says. “We’re doing a little bit better than the rest of the United States in getting people to undetectable HIV levels, but we still have a long way to go.”

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Wards of Ward 86

Some of the challenges facing the campaign are evident in General Hospital’s Ward 86, which takes only patients who have no insurance—and that puts the doctors, nurses, and social workers there on the front line.

First thing on a Friday morning in May, as patients start to fill the waiting room at Ward 86, a team known as PHAST begins to hunt for people who missed their appointments the day before. PHAST stands for Positive Health Access to Services and Treatment, and for the past 10 years, the program has singled out HIV-infected people who have had trou-



Residency requirement. Stable housing helped Connie Sprinkle stay on meds.

ble taking care of their disease or who are newly diagnosed. PHAST enrolls people who live in a fog in Fog City, sleeping on the streets, shooting heroin and smoking meth, or wrestling with paranoia and schizophrenia. "People get lost," says Diane Jones (see photo, p. 171), the nurse who runs the program. "Their lives are very chaotic."

After reviewing the previous day's appointment log, Sandra Torres, a social worker, discovers that half of the 20 PHAST patients scheduled for a visit didn't show up. A few rescheduled, and a few others called and said they couldn't make it. "But three are absolutely no-shows," Torres says. "We don't know what's going on."

Torres phones the first no-show, a 49-year-old man who found out he was infected 10 years ago after a PCP overdose hospitalized him. She leaves a message on his voice mail. "He's problematic," she says after hanging up. "He hasn't had labs since October, and his CD4 count was 68 and his viral load was 54,000. He hasn't been here since February. He reports 100% adherence." His blood work suggests anything but.

The second no-show, who like the first is an MSM, has a full voice mailbox. "He's concerning because he likely has anal cancer," Torres says. In September, PHAST's outreach worker went to his house and spoke with him. Torres phones his pharmacy and learns that he hasn't picked up any medication in 3 months. They'll send the outreach worker to his house again.

The third patient is/was an injecting drug user; Torres e-mails him and also leaves a message at his methadone clinic.

Sometimes, the no-shows die, or they move or change clinics without telling anyone. But the PHAST team frequently locates the patients and then connects them to housing, substance treatment, transportation, counseling—or whatever else helps them help themselves. During the past year, 529 people enrolled in PHAST, and 79% of them initially were not receiving antiretroviral drugs. Now, 71% of these patients are taking the drugs. More than a third of the patients "graduated": They kept appointments, refilled medications, and used the emergency room and urgent care appropriately. Another 129 moved on to long-term residential care, switched clinics, or are locked up. Seven died, and 47 did not contact the program for 6 months and fell into



Takes a village. San Francisco Department of Public Health's Moupali Das charts community viral load to guide treatment and prevention.

the "lost to follow-up" category.

Diane Havlir of the University of California, San Francisco, who heads the HIV/AIDS program at the hospital and is also a co-chair of the international AIDS conference that will be held next week, notes that when they look at all 2669 patients who received treatment at Ward 86 last year, only 75.4% had undetectable viral loads. "We don't know all the answers," Havlir says. "We have to study what we're doing and better understand the science of delivering care."

Connie Sprinkle, 58, shows the challenges faced by both the PHAST patients and the Ward 86 staff. "Most of my life has just been running and doing what I have to do to survive," says Sprinkle, who is also known as Mama Peaches. Sprinkle told *Science* that molestations by a relative led her to start running away from home at 10 and using heroin at 13. She had her own child at 16 and the next year began dancing in strip clubs. Forgery soon sent her to the penitentiary for a 3-year stint. She was diagnosed with an HIV infection at Ward 86 in 1985, the first year the test became available. It came as little surprise, she says. "I was a

hooker and did IV drugs. I was homeless. I did everything that was wrong."

Sprinkle took AZT when it came to market 2 years later, but the drug made her sick and she stopped after a week. Same thing happened with ddI, the second antiretroviral that came to market. "That made me sicker," she says. "What's the benefit of being sick when you don't feel sick?" By the early '90s, she'd stopped dancing and selling sex and was living in cars and surviving on Social Security income. She rarely visited Ward 86.

Three years ago, suffering from a serious case of *Clostridium difficile*, Sprinkle returned to the ward for help. "My boyfriend of 24 years said he'd had enough of the smell, and he brought me up with my bags and everything," she says. "And he left." Tests showed her CD4 cell count was just 14.

The PHAST team found Sprinkle housing at the city-run Laguna Honda, which has 24-hour care for residents, and she eventually moved to a permanent-care facility, Leland House, supported by the federal Housing Opportunities for Persons with AIDS program. The staff dispenses the antiretroviral drugs and watches her take them each day, which Sprinkle bluntly says she wouldn't do on her own. "There's some ambivalence about the will to live," she says.

Today, Sprinkle's CD4 count is 275 and her viral load is undetectable. So in addition to stabilizing her life and her HIV infection, with PHAST's help, Sprinkle has done her small part to decrease the community viral load—a concept, she says, that had never crossed her mind. **—JON COHEN**

LOS ANGELES, CALIFORNIA

Life in the Fast Lane: HIV and Meth

STEVEN SHOPTAW RECENTLY HAD A CASE that flapped this unflappable clinical psychologist—and dramatically explains how methamphetamine use on the West Coast has become so intimately linked to HIV in men who have sex with men (MSM).

Shoptaw* works at the University of California, Los Angeles (UCLA), and runs the Vine Street Clinic, a center for meth research and treatment. He says a longtime patient put an ad on Craigslist that effectively offered men the chance to use him and leave. The rules: No condoms, he was the bottom, and he wore a blindfold. Hyped on crystal meth for 3 days, the HIV-infected Latino

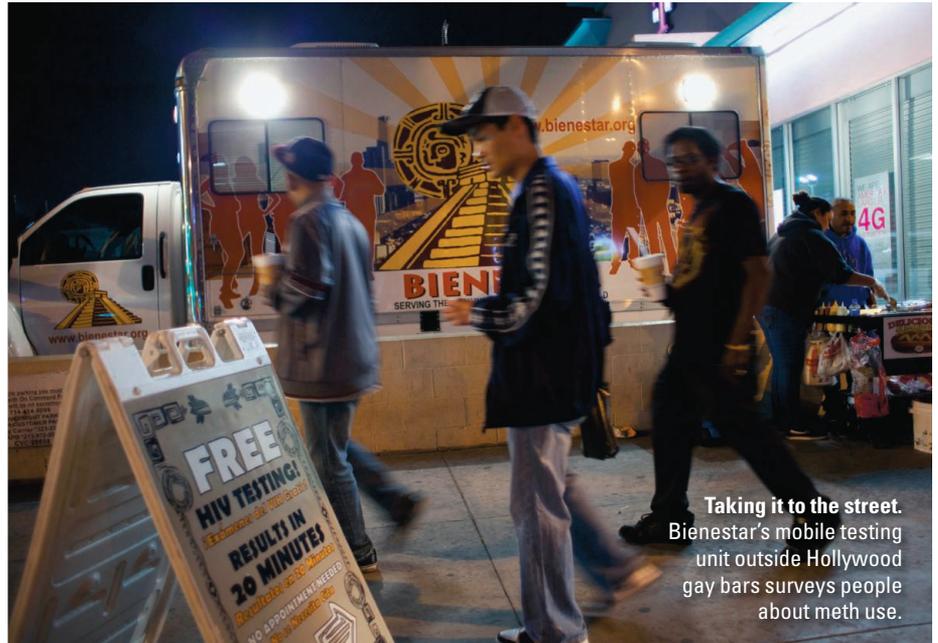
man in his 30s reported that dozens of men came to his hotel room and helped him live out his fantasy. "For many MSM, when they get under the influence of stimulants, particularly meth, it's all accelerator and no brake," says Shoptaw, who has worked closely with his UCLA colleague Cathy Reback, a research sociologist, to document meth's role in the LA epidemic and test interventions. "There's no way they can stop engaging in some extreme form of sexual activity. Meth facilitates extreme sexual behavior that's just not there when men are not high."

Meth, which comes in both a crystalline form ("ice") and a fine powder ("speed"), is

typically smoked or snorted; some users inject it, but there's scant evidence that sharing of syringes occurs and contributes to the spread of HIV. Studies show that meth has gained little popularity in black MSM communities or in MSM who live in the Northeast, Midwest, or South. "It's a real West Coast phenomenon," says Shoptaw, whose clients are evenly split between Latinos and whites. Although the drug is also used by many heterosexuals and leads them to extreme sex, Shoptaw says they have such low levels of HIV in their communities that it hasn't been a factor in transmission. "Even in the presence of a lot of risky behavior, if it's not where the virus is circulating, meth is just a drug problem," he says.

Shoptaw and Reback received widespread attention when they reported in the November 2006 *Journal of Urban Health* about studies in Los Angeles that showed how HIV prevalence in MSM climbed in lockstep with the intensity of meth use. At one extreme, 86% of MSM at a residential treatment facility for drug addiction reported that they were HIV-infected; among recreational users, it was a still-high 23%. Studies have also shown that HIV-infected meth users on antiretroviral drugs (ARVs) have trouble sticking to their treatment regimen. "The simplest explanation is that meth makes you forget to use your ARVs," Shoptaw says.

Shoptaw, Reback, and others have



Taking it to the street. Bienestar's mobile testing unit outside Hollywood gay bars surveys people about meth use.

shown that cognitive behavioral therapy—especially if it's "gay-specific"—and a "contingency management" strategy that financially rewards people for staying clean can cut meth use in MSM. Text messaging, which sends notes like "2 much tweak & freak is harsh 2 ur body" at strategic times, can decrease use, too. Several different types of drugs are also being studied, including

some that try to boost the dopamine levels that meth depletes and others that reduce inflammation in the brain caused by the drug. Reback says more men are coming into treatment, but the prevalence of HIV in regular meth users stubbornly remains around 60%. "We haven't put a dent in it."

—JON COHEN

*Steven Shoptaw is married to the author's cousin.

SAN DIEGO, CALIFORNIA, AND TIJUANA, MEXICO

My Virus Is Your Virus

THE TIJUANA RIVER CANAL, A CONCRETE edifice that abuts the Mexican side of the border here, has a sidewalk along its upper ridge that sports a view of what to many locals represents both heaven and hell. Heaven is the opulent Land of Plenty, which stretches as far as the eye can see to the north. Hell is immediately below in the canal's basin—a fetid, garbage-strewn horror that has become home to heroin addicts, many of them deportees from the United States, some infected with HIV.



Breaching borders. Steffanie Strathdee (left) and Thomas Patterson track regional spread of HIV.

Men gather in clumps along the sidewalk, putting lighters to spoons that hold the local heroin known as black tar, burning off the impurities in this version of the opiate. They cook and inject openly, despite the border guards on the San Diego side, who, stationed on a hill in an SUV to deter fence jumpers, watch them through binoculars. Some of the heavily tattooed men have ink on their faces, and several wear syringes balanced behind their ears like pencils. But when they see Susi

Leal, a health promoter who stopped shooting up herself 12 years ago, they smile wide, and there is nothing unsettling about them at all. Leal works with a U.S.-government-funded HIV/AIDS research study in which these men are participating, and it has shown how readily the virus makes a mockery of the border and creates one regional epidemic.

The 8-year-old project, El Cuete—slang for both syringe and being high—is run by a binational team of researchers from the University of California, San Diego (UCSD), located less than 50 km north. "The epidemics of HIV, TB, and syphilis are linked between San Diego and Tijuana," says UCSD epidemiologist Steffanie Strathdee, principal investigator of the project. "You can't just draw the line and say it's their problem, it's not ours."

Strathdee and her husband, UCSD psychologist Thomas Patterson, have published a flood of studies that take a cross-border perspective on HIV, examining the histories and viral status of 3000 injecting drug users (IDUs) in Tijuana, including the canal dwell-



Painful reality. Many deported heroin users who live in the Tijuana River Canal consider California home.

ers. A second, overlapping study they run has done similar work with more than 1000 sex workers in Tijuana. And Patterson conducted a third study that has involved 800 men who buy sex in Tijuana, half of whom live in San Diego. A common theme in all of their studies—which they review in a policy forum they co-authored for the June *Annals of Epidemiology*—is that many of these people, by force or free will, go back and forth between Tijuana and southern California, sometimes carrying the virus with them.

Their studies have shown that more than half the male IDUs in Tijuana were deported from the United States. In the canal, several men say they went to America as toddlers and were kicked out in their 20s or 30s after being arrested, most on drug-related charges. “I think more in English than in Spanish,” explains one man, who says he was a San Diego resident for 28 of his 30 years. Another says he was a pastor in Los Angeles for 10 years. Most feel the pull of children and wives back in California; several have multiple deportations on their records. A comparison of male IDUs who had been deported to those who had not found a fourfold higher risk of HIV infection among the deportees, underscoring that mobility and the attendant social upheaval puts people at risk. Patterson says deported women engage in higher risk behavior, too, including sex work. “They get down here in the middle of the night and don’t have any language skills or context to work,” he says.

Strathdee and Patterson have found that

fewer than half of the sex workers and IDUs in Tijuana had been tested for HIV before they joined one of their studies—a huge missed opportunity both to treat and prevent spread (see p. 168). Female IDUs who sold sex and had a sexually transmitted infection such as syphilis have the highest prevalence documented, 12%, which dropped to 10% if they only injected drugs. IDU sex workers said they shot up with clients more than half the time. Patterson’s study of male clients from San Diego and Tijuana found a 5%

NEW YORK, NEW YORK

Miracle on 34th Street: Success With Injectors

HIV TYPICALLY SPREADS MORE READILY between people who share needles than in sexual networks, which means a large community of injecting drug users (IDUs) can mark the emergence of an epidemic with great precision. This dense city of about 8 million residents had an estimated 200,000 IDUs in the late 1970s, more than any city in the world. In 1978, Beth Israel Medical Center collected blood samples of users to study liver disease. A retrospective analysis of the samples conducted by Beth Israel’s Don Des Jarlais and colleagues found that 10% were already infected with HIV. By 1981, the prevalence had jumped to 50%, which helped make the Big Apple the center of the country’s AIDS epidemic. “Over half the

prevalence in both groups. Interestingly, in the largest study they did of male IDUs, only 4% of them tested positive for HIV, which is high, but not for IDUs. (They suspect that female IDUs in their study had much higher prevalence primarily because they have higher syphilis rates.)

Although sharing needles is the norm in Tijuana, Daniel Ciccarone, a clinician and researcher at University of California, San Francisco, notes in the May 2009 *International Journal of Drug Policy* that users of black tar heroin—the most popular form of the drug throughout the western United States—have a lower prevalence of HIV than that of those who shoot white or brown versions. He contends that the main factor likely slowing HIV’s spread is that black tar gums up needles and syringes, which frequently have to be cleaned before reuse or thrown out.

Strathdee notes that there were more than 40 million legal crossings from Tijuana to San Diego last year—it is the world’s busiest land border—and she says the two countries have to stop pointing fingers at each other when it comes to HIV/AIDS. She hopes her team’s research will help end the “blame game” and lead both countries to develop a more coordinated approach for treatment and prevention. “We’re absolutely sitting on a time bomb,” Strathdee says. “All of these people are going to fall through the cracks, and it’s going to blow back to both countries. If we don’t do something soon, it’s really going to get out of control.” **—JON COHEN**

injectors were infected before we even knew about AIDS,” says Des Jarlais, as he walks up to the Lower East Side Harm Reduction Center for a visit. New infections occurred in this IDU population at the staggering rate of 13% per year.

Today, studies by Des Jarlais and others have shown that the incidence of HIV in New York City IDUs is 1%. “We’re running out of new infections,” says Des Jarlais, a social psychologist who directs research at Beth Israel’s Baron Edmond de Rothschild Chemical Dependency Institute.

Although the city’s IDU population has dwindled to an estimated 100,000, that doesn’t explain the steep drop in incidence. The main reason is that users stopped shar-

Pay Now, Benefits May Follow

BRONX, NEW YORK—As a celebrated study known in shorthand as HPTN 052 unequivocally proved last year, antiretroviral treatment is prevention: When people reduce the amount of HIV in their bodies, they are less likely to infect others. But for it to work, people, of course, have to learn that they are infected, seek care, and then take their medicine—and there's a steep drop-off between each of these steps, which collectively is called the "treatment cascade" (see p. 168). Now, an innovative and ambitious follow-on trial, dubbed HPTN 065, is taking place both here and in Washington, D.C., to see if it can build on its sister study. "We have to make a dent at every step of the cascade," says Wafaa El-Sadr, the study's principal investigator and an epidemiologist at Columbia University's Mailman School of Public Health.

The HIV Prevention Trials Network (HPTN), sponsored by the U.S. National Institute of Allergy and Infectious Diseases, will spend \$32 million on HPTN 065. The study began in September 2010 and will ultimately involve 10,000 people in the Bronx and D.C., both of which are hard-hit by HIV/AIDS, particularly in African-American and Latino communities. In addition to launching major testing campaigns, the study will assess whether giving cash incentives to people who test positive will encourage them to seek care, thereby reducing their viral loads. Only half of the nearly 40 sites that provide testing and care will offer the incentives, which allows HPTN 065 to determine whether they have an impact. As an added control, the study is also examining data from patients in



Rewarding experience. Wafaa El-Sadr (left) and a patient who earned a gift card by suppressing HIV.

Houston, Texas; Chicago, Illinois; Philadelphia, Pennsylvania; and Miami, Florida, which have no similar large-scale campaigns to test and treat. Health departments in each city are collaborating with the study investigators.

The HPTN 065 team recognizes that paying people to take care of their own health might seem absurd, but weight-loss and smoking-cessation programs have successfully used "contingency management" or "conditional cash transfers." El-Sadr adds that the designers of HPTN 065 consulted closely with the community and thought long and hard about how best to do this. "Before we introduced our financial incentive, we had to think so carefully about what can happen that's good and what can undermine what you're trying to do," El-Sadr says. "And we want to use incentives that, if they are effective, will be cost-effective for health systems."

The study offers no financial incentive for testing—as El-Sadr points out, the same negative people might keep coming back just for the cash. Instead, it gives people who find out they are positive a coupon they can redeem for \$125 worth of Visa gift cards if they show up for a clinic visit and complete laboratory tests. Patients who keep their appointments, take their antiretroviral drugs as instructed, and reduce the amount of HIV in their blood to undetectable levels receive gift cards loaded with \$70 up to four times per year. The reward gives new meaning to the credit card company's tag line, "Life Takes Visa."

The researchers plan to complete the trial by February 2014. **—J.C.**

ing needles, Des Jarlais says—thanks in large part to this Harm Reduction Center and many other groups doing similar work. "In the beginning, there was nothing at all

like this," Des Jarlais says about the center, which last year took in 200,000 used syringes and gave out 250,000 clean ones. The 24-person staff also offers HIV testing, help finding housing, and counseling. "This is a full-service organization, and that's the key to its success," Des Jarlais says.

As Des Jarlais and colleagues explain in an article in the January 2011 issue of *Substance Use & Misuse* that looks at HIV in IDUs in New York City over the past 25 years, the logic of providing clean needles to people who shoot up heroin, cocaine, and other illicit drugs did not immediately win over the public or politicians.

"Syringe exchange was considered as early as 1985 but encountered very strong opposition," they note. An article in the same issue recounted that police, conservative politicians, and heroin-weary African-American communities were wary of seeming to condone drug use. Indeed, the U.S. Congress in 1988 outright banned the funding of needle-exchange programs. "With such strong resistance to syringe exchange, punitive drug laws, and the federal ban on syringe exchange funding, it is, in fact, quite remarkable that so much was subsequently accomplished," wrote Daliah Heller and Denise Paone, who worked on the issue at the New York City Department of Health and Mental Hygiene.

Local laws and policies began to change in the early 1990s in response to vocal AIDS activists who illegally distributed clean needles and confronted lawmakers, citing scientific evidence that syringe exchange slowed HIV's spread. As Des Jarlais and colleagues detail, the increase in syringe-exchange programs directly correlates with a precipi-



Swap, meet. Don Des Jarlais at Lower East Side Harm Reduction Center, which runs a popular needle exchange and hangout.

CREDITS: MALCOLM LINTON

tous drop in HIV incidence among IDUs. Heller, who is now a visiting scholar at the City University of New York, says there was also a “diffusion of benefit” from the prevention message that came along with syringe-exchange programs. “Syringe exchange was strong at getting the word out, which was almost as important as getting the needles out,” Heller says.

Des Jarlais says syringe exchange did not single-handedly turn around New York’s HIV/AIDS epidemic in IDUs, stressing that the growth of programs that provide opiate addicts with substitution drugs such as methadone and buprenorphine, which are

taken orally, has played a major role. “In the early days of the epidemic, drug-treatment programs didn’t want anything to do with people with HIV,” he says. “People were scared.” Today, Beth Israel runs 18 methadone clinics around the city, the largest such program in the world.

Des Jarlais says to take the next step and eradicate the spread of HIV in IDUs would require more effectively coupling drug substitution, counseling, and antiretroviral treatment with syringe exchange. But he says it offers a huge payoff for a small investment. “If I had limited money, and a lot of places in the world have extremely limited money,

I’d do syringe exchange first,” Des Jarlais says. “It’s the cheapest intervention and can be done with a wide variety of staff. You don’t even need M.D.s.”

To Des Jarlais’s “profound regret,” the lesson of New York City and syringe exchange has fallen on deaf ears in too many locales—including in the U.S. Congress, which lifted the ban on federal funding in 2009 only to reinstate it 2 years later. “I’m extremely frustrated that people are not applying what we know,” he says. “HIV prevention for people who inject drugs can be remarkably effective. It’s about having the political will to apply what we know.”

—JON COHEN



Time heals. With help from Josiah Rich (*left*), Robert Quintana’s health improved when he was locked up.

ment when they get out,” Rich says.

People unaware of their HIV status are three times more likely to transmit their infection, and they also, obviously, will not seek treatment for it. Since 2006, the U.S. Centers for Disease Control and Prevention has recommended “opt-out” testing for all prisoners, noting in a “guidance for correctional settings” that less than half of all state prisons that year reported that they offered it. Rhode Island, in contrast, a small state of just over 1 million people, began mandatory testing of all convicted prisoners in 1989 and has an opt-out policy for people in jails who have not yet been sentenced. One-third of all HIV diagnoses in the state during the following decade were made while people were locked up, Rich reported in the October 2002 issue of *AIDS Education and Prevention*.

Although transmission can occur in prison, Rich has helped document that few people become infected behind bars. Much more typical is a patient he saw one morning this spring. Robert Quintana has struggled with heroin addiction since he was a teen and is now doing a 5-year stint for a drug-related burglary. As Rich palpates Quintana’s liver, the 43-year-old patient says there’s no comparison between the medical treatment he’s receiving at this minimum-security facility versus that at the Massachusetts prison he called home between 1991 and 2000. “It’s a really big difference,” says Quintana, who takes antiretroviral drugs for his HIV and a treatment that he hopes will cure his hepatitis C infection. “They actually care over here. There, it was take it or leave it. ‘You don’t take medicine now? Fuggedaboutit.’ Here, I’ve only missed a couple of doses.”

PROVIDENCE, RHODE ISLAND

HIV and the Cell: The Prisoner’s Dilemma

JOSIAH RICH BELIEVES THAT ONE OF THE most important places to stanch the AIDS epidemic is in the nation’s prisons. “If you think that treatment can get us out of this HIV epidemic, which I think it can, these are exactly the people we need to focus on,” says Rich, a clinician and researcher here at Brown University who treats HIV-infected inmates in the cluster of correctional facilities in nearby Cranston.

As Rich notes, the United States incarcerates roughly 10 million prisoners each year—the most in the world—and people behind bars disproportionately come from the highest risk groups for HIV infection:

injecting drug users, heterosexuals who have concurrent relationships, the impoverished, the homeless, and African Americans and Latinos. Some 150,000 HIV-infected people are released from jails and prisons each year. That’s 12.5% of all the infected people in the country.

Over the past 18 years, Rich has conducted pioneering research about HIV/AIDS in prisoners and helped Rhode Island create one of the most progressive and effective programs to help people both behind bars and when they’re on the outside. “Many prisoners are not getting treated, and even ones who are getting treated, we’re not keeping them in treat-

For Quintana and HIV-infected prisoners in Rhode Island—and in many other locales—prison becomes a place to improve their health. But that progress typically evaporates soon after release. A study Rich co-authored that examined Texas prisoners between 2004 and 2007 asked whether they filled their

prescriptions for antiretroviral drugs upon release. After 2 months, 70% had not picked up their pills, as Rich and colleagues reported in the 25 February 2009 *Journal of the American Medical Association*.

Rich and his Rhode Island colleagues have shown how to extend the benefits from inside

to outside through Project Bridge, which began at Miriam Hospital in Providence in 1996. The project has a social work team that helps inmates for the first 18 months after release. At the end of that period, 90% of participants were still in care.

—JON COHEN

BALTIMORE, MARYLAND

Dancing the Night Away; Keeping HIV at Bay

TO UNDERSTAND THE SPREAD OF HIV AND effectively intervene, researchers have long sought out people at risk, from gay men and injecting drug users in some populations to young women and migrant men in others. But there has been a push in the past few years to focus on venues where the uninfected and infected mingle. And in Baltimore, two venues that are receiving increased attention from researchers and public health officials have little in common other than the fact that they both involve dancing: clubs that stage “house/ball” events popular with African-American men who have sex with men (MSM), and bars that feature strippers who cater to all races of heterosexual men. “They are such different populations and the dynamics are so different,” says Susan Sherman, a behavioral scientist at Johns Hopkins Bloomberg School of Public Health (JHSPH) here, who studies exotic dancers. “The link is we try to meet people at places where risk is generated.”

The house/ball community, made famous in the 1990 documentary *Paris Is Burning*, draws hordes of young MSM to jam-packed clubs to watch dancers strut down runways in front of a panel of judges. The dancers often belong to different “houses” and compete in gender-bending competition categories including butch queen and schoolboy. “Go to a gay bar in Baltimore, and there are two black guys,” says Chris Beyrer, an epidemiologist at JHSPH, who recently attended his first ball with a younger researcher now working with the house/ball community. “At the ball, there are hundreds of people dancing.”

The Baltimore City Health Department has a youth outreach coordinator, Keith Holt, who is part of the community and stages an annual ball called Know Your Status. “Some people have made ballroom their life, and there’s a lot of risky behavior,” Holt says. On 13 June, Baltimore Mayor Stephanie Rawling-Blake announced a new HIV/AIDS awareness campaign, Status Update, that fea-

tures posters of people in different category costumes with this ribald pun: “Have Balls. Get Tested.”

No studies have specifically analyzed the HIV/AIDS prevalence in the house/ball community here, but researchers have included the events in venue-based testing in Baltimore, which helped reveal that the city has a severe epidemic in MSM. As JHSPH behavioral scientist Danielle German and colleagues reported in the 1 May 2011 *Journal of Acquired Immune Deficiency Syndromes*, they did surveys and testing in MSM venues as part of the National HIV Behavioral Surveillance, a system organized by the U.S. Centers for Disease Control and Prevention (CDC) to assess prevalence in different high-risk communities. The results of the first survey, which took place in 2004 and 2005, caught the city off guard. “Baltimore has this striking black MSM epidemic that nobody had any idea about,” German says.

A second survey in 2008 tested 448 men, 71% black and 23% white, regardless of whether they had tested positive before. The prevalence was 37.5%, and a startling 78.4% of the men did not know their status. German has done intensive studies to understand why so many of the MSM did not know their status, noting that it is more of a problem here than in other test cities. Jamal Hailey, an African-American MSM who manages HIV-prevention programs at the University of Maryland, Baltimore, and conducted field research for the study, says he thinks the rampant pov-

erty and depression in Baltimore are the main factors. “A lot of people are just trying to make it,” says Hailey, whose own father died from AIDS 13 years ago. “So getting an HIV test isn’t at the top of their to-do lists.”

In the past 2 years, JHSPH’s Sherman has published four papers about the dancers who work at the two dozen strip clubs on East Baltimore Street—an area called “The Block.” One study of 98 strippers, published in the 1 April 2011 issue of *Drug and Alcohol Dependence*, found that although the women don’t see themselves as sex workers, 42% of those surveyed traded sex for money or other valuables, and they were three times more likely to do this if they smoked crack cocaine. Half of the women said they started to smoke crack or shoot heroin after they became



Site visits. Baltimore’s HIV prevention efforts target—and stage—competitive dances at gay clubs.

exotic dancers. “These women have limited negotiating power,” says Sherman, stressing that this puts their health at risk. “They come and they go, and there’s no union.”

No researchers have systematically tested the exotic dancers on The Block for HIV, but then there’s little sex-worker research done in the United States. “We don’t really talk about sex workers because we somehow feel it’s not a major driver of HIV spread, but we’re not tracking it,” says Kevin Fenton, director of

CDC's National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention.

Sherman now hopes to conduct both HIV incidence and prevalence studies of women who dance on The Block and elsewhere in the

state—if the clubs and women see that it's in their best interests. "If we could just create some sort of council where different people could talk together—dancers, managers, and owners—then maybe they could make it rou-

tine that condoms are part of sex acts," Sherman says. Their goal is not to "save women from dancing," she says, but to reduce the risks they face from HIV and other diseases when they step down off the stage. **—JON COHEN**

WASHINGTON, DISTRICT OF COLUMBIA

HIV/AIDS Response Renovated in Capital

SEVEN YEARS AGO, A PUBLIC-POLICY nonprofit called DC Appleseed issued a scathing report about the sorry state of the response to HIV/AIDS in the nation's capital, which it said "lags far behind that of many other cities across the nation." The report called the epidemic in this city of 600,000 people a "public health crisis" and faulted the government for its fragmented leadership, marginal attempts to distribute condoms, weak programs for people with substance-abuse problems, and nonexistent surveillance data. "This challenge is of life-and-death importance," the report concluded. "Simply put, business cannot go on 'as usual.'"

It hasn't. And that's coming from DC Appleseed, a nonpartisan group with outposts around the country that organizes teams of attorneys and other volunteers to analyze local problems and then take action.

Although D.C. remains among the hardest-hit cities in the nation, the nonprofit's most recent report says it "has made steady and significant improvements in its overall response to HIV/AIDS." Condom distribution jumped from 115,000 in 2006 to more than 5 million in 2011. The number of publicly supported HIV tests performed tripled between 2007 and 2011, making the District "a national leader." Surveillance updates have "improved greatly" in both quality and regularity, and all these actions have had results.

According to the 2011 annual report from D.C.'s Department of Health, newly diagnosed infections in general dropped by nearly 24% between 2006 and 2010, and the decrease was 71% in injecting drug users. Other recent improvements include chlamydia and gonorrhea cases leveling off, AIDS deaths decreasing, and people learning of their infections at an earlier stage of the disease when they are easier to treat.

The city also has more HIV/AIDS research projects under way than ever before, including a massive study funded by the U.S. National

Institutes of Health (NIH) called HPTN 065 (see p. 179) that aims to find and treat infected people. "Before 2006, there was virtually no research in the District," says epidemiologist Many Magnus, who works here at George Washington University (GW).

Angela Fulwood Wood, who runs a large clinic that's participating in HPTN 065, the Family and Medical Counseling Service (FMCS), credits the city's progress to the nexus of the health department, academia,



Patient pursuer. Robin Thomas of Recapture Blitz tracks down no-shows and returns them to care.

and providers. "We've all grown," Wood says.

Heralded as the changes have been, the city still has a serious HIV/AIDS problem. More than 14,000 HIV-infected people lived in D.C. in 2010, an adult prevalence of 2.7%. African Americans are much more heavily affected, accounting for 91.5% of the female cases and 67.6% of the males. The main modes of transmission are men who have sex with men, or MSM (40.5%), heterosexual contact (28%), and injecting drug users (15.1%).

In the wake of the 2005 DC Appleseed report, D.C.'s Department of Health hired an up-and-coming epidemiologist, Tiffany West, from the U.S. Centers for Disease Control and Prevention (CDC) in Atlanta to right its surveillance ship. GW's Magnus and Alan Greenberg, who previously ran CDC's HIV

epidemiology, soon teamed up with West and her staff. "Public-private partnerships really did help us get a different level of technical support that was required to build this program from scratch," West says. In 2010, NIH also formed the D.C. Partnership for HIV/AIDS Progress, which links its researchers to the Department of Health and also helps fund the city's role in HPTN 065 and other multisite studies.

Wood's team from FMCS works with the health department on several innovative interventions. The group now offers HIV testing at both the Department of Motor Vehicles and the Income Maintenance Administration (welfare) office in the most economically strapped part of the city. Based on Wood's idea, FMCS launched Recapture Blitz to track down patients who disappear. Robin Thomas, an FMCS community health worker, phones missing patients and also drives to their homes to see why they haven't come in for care. "My job is to settle people down," says Thomas, who is HIV-infected herself. "I try to see what's getting in their way and how we can help, whether it's transportation or going to the doctor's appointment with them." A half-dozen clinics now do this in D.C., and in 2010, they found about one-third of the lost patients, half of whom made and kept appointments.

Taking a page from the health department in San Francisco (see p. 175), West and her staff gather data from mandated reporting of lab tests of HIV-infected people to calculate "community viral load," which theoretically should give them a better handle on which neighborhoods are having success or difficulty controlling their infections.

When West took the job here, she dreamed of creating a surveillance program that, like the health departments in San Francisco and New York, was science-driven, understood the community, and could use its findings to inform policies and programs. Recently, she says, people from those cities have knocked on her door. "I never would have thought in a million years that they'd come ask us for technical assistance, but they're doing that right now," she says. "We've literally went from worst to first." **—JON COHEN**



PROFILE: ANTHONY FAUCI

The View From The Top of the HIV/AIDS World

Science spends a day with immunologist and clinician Anthony Fauci, head of the single largest funder of HIV/AIDS research

Anthony Fauci runs a marathon every day.

Fauci heads the single largest funder of HIV/AIDS research, the U.S. National Institute of Allergy and Infectious Diseases (NIAID), and the job requires an early start and a late finish. Part of the U.S. National Institutes of Health (NIH), NIAID will dole out nearly one-third of its \$4.5 billion budget to HIV/AIDS researchers in 2012—and Fauci's imprimatur is visible at every level. An immunologist who made fundamental findings about HIV's destructive ways, Fauci was also a key architect of the President's Emergency Plan for AIDS Relief that

provides anti-HIV drugs to millions of the world's poor.

NIAID funds a wide portfolio of research, and controversies repeatedly erupt around Fauci. A native of Brooklyn, New York, who studied at a Jesuit college, Fauci, 71, enjoys a good debate, and this past year alone has found him at the center of hot topics such as mutant forms of the H5N1 bird flu virus that scientists engineered to transmit in mammals and a mouse retrovirus erroneously linked to chronic fatigue syndrome. He is just as comfortable doing rounds with patients as he is testifying to

Front runner. Anthony Fauci has headed NIAID for 28 years and tries to fit in a run every day to let off steam.

Congress. He's a go-to source for journalists, and photos that clutter one office wall show Fauci hobnobbing with the likes of presidents Bill Clinton, George H. W. Bush, and George W. Bush, and Mother Teresa, Elizabeth Taylor, and rock star Bono.

Fauci's critics say he is an obsessive-compulsive autocrat with a serious limelight addiction. But in his 28 years occupying the NIAID director's office on the seventh floor of NIH's Building 31 in Bethesda, Maryland, no serious charge against him has stuck—and no one has challenged his commitment.

On 10 May, reporting for the special issue HIV/AIDS in America (see p. 167), *Science* jogged alongside Fauci for the day.

6:30 a.m. Fauci answers the flood of e-mails that poured in overnight, reads briefing material, and puts finishing touches on a few papers. It's the only peace he'll have all day.

8:15 a.m. A dash to the first-floor cafeteria for a croissant egg sandwich includes brief chats with secretaries, janitors, cashiers, and scientists—but no stopping. "Things are going to seem kind of hectic, because that's my life," he says. "We don't waste time here. I'm a bit of a grump."

8:22 a.m. Back in his office, Fauci's three assistants bounce in and out, sitcom fashion. He swears like a scientist, and his rapid-fire patter mixes the demanding and caustic with a dollop of charm. Boston on the 22nd for a *New England Journal of Medicine* panel! NIH Director Francis Collins at *exactly* 6 p.m. to talk about the H5N1 thing! Get the staffer on the phone who attached a three-page memo in an e-mail! "You violated Fauci rule number 26," he barks at the staffer over his speaker phone. "No e-mail longer than one page!" But he likes the memo, which describes a new independent report about NIAID.

"We couldn't look better if we wrote it ourselves," Fauci crows. "Don't ever send me more than a one-page memo again."

He's kidding. But he's not.

8:51 a.m. Fauci speed-walks up the hill to the NIH Clinical Center to see patients, which he does 3 days a week. The center recently started treating difficult HIV/AIDS cases from the local community. "It's like the '80s again," he says. "It's great for the fellows." He first sees a woman, 51, who presented with zero CD4 cells—normal is above 600, and 200 is the cutoff for AIDS—

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and a skin rash diagnosed elsewhere as cutaneous T-cell lymphoma. “When they told me I had full-blown AIDS, that hurt me,” says the woman, explaining that she had been diagnosed 10 years earlier. “I said to the doctor, ‘What you telling me? I’m going to die?’ And he said, ‘Yeah.’” Clinical Center doctors started her on antiretroviral treatment, her rash resolved, and she now has a CD4 count of 122. Before leaving, Fauci notes that she used to live in Brooklyn. “Bensonhurst,” she says. “I was born in Bensonhurst!” bellows Fauci, whose Brooklyn accent remains undiluted. “It’s inexcusable for somebody to present here with zero CD4s,” he says as he exits. She is hardly an anomaly.

9:06 a.m. Fauci visits five more patients who have been close to the brink: lymphoma in the stomach, acute renal failure, blinding retinopathy caused by cytomegalovirus. One patient is a nurse who, apparently in denial about his disease, had only 23 CD4s when he presented. Another is a wheelchair-bound man who had a rare case of TB that spread to his knee and an even-rarer complication called chylothorax after starting on antiretroviral drugs. Lymph fluid drained from his lungs filled two 1-liter bottles. “You almost never see this,” Fauci said. “This is the 1940s.”

9:43 a.m. Fauci checks in with his wife, Christine Grady, chief of the Clinical Center’s Department of Bioethics. On the speed walk back down the hill to Building 31, he’s sorting out the bioethical dilemma he’s just witnessed in the clinic. “It’s unconscionable in the capital of our nation,” Fauci says. “What’s going on here?”

10:02 a.m. Fauci’s inner circle meets for a daily powwow about his schedule, including a commencement address at the University of Miami, an Institute of Medicine meeting on H5N1, and a request to sit on a panel about a revival of the AIDS play *The Normal Heart*, which was written by pioneering AIDS activist and Fauci-basher-turned-best-friend-forever Larry Kramer. “I said I’d only participate if he had De Niro play me,” Fauci says.

11:07 a.m. “Hugh!” Fauci hollers, calling for his top deputy, the mild-mannered Hugh Auchincloss Jr. Fauci wants to make sure the ExCom—the executive committee meeting later today with his division directors—runs like clockwork. “I have a phenomenal impatience for people who go over their allotted time,” Fauci says. One of his three adult daughters phones, and he speaks to her as though time does not exist.

12:00 p.m. Fauci changes into a T-shirt, shorts, and sneakers and heads off campus

for a 5-kilometer run, which is followed by a quick shower and a stop at the cafeteria for a yogurt and hummus with pretzels. He eats lunch at his desk, which is followed by a meeting with an investigator in his lab who updates him about cutting-edge HIV cure research.

1:47 p.m. “Patty!” Fauci, reviewing his schedule for his commencement talk in Miami, is pissed that he has to kill time at his beachfront hotel. “I have 5 hours of doing nothing,” he complains to Patricia Conrad, his right-hand woman, who formerly worked at the White House. He then puts finishing touches on slides for the opening plenary that he will give at the 19th International AIDS Conference. Fauci may be the only presenter at the meeting who has finished preparing for his talk 2 months early.



Political office. Fauci’s job blends science and medicine with diplomacy and policy.

3:30 p.m. The ExCom gathers 30 of NIAID’s top brass in a conference room, and the bland review of budgetary issues segues into a spicy discussion about H5N1 and the ripple effects of the bird flu controversy. NIAID funds studies of many other pathogens, and Fauci asks whether it should continue to support any “gain-of-function” experiments that aim to better understand how a bug transmits or causes disease. “We have to get this aired out,” Fauci says. “I would love to do this in a very transparent way.”

5:00 p.m. At a gathering of Fauci’s own lab members, a researcher reviews a study of a promising experimental hepatitis C drug. Fauci is wowed by possibilities: There are three times as many people in the United States infected with the hepatitis C virus as

with HIV, and the new drugs have little toxicity and can outright cure many infections.

6:01 p.m. NIH Director Collins summons Fauci to his office for a private meeting to discuss H5N1.

6:30 p.m. Two high school girls interview Fauci about global ethics. “What’s the most important issue you are now facing?” one of the girls asks. “My hope is that in the next 5 years, if we as a nation and a world have the political will to implement what we already have, we’re going to probably see a dramatic turnaround in the AIDS epidemic,” he says. The girls notice a photo of Fauci with Paul Farmer, the Harvard clinician widely celebrated for his HIV/AIDS work in Haiti. “What was it like meeting him?” one of the awestruck girls asks. Fauci, amused, dryly says that they met in

the late 1980s when he spoke to Farmer’s medical school class at Harvard. When they ask him to name his favorite person, he graciously embraces their exuberance and offers that Farmer is one of them. “He really walks the walk,” says the man who really runs the run.

7:12 p.m. A network television producer wants to preinterview Fauci for a possible appearance early tomorrow morning. “She said she wants you to send her home with something solid,” Conrad says. Fauci phones the producer, who has a shaky grasp about HIV/AIDS and needs a 101 lesson, which he obligingly gives. By the time he hangs up at 7:30, he’s spent. “It’s going to be one of those days tomorrow,” he says.

—JON COHEN