as well. Neal Blewett, the minister of health, rallied bipartisan support for a strong HIV/AIDS response and included representatives from the drug-using community in the discussions. And Wodak believes that Australia’s history as a British penal colony helped, too. “Convicts are practical people—they’re not ideologues,” he says.

The Australian government soon went beyond its support of needle and syringe programs, allowing a center to open in 2001, under the auspices of a church group, where users could inject drugs with clean equipment under medical supervision—without fear of prosecution. Located near a busy subway stop, the Sydney Medically Supervised Injecting Centre (MSIC) was the first facility of its kind outside of a few European coun-

tries, and the feedback from clients has been overwhelmingly positive, says the center’s medical director, Marianne Jauncey. “The single starkest, most commonly repeated phrase is, ‘Thank you for treating me like a human being,’” Jauncey says.

A series of independent reviews has found that MSIC has delivered on its promise. The latest, published by the accounting firm KPMG in 2010, found that the center had supervised more than 600,000 injections, referring about one-third of its clients to drug treatment. It managed nearly 3500 overdoses without a single death and saved the health system some US$600,000 per year. Since the site’s opening, HIV infection rates have dropped in the nearby neighborhoods, although the review did not have enough data to link MSIC to the decline.

Australia’s harm reduction effort has had its limits, which the hepatitis C virus (HCV) spotlights. HCV is transmitted by needle and syringe sharing much more easily than HIV is, and it was already widespread when harm reduction efforts began for HIV. According to Department of Health and Ageing estimates, this liver-damaging virus had infected more than 80,000 people by 1986. That number grew to 200,000 by 2000, despite needle and syringe programs. Yet, without those programs, the country would have faced a much larger HCV epidemic: The health department estimates that they prevented more than 100,000 new HCV infections.

Harm reduction programs for both HIV and HCV also overlooked some marginalized populations for a time. A study published in the October 2006 issue of Addiction found few services were available for “ethnic minorities”—a group that included indigenous Australians and immigrants from Vietnam and other Southeast Asian countries—who injected drugs in Sydney and in less urban sites around New South Wales. “It was a harm reduction nightmare,” says Lisa Maher, an epidemiologist at the Kirby Institute who led the study. Over 3 years, 31% of the ethnic minorities in the 368-person study became infected with HCV, a rate three times higher than seen in the non–ethnic minority group. Needle and syringe programs and the accompanying health services for people who inject drugs have since expanded to these communities.

Wodak stresses that harm reduction can only do what its name implies. “We’re happy to make a bad problem less bad,” Wodak says. “We don’t have to eradicate the problem in order to feel that we’ve succeeded.”

PAPUA NEW GUINEA

In PNG, the epidemic that wasn’t

Data vacuum despite improved surveillance

A decade ago, the forecast for the island of New Guinea was dire. A heterosexual epidemic was set to explode, a team of leading international epidemiologists predicted in a report called *AIDS in Asia: Face the Facts*. They warned that “there is every indication that the island is facing an epidemic which resembles those seen in parts of sub-Saharan Africa.” Papua New Guinea (PNG), which shares the island with Indonesia, structured its response to its epidemic based on those early predictions. But the bomb never went off.

To this day, PNG struggles to describe not only why those early predictions were so wide off the mark, but also the exact contours of the smaller, but still serious, epidemic the country is experiencing today. That confusion has come at a steep price, particularly when it comes to decisions about where to target prevention efforts. “It gives rise to a very unfocused program,” says Stuart Watson, country coordinator in PNG for the Joint United Nations Programme on HIV/AIDS (UNAIDS). “We don’t know exactly what we’re responding to, and, as a result, we respond to everything.”

Epidemiologists have long had good reason to fear a serious heterosexual epidemic in PNG. Reported condom use is low. Medically supervised circumcision, which protects heterosexual men from HIV, is rare. Sexual violence, in contrast, is rampant; a survey published in the October 2013 issue of *The Lancet Global Health* found that 40% of PNG men interviewed reported having raped a female “non-partner.” One recent study in a highlands community and Port Moresby, the capital, found that more than 20% of the 154 people tested at sexual health clinics were infected with chlamydia or gonorrhea.

Early predictions suggested that by 2014, 10% of the adults in PNG would be infected with HIV. According to the PNG National Department of Health, the estimate of the adult prevalence today is 0.65%. Watson thinks that understates the true prevalence. “Ask most people cold-face if they believe those..."
figures: no,” he says. But he believes the actual figure is well short of 10%.

“The epidemic in PNG doesn’t make a lot of sense in some ways,” says epidemiologist Andrew Vallely, who lives in Milne Bay province and works with both the PNG Institute of Medical Research (IMR) and the University of New South Wales (UNSW) in Sydney. “Why has HIV not taken off?”

In trying to gauge HIV prevalence in PNG, epidemiologists have had far more assumptions than hard data. Joanne Robinson, a strategic information adviser at UNAIDS in PNG, notes that from 1993 to 2001, the only official HIV prevalence data came from one antenatal clinic at the general hospital in Port Moresby. “They did have very high prevalence rates, but it wasn’t representative of the rest of the country,” Robinson says. Today, data come from 380 sites, and as surveillance has expanded to ever more remote, rural areas, the overall prevalence has dropped.

But the data still give an incomplete—if not outright misleading—picture. “Our estimates are based on extremely limited samples of the population to this day,” Watson says. He notes that only 60% of pregnant women attend antenatal clinics and a mere 40% receive HIV tests. The government has not done systematic, large-scale studies of several “key populations” that often have high HIV prevalence: men who have sex with men (MSM), transgenderers, and sex workers. A small study done in Port Moresby by IMR in 2010 did show extremely high HIV prevalence in people who sold sex, whether they were females (19%), males (8.8%), or transgender women (23.7%).

Moreover, the epidemic is geographically patchy, with high heterosexual prevalence in some regions. As the PNG health department noted that year, just five of the country’s 22 provinces, all in the highlands, accounted for 60% of reported HIV cases even though they have just 40% of the population. “PNG is now experiencing an epidemic concentrated in particular geographical locations and population groups,” states an HIV/AIDS response progress report it filed in March with UNAIDS.

Such patchiness complicates surveillance. For one, it is hard to access many isolated communities on this island of steep volcanic mountains. To reach the highland town of Goroka from Port Moresby,
for example, requires either an expensive flight or a torturous 7-day hike. And the 800 different languages spoken on the island reflect cultural variation, including sexual practices that can affect transmission, such as polygamy and the age of initiation. “What you say about one place is not what you say about another place,” says social anthropologist Angela Kelly-Hanku, who lives in Goroka and works on Vallely’s team.

One surprising cultural factor that may have had a role in curbing the epidemic is traditional penile cutting. Several large-scale studies in Africa have shown that medical circumcision—which removes the entire foreskin under sterile conditions—reduces the risk of sexual transmission of HIV by about 60%. While medical circumcision is uncommon in Papua New Guinea, up to 70% of men in some communities report having had a traditional penile cut as a boy, a procedure that involves cutting different types of slits into the foreskin but not removing it.

Following a recommendation from UNAIDS and the World Health Organization in 2007 that prevention programs in high-prevalence countries should incorporate male circumcision, PNG health officials became interested in launching a national program. With funding from the Australian government, Vallely’s group collaborated on a 4-year study to gauge the procedure’s acceptability and potential impact. What they found surprised them.

When the researchers assessed penile cutting around the country, the places that practiced it the most had the lowest HIV prevalence. “It may help explain why the epidemic looks as it does in PNG,” Vallely says. “To be honest, we never imagined when we heard of these practices that this would be the result.”

**Prevention, Papua New Guinea style**

Early on a Friday evening in March in Kids Kona, one of the many villages tucked into the hills that surround the town of Goroka, some 75 people cram into a mud-floored hut with a corrugated tin roof and excitedly wait for the show to begin. This village cinema, or haus piksa in the local pidgin, has a generator that provides electricity—a rarity here in the country’s Eastern Highlands province—and, of course, a screen, which in this case is an old TV set. The standing-room-only audience is so swept up by tonight’s video that no one leaves when the generator cuts out, candles are lit, and someone has to make a trip to town for more fuel.

This is not Rambo or a rugby match, both of which are wildly popular in this country known by the shorthand PNG. The slick video, a University of Goroka production titled One More Chance, is part of an innovative campaign to prevent HIV’s spread, which has hit some PNG communities hard (see main story, p. 158). It tells the story of Siparo Bangkoma, a local man whose complicated family life was turned upside down by HIV. Siparo became deathly ill from the virus, but he hid his infection from his two wives until the second wife became weak herself and confronted him. When he confessed, the ailing wife told the other. Both women discovered they, too, had become infected. Rage eventually gave way to acceptance, and the two mothers decided they would raise their children together, but agreed that Siparo would no longer have a physical relationship with the second wife.

Siparo is at the screening and speaks to the crowd when the video ends. “You can get HIV and you can live with it,” he announces. “I’m happy because I can stand in front of you and talk out. In my country, many people feel ashamed. I’m not ashamed. God gave me one more chance. Make sure your children are educated. This is a true story. It’s my life story. You have to change your attitude and thinking,” he says.

“‘This is a way to do HIV prevention that’s really true to PNG,’ says Angela Kelly-Hanku, an Australian social anthropologist who studies HIV/AIDS with the PNG Institute of Medical Research in Goroka, where she lives, and the University of New South Wales in Sydney. After the screening, Kelly-Hanku shows off a bottle of antiretroviral (ARV) drugs. “When you take the ARVs, it’s like putting a gate around your garden,” Kelly-Hanku says. “Now, the pigs can’t go inside.”

The student filmmakers who produced One More Chance have made four other HIV/AIDS videos as part of a project called Komuniti Tok Piksa. They target rural communities, which are missed by mass media campaigns and often have low levels of literacy, teaching people how HIV is spread, the importance of testing, and that lifesaving treatments exist. The stories are told in pidgin.

Verena Thomas, who leads the project, says the 110 screenings so far have all been well attended. Says Thomas: “People on the screen are the heroes, whether they’re Rambos or Siparos.”
In collaboration with colleagues in PNG, Vallely and co-workers are now conducting epidemiologic studies to see if the link holds up. At UNSW’s Kirby Institute for Infection and Immunity in Society, another group is doing lab studies with foreskins from PNG to explore fundamental mechanistic questions: How does medical circumcision thwart HIV, and does traditional cutting have any impact (see sidebar, right)? Vallely says if traditional penile cutting does prove capable of lowering the risk of HIV infection, it may ultimately alter public health campaigns. “We don’t want to stop something that prevents HIV from taking off in PNG,” he says.

Watson maintains that confusion about the epidemic’s contours and its drivers wastes precious resources. In 2012, most government spending went toward managing the response, not delivering services like prevention, treatment, and care. “We have a very top-heavy national response that gobbles up nearly 80% of the funding,” he says, noting that the National AIDS Council employs more than 100 people.

The painful Catch-22 is that PNG is left with little money to improve surveillance and figure out how best to curtail its epidemic. “We don’t have the resources for that because we’re still responding to an epidemic we don’t have,” Watson says.

The circumcision conundrum

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Stuart Turville had a surprising item to declare last September when he arrived here from Papua New Guinea (PNG) on a Friday evening flight: a cooler that contained five freshly harvested foreskins packed on ice. “Coming in with samples like this is always somewhat amusing to customs officials in Australia,” says Turville, a virologist at the Kirby Institute for Infection and Immunity in Society in Sydney.

Turville’s team regularly imports this precious cargo from its neighbor to answer a fundamental but underexplored question: How does male circumcision protect against HIV? Studies have clearly shown that medical circumcision works, but confusion remains about the mechanism. Foreskins surgically removed from men in PNG who opt to go through medical circumcision offer an intriguing opportunity to address the question. Whereas some had fully intact foreskins, many had various traditional penile cuts as boys (see main story, p. 158).

Turville is leading lab studies that incubate these different foreskins with fluorescently labeled HIV (pictured). That allows researchers to assess how the transmission process is affected by factors that vary among the foreskins, including the degree of keratinization (in red) and the presence of immune target cells.

Surprisingly few groups have published studies about the protective mechanism of circumcision, says virologist Thomas Hope of Northwestern University’s Feinberg School of Medicine in Chicago, Illinois, a veteran researcher of foreskins and HIV who has begun collaborating with the Kirby Institute group. “And a lot of it is wrong.”
In PNG, the epidemic that wasn’t

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