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Circumcision — A Surgical Strategy for HIV Prevention in Africa

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In a radical departure from earlier strategies, public health officials are now arguing that circumcision of men should be a key weapon in the fight against infection with the human immunodeficiency virus (HIV) in Africa. Recent studies have shown that circumcision reduces infection rates by 50 to 60% among heterosexual African men. Experts estimate that more than 3 million lives could be saved in sub-Saharan Africa alone if the procedure becomes widely used. But skeptics argue that efforts to “scale-up” circumcision programs on the continent that has the fewest physicians per capita may draw funds away from other necessary public health programs, ultimately threatening already tenuous health care systems.

How circumcision prevents HIV transmission is not completely understood, but scientists believe that the foreskin acts as a reservoir for HIV-containing secretions, increasing the contact time between the virus and target cells lining the foreskin's inner mucosa. Early evidence of circumcision's protective effect dates back to the late 1980s. Researchers working in Africa and Asia noticed that HIV-prevalence rates differed dramatically among neighboring regions and were often lowest in areas where circumcision was practiced. More than 40 observational studies followed, but most researchers remained skeptical about the results. Then, in 2002, Bertran Auvert, professor of public health at the University of Versailles, launched one of the first randomized, controlled trials of circumcision in Orange Farm, South Africa, a community with a low rate of circumcision and a high prevalence of HIV infection. After the 12-month interim analysis, the data and safety monitoring board decided to stop the trial. The data were clear: circumcision reduced the rate of HIV infection among heterosexual men by 60%.¹

Since then, two other randomized, controlled clinical trials in Kenya and Uganda have confirmed the results from South Africa.^{2,3} Both were stopped early because of overwhelmingly positive results. The research teams thought it was unethical to require men in the control group to wait 24 months before undergoing circumcision. A few men had already obtained off-protocol circumcisions, but since the study results were released, the demand has skyrocketed. “We have three operating rooms running every day,” said Ronald Gray, lead author on the Ugandan study and professor at the Johns Hopkins Bloomberg School of Public Health. “We have done about 1000 surgeries in 3 months — after completing all of the surgeries for trial participants.”

Researchers have also found that circumcision provides increased protection against the human papillomavirus, herpes simplex virus, syphilis, and chancroid. But the most compelling evidence is still for HIV prevention, argues Roger Shapiro, a researcher at Harvard School of Public Health who is helping to implement a pilot program to offer infant

circumcision in Botswana: “Circumcision isn’t a new scientific breakthrough, but it works. It is the only proven medical intervention that can complement condom use and improve protection. If we had this level of data for a vaccine or a microbicide, you can bet there would be a massive push for immediate scale-up.”

Key distinctions between penile surgery and less-invasive methods of HIV prevention, however, may hinder momentum. For one thing, some African officials remain wary of circumcision because of concerns about cost and safety. Currently, physicians are performing most circumcisions, but many countries are hoping to decrease costs by training a cadre of lower-level health care workers (such as medical or clinical officers and nurses) to fill the provider gap that many countries face. Adequate training is essential, however, since complication rates ranged from 1.7 to 3.6% among HIV-negative men in the trials (as compared with rates of 0.2 to 2.0% associated with infant circumcision in the United States). Most complications were minor — pain or bleeding — but higher complication rates have been reported outside trial settings. One recent report indicated that severe complications developed in 18% of men, and 6% had permanent adverse sequelae including mutilation of the glans, excessive scarring, and erectile dysfunction.⁴ Inadequate sterilization procedures and surgical instruments were probably important factors in the higher rates, but Daniel Halperin, senior research scientist at Harvard School of Public Health, argues that high complication rates primarily reflect a problem with training, not with the procedure itself: “Circumcision can be performed safely, with relatively few complications, anywhere in the world, if clinicians are trained properly.”

Policymakers are also struggling with complex cultural barriers in societies where circumcision is not part of mainstream practice. In countries such as South Africa, for example, most men are not circumcised, but certain subpopulations, including the Xhosa ethnic group, practice circumcision of boys as a rite of passage into manhood. Many South Africans frown on the practice, and after several young Xhosa boys died from circumcision-related complications, then-President Thabo Mbeki signed a bill banning (with some religious and medical exceptions) circumcision in boys under 16 years of age. Some fear that the deaths associated with traditional circumcision have prevented expansion of the program in South Africa, but others argue that offering clean, safe medical circumcision to these communities could be lifesaving.

Many public health researchers fear that there are deeper reasons for some African governments’ skepticism. Some speculate that Africa’s colonialist history has left these leaders with lingering suspicions about possible oppression, which have long taken the form of “deep denial regarding HIV treatment and prevention in certain regions of Africa,” according to Francois Venter, clinical director of HIV management and reproductive health at the University of the Witwatersrand in South Africa. Others reference the dark history of surgical interventions deployed in the name of public health, citing the Indian sterilization camps of the 1970s. All agree that implementation of circumcision on a national level will require in-country champions and strong political will to succeed. “Currently all of the funding is coming from Western nations,” says Venter, “and this makes people suspicious.”

To counterbalance perceptions of Western intrusion, the U.S. President’s Emergency Plan for AIDS Relief (PEPFAR) is working with local governments and public health partners to create an acceptable and sustainable model for implementing circumcision programs. “Countries are going to have to scale-up according to their own goals,” said Catherine Hankins, chief scientific adviser to the Joint United Nations Program on HIV/AIDS (UNAIDS). “We are not setting any international agendas.” UNAIDS, the World Health Organization (WHO), and their partners have set up a Web site (www.malecircumcision.org) to allow interested countries to trade information directly.

Most people involved in scaling up adult male circumcision recognize that the surgery is a costly endeavor and a socially complex intervention that may compromise other public health priorities. Venter argues, “In South Africa, we have many other competing health issues, including maternal and child health and tuberculosis, which still need much more support.” Nevertheless, he remains a proponent of circumcision as a means for getting young men into the health care system to help protect them against HIV and educate them about safe sex practices.

Major international funders, including the Bill and Melinda Gates Foundation and PEPFAR, agree that ramped-up circumcision efforts must be funded as add-on services to guarantee that they will not detract from other programs. Although PEPFAR has granted \$26 million for circumcision programs in 13 African countries — Botswana, Kenya, Rwanda, Zambia, South Africa, Lesotho, Malawi, Mozambique, Tanzania, Uganda, Namibia, Ethiopia, and Swaziland — implementation has been highly variable.

In order to optimize HIV-prevention measures, officials from WHO and UNAIDS are advising that countries offer a minimum package of services in addition to circumcision, including HIV testing, screening for sexually transmitted infections, promotion of condom use, and counseling on safer sex. Such a comprehensive approach is meant to address concerns that circumcised men may adopt riskier behavior because they feel protected after undergoing the procedure. Despite these concerns, Gray and others have shown that there are no differences between the sexual behaviors of circumcised men and those of uncircumcised men — reassuring news, since many researchers and policymakers see circumcision programs as an opportunity to engage young men and women in HIV prevention. Robert Bailey, lead author on the Kenya study and professor of epidemiology at University of Illinois at Chicago, has noticed more participation of sexual partners in voluntary HIV counseling and testing since circumcision programs started.

Reaching women through other prevention methods is important because there is no direct evidence to date that circumcision reduces the risk of transmission from men to women. In a small substudy, Ugandan researchers circumcised HIV-positive men and then followed their HIV-negative female partners to see whether their risk of infection was reduced. Data presented earlier this year did not demonstrate a benefit⁵ — a failure the researchers attributed to a sample size too small to allow differences to reach statistical significance. Indirect evidence from modeling, however, suggests that women will ultimately benefit from circumcision programs that reduce the HIV prevalence among men.

Although circumcision has increasing support from researchers, donors, and politicians, its status as a non-behavior-based intervention may ultimately be its biggest obstacle. Neil Martinson, deputy director of the Perinatal HIV Research Institute at the University of the Witwatersrand in South Africa, summarizes this concern: “People are used to policies that target behaviors, but circumcision is a surgical intervention — it’s cold, hard steel — and that doesn’t always go down well.” Ultimately, as programs move forward, the scale-up of circumcision will require strong political backing, adequate funding, and leaders to champion the cause to ensure that it is a safe, low-cost option available throughout Africa.

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