To Screen or Not to Screen: Is That Really the Question?

Few diagnostic tests or screening procedures have engendered as much controversy as the HIV test. From the inception of HIV testing, unique social issues have complicated deliberations about HIV testing. In 1985, when the HIV antibody test was first introduced, evidence suggested that approximately half of persons who were antibody-positive would become persistently infected carriers, and only 10% would develop AIDS (1).

No effective treatment existed, and specific pretest counseling evolved (based on models used with genetic testing for untreatable conditions) to ensure that persons who sought HIV testing were aware of the uncertain meaning of a positive test result. In the context of widespread fear, stigma, and concern about discrimination, many states adopted requirements for separate written consent for HIV testing and established dedicated HIV testing sites, often outside of health care facilities, to allow anonymous testing. Routine HIV screening was unheard of except for blood donors.

Once studies showed that HIV was highly fatal, the Centers for Disease Control and Prevention (CDC) recommended HIV counseling and testing for persons at high risk and patients at hospitals with HIV prevalence rates greater than 1%. The discovery that zidovudine prophylaxis reduced perinatal transmission by two thirds led directly to a recommendation to screen all pregnant women. As of 2002, 38% of adults aged 18 to 64 years (68 million people) reported that they had been tested for HIV at least once; an estimated 16 to 18 million adults are tested annually (2). However, an estimated one quarter of the approximately 1 million to 1.2 million HIV-infected persons in the United States are unaware that they are infected (3). Infection often remains undiagnosed until late in the course of disease despite multiple encounters with the health care system (4, 5). With the advent of effective treatment, clinicians and public health officials have increasingly called for expanded routine screening (6, 7), and the CDC recently recommended HIV screening in health care settings for all patients aged 13 to 64 years (8).

In this issue, Paltiel and colleagues (9) examine the cost-effectiveness of HIV screening with rapid tests, using a sophisticated cost-utility analysis that expresses benefits as gains in quality-adjusted life-years (QALYs). The authors consider the medical benefits to individual patients and investigate several assumptions—both favorable and unfavorable—about the effects of earlier HIV diagnosis and treatment on subsequent transmission. Their conclusion: Routine, one-time rapid HIV testing for all adult patients is cost-effective even when the prevalence of undiagnosed HIV infection is as low as 0.2% (assuming that earlier diagnosis and antiretroviral treatment reduces HIV transmission). Screening is still cost-effective under unfavorable assumptions about the effects on subsequent transmission, but only at a somewhat higher prevalence (0.4%). The unfavorable transmission scenario assumes that HIV screening and treatment increase HIV transmission by prolonging life (and therefore the duration of infectiousness) and that infected persons might increase sexual risk-taking because they mistakenly think that having an undetectable viral load means that they are not infectious. The conclusion about the cost-effectiveness of screening is based on the conventional premise that interventions that produce a QALY for $50 000 or less are a bargain (10). Paltiel and colleagues also show that HIV screening remains cost-effective at an even lower prevalence of undiagnosed HIV infection if early detection leads to a more pronounced reduction in subsequent transmission or if society is willing to pay more than $50 000 per QALY.

How does the cost-effectiveness of HIV screening in Paltiel and colleagues’ study compare with the cost-effectiveness of other HIV screening programs? Since 1995, when the CDC recommended HIV testing for all pregnant women, the number of infants born annually in the United States with HIV infection has decreased more than 90%. In 2002, nearly 70% of the 4 million women who became pregnant reported that they had been tested for HIV during prenatal care (11). Prenatal screening averts as many as 1500 neonatal HIV infections per year. It is cost-saving wherever the HIV prevalence among pregnant women is more than 0.2% and costs less than $50 000 per QALY until HIV prevalence falls below 0.0075% (12). Current policies for testing donated blood are at the other extreme of cost-effectiveness. HIV antibody screening of the 15 million units of blood collected annually averts 1568 infections per year and costs $3600 per QALY (13). Pooled nucleic acid testing for HIV and hepatitis C virus (HCV) was added to the battery of screening tests for donated blood in 1999. According to current estimates, this additional screening averts an additional 4 HIV and 56 HCV infections annually, at a cost of $4.3 million per QALY (14).

The CDC now recommends HIV screening for all adults, which means that HIV screening should become routine practice in primary care offices. Routine HIV screening is likely to be more cost-effective than Paltiel and colleagues suggest. Their model, like other recent analyses (15–17), includes pretest counseling, which costs 3 times more than the rapid HIV test. In addition to increasing the cost, requirements for pretest counseling might also diminish physicians’ willingness to perform HIV screening. Because of competing demands, many clinicians already have difficulty providing all the preventive services recommended for their patients. A recent study in a primary care practice suggests that physicians are more likely to conduct screening than counseling: Patients were up to date on 55% of recommended screening services but on only 9%
of health habit counseling (18). These considerations, and equivocal evidence for the effectiveness of counseling for persons who have negative test results, led the CDC to recommend HIV screening on the same voluntary basis as other screening or diagnostic tests—without pretest counseling or separate, written consent. Counseling efforts should focus on patients most likely to benefit: those with positive HIV test results and patients who have negative test results but engage in high-risk behaviors (8).

Cost-effectiveness models for infectious diseases like HIV often underestimate the ultimate benefits to society. HIV is a communicable, fatal disease for which there is effective treatment but no cure. Paltiel and colleagues conclude that HIV screening is cost-effective when only the medical benefits to infected patients are considered, which is the usual basis for decisions about practice guidelines. However, they modeled the effects on subsequent transmission primarily on the basis of the potential for antiretroviral therapy to reduce infectiousness. They also restricted their benefit calculations to “first-generation” secondary transmissions—that is, new infections attributable to patients who are already infected, but not subsequent transmissions from the persons they might infect. It is crucial to more accurately quantify the many ramifications of early detection and treatment of HIV on overall transmission dynamics. Most patients, after learning that they are infected, take steps to protect their partners; these steps substantially reduce HIV transmission. The aggregate annual transmission rate for persons unaware of their HIV infection is estimated to be 6.9% compared with 2.0% for persons who are aware (19). This reduction in transmission is similar to that achieved with zidovudine prophylaxis to reduce the risk for perinatal transmission, and could have substantial implications for curbing the HIV epidemic. Many of the essential parameters needed to guide decisions about screening—including the prevalence of undiagnosed HIV infection in specific settings, the optimal frequency for retesting, and the ultimate effects on the course of the epidemic—will be known with certainty only after we implement screening and examine the results.

No other industrialized country has instituted HIV screening for all patients. Nonetheless, the new U.S. policy seems proportionate to the problem, because few industrialized countries have an HIV/AIDS epidemic as severe as that of the United States. Current testing practices have successfully identified HIV in approximately 75% of infected patients. However, progress has stalled. An estimated 40,000 new HIV infections continue to occur each year. Nearly 40% of infected patients are not tested for HIV until they develop symptoms, after they have been infected—and infectious—for a decade. The prevalence of undiagnosed HIV infection is likely to fall within Paltiel and colleagues’ range for cost-effective screening in most practice settings. The 1999–2002 National Health and Nutrition Examination Survey estimates that HIV prevalence is 0.43% in the U.S. adult population and is consider-

erably higher among African Americans: 1.42% among non-Hispanic blacks 18 to 39 years of age and 3.58% among those aged 40 to 49 (20). Consistent with CDC estimates, 25% of persons infected with HIV did not know they were infected.

The CDC’s recommendation for opt-out screening is designed to make HIV screening more practical for both physicians and their patients. Patients are free to decline the test without recrimination, and they do not need to admit to some past indiscretion to qualify for testing. Physicians can provide information about HIV testing easily and effectively, with such aids as the prescription-like tear-off sheet developed by the American College of Obstetricians and Gynecologists. HIV screening can bring lifesaving information to infected patients earlier, when it is most beneficial, helping them to protect themselves and their partners. Eventually, reminiscent of successful screening programs for syphilis and tuberculosis, the cost-effectiveness question for HIV will change from whether we should screen for HIV to when we should stop.

Bernard M. Branson, MD
Centers for Disease Control and Prevention
Atlanta, GA 30333

Disclaimer: The findings and conclusions in this report are those of the author and do not necessarily represent the views of the Centers for Disease Control and Prevention.

Potential Financial Conflicts of Interest: None disclosed.

Requests for Single Reprints: Bernard M. Branson, MD, CDC–Division of HIV/AIDS Prevention, 1600 Clifton Road, MS D-21, Atlanta, GA 30333; e-mail, bmb2@cdc.gov.


References

Downloaded From: http://annals.org/pdfaccess.ashx?url=/data/journals/aim/20127/ on 06/25/2018


10. Ubel PA, Hirth RA, Chernew ME, Fendrick AM. What is the price of life and why doesn’t it increase at the rate of inflation? Arch Intern Med. 2003;163:1637-41. [PMID: 12885677]


19. Marks G, Crepaz N, Janssen RS. Estimating sexual transmission of HIV from persons aware and unaware that they are infected with the virus in the USA. AIDS. 2006;20:1447-50. [PMID: 16791020]