Projecting Possible Future Courses of the HIV Epidemic in the United States

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The Future of HIV

The U.S. HIV epidemic has claimed more than 575,000 lives, and 56,300 Americans were newly infected with HIV in 2006. HIV prevention efforts to date have helped hundreds of thousands of people avoid infection, but have not reached enough of those currently at risk of acquiring or transmitting HIV with highly effective interventions to turn the course of the epidemic.

To help set U.S. HIV prevention goals, determine prevention program needs, and project future healthcare costs, the Centers for Disease Control and Prevention and Johns Hopkins University conducted an analysis[1] that projects what the HIV epidemic in the United States might look like in 10 years under different scenarios.

The CDC/Johns Hopkins study reveals that maintaining status quo HIV prevention efforts could put the nation on a dangerous trajectory, resulting in substantial increases in HIV and related costs to the U.S. healthcare system.

Unprecedented Challenges in HIV Prevention

Nearly 30 years into the HIV epidemic, HIV continues to take a heavy toll in the United States. More than 1.1 million people are currently living with HIV, nearly 18,000 people with AIDS still die each year, and lifetime medical care for those who become infected with HIV each year is estimated to cost $20 billion. Gay and bisexual men of all races, African-Americans, Latinos, and injection drug users are most affected.

In the fight against HIV, the nation is facing unprecedented challenges:

- **Impact of economic crisis:** The current economic crisis has severely impacted state and local governments and community-based organizations, with $170 million in cuts to state HIV/AIDS prevention and care programs in fiscal year 2009 alone[2]. These cuts mean that essential HIV prevention services will reach fewer of those at risk of HIV infection. In addition, waiting lists for the federal AIDS Drug Assistance Program (ADAP), which provides HIV treatment to low-income individuals, are at record highs.
- **Increasing HIV prevalence:** It is anticipated that the number of people living with HIV will continue to increase over time, due to the remarkable benefits of life-prolonging HIV treatments. As more people live with HIV, opportunities for transmission increase, as does the need for prevention services and medical care.
- **Complacency:** Despite the severe impact of HIV in the United States, studies show that many Americans — even those at greatest risk of infection — have grown complacent about HIV[3,4]. This is a major concern since lack of awareness about HIV can contribute to increased risk behaviors, and reduce community and governmental mobilization.

Study Examined Five Scenarios

The CDC/Johns Hopkins study examined five scenarios: three scenarios examined likely outcomes of status quo HIV prevention efforts ("base-case scenarios"), and two scenarios investigated the impact of a significant expansion of HIV prevention efforts ("intensified intervention scenarios").

As indicated in the graphs on the following page, the study found that rapid scale up of HIV prevention efforts could substantially reduce the number of HIV infections and the number of people living with HIV over the next 10 years, compared to the base-case scenarios.

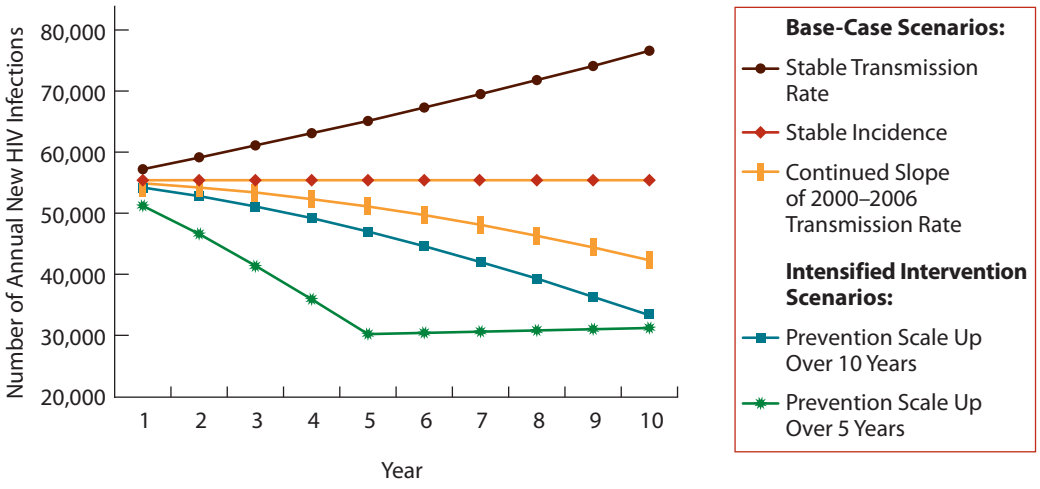
Definitions

HIV prevalence: The number of people living with HIV — with or without a diagnosis of AIDS — at a point in time. CDC estimates that there were more than 1.1 million people living with HIV in the United States at the end of 2006.

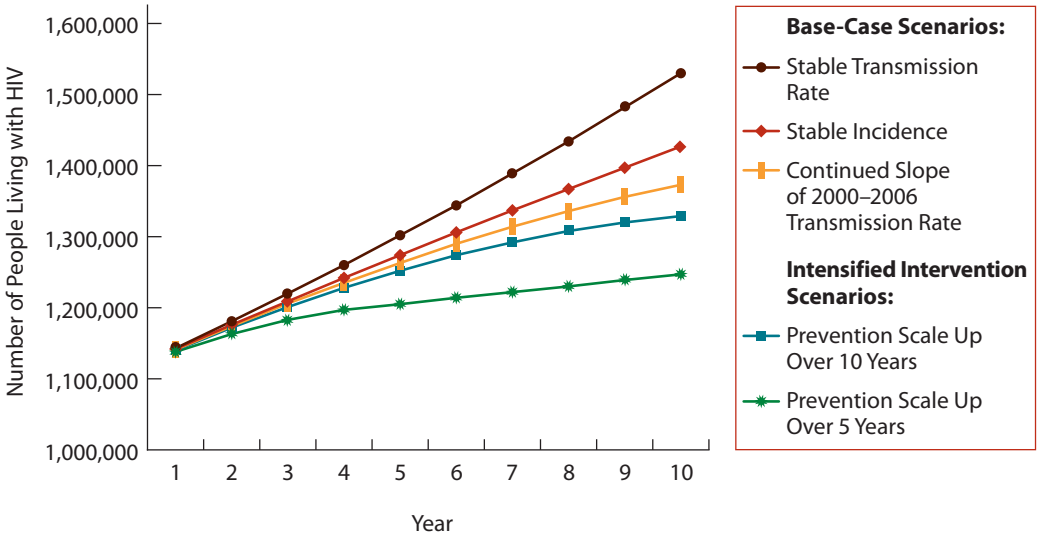
HIV incidence: The number of people who become newly infected with HIV each year. CDC estimates that there were 56,300 new HIV infections in 2006. (The analysis described here draws on historical trends that indicate that 55,400 annual new infections occurred in the United States each year between 2003 and 2006.)

HIV transmission rate: Indicates the estimated number of new HIV infections transmitted per year per person living with HIV. CDC estimates that there were 5 transmissions for every 100 individuals living with HIV in the United States in 2006.

Comparison of Five Scenarios: Projected HIV Incidence



Comparison of Five Scenarios: Projected HIV Prevalence



Status Quo in HIV Prevention Could Translate into a Worsening U.S. HIV Epidemic

Researchers examined three "base-case scenarios" that assumed different epidemiologic trends and a continuation of current federal HIV prevention funding levels. Each scenario estimated the impact on future HIV incidence and prevalence (see box on this page for definitions) over the next 10 years. The study found that continuing current trends could increase the number of people living with HIV by as much as 38 percent, and would cost the U.S. healthcare system an additional $128 billion to $237 billion in medical care costs for those who become infected.

Stable HIV incidence: One scenario assumed that the number of annual new HIV infections would remain constant over the next 10 years at 55,400, which the study projected would increase national HIV prevalence by 29 percent (from 1.107 million to 1.427 million people living with HIV). This scenario is plausible given continued high HIV incidence among men who have sex with men — who make up the majority of individuals infected with HIV — and declining incidence among other risk groups. To hold HIV incidence stable in the face of increasing prevalence means that the HIV transmission rate would have to substantially decline.

Continued decline in national HIV transmission rate: The most optimistic base-case scenario assumed a continuation of the downward trend in the nation's HIV transmission rate observed in recent years (2000–2006), such that the HIV transmission rate would decline in 10 years from 5.0 to 3.1 new HIV infections per 100 persons living with HIV. Under this scenario, the study projected that HIV prevalence would increase by 24 percent (from 1.107 million to 1.373 million people living with HIV) and that HIV incidence would decline by 24 percent (from 55,400 to 42,300 annual new HIV infections). For this scenario to be realized, it would be necessary to discover and achieve enough new efficiencies in HIV prevention efforts to offset substantial cuts to HIV prevention budgets at state and local levels.

Stable HIV transmission rate: The most pessimistic base-case scenario projected the impact of a static HIV transmission rate (at the current CDC estimate of 5.0 new HIV infections transmitted annually per 100 persons living with HIV). It found that both HIV prevalence and incidence would increase by 38 percent (from 1.107 million to 1.530 million people living with HIV, and from 55,400 to 76,600 annual new HIV infections). Recent cuts to state and local HIV prevention budgets may make it difficult to make further progress in reducing HIV transmission.

Rapid Scale Up of HIV Prevention Efforts Could Save the Most Lives and Money

The study found that a rapid expansion of HIV prevention efforts could most effectively reduce the number of new HIV infections in the United States, and save the U.S. healthcare system up to 25 times the amount that would need to be invested in prevention.

Based on expert recommendations provided to Congress in 2008[5,6], the researchers examined two "intensified intervention scenarios" that assumed a significant increase in the federal investment in HIV prevention in order to achieve a 50 percent reduction in the national HIV transmission rate (from 5.0 to 2.5 new infections per 100 persons living with HIV). One scenario examined the prevention interventions and resources that would be needed to cut the HIV transmission rate in half in five years; the other scenario investigated the interventions and resources that would be needed to cut the transmission rate in half in 10 years. Both scenarios placed considerable emphasis on expanding access to HIV testing and behavioral interventions for people living with HIV and those at very high risk of contracting HIV, though they made different assumptions about other HIV prevention efforts that would be required (e.g., local capacity building, HIV surveillance, research, and evaluation).

The study found that the greatest gains could be achieved by scaling up prevention in five years:

- **Expanding HIV prevention in 5 years:** The study found that intensifying national HIV prevention efforts over a five-year timeframe and maintaining them for the subsequent five years could reduce annual HIV incidence by 46 percent (from 55,400 to 30,200 new infections) — saving as many as an additional 306,000 people from becoming infected over the next 10 years — compared to maintaining current prevention efforts. HIV prevalence in this scenario would increase by only 13 percent (from 1.107 million to 1.247 million people living with HIV) — the smallest increase of any scenario included in the analysis. This rapid scale up would also save 25 times the amount that would need to be invested: expanding HIV prevention in five years would require an additional investment of $4.5 billion over 10 years, and would save up to $104 billion in avoided lifetime medical costs.
- **Expanding HIV prevention in 10 years:** The study shows that expanding HIV prevention over a 10-year timeframe could reduce national HIV incidence by 40 percent (from 55,400 to 33,300 new infections) — preventing as many as an additional 215,000 new infections. In this scenario, HIV prevalence would increase by 20 percent (from 1.107 million to 1.329 million

people living with HIV) — lower than any of the "base-case scenarios." This expansion of HIV prevention would require an additional investment of $10.1 billion over 10 years, and would save as much as $66 billion in averted lifetime medical costs.

Rapidly expanding HIV prevention would not be easy, but it is achievable. It is estimated that HIV prevention efforts in the United States to date have averted more than 350,000 HIV infections and saved more than $125 billion in medical costs.

The release of the National HIV/AIDS Strategy in July, 2010 gives the HIV prevention community an opportunity to redefine our nation's approach to HIV prevention and calls for shared responsibility to end the U.S. epidemic. Modeling studies, such as this one, can help guide appropriate actions as we collectively move forward to implement the National HIV/AIDS Strategy. It is clear that progress will require us to direct available resources to the populations and geographic areas with the most urgent needs. Additionally, we must expand HIV prevention efforts for individuals at the highest risk of HIV transmission and infection; ensure a focus on community-level interventions that address underlying HIV risk factors in hardest-hit areas; and work to ensure basic, fundamental HIV knowledge among all Americans.

Additional Resources:

CDC HIV & AIDS
www.cdc.gov/hiv
Visit CDC's HIV and AIDS Web site.

CDC-INFO
1-800-CDC-INFO (232-4636)
Get information about personal risk, prevention, and testing.

CDC National HIV Testing Resources
www.hivtest.org
Text your ZIP code to KNOW IT (566948).
Locate an HIV testing site near you.

CDC National Prevention Information Network (NPIN)
1-800-458-5231
www.cdcnpin.org
Find CDC resources and technical assistance.

AIDSinfo
1-800-448-0440
www.aidsinfo.nih.gov
Locate resources on HIV and AIDS treatment and clinical trials.

For more information, visit the CDC HIV & AIDS Web site at www.cdc.gov/hiv.

References

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