

Ending the Human Immunodeficiency Virus Epidemic: Towards an Evidence-Based Approach

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(See the Brief Report article by Nosyk et al on pages 2195–8 and Viewpoints by Eisinger et al on pages 2212–7.)

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The newly announced Ending the HIV Epidemic (EtHE) initiative aims to reduce the human immunodeficiency virus (HIV) incidence in the United States by 90% within 10 years. The initiative focuses on 50 high-burden counties and 7 Southern states with high rural HIV incidences, and it includes 4 pillars: (1) early diagnosis; (2) the treatment of HIV to achieve viral suppression; (3) the prevention of HIV infection in high-risk subgroups; and (4) the rapid detection of and response to transmission hotspots [1].

In this issue of *Clinical Infectious Diseases*, Nosyk et al [2] present a mathematical model of HIV transmission, calibrated to 6 urban epidemics in the United States. In these areas, the model forecasts modest declines to slight increases in the HIV incidence in each city (ranging from a 19.7% decrease in New York to a 5.2% increase in Atlanta) if the HIV response continues at its current pace. The analysis effectively recapitulates many of the heterogeneities underlying the HIV epidemic (including race, biological sex, and other risk factors), and makes a compelling case that current

service levels will not generate large declines in the HIV incidence in each city going forward. Their results dovetail with a recent modeling study on the national level [3], but by modeling city-level epidemics, Nosyk and colleagues [2] incorporated the specific population dynamics and prevention programs that affect HIV transmission in each city [4]. This study lays a foundation for an evidence-based approach to developing locally tailored strategies to end the HIV epidemic.

If current services will not end the HIV epidemic in the United States, there is a logical next question: what interventions, at what intensity, and targeted to which population subgroups, would be sufficient to achieve EtHE goals? Answering this question in a rigorous, evidence-based manner will be critical. To do so, we must recognize that the US HIV epidemic is driven by heterogeneous transmission across high-risk subgroups [5], and that substantial knowledge gaps—particularly at the local level—make estimating the impact of specific interventions challenging. Addressing these gaps will require engagement from multiple stakeholders, as illustrated by 3 aspects of the HIV epidemic where data are lacking.

First, to better project the impact of pre-exposure prophylaxis (PrEP), we need to better understand the overlap of PrEP eligibility and the HIV acquisition risk at the local level. PrEP eligibility criteria for

heterosexuals, men who have sex with men (MSM), and people who inject drugs are well defined [6, 7]. However, to make accurate predictions about the potential effects of delivering PrEP to these and other high-risk subgroups, we need to know (1) how many people at the local level are eligible within different risk strata; and (2) the baseline risk of HIV acquisition that these individuals face. Filling these knowledge gaps will require engagement by local health departments and researchers, to estimate the overlaps and risks, and by national health policymakers, who can formulate revised guidelines if needed.

Second, to estimate the impact of interventions targeting the HIV continuum of care (rapid testing, interventions to increase viral suppression), we need a more detailed description of the current state of that continuum, especially among key subgroups. Such data are not available systematically at the local level. The Centers for Disease Control and Prevention makes aggregate estimates of linkage to care and viral suppression available at the state and national level [8], and surveys, such as the National HIV Behavioral Surveillance System [9] and the Behavioral Risk Factor Surveillance System [10], capture self-reported HIV testing for states and metropolitan statistical areas. Stratifications of these estimates by age, race, or HIV risk factor are often not available at sub-state levels. Many local health departments

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collect data on the continuum of care, but they are not reported systematically, making a comprehensive synthesis of local data challenging. Developing a more complete understanding of the continuum of HIV care across 50 counties and 7 states will require funding to support additional data collection, sustained political commitment, and a willingness to collaborate across numerous local and state-level jurisdictions.

Third, to estimate the population-level impacts of interventions targeted at specific subgroups, a more detailed understanding of between-group mixing (sexual and needle-sharing networks) is required. A handful of studies have examined sexual mixing patterns along racial lines [11–15], primarily among MSM, and even fewer have looked at needle-sharing networks [16, 17]. Very few studies have looked at mixing across age groups [18]. To our knowledge, no studies have examined mixing with respect to PrEP eligibility or described differences in such mixing across different geographical settings (eg, urban versus rural networks). Filling these gaps will require engagement of the research community and a commitment to generate such data in an accelerated timeframe. These data must then be linked into models and other analytical frameworks to generate an evidence base that can be useful for policy guidance.

Ending the HIV epidemic in the next decade is an ambitious and worthy goal but, as Nosyk et al [2] elegantly describe,

the services and interventions that have brought us to this point will not be sufficient to achieve success. To develop an evidence-based approach to end the HIV epidemic in the United States that is tailored to the needs of local communities, the broad engagement of stakeholders—from local and state health departments, national policymakers, the research community, and funding agencies—will be essential. Given the short amount of time remaining, establishing these networks of engagement could not be more urgent.

Notes

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