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A Data-Driven Approach to Getting to Zero: Modeling Cost-Effectiveness of HIV Prevention and Treatment Strategies in Los Angeles County

On March 22, 2019, the California HIV/AIDS Policy Research Centers (CHPRC) convened a group of stakeholders representing public health, community-based organizations and academic sectors to discuss a data-driven approach to Los Angeles County's plan for Getting to Zero. Leading experts presented a modeling study undertaken by investigators from University of California Los Angeles (UCLA) and University of Southern California (USC), in partnership with the Division of HIV and STD Programs (DHSP) of the Los Angeles County Department of Public Health.

The modeling study is a collaborative project that seeks to gather data and develop a research tool that helps simulate the effectiveness of specific prevention and treatment strategies to end syndemics related to HIV. Drs. Corrina Moucheraud (UCLA) and Sze-chuan Suen (USC) presented their progress on developing the model to ensure that data-driven policy recommendations are based on best estimates for Los Angeles County. This work includes taking into account nuances with HIV disease transmission, its impact on different demographic groups and among those whose behaviors may vary. While there is uncertainty in the process, including challenges with data that are unavailable (e.g. unknown transmission patterns), investigators have pursued efforts to model different interventions.

The overall purpose of the meeting was threefold:

1. Investigators to present progress on developing a mathematical model of HIV transmission among Men who Have Sex with Men (MSM) ages 15-65 years in Los Angeles County;
2. Center staff to engage key stakeholders in Los Angeles County including County representatives, healthcare partners and community-based partners in brainstorming priorities related to HIV prevention and treatment; and
3. Investigators and Center staff respond to queries regarding data that could be made available through the modeling project.

Presentation by Investigators

Investigators Moucheraud and Suen presented on the structural framework of the mathematical model currently under development. See Figure 1 below. Drawing on the prior work of other studies, the investigators demonstrated how the model could serve as a useful tool in making decisions regarding policy priorities. While the details of the model proved intricate, the potential outputs from the model were clear, including the ability to determine how specific interventions could stand to impact the epidemic and HIV-related outcomes as well as the economic costs and benefits.

Investigators specifically discussed how the model could be taken to the next step, to predict HIV-related outcomes and economic costs in addressing the HIV epidemic based on a variety of factors including PrEP uptake, treatment uptake, care coordination, expanded HIV testing, and social programs. The cost of anti-retroviral therapy was recognized as the principal factor in addressing cost effectiveness.

Investigators noted diverse conditions within and among health districts across the County of Los Angeles necessitating robust and high quality data. Such would be required for conducting comparisons intra-district and across multiple districts. Investigators closed with a call for more input on the various scenarios constituents would want to see modeled and key outcomes they would like to see the model simulate moving forward.

FIGURE 1. Outcomes Derived from Model

Epidemic Outcomes

- Total HIV diagnoses
- HIV incidence and prevalence
- Mortality
- Relative benefits of each intervention
 - Infections averted
 - Deaths averted
 - Quality-adjusted life year(s) gained

Costs

Resource use

- Number tested
- Number treated with ART
- Number treated with PrEP

Relative costs of each intervention

- Costs to health sector costs
- Payer’s costs
- Societal costs

Stakeholder Discussion

Participants were asked to identify one or more strategies to ending the HIV epidemic. The following strategies were identified and prioritized in the following order:

Priority 1: HIV/STI testing and treatment

- Implementing rapid antiretroviral start
- Conducting network testing
- Increasing access to STI testing and treatment
- Continuing work on treatment as prevention, U=U
- Targeting individuals not virally suppressed

Priority 2: Pre-Exposure Prophylaxis (PrEP)

- Implementing rapid PrEP start
- Targeting specific communities (e.g. Black and Latinx men who have sex with men and cisgender/transgender women)
- Promoting PrEP linkage and retention
- Bridging Post-exposure Prophylaxis (PEP) uptake to PrEP uptake

Priority 3: Addressing social determinants

- Food insecurity
- Transportation

- Criminalization
- School-age children

Priority 4: Housing and homelessness

- Including people that are HIV-negative but at risk for HIV

Priority 5: Policy

- Expanding access and broaden health centers' services
- Conducting research to effectively advocate for evidence-based policies
- Engaging in advocacy at the state level

Priority 6: Comprehensive sexual health education

Priority 7: Training for service and healthcare providers

- Addressing issues such as medical mistrust
- Expanding PrEP education and services within primary care

Priority 8: Special populations

- Addressing issues of substance use, HCV, and mental health

Stakeholder Queries

After the Investigators' presentation, participants weighed in on their given rationales for identifying the above strategies. Follow-up questions to the investigators revealed an interest in further exploring outcomes currently utilized as measures of success, moving beyond calculations of HIV transmissions averted and costs saved. Participants expressed concerns regarding how data may be failing to capture nuances with regard to where people live, spend most of their time, and obtain HIV treatment and prevention services. Because different neighborhoods have differing levels of access to comprehensive and competent services, a model that is able to account for these geographic differences could provide critical insight moving forward. Participants expressed interest in seeing this model expanded to focus on other specific populations, not just MSM, including transgender-identified individuals and people who inject drugs. Finally, participants expressed interest in understanding if and how the model could address strategies that are currently bundled, such as the supportive housing services providers that offer both housing and social services.

Next Steps

Center staff look forward to collaborating with Investigators of the project and key stakeholders moving forward. With community input and in partnership with the Los Angeles Department of Public Health, the research team will work to address some of the questions and concerns raised during the convening. The Southern California HIV/AIDS Policy Research Center looks forward to presenting the final results of the project.