

PACHA Full Council meeting: HIV Cluster Detection and Response

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Ending
the
HIV
Epidemic



What is Cluster Detection and Response?

Cluster detection and response offers a framework to guide tailored implementation of proven HIV prevention strategies where transmission is occurring most rapidly



Why is Responding to Clusters Important?

**Standard Treatment &
Prevention Services**



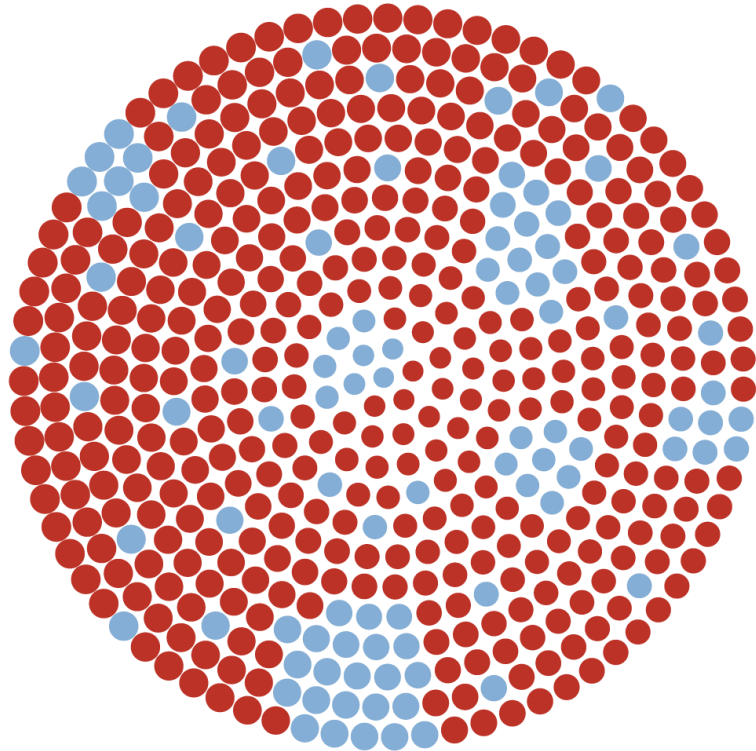
**Cluster
Detection and
Response**

**Tailored Interventions &
Specialized Care**



HIV Is Transmitted Through Networks

Transmission is not uniform

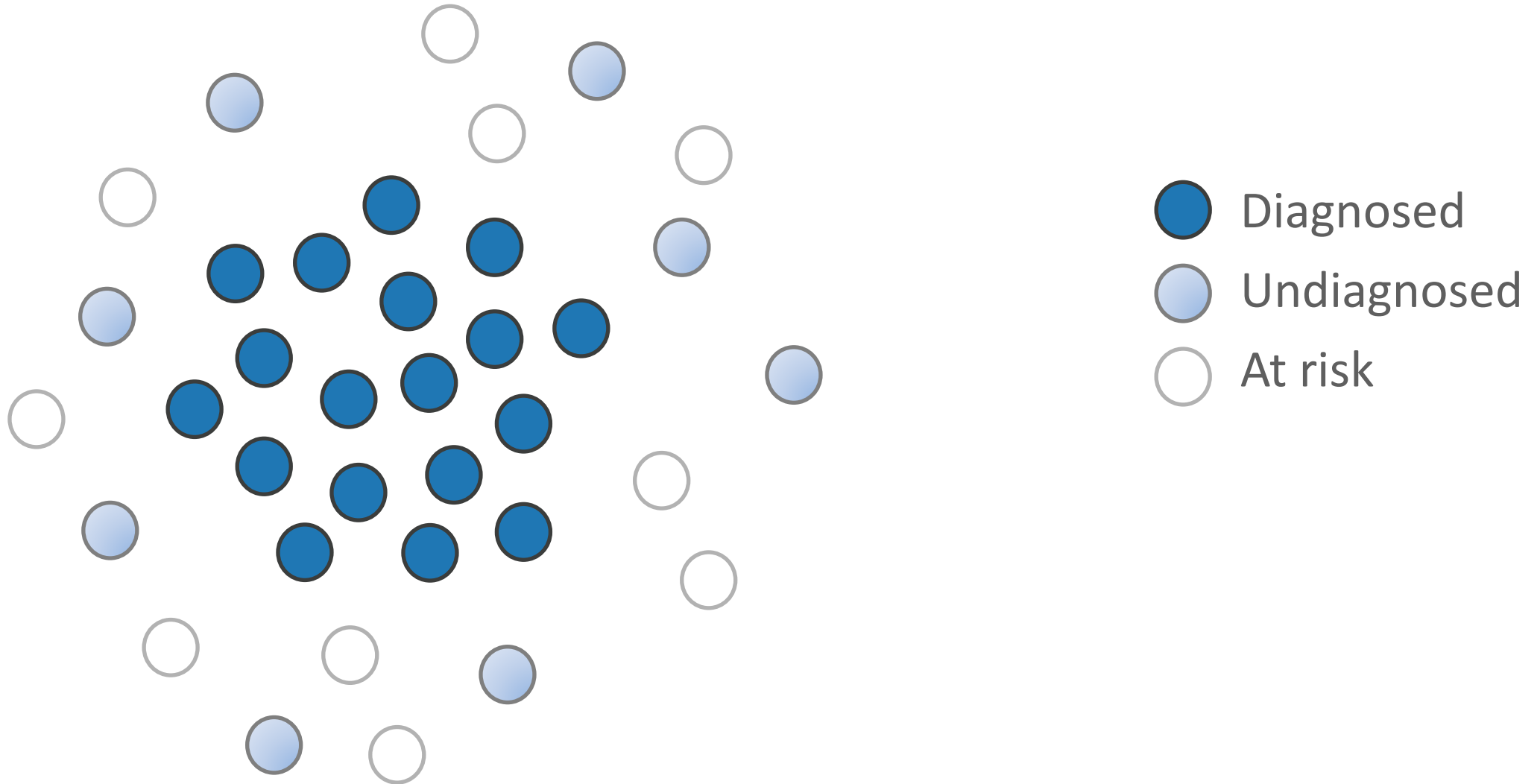


Identify networks in which HIV
is spreading quickly



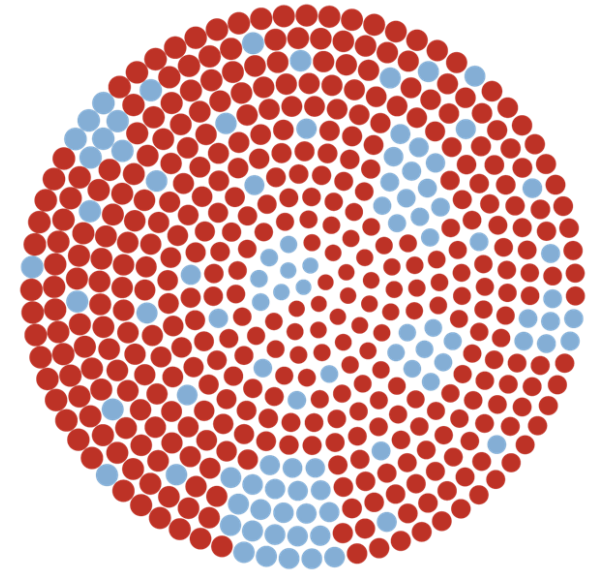
Help people get into care and
prevent HIV

Networks Include People With and Without HIV



Response Activities Should be Tailored to Networks Experiencing Rapid Transmission

- Cluster detection and response goes beyond identifying subpopulations with high numbers of diagnoses
 - Even within priority populations, transmission is not uniform
 - Groups experiencing rapid transmission change over time and show substantial geographic variation
- Identifying networks not reached by existing services presents an opportunity to improve health equity



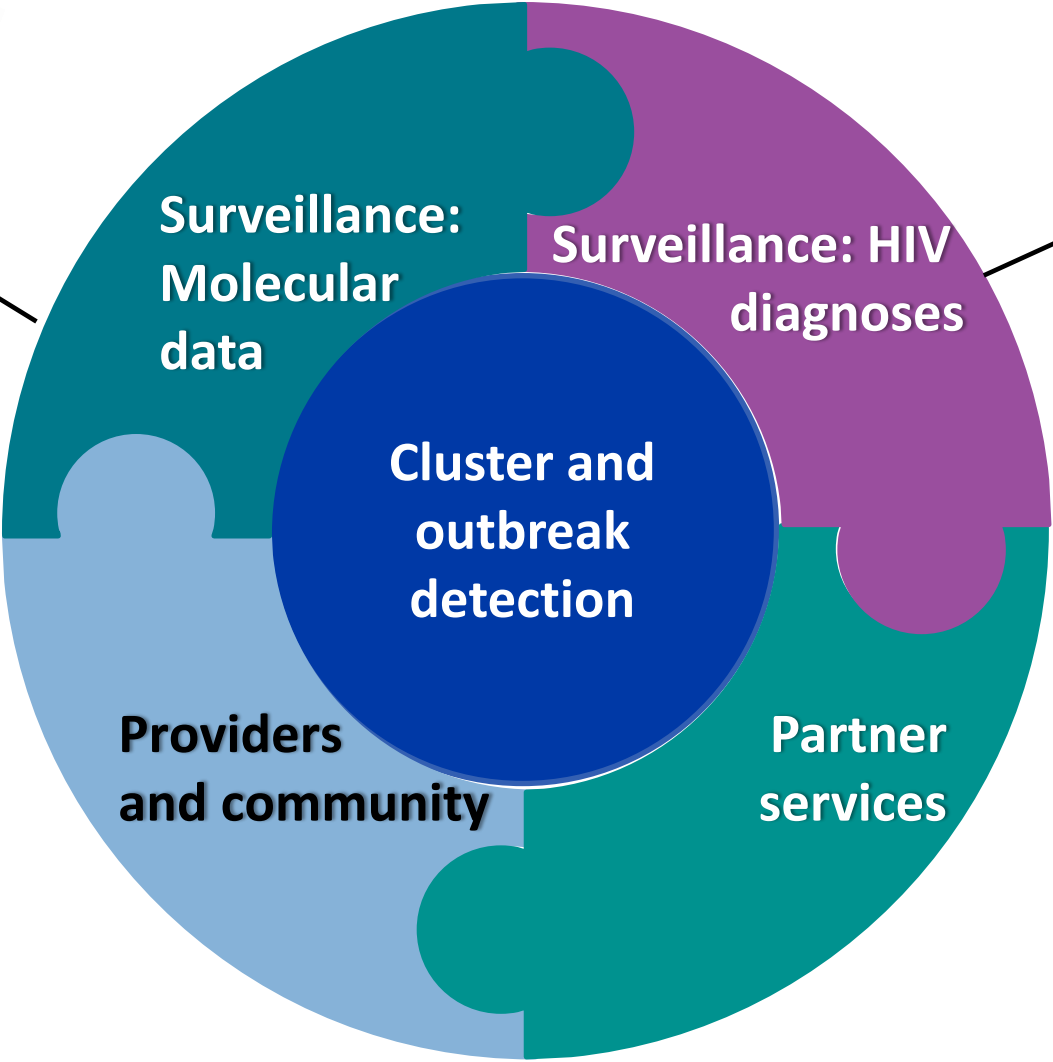


How Are Clusters Detected?

Molecular analysis



Time-space analysis





Molecular Cluster Detection

Identifying Rapid HIV Transmission



Traditional
epidemiology

HIV brings extra challenges

Delayed
diagnosis



Population
mobility



High-burden
areas



Molecular Outbreak Detection Is Longstanding



Averts 250,000 illnesses from
Salmonella annually

Scharff RL *et al.* *Am J Prev Med* 2016

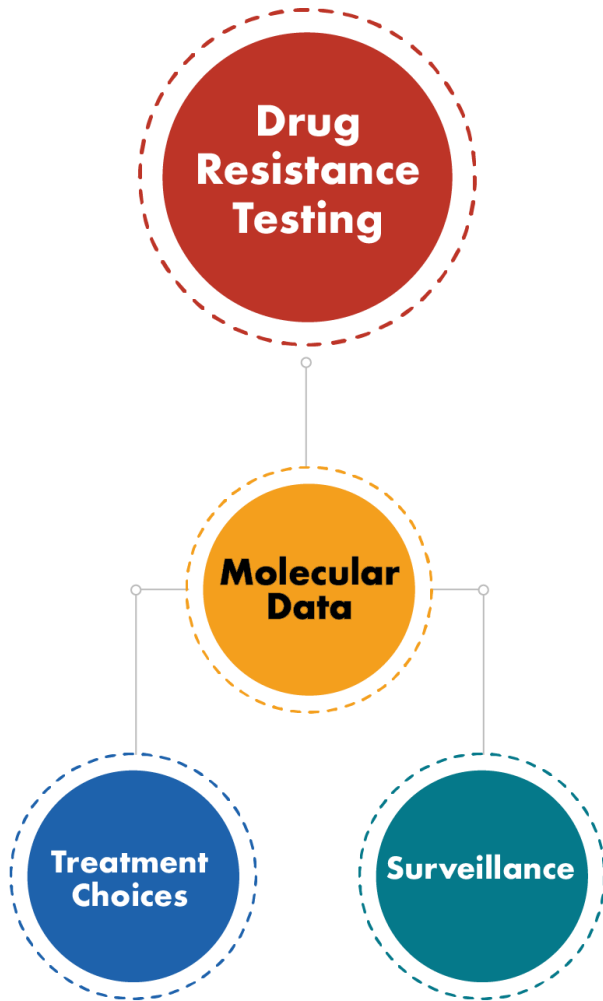


National TB
Genotyping
Surveillance

> 75% of TB outbreaks first
identified using molecular data

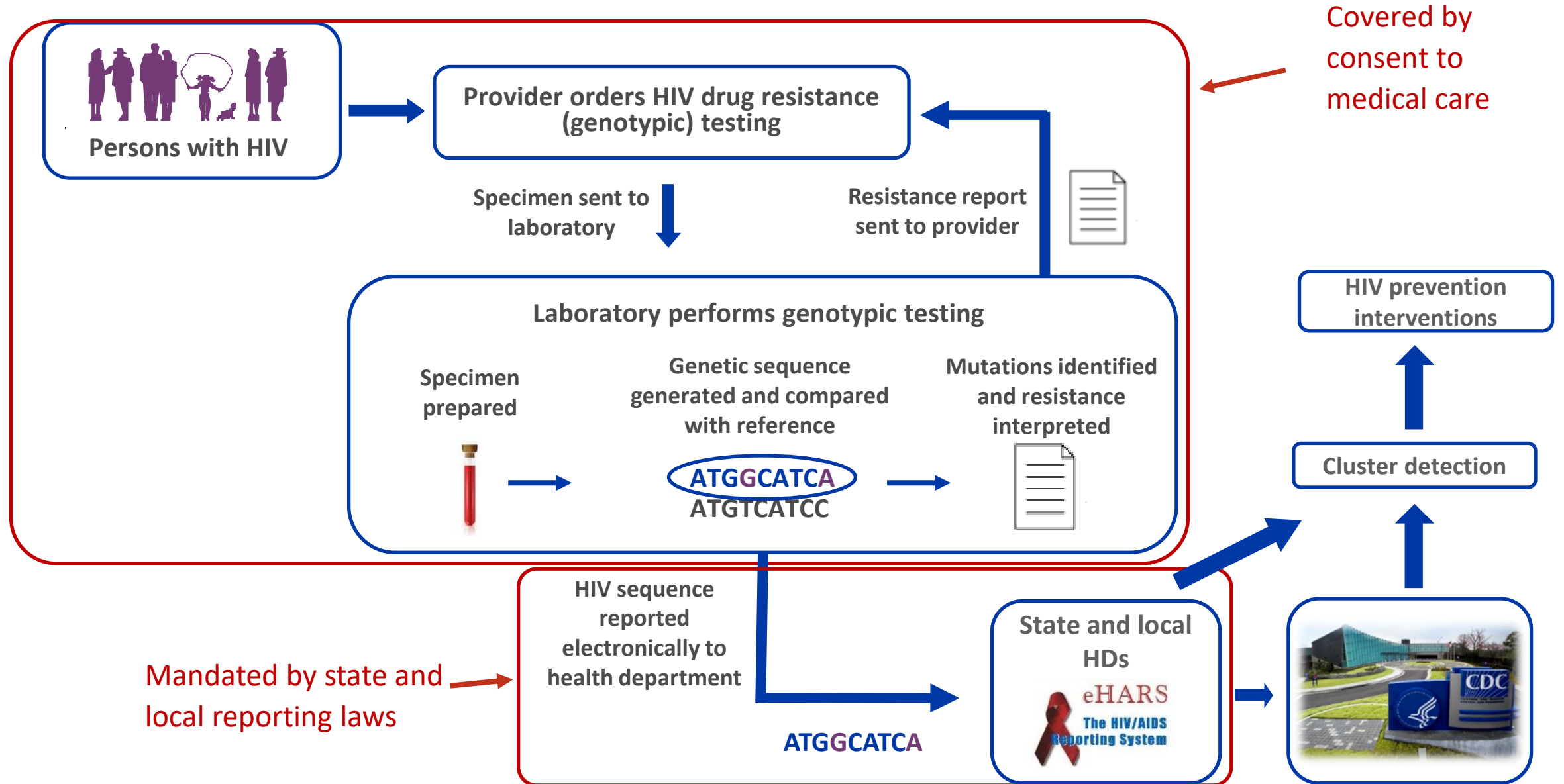
Mindra G *et al.* *Pub Health Rep* 2017

HIV Molecular Data Usually Come from Drug Resistance Testing



- Standard part of clinical care in many developed nations
- Public health agencies can conduct secondary data analysis

How is molecular data collected by the National HIV Surveillance System?



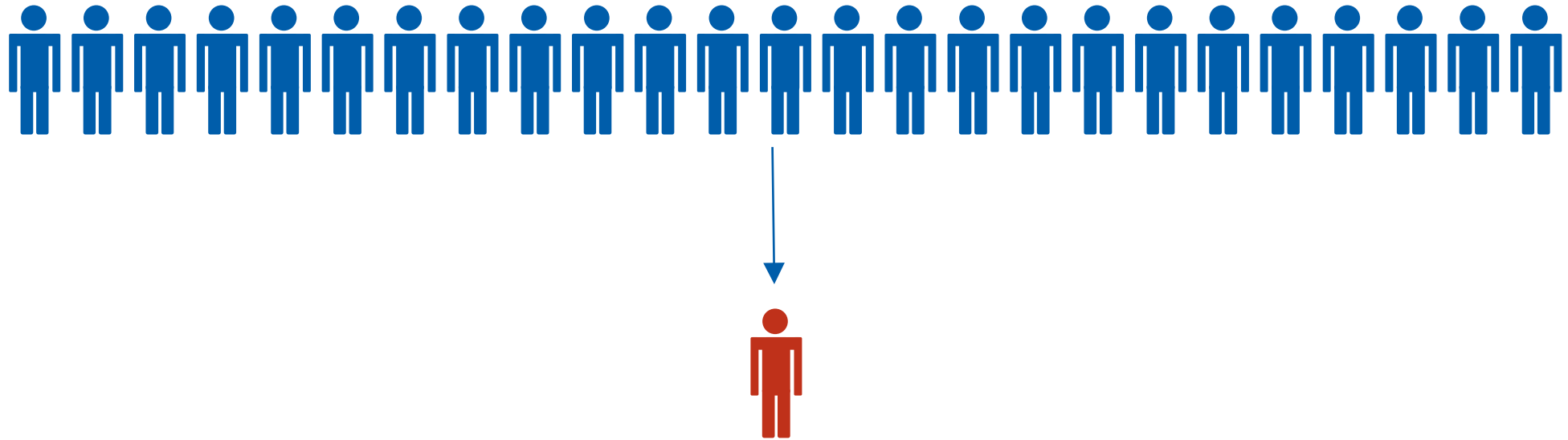
Clusters and Outbreaks Affect Many Different Populations

- Outbreaks among people who inject drugs have been highly visible in recent years
- Sexual transmission is the mode of HIV transmission for >75% of people in molecular clusters of rapid transmission
- Using diverse methods to identify clusters is important to improve services for all populations experiencing rapid transmission



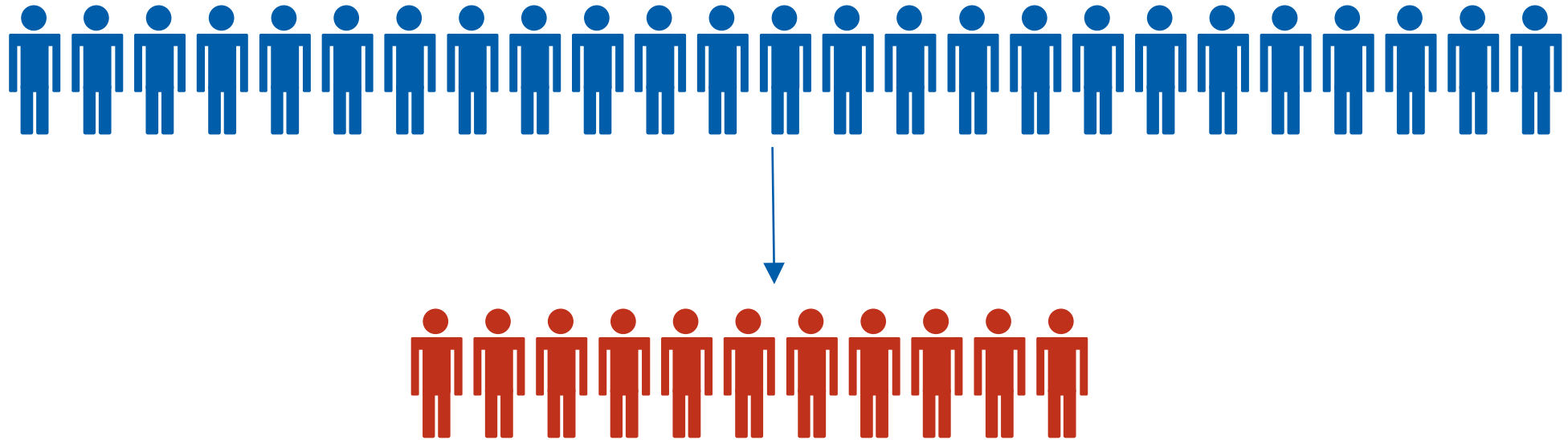
HIV Transmission Rate in the United States

4 transmissions per 100 people living with HIV per year



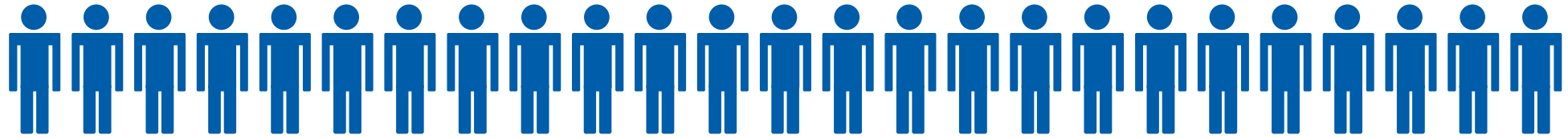
HIV Transmission Rate in First 60 Priority Molecular Clusters

44 transmissions per year per 100 persons living with HIV



HIV Transmission Rate in Some Clusters Is Even Higher

134 transmissions per year per 100 persons living with HIV



Molecular Analysis Detects Clusters That Would Otherwise Be Missed

- None of the first 60 molecular clusters recognized through epidemiologic methods alone
- **Rapid transmission can be hard to detect without sequence data**
- Since December 2015, molecular analysis has identified nearly 300 clusters of rapid transmission





Core Strategies for Cluster Detection and Response

Core Cluster Detection and Response Strategies

Fundamental Building Blocks

- Internal partnerships
- External partnerships and community engagement
- High-quality, timely data
- Data integration
- Flexible funding

Community Engagement is Essential



Involving Communities Is Essential and Can Help to Address Stigma

- Involving local community members and organizations in planning, implementing, and evaluating response activities can strengthen the delivered interventions
 - Can help design messaging and materials to avoid further stigmatizing affected communities and deliver services effectively



Fundamental Building Blocks: Example of Community Partnerships

Molecular Cluster in Texas

- Providers, community members, and HD staff established an alliance
- The alliance's efforts led to:
 - A quadrupling of HIV testing
 - Accelerated linkage to care
 - Activities to reduce stigma



<https://www.cdc.gov/hiv/policies/cdr/spotlights/index.html>

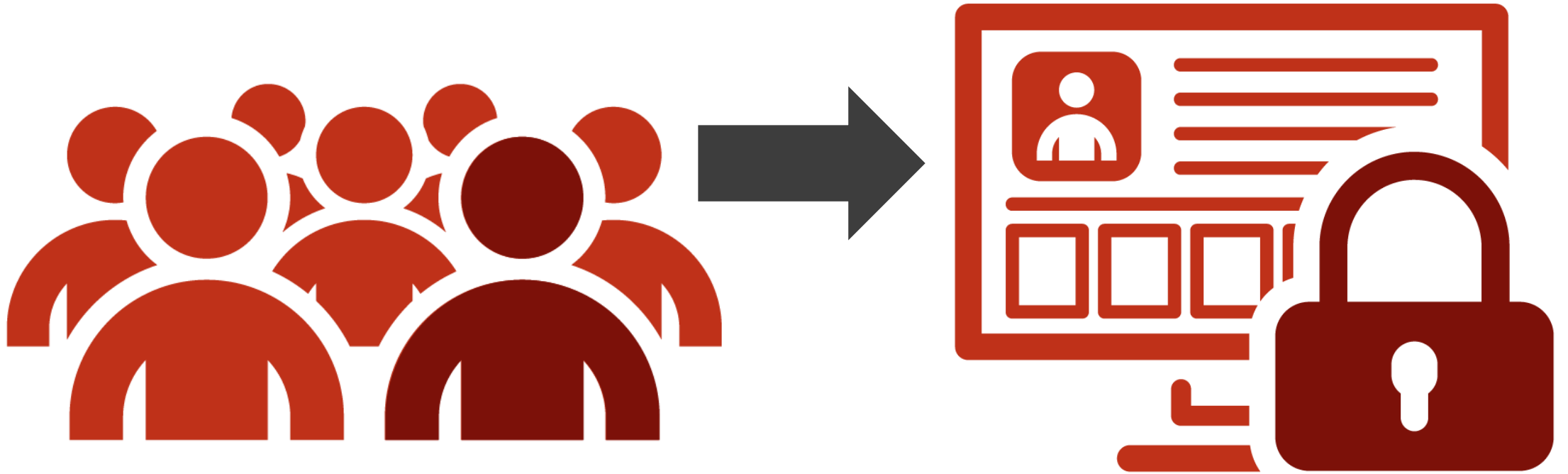
Pack *et al.* Natl HIV Prev Conf 2019

HIV Criminalization

- CDC provides guidance to states on reviewing and revising criminalization laws and ensuring strong data protections
- January 2021: CDC leadership published commentary in *Lancet HIV* encouraging states to align their HIV criminalization laws with the science and/or revise the application of these laws for the sake of people with HIV and for the public's health



U.S. HIV Public Health Data Are Strictly Protected



No known instances of molecular data from surveillance being used in a court case

Core Cluster Detection and Response Strategies

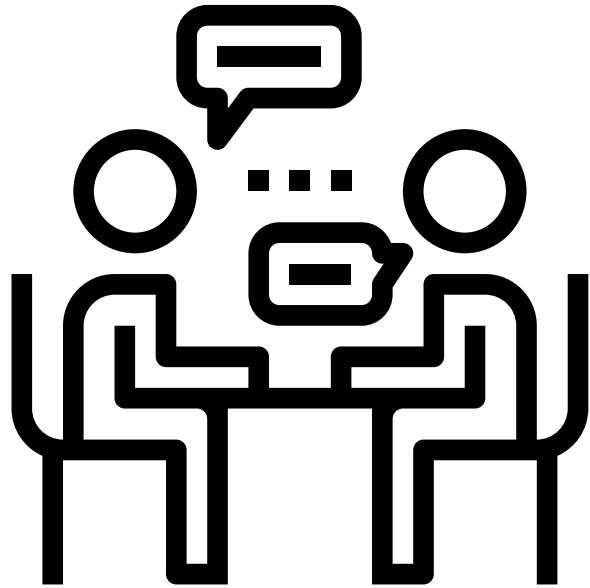
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Investigate and Intervene in Networks

- Understand networks
- Support linkage to and retention in critical services

Networks: Example of Understanding Networks



Massachusetts Outbreak Response

- Qualitative interviews conducted with people who inject drugs, providers, and other stakeholders
- Identified challenges in accessibility of HIV treatment and syringe services programs
- Led to rapidly service expansion in the response with later expansion statewide

<https://www.cdc.gov/hiv/policies/cdr/spotlights/index.html>

Cranston *et al.* MMWR 2019; Alpren *et al.* AJPH 2020

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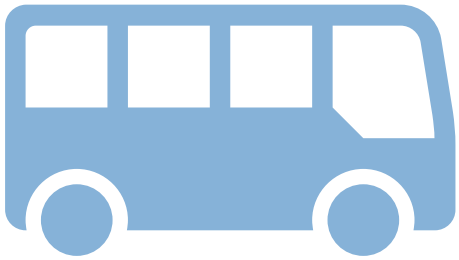
- Understand networks
- Support linkage to and retention in critical services

Identify and Address Gaps in Programs and Services

- Identify and swiftly address gaps
- Use cluster information to guide future activities

Strengthening Programs and Services: Example of Identifying and Addressing Gaps

Minnesota Outbreak Response



- Moved from clinic-based PrEP model to a street-based PrEP model
- Integrated HIV prevention and care services into culturally competent clinics focused on tribal communities

<https://www.cdc.gov/hiv/policies/cdr/spotlights/index.html>



Response Outcomes



- Reduced diagnoses or transmission, or a lack of new linked cases
- Improved HIV testing and diagnosis
- Improved viral suppression, or improved linkage to and retention in HIV care
- Improved PrEP uptake or SSP utilization
- Improved prevention and care for other conditions, such as hepatitis A vaccination, hepatitis C treatment, improved opioid use disorder treatment, prevention of endocarditis

Ending the HIV Epidemic: Response Guides Other Strategies

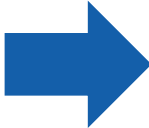


Diagnose all people with HIV as early as possible.

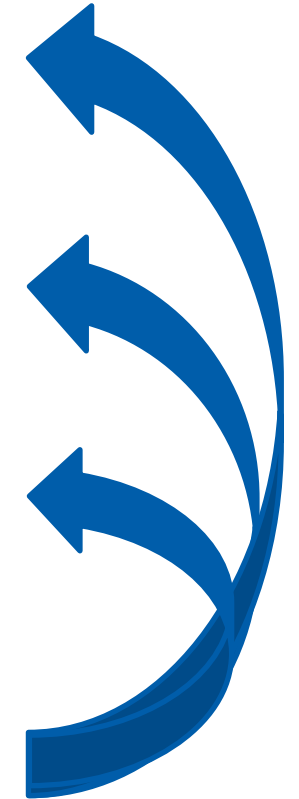
Treat people with HIV rapidly and effectively to reach sustained viral suppression.



Prevent new HIV transmissions by using proven interventions, including pre-exposure prophylaxis (PrEP) and syringe services programs (SSPs).



Respond quickly to potential HIV outbreaks to get needed prevention and treatment services to people who need them.



A Variety of Resources Can Be Used to Support Response



- Integrated HIV Surveillance and Prevention Programs for Health Departments
 - Supports core activities cluster detection and response, including developing cluster and outbreak detection and response plans
- Ending the HIV Epidemic Initiative
 - Provides funding to further develop fundamental building blocks, investigate and intervene in networks, and identify and address gaps in programs and services
- CDC directly funded health departments and CBOs can receive capacity-building assistance for cluster detection and response planning and response-related activities

Cluster and Outbreak Response Can Help Bring the Nation Closer to Ending the HIV Epidemic

- Cluster and outbreak detection allow us to identify when HIV is spreading quickly.
- A cluster or outbreak is a failure of our care and prevention services that needs to be addressed to improve access to services and stop transmission.
- Cluster and outbreak response involves curating care and prevention services to be more accessible to the people who need them most.





www.cdc.gov/hivcluster

For more information, contact CDC
1-800-CDC-INFO (232-4636)
TTY: 1-888-232-6348 www.cdc.gov



The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.