The impact of syringe services program closure on the risk of rebound HIV outbreaks among people who inject drugs: A modeling study

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Introduction – Syringe Services Programs (SSPs) in the US

US states that have syringe services programs (SSPs) and state-level laws that explicitly authorize or are consistent with the legal operation of SSPs, August 1, 2019

Introduction - SSP in Scott County, Indiana

- HIV outbreak in Scott County in 2015
- Incidence rate over 50 times that of the national average
- The state’s 1st SSP authorized to operate in April, 2015


Study Question and Objectives

**Study question**

The operation of SSP is subject to:

- Two-year sunset clause
- A lack of social and political support
- Impact of COVID-19 pandemic

**Objectives**

To examine:

- The impact of the permanent or temporary closure of SSP
- To what extent there could be a rebound outbreak of HIV
Agent-based Model (ABM)

- A stochastic, individual-based modeling approach
- Simulate the behaviors and interactions of individuals within networks to determine population-level outcomes
- **TITAN** (Treatment of Infection and Transmission in Agent-Based Networks), a previously published ABM, was adapted and extended
- Transmission networks (PWID, non-PWID)
  - Syringe sharing
  - Sexual contact
### Modeling Scenarios (2020-2025)

<table>
<thead>
<tr>
<th>Persistent operation</th>
<th>Permanent closure</th>
<th>Delayed closure</th>
<th>Temporary closure</th>
</tr>
</thead>
<tbody>
<tr>
<td>At current service levels: reaching 237 PWID a year</td>
<td>At current service levels: reaching 237 PWID a year</td>
<td>Closure in the remaining period: 2023-2025</td>
<td>Temporary service interruption: Apr 2020 - Mar 2021</td>
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<td>Return to pre-interruption levels after Apr 2021</td>
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Results - Calibration

Calibration **targets** (2015-2018):

- Annual number of new HIV diagnoses
- Number of persons living with diagnosed HIV
Results – Number of New HIV Infections

- Permanent
  - Up by 57.7% during 2021-2025

- Delayed
  - Up by 37.9% during 2021-2025

- Temporary
  - 12 (33%) more infections during 2020-2021
Results – HIV Prevalence among PWID in 2025

- **Persistent**
  - 49.7% [41.4% - 58.8%]

- **Permanent**
  - 60% [50.5% - 68.9%]

- **Delayed**
  - 56.1% [47% - 65.5%]
Sensitivity Analysis on Reduced HIV Prevalence by 85%

• Among PWID
  • Permanent closure
    • 166.9% more HIV infections
    • 139.7% higher incidence rate per 100 person-years
  • Delayed closure
    • 103.2% more HIV infections
    • 89.2% higher incidence rate per 100 person-years
Conclusions

• Temporary interruption and permanent closure of existing SSPs operating in rural US may lead to “rebound” HIV outbreaks among PWID

• To maintain control of the HIV epidemic, it will be necessary to sustain existing or implement new SSPs in combination with other prevention interventions

• It will be necessary to overcome all the social and structural barriers in the US
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Thank You

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