Background

- Access to antiretroviral therapy (ART) and harm reduction services have been cited as key contributors to the control of the HIV epidemic.
- The specific contribution of harm reduction has been questioned due to uncertainty in the true efficacy of ART in prevention of HIV transmission through needle sharing.
- We aimed to isolate the independent effects of harm reduction services and the secondary preventive benefits of ART through needle sharing on HIV incidence in British Columbia, from 1996-2013.

Methods

- Using comprehensive linked population-level data, we populated a dynamic, compartmental transmission model to simulate the HIV/AIDS epidemic in BC from 1996-2013.
- We used publicly-available records of the number of needles distributed and the number of person-years on opioid agonist treatment (OAT), as a proxy for harm reduction services (Figure 1).
- We estimated scenarios designed to isolate the independent effects of harm reduction services and ART (assuming 50% (10%-90%) efficacy) in reducing HIV incidence through needle sharing.
- HIV incidence, mortality, and quality-adjusted life years (QALYs) were estimated.

Results

Table 1. Six scenarios of harm reduction scale up and ART efficacy in preventing HIV transmission

<table>
<thead>
<tr>
<th>Scenario</th>
<th>OAT</th>
<th>NDP</th>
<th>ART</th>
<th>Total QALYs</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1</td>
<td></td>
<td></td>
<td></td>
<td>3,204</td>
</tr>
<tr>
<td>S2</td>
<td></td>
<td></td>
<td></td>
<td>4,084</td>
</tr>
<tr>
<td>S3</td>
<td></td>
<td></td>
<td></td>
<td>7,987</td>
</tr>
<tr>
<td>S4</td>
<td></td>
<td></td>
<td></td>
<td>50%*</td>
</tr>
<tr>
<td>S5</td>
<td></td>
<td></td>
<td></td>
<td>NDPA</td>
</tr>
<tr>
<td>S6</td>
<td></td>
<td></td>
<td></td>
<td>52,569,855</td>
</tr>
</tbody>
</table>

Figure 2. Percentage of incident HIV infections averted attributable to the preventive benefits of ART via needle sharing and harm reduction services among PLHIV

Panel A: Estimated independent effects of harm reduction services and ART

Panel B: Estimated independent effects of needle distribution and OAT

Figure 2 Percentag of incident HIV infections averted attributable to the preventive benefits of ART via needle sharing and harm reduction services among PLHIV

Panel A: Estimated independent effects of harm reduction services and ART

Panel B: Estimated independent effects of needle distribution and OAT

Conclusion

- If the true efficacy of ART in preventing HIV transmission through needle sharing is closer to its efficacy in sexual transmission (96%), ART’s impact on incident cases averted may be greater than that of harm reduction.
- Nonetheless, harm reduction services played a vital role in reducing HIV incidence in BC, and should be viewed as critical and cost-effective tools in combination implementation strategies to reduce the public health and economic burden of HIV/AIDS.

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