Evaluating Strategies to Reduce Risk of HIV Infection in the U.S. Blood Supply

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BACKGROUND

- Men who have sex with men (MSM) have been prohibited from donating blood in the U.S. since 1985.
- Current FDA policy bans donations from any man who has had sex with a man in the prior year.1
- All donated units are HIV-tested with 4th generation Ab/Ag and viral load testing, resulting in an HIV transmission risk via the blood supply of 1 in 1.5 million.2
- Given improvements in HIV testing over the past 3 decades,3 the current MSM ban may be unnecessary

METHODS

We developed a descriptive model to compare 4 strategies to screen the blood supply:

1) Current: a deferral for MSM (based on self-reporting) followed by testing of all donated units.
2) Test-only: no deferral, with testing of all donated units.
3) Risk-based: a deferral for all male donors who report condomless anal intercourse in the past 6 weeks, followed by testing of all donated units.
4) Ask-only: a deferral for MSM (based on self-reporting) with no testing

- The primary outcome was the expected number of accepted HIV-infected donations per million units of donated blood.
- Sensitivity analyses were used to examine parameter uncertainty for the 2 strategies found in the base case to result in lowest risk.

Table 1. Input parameters

<table>
<thead>
<tr>
<th>INPUT PARAMETERS</th>
<th>VALUE</th>
<th>RANGE EXAMINED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prevalence of MSM</td>
<td>3.7%4</td>
<td>3-20%</td>
</tr>
<tr>
<td>Prevalence of acute HIV in MSM (per 100,000)</td>
<td>58.55</td>
<td></td>
</tr>
<tr>
<td>Prevalence of chronic HIV in MSM (per 100,000)</td>
<td>1,7586</td>
<td></td>
</tr>
<tr>
<td>Prevalence of acute HIV in MSW (per 100,000)</td>
<td>1.37</td>
<td></td>
</tr>
<tr>
<td>Prevalence of acute HIV in MSW (per 100,000)</td>
<td>21.68</td>
<td></td>
</tr>
<tr>
<td>Percent of MSM having CAI (per month)</td>
<td>4.2%9</td>
<td></td>
</tr>
<tr>
<td>Percent of MSW having CAI (per month)</td>
<td>0.6%10</td>
<td></td>
</tr>
<tr>
<td>Probability of disclosing CAI</td>
<td>97.4%11</td>
<td>85-100%</td>
</tr>
<tr>
<td>Probability of disclosing MSW status</td>
<td>97.4%11</td>
<td>94-100%</td>
</tr>
<tr>
<td>4th Generation Ab/Ag HIV Test Sensitivity</td>
<td>99.4%11</td>
<td>99-100%</td>
</tr>
</tbody>
</table>

Figure 1. One-way sensitivity analyses where selected input parameters were varied over plausible ranges. Dashed line represents the base case.

• Across plausible ranges of test sensitivity (for acute and chronic infection) and MSM prevalence, a risk-based strategy remains superior to the current strategy.
• The current strategy becomes superior when there is either a low rate of accurate self-reported disclosure of CAI or a high rate of accurate self-reported MSM status.

REFERENCES


Figure 2. Three-way sensitivity analysis evaluating variations in probability of disclosing MSM status, CAI, and MSM prevalence. The base case is marked by an X.

• Over plausible ranges of variation, the risk-based strategy remains superior in the majority of cases, at all ranges of MSM prevalence evaluated.
• As both the current and risk-based screening strategies approach 100% probability of excluding the intended population, the current strategy becomes superior.

LIMITATIONS

• The analysis assumes no self-deferral, which would decrease the number of accepted HIV-infected units in all strategies.
• We defined acute HIV as infection less than 6 weeks; this model does not evaluate risk for a shorter deferral period.
• The probability of disclosing CAI is not defined for MSM and MSW and contributes uncertainty to the model.

CONCLUSION

• A risk-based screening strategy may improve the safety of the blood supply and decrease stigma associated with the current ban on MSM donors.
• Variations in effectiveness of the current and risk-based screening questions contribute the most uncertainty.