Optimizing HIV Prevention in Michigan

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Overview

- Brief Background of HIV in Michigan
  - Current Resource Levels in Michigan
- Current Projects to be Presented Today
  - Counseling and Testing Scenario Analysis
  - Resource Allocation Analysis
- Conclusions
HIV in Michigan

- 18,200 people living with HIV/AIDS in Michigan
- Between 2003 and 2007 the rate of new diagnoses remained stable with an average of 892 new HIV diagnoses each year
- MSM 46% of new cases and African Americans 59% of all new cases reported
- Since 2003 24% increase in adolescents
Current Resource Levels in Michigan

- Majority are Federal resources
  - $8.2 million managed by DHWDC and approximately $7 million are federal resources
- Increasing infection among several population groups and diminishing funding
- How can we optimize prevention efforts?
  - What array of services would result in…
    - the most HIV infections averted?
    - the lowest HIV transmission rate possible?
    - maximize the level of awareness of HIV seropositivity?
Counseling and Testing Scenario Analysis for U.S.

- Background
  - CDC 2006 HIV testing recommendations
    - Opt-out
    - Opt-out with counseling
    - Routine HIV testing
    - “Targeted” testing
  - Conclusion: “Targeted” counseling appears preferred
    - Definition of “Targeted” is key
Counseling and Testing Scenario Analysis: Michigan

- **Methods**
  - Payer’s Perspective
  - All costs are in 2007 US dollars
  - One year time horizon
    - To examine the initial impact of each scenario
## Counseling and Testing Scenario Analysis: Input Parameters - Michigan

### Table 1- Input Parameter Values and Sources

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of persons 13-64 years old in</td>
<td>7,066,950</td>
<td>Census; MI</td>
</tr>
<tr>
<td>Number of persons living with HIV in</td>
<td>18,200</td>
<td>MI</td>
</tr>
<tr>
<td>Percentage of persons unaware that they are HIV+</td>
<td>21%</td>
<td>CDC</td>
</tr>
<tr>
<td>Percentage of newly diagnosed HIV patients previously in contact with health care system</td>
<td>84%</td>
<td>CDC; MI</td>
</tr>
<tr>
<td>Uptake of screening recommendation</td>
<td>44%</td>
<td>MI</td>
</tr>
<tr>
<td>Adult population already receiving HIV testing</td>
<td>27%</td>
<td>MI</td>
</tr>
<tr>
<td>Persons testing HIV+ who are already aware of or do not receive results</td>
<td>37%</td>
<td>PLOS Medicine; MI</td>
</tr>
<tr>
<td>Cost of counseling and testing for one HIV-client</td>
<td>$30.68</td>
<td>PLOS Medicine; MI</td>
</tr>
<tr>
<td>Cost of counseling and testing for one HIV + client</td>
<td>$189.59</td>
<td>MI</td>
</tr>
<tr>
<td>Annual per patient medical costs for one HIV + patient</td>
<td>$30,093.00</td>
<td>MI Medicaid</td>
</tr>
<tr>
<td>Transmission rate from unaware HIV+ persons</td>
<td>10.93%</td>
<td>PLOS Medicine; MI</td>
</tr>
<tr>
<td>Transmission rate from aware HIV+ persons</td>
<td>3.15%</td>
<td>MI</td>
</tr>
<tr>
<td>Percentage of persons in age group at high risk of HIV infection</td>
<td>11.90%</td>
<td>CDC</td>
</tr>
<tr>
<td>Percentage of HIV+ persons uninsured or on public health care assistance</td>
<td>75%</td>
<td>PLOS Medicine</td>
</tr>
</tbody>
</table>
# Counseling and Testing Scenario Analysis: Results - Michigan

Table 2- Cost and Consequences of Four HIV Testing or Counseling and Testing Scenarios

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Basic Case (Opt-Out Testing)</th>
<th>Behavioral Offset Case</th>
<th>Routine Counseling and Testing Case</th>
<th>Targeted Counseling and Testing Case</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Persons Tested</td>
<td>1,201,382</td>
<td>1,201,382</td>
<td>1,201,382</td>
<td>547,973</td>
</tr>
<tr>
<td>Number of Undiagnosed HIV Positive Persons Reached</td>
<td>544</td>
<td>544</td>
<td>544</td>
<td>1,726</td>
</tr>
<tr>
<td>Number of High-Risk HIV Negative Persons Reached</td>
<td>142,792</td>
<td>142,792</td>
<td>142,792</td>
<td>128,468</td>
</tr>
<tr>
<td>Total Testing Cost</td>
<td>17,246,008</td>
<td>17,246,008</td>
<td>28,354,611</td>
<td>17,246,008</td>
</tr>
<tr>
<td>Transmissions Averted</td>
<td>42</td>
<td>42</td>
<td>42</td>
<td>134</td>
</tr>
<tr>
<td>Infections Averted</td>
<td>----</td>
<td>(7)</td>
<td>21</td>
<td>17</td>
</tr>
<tr>
<td>Transmissions and Infections Averted</td>
<td>42</td>
<td>35</td>
<td>63</td>
<td>151</td>
</tr>
<tr>
<td>Gross Cost Per Transmission or Infection Averted</td>
<td>407,280</td>
<td>488,560</td>
<td>448,172</td>
<td>114,069</td>
</tr>
<tr>
<td>Public Support for Medical Care Needed Y1</td>
<td>12,284,498</td>
<td>12,284,498</td>
<td>12,284,498</td>
<td>38,957,956</td>
</tr>
</tbody>
</table>
Counseling and Testing Scenario Analysis

Conclusions

- Better investment for Michigan would be a highly targeted program of HIV counseling and testing
- Targeted program could combine a mixture of clinical and community-based counseling and testing
- Again, definition of “targeted” is key
Resource Allocation Model

Background

- September 2008 Congressional Hearing Chaired by Representative Henry A. Waxman
  - Assessed Resources and Programs needed to reduce HIV incidence in the U.S.
  - Testimony was given by CDC and Dr. David Holtgrave among others

Holtgrave Congressional Testimony
- If HIV prevention budget were increased to $1.3 billion per year for 4 years the following could be achieved
  - Reduction of HIV incidence by $\frac{1}{2}$
  - Reduction of HIV transmission rate by $\frac{1}{2}$
  - Increase in awareness of HIV serpositivity to just over 90%
Resource Allocation Model - Michigan (1)

Background

- National model applied to Michigan
  - At the current level of resources available for HIV prevention activities in the State
    - What array of services would result in the most HIV infections averted?
    - Result in the lowest HIV transmission rate possible?
    - Maximize the level of awareness of HIV seropositivity?
Resource Allocation Model - Michigan (2)

Methods

- Information on HIV incidence and prevalence is used to calculate the HIV transmission rate for the state.
- Assumes Year 1 large-scale targeted counseling and testing campaign.
  - Lowering the unawareness rate of HIV seropositivity
    - Nationally it has been demonstrated persons who are aware of their seropositivity have an HIV transmission rate 3-4 fold lower than persons who are living with HIV and are unaware.
- Assumes level of capacity building and public information constant Year 0 to Year 1.
- Intervention effect sizes based on HIV prevention literature and costs of interventions per client based on same literature.
Methods Continued

- Results from Year 1 used as an input for Year 2 calculations
- Calculations for Year 2 mimic Year 1 except there is no longer the assumption made that a massive targeted counseling and testing campaign is the best intervention option

This model aims to invest in

- A persistent effort to maximize serostatus awareness (based on number of persons unaware of HIV seropositivity)
- Evidence-based prevention services for all persons aware of their HIV positive serostatus but who continue to engage in risk behavior (a small minority of PLWH/A)
- Persons newly learning they are living with HIV via the recommended program are covered with partner notification services
- Prevention for HIV negative persons at risk of infection

Year 2 approach is repeated for Years 3 and 4
# Resource Allocation Model - Michigan (4)

## Results

### Summary of Resource Allocation Model Results (Base Case)

<table>
<thead>
<tr>
<th></th>
<th>Year 0</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Year 4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Model Outputs (Yrs 1-4)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Incidence (est.)</td>
<td>870</td>
<td>822</td>
<td>729</td>
<td>672</td>
<td>640</td>
</tr>
<tr>
<td>Prevalence (est.)</td>
<td>18,200</td>
<td>18,736</td>
<td>19,172</td>
<td>19,546</td>
<td>19,882</td>
</tr>
<tr>
<td>Transmission Rate (est.)</td>
<td>0.0478</td>
<td>0.0439</td>
<td>0.0380</td>
<td>0.0344</td>
<td>0.0322</td>
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<tr>
<td>Seropos. Unawareness (est.)</td>
<td>0.21</td>
<td>0.18</td>
<td>0.15</td>
<td>0.13</td>
<td>0.10</td>
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<tr>
<td><strong>Total Costs</strong></td>
<td>$8,635,000</td>
<td>$8,640,855</td>
<td>$8,660,784</td>
<td>$8,640,856</td>
<td>$8,554,930</td>
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<tr>
<td>Unaware (VCT services)</td>
<td>$4,934,361</td>
<td>$5,350,000</td>
<td>$3,383,365</td>
<td>$2,947,099</td>
<td>$2,479,559</td>
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<tr>
<td>HIV+, Aware (prev svcs)</td>
<td>$332,568</td>
<td>$535,469</td>
<td>$2,456,461</td>
<td>$2,595,981</td>
<td>$2,730,583</td>
</tr>
<tr>
<td>HIV- high risk (prev svcs)</td>
<td>$1,123,071</td>
<td>$797,057</td>
<td>$1,467,791</td>
<td>$1,821,109</td>
<td>$2,125,639</td>
</tr>
<tr>
<td>Partner services</td>
<td>$610,000</td>
<td>$267,735</td>
<td>$275,623</td>
<td>$257,475</td>
<td>$262,494</td>
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<tr>
<td>Capacity building (fiat)</td>
<td>$450,000</td>
<td>$450,000</td>
<td>$450,000</td>
<td>$450,000</td>
<td>$450,000</td>
</tr>
<tr>
<td>Lab (fiat)</td>
<td>$660,000</td>
<td>$715,594</td>
<td>$452,545</td>
<td>$394,192</td>
<td>$331,656</td>
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<tr>
<td>Public Info/Newsltr (fiat)</td>
<td>$525,000</td>
<td>$525,000</td>
<td>$175,000</td>
<td>$175,000</td>
<td>$175,000</td>
</tr>
</tbody>
</table>
Uncertainty in Results

- Every mathematical model has some uncertainty in its results
  - Uncertainty in input parameters leading to uncertainty in results
- Sensitivity analysis relatively reassuring
  - Examines the impact of constraining the HIV transmission rate to be constant year to year (for both persons aware and unaware they are living with HIV)
  - Incidence results are not as favorable because the “flat” transmission rate by serostatus awareness underestimates the impact of counseling and testing
Conclusion and Discussion

- Model is focused on maximizing epidemic impact given resource constraints
- Model suggests with some resource reallocation improvements in HIV prevention outcomes may be possible
- Small fraction of all people in need of HIV prevention services in Michigan can currently access these services
  - Guarantees a continued epidemic
- Model projects growing HIV prevalence
  - Plans to clearly link prevention to care and treatment are essential
  - Medical costs will grow
- Investments should take into account racial and ethnic health disparities
  - Money should not follow but anticipate the epidemic community to community
Conclusion and Discussion Continued

- Recommendation for specific interventions for HIV seronegative persons not so clear
  - Current resource level constrained
  - Only a tiny fraction of at-risk seronegatives needing services will receive them in Michigan

- Identify the 3.5% to 5.5% of HIV seronegative persons most at risk of infection in a given year, then identify for the specific population represented in that 3.5% to 5.5% the interventions that can prevent the most infection for a given limited resources level
CDC National Resource Allocation Model Results

Allocations by Intervention type

CDC National Resource Allocation Model Results

Review

- Brief Background of HIV in Michigan
  - Current Resource Levels in Michigan
- Current Projects
  - Counseling and Testing Scenario Analysis
  - Resource Allocation
- Conclusions
Questions/ Reactions / Suggestions