Social Network Testing Project (SNTP): An Effective Method to Diagnose HIV Infection among Young MSM

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HIV Epidemic among Young MSM

- Among young HIV+ MSM (13-24 yrs.) in 2006, ~48%\textsuperscript{2} were not aware of their status.

- In LAC, ~56% of 18-24 yrs. and ~64% of 25-29 yrs.\textsuperscript{3} old MSM had unrecognized infection in 2008.

- As of 2007, MSM exposure accounts for 76%\textsuperscript{4} of all living HIV/AIDS cases in LAC, 46%\textsuperscript{5} in U.S.

1 Marks G et al., *Estimating sexual transmission of HIV from persons aware and unaware that they are infected with the virus in the USA.* AIDS 2006; 20(10).
3 LA Men’s Survey, 2008. NHBS-MSM. Los Angeles County Department of Public Health, HIV Epidemiology Program.
HIV Epidemic among African-Americans

Estimated Number* of New HIV Infections in Men Who Have Sex with Men, by Race/Ethnicity and Age Group, United States, 2006

* Incidence estimates are adjusted for reporting delays and reclassification of cases reported without a known risk factor for human immunodeficiency virus (HIV) but not for underreporting.
† Non-Hispanic whites and non-Hispanic blacks are referred to as white and black, respectively. Persons of Hispanic/Latino ethnicity might be of any race.
Note: The “†” bars denote the data range for each confidence interval.

2011 Estimated Number of Persons Living with HIV and AIDS in LAC

- Estimate that 21.5% of HIV+ in LA County are unaware of their infection; modified from CDC estimate.
- Of 5,100 notifications pending investigation, estimate 2,200 who have detectable VL to be cases, as well as about 1,000 of the remaining cases.

**Source:** LAC HIV Epidemiology Program, reported as of 12/31/2010.
What is an effective strategy to effectively and efficiently reduce rates of undiagnosed HIV among young MSM?

Social network testing has been shown as an effective method to identify undiagnosed infection.

Seven-city demonstration project achieved a 5.6% positivity rate vs. 1% rate achieved at CDC-funded sites.

Using Social Networks to Reach Black MSM for HIV Testing and Linkage to Care

Vincent Fuqua · Yea-Hung Chen · Tracey Packer · Teri Dowling · Theresa O. Ick · Binh Nguyen · Grant N. Colfax · H. Fisher Raymond
Social Network Testing Flowchart

What is it? Peer-recruitment strategy that identifies high-risk individuals and provides them with HIV Counseling and Testing services.

Phase 1: Recruiter Enlistment
- Individuals are screened and interviewed in order to determine eligibility

Phase 2: Recruitment Engagement
- Recruiters are provided w/ an orientation to the program and trained on how to identify, approach, and recruit high-risk network associates.

Phase 3: Recruitment of Network Associates
- Recruiters identify high-risk (social/sexual) network associates and refer them to project testing sites.

Phase 4: Counseling, Testing, Referral (CTR)
- Network associates receive CTR services.
Project Questions & Objectives

Questions:
1. Is social network testing an effective method to identify undiagnosed HIV among young MSM?
2. Why are African-American young MSM so disproportionately impacted by HIV?

Objectives:
- Reduce the number of young MSM with undiagnosed HIV
- Achieve a positivity rate higher than the jurisdictional average
- Characterize the spread and transmission of HIV within social/sexual networks
Methodology

- Social Network Testing Project (SNTP) was implemented at three DHSP-funded agencies (five sites) that provide HIV counseling and testing services.
- Sampling: Snowball sampling.
- Recruiters:
  - Recruiter survey administered via PDA (used to determine eligibility and collect risk information).
  - Incentives received for completing survey and recruiting targeted network associates\(^1\).
- Testers:
  - Underwent same testing protocol as non-project testers.
  - Incentives received if tester eligibility is met.

\(^1\) Recruiters received incentives if the network associate was a male, 18-40 yrs. who either self-identified as gay or bisexual or reported sex with another male in the past year.
Recruiter/Tester Eligibility

Recruiter Eligibility:
- Male or transgender MTF
- 18-40 yrs. Old
- Identify as gay/bisexual OR report sex with male in past 6 mo.
- Report at least one high-risk behavior in past 6 mo.

Tester Eligibility:
- Recruited by a SNTP recruiter
- Agreed to test confidentially (names-based)
- At least 12 yrs. old (California Health Code 121020)

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1 In order to be eligible as a recruiter for TG MTFs, individual must report having had sex with a male in past 6 mo.
2 Risk behaviors include: sex without condom use, sharing needles, sex with HIV serodiscordant/unknown status partner, sex while high/drunken, engaged in sex exchange, diagnosed with a STD, found sex partners online/anonymously/traded multiple sex partners.
Sample Size

Recruiters: N = 39

# People screened

Eligible
n = 130
94%

Ineligible
n = 9
6%

Accepted Training
n = 123
95%

Declined Training
n = 7
5%

Recruited 0 testers
n = 84
68%

Recruited ≥ 1 tester
n = 39
32%

Testers: N = 238

NETWORK INDEX* = 6.1

N = 139

* Network index = Average # of testers brought each per recruiter.
Data Analysis Plan

• Compare differences (using chi-square tests) in demographic profile/risk behaviors between:
  – SNTP testers vs. DHSP-funded testers (at same testing locations)
  – Positive testers and negative testers (among SNTP testers)

• Determine recruiter characteristics associated with the ability to:
  – Bring in a large # of network associates (high network index)
  – Identify those with undiagnosed infection (high HIV prevalence)

• Model HIV-positivity using various demographic/risk covariates (logistic regression)

• Analyze social network factors of recruiters:
  – Age difference of sexual partners
  – Sexual partner concurrency
SNTP achieved new HIV positivity rates 5-10 times greater than the rates at DHSP-funded sites by year and modality.

* 2009 data does not include SNTP participants
<table>
<thead>
<tr>
<th>Site</th>
<th>% Tested</th>
<th>New Positivity (SNTP)</th>
<th>New Positivity (DHSP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LAGLC - SPOT</td>
<td>7.1%</td>
<td>0.0%</td>
<td>1.6%</td>
</tr>
<tr>
<td>MAP</td>
<td>10.1%</td>
<td>4.2%</td>
<td>2.6%</td>
</tr>
<tr>
<td>OASIS</td>
<td>10.5%</td>
<td>16.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>LAGLC - JG</td>
<td>42.0%</td>
<td>8.0%</td>
<td>1.4%</td>
</tr>
<tr>
<td>LAGLC - Village</td>
<td>30.3%</td>
<td>5.6%</td>
<td>4.8%</td>
</tr>
<tr>
<td>OSS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LAGLC - JG</td>
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<td>8.0%</td>
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</tr>
</tbody>
</table>
SNTP Tester Demographics

Gender:
- Male: 80%
- Female: 14%
- Transgender: 6%

Race:
- Black: 63%
- Latino: 18%
- White: 14%
- Other: 5%

Age:
- 12-24: 75%
- 25-39: 21%
- 40-49: 4%
- 50+: 1%

Sex Identity:
- Homosexual: 40%
- Bisexual: 35%
- Heterosexual: 24%
- Other/DK: 1%
Demographic Comparison: Tester

• Compared to DHSP testers*, SNTP testers were more likely to…
  – First time testers (26% vs. 9%)**
  – Higher proportion with newly diagnosed infection, among positive testers (90% vs. 76%)**
  – African-American (63% vs. 17%)**
  – Young – ages 12-24 (75% vs. 21%)**
  – Bisexual (35% vs. 9%)**
  – Homeless (50% vs. 4%)**

• Among SNTP testers, HIV+ were more likely to… (compared to HIV-)
  – Male (84% vs. 80%)**
  – Gay/Homosexual/Lesbian (79% vs. 37%)**
  – Homeless (84% vs. 47%)

* Represent all non-SNTP individuals who tested at any one of the five SNTP testing sites in 2009.
** p-value < 0.05
Risk Behaviors: SNTP vs. DHSP

- Compared to DHSP testers, SNTP testers were:
  - More likely to exchange sex for goods (14% vs. 3%)**
  - More likely to share needles/injection equipment (3% vs. 1%)**
  - Less likely to have sex with HIV+ partner (6% vs. 12%)**

Aggregate Risk Levels*

- No Risk
  - SNTP: 14%
  - OAPP: 12%

- Low Risk (1-2)
  - SNTP: 35%
  - OAPP: 34%

- Medium Risk (3-4)
  - SNTP: 50%
  - OAPP: 52%

- High Risk (≥ 5)
  - SNTP: 2%
  - OAPP: 3%

* Based on 8 individual risk factors: multiple sex partners, inconsistent condom use, sex while high/intoxicated, sex with HIV+ partner, STD diagnosis, sex exchange, shared needles/injection paraphernalia.

** p-value < 0.05
Risk Behaviors: HIV+ vs. HIV-

- Among SNTP testers, positive testers were…
  - More likely to have sex with HIV+ partner (32% vs. 4%)**
  - Less likely to know status of HIV+ partner prior to sexual contact (17% vs. 78%)**

![Aggregate Risk Levels Graph]

* Based on 8 individual risk factors: multiple sex partners, inconsistent condom use, sex while high/intoxicated, sex with HIV+ partner, STD diagnosis, sex exchange, shared needles/injection paraphernalia.

** p-value < 0.05
Risk Behaviors: Racial Breakdown

<table>
<thead>
<tr>
<th>Risk Behaviors</th>
<th>Black (n = 150)</th>
<th>Latino (n = 43)</th>
<th>White (n = 33)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tested Positive</td>
<td>11%</td>
<td>5%</td>
<td>3%</td>
</tr>
<tr>
<td>Mean # Sex Partners (std dev)</td>
<td>13 (39) B</td>
<td>10 (13)</td>
<td>5 (7) A</td>
</tr>
<tr>
<td>Inconsistent Condom Use</td>
<td>73%</td>
<td>74%</td>
<td>67%</td>
</tr>
<tr>
<td>Sex while High/Intoxicated</td>
<td>47%</td>
<td>51%</td>
<td>39%</td>
</tr>
<tr>
<td>Sex w/ HIV+ Partner</td>
<td>6%</td>
<td>5%</td>
<td>9%</td>
</tr>
<tr>
<td>Knew Status of Partner</td>
<td>44%</td>
<td>0%</td>
<td>100%</td>
</tr>
<tr>
<td>Inconsistent Condom Use</td>
<td>44%</td>
<td>100%</td>
<td>67%</td>
</tr>
<tr>
<td>STD Diagnosis</td>
<td>11%</td>
<td>7%</td>
<td>3%</td>
</tr>
<tr>
<td>Exchanged Sex for Goods</td>
<td>14%</td>
<td>9%</td>
<td>15%</td>
</tr>
<tr>
<td>Shared Needles</td>
<td>3%</td>
<td>0%</td>
<td>6%</td>
</tr>
</tbody>
</table>

– No significant differences in aggregate risk levels by race.

A Significantly different (p-value < 0.05) compared to African-Americans
B Significantly different (p-value < 0.05) compared to Whites.
<table>
<thead>
<tr>
<th>Characteristic</th>
<th>%</th>
<th>Network Index</th>
<th>HIV Prevalence</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIV Status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td>29%</td>
<td>3.2</td>
<td>14.3</td>
</tr>
<tr>
<td>Negative/Unknown</td>
<td>71%</td>
<td>7.5</td>
<td>6.9</td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>76%</td>
<td>6.6</td>
<td>8.9</td>
</tr>
<tr>
<td>Latino</td>
<td>16%</td>
<td>5.8</td>
<td>5.7</td>
</tr>
<tr>
<td>Other</td>
<td>8%</td>
<td>3.3</td>
<td>0.0</td>
</tr>
<tr>
<td>Sexual Identity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gay/Homosexual</td>
<td>66%</td>
<td>6.1</td>
<td>6.6</td>
</tr>
<tr>
<td>Bisexual</td>
<td>29%</td>
<td>7.4</td>
<td>11.1</td>
</tr>
<tr>
<td>Other</td>
<td>5%</td>
<td>2.0</td>
<td>0.0</td>
</tr>
</tbody>
</table>

* Data from 1 recruiter was lost, which reduced testing total from 238 to 237.
## Network Index and HIV Prevalence by Recruiter Characteristics (N = 38)*

<table>
<thead>
<tr>
<th>Characteristic</th>
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</tr>
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<tbody>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Youth (18-24)</td>
<td>68%</td>
<td>7.3</td>
<td>7.9</td>
</tr>
<tr>
<td>Non-Youth (25-40)</td>
<td>32%</td>
<td>3.9</td>
<td>8.5</td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Finished High School</td>
<td>76%</td>
<td>6.6</td>
<td>8.9</td>
</tr>
<tr>
<td>Didn’t Finish High School</td>
<td>24%</td>
<td>5.2</td>
<td>4.3</td>
</tr>
<tr>
<td><strong>Employment</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employed</td>
<td>37%</td>
<td>5.9</td>
<td>9.8</td>
</tr>
<tr>
<td>Unemployed/On Disability</td>
<td>63%</td>
<td>6.5</td>
<td>7.1</td>
</tr>
<tr>
<td><strong>Living Situation</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stable</td>
<td>71%</td>
<td>5.6</td>
<td>7.2</td>
</tr>
<tr>
<td>Unstable (Homeless/Transitional)</td>
<td>29%</td>
<td>7.7</td>
<td>9.4</td>
</tr>
</tbody>
</table>

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## Network Index and HIV Prevalence by Recruiter Characteristics (N = 38)*

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<th>%</th>
<th>Network Index</th>
<th>HIV Prevalence</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Insurance</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Private/Public Health Insurance</td>
<td>42%</td>
<td>4.5</td>
<td>6.9</td>
</tr>
<tr>
<td>No Health Insurance</td>
<td>58%</td>
<td>7.5</td>
<td>8.5</td>
</tr>
<tr>
<td><strong>Risk Levels</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low (1-2 risk factors)</td>
<td>24%</td>
<td>6.1</td>
<td>10.9</td>
</tr>
<tr>
<td>Medium (3-4 risk factors)</td>
<td>45%</td>
<td>8.2</td>
<td>8.6</td>
</tr>
<tr>
<td>High (≥ 5 risk factors)</td>
<td>32%</td>
<td>3.5</td>
<td>2.4</td>
</tr>
</tbody>
</table>
Discussion

• SNTP was effective at identifying undiagnosed HIV among young MSM
  – SNTP achieved higher positivity rates
  – Identified larger proportion of first-time testers

• SNTP testers had similar levels of risk, yet much higher prevalence rates compared to DHSP-funded testers
  – Suggests that SNTP population is inherently at higher risk of becoming infected with HIV

• HIV disparities continue to persist despite individual-level risk behaviors are similar across the different races
  – Indicates individual-level risk behaviors are not the predominant factor affecting transmission
Limitations

• High proportion of trained recruiters did not bring any network associates (NA)
  – Recruiters who brought in at least one NA were more likely to be African-American and younger (no other significant differences)

• Small sample sizes inhibited ability to...
  – Model HIV-status with a number of covariates
  – Investigate further potential hypotheses to explain HIV disparities among young African-American MSM

• Majority of data is self-report
  – Social-desirability or reporter bias?
Literature

• Numerous studies have shown that individual-level risk behaviors are not the primary reason for the disproportionate rates of HIV among Black MSM.

• Other potential hypotheses that may explain the racial disparities include:
  - Higher STD Prevalence
  - Partner Selection (race/age)
  - Higher rates of undiagnosed infection (lower testing levels)
  - Lower ART Usage
  - Sexual Identity Disclosure
  - High HIV Background Prevalence
  - Young Black and Latino MSM were more likely to have partners of unknown HIV status compared to White MSM.
  - Older partner selection, sexual risk behaviour and unrecognised HIV infection among black and Latino men who have sex with men

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Next Steps

• Further analysis/investigation into hypotheses that can explain the disproportionate racial impact.

• Further expansion of social network testing among DHSP-funded agencies.
  – Currently, one agency is funded to conduct SNT.

• Additional Questions:
  1. Is social network testing cost-effective compared to other testing modalities?
  2. Is social network testing generalizable and effective among other (general, low risk, high risk) populations?
Comprehensive HIV Prevention Strategy

- Increasing the proportion aware of their serostatus alone does not constitute a comprehensive HIV prevention plan.
- In accordance with the National HIV/AIDS Strategy - Testing, Linkage to Care, Plus Treatment (TLC+) provides the framework for a holistic approach towards HIV prevention.

**Testing**
- Decrease number of individuals with undiagnosed HIV (expand testing)

**Linkage to Care**
- Immediate linkage to HIV care and social services

**+ Treatment**
- Improve retention in care, access to ART, and treatment adherence
Division of HIV and STD Programs
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