TRANSLATING SCIENCE TO BETTER HEALTH:
THE POWER OF DIVERSITY AND MULTICULTURAL ENGAGEMENT

CONCURRENT SCIENTIFIC SESSION 6
Balancing the Inequities and Disparities of HIV and AIDS over the Next 30 Years

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HIV Infection and Methamphetamine Abuse are Associated with Redox Changes in the Cerebrospinal Fluid

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HIV Infection and Methamphetamine Abuse are Associated with Redox Changes in the Cerebrospinal Fluid

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**HIV-Meth-Oxidative stress**

- The spread of HIV infection is partially fueled by methamphetamine (Meth) abuse.
- Both diseases may be pathogenic to the central nervous system (CNS), and may lead to additive effects on CNS injury.
- Oxidative stress is a major causative factor of HIV- and Meth-induced neuropathogeneses.

**Glutathione (GSH) metabolism**

- **GSH**
- **GSSG**
- **cGPx**
- **Glu**
- **GCS**
- **γGluCys**
- **Cys**
- **xCT**
- **GST**
- **GS-X**
- **Gly**
- **Dipeptidase**
- **GGT**
- **CysGly**
- **γGluX**
- **+**
- **GSH GSSG**
- **eGPx**

**Experimental Design**

<table>
<thead>
<tr>
<th></th>
<th>Control</th>
<th>HIV</th>
<th>Meth</th>
<th>HIV/Meth</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>41</td>
<td>34</td>
<td>23</td>
<td>25</td>
</tr>
</tbody>
</table>

**Male (%)**

- Control: 90%
- HIV: 91%
- Meth: 87%
- HIV/Meth: 88%

**Age (yr)**

- Control: 39 ± 13
- HIV: 42 ± 11
- Meth: 39 ± 10
- HIV/Meth: 42 ± 8
Effects of HIV on GSH and GGT

Correlations
GGT vs. GSH; GGT vs. Age

Effects of Meth on GPx
GPx correlates with GGT
**Effect of HIV on HNE**

**Correlations**

HNE vs. GSH; HNE vs. GPx

- PHIV seronegative = 0.0074
- P Meth = 0.0172
- P Control = 0.0052

**Proposed Mechanism**

- HIV infection:
  - Ggt
  - CysGly
  - ROS
  - HNE
- Meth abuse:
  - HNE
  - Lipid peroxidation
  - GSH
  - GPx

HIV+Meth = HIV (oxidative stress)
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Reducing HIV Risk Behaviors in Young Sexual Minority Men

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Risk Reduction Intervention for Highly Vulnerable Emerging Adult Males

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Center for Study of Gene Structure and Function

The YMHP Team

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Education Supervisor: Catherine Holder
Recruitment Coordinator: Kevin Robin
Graphic Designer: Chris Hietikko

Research Staff, Therapists, Educators: Aaron Breslow, Andrea Vial, Anna Johnson, Anthony Surace, Brooke Wells, Greg Payton, Joel Rowe, Jon Rendina, Julia Tomassilli, Wolf Goeter, Mark Frazier, Michael Adams, Tyrel Starks, Zak Hill-Whilton, and our recruiters.

Diagnoses of HIV Infection among Adult and Adolescent Males, 2006—2009—40 States and 5 U.S. Dependent Areas

Of the 171,020 diagnoses of HIV infection among adults and adolescents during 2006 through 2009:
71% of diagnosed HIV infections in males were attributed to male-to-male sexual contact
18% of diagnosed HIV infections in males during 2006 through 2009 were aged 13-24
8% of diagnosed HIV infections in males aged 13-24 were attributed to male-to-male sexual contact

In 2009, 56% of HIV infections diagnosed among adults and adolescents were attributed to male-to-male sexual contact.
Alarming HIV Rates for YMSM

YMSM were the group with the highest HIV prevalence in the US in 2009.

- Of all young males (13-24) living with HIV, 73% were MSM.

Emerging Adults

- We focus on Emerging Adult YMSM (18-29 years old).
- Due to HIV rates in both the 13-24 group and the 25-34 group.
- Unique developmental group.
- Attained adult status, but may not yet have assumed the roles and responsibilities of full adulthood.

Substance Use in YMSM
Young Men’s Health Project (YMHP)
- Randomized controlled trial (RCT)
- Brief 4-session risk reduction intervention
- Aims to reduce drug use and sexual risk among non-treatment seeking HIV-YMSM in New York City (NYC).

Recruitment
- Significant recruitment efforts put into various advertising campaigns (internet-based, venue-based), incentivized snowball sampling, and brochures.
- What worked best was a simple image and tag-line.

Eligibility
- Enrollment eligibility (N=206):
  - 18-29 years old
  - Biological male
  - HIV- or unknown status
  - ≥ 5 days of drug use in past 3 months (cocaine, meth, ecstasy, GHB, ketamine, poppers).
  - ≥ 1 incident of anal sex without a condom with HIV+ or unknown status main partner or any casual partners in past 3 months.
Study Structure and Data
- Baseline, 3, 6, 9, and 12-month assessments via ACASI and 30-day interviewer-administered TLFB calendar.
- Option to be randomized to the two intervention arms (Motivational Interviewing vs. Education) after baseline.

Baseline Data Analyses
- Analyses drew on baseline data from all participants, regardless of their subsequent randomization.
- We examined independent and interactive effects of:
  - Substance use
  - Mental Health – BSI Anxiety and Depression
  - Endorsement of benefits of unprotected sex on sexual risk.
- We also examined sex acts both within and outside main partnerships.

Variables
- Predictors
  - Substance use on a day of sexual activity
  - Mental Health – BSI Anxiety and Depression
  - Benefits of Unprotected Sex
  - Main Partner Sex Day
    - Main partner
      - in a romantic relationship with another man for at least 90 days
      - sero-concordant (HIV-negative) or unknown serostatus (those with HIV-positive main partners were excluded from analyses)
      - Participant had to have had sex with this main partner in the past 30 days.

- Outcome
  - Odds of not using a condom on a sex day
Analyses

Generalized Estimating Equations (GEE) was used to assess the relative odds of not using a condom on a day when a participant had sex adjusting for predictors.

### Participant Demographics

<table>
<thead>
<tr>
<th>Race/Ethnicity</th>
<th>n</th>
<th>%</th>
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<tbody>
<tr>
<td>Black</td>
<td>38</td>
<td>20</td>
</tr>
<tr>
<td>Latino</td>
<td>62</td>
<td>33</td>
</tr>
<tr>
<td>White</td>
<td>66</td>
<td>35</td>
</tr>
<tr>
<td>Other/Mixed</td>
<td>22</td>
<td>12</td>
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<tr>
<th>Parental Social Class</th>
<th>n</th>
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<tbody>
<tr>
<td>Working Class/Poor</td>
<td>68</td>
<td>36</td>
</tr>
<tr>
<td>Middle Class</td>
<td>120</td>
<td>64</td>
</tr>
<tr>
<td>Other/Mixed</td>
<td>22</td>
<td>12</td>
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<th>Income</th>
<th>n</th>
<th>%</th>
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<tr>
<td>&lt;30K</td>
<td>123</td>
<td>65</td>
</tr>
<tr>
<td>&gt;30K</td>
<td>65</td>
<td>35</td>
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<table>
<thead>
<tr>
<th>Education</th>
<th>n</th>
<th>%</th>
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<tbody>
<tr>
<td>Less than College</td>
<td>113</td>
<td>60</td>
</tr>
<tr>
<td>College or More</td>
<td>75</td>
<td>40</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sexual orientation</th>
<th>n</th>
<th>%</th>
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<tbody>
<tr>
<td>Gay</td>
<td>170</td>
<td>90</td>
</tr>
<tr>
<td>Bisexual</td>
<td>18</td>
<td>10</td>
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<table>
<thead>
<tr>
<th>Relationship status</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>In a relationship</td>
<td>34</td>
<td>18</td>
</tr>
<tr>
<td>Single</td>
<td>154</td>
<td>82</td>
</tr>
</tbody>
</table>

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### Percent of Participants with No Condom Sex Days and Mean Number of No Condom Sex Days

- No Condom Sex Day Full Sample (N=154): 3.0
- No Condom Sex Day Non-partnered (N=114): 3.1
- No Condom Sex Day Partnered (N=40): 2.5
Percent of Participants Using Drugs and Mean Number of Drug Days

Odds of Not Using A Condom (First Order)

Log Odds of Not Using a Condom

Z-scores: BSI
### Odds of Not Using a Condom (Parsimonious Model)

<table>
<thead>
<tr>
<th></th>
<th>Exp(β)</th>
<th>C.I.</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>0.98</td>
<td>0.74/1.30</td>
<td>.982</td>
</tr>
<tr>
<td>Any drug</td>
<td>2.08</td>
<td>1.45/2.98</td>
<td>.000</td>
</tr>
<tr>
<td>MP Sex Day</td>
<td>5.36</td>
<td>1.98/14.50</td>
<td>.001</td>
</tr>
<tr>
<td>BSI Total Score</td>
<td>1.16</td>
<td>0.95/1.43</td>
<td>.148</td>
</tr>
<tr>
<td>DB – Pro Sex</td>
<td>1.92</td>
<td>1.52/2.45</td>
<td>.000</td>
</tr>
<tr>
<td>BSI*MP Sex Day</td>
<td>0.15</td>
<td>0.06/0.40</td>
<td>.000</td>
</tr>
</tbody>
</table>

**Conclusions**

Drug use and perceiving benefits of sex without a condom were associated with unprotected sex days.

BSI scores moderated the effects of having a main partner sex day on condom use:

- Partnered men with low BSI scores (happy people!), increased their odds of not using a condom, which were further exacerbated by drug use.
- Inversely, having sex with a main partner and being more depressed and anxious increased the odds of using a condom.

Regardless of whether one’s sex partner was a main or a casual partner, if the participant endorsed benefits of having unprotected sex, he was not likely to use a condom.

### Implications

Substance use remains a strong predictor of condom non-use, and needs to be a target of prevention programs for YMSM.

Perceiving benefits of unprotected sex is also a robust predictor, above and beyond substance use, and efforts should be made to address changing these perceptions.

Efforts to improve mental health among those having sex with casual partners could increase condom use in this group of YMSM.

But, when having sex with a main partner, positive mental health decreased condom use. This needs more examination to fully understand intervention implications.
Thank you!
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Thank you for participating!