ACCURACY IN PREDICTING DAILY ANAL INTERCOURSE WITH CASUAL PARTNERS AND ITS RELEVANCE FOR INTERMITTENT PrEP: AN ONLINE DIARY ANALYSIS OF HIGHLY SEXUALLY ACTIVE GAY AND BISEXUAL MEN

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PrEP has demonstrated efficacy in reducing HIV transmission among MSM.

One-size-fits-all approach is already being questioned.

New approaches to tailoring PrEP to different populations have emerged as areas for investigation:

- To manage side effects
- To improve adherence
- To increase acceptability
- To improve efficacy
Intermittent PrEP

- Event-driven dosing
- What are the efficacy & optimal dosing schedules?
- Which groups make the best targets for intermittent PrEP?

- Feasibility research is also needed
- Question guiding this study:
  - How well can highly sexually active men anticipate when they will have anal sex with casual male partners?
METHODS
Pillow Talk: Compulsive behaviors, mental health, & HIV Risk

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earn money for keeping a sex diary
Methods

- Highly sexually active gay/bisexual men (HIV-negative & positive)
  - ≥9 male partners in 90 days
  - Issues of sexual compulsivity & hypersexuality
- Multi-component, longitudinal study
  - At-home, online surveys
  - In-office HIV testing
  - Retrospective sexual behavior & substance use (TLFB)
  - Structured clinical interview (CDIS)
  - Qualitative interviews
  - Neurocognitive testing
  - Two, 30-day online daily diaries (affect, sexual behavior)
Online daily diary

**What is it?**

- A brief, online, adaptive survey
- Measures daily fluctuations in affect, substance use, sexual arousal, and sexual behavior
Casual partner section (cont'd)

Please check all that apply about your sexual activity with him (Partner #1) today. (Select one choice from each of the two columns)

<table>
<thead>
<tr>
<th>Did you...</th>
<th>With Condom</th>
<th>Without Condom</th>
<th>Both with and Without</th>
<th>N/A (Did not do this)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fucked partner in the ass</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Got fucked by partner</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gave partner a blowjob</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Got a blowjob from partner</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Assessment of likelihood

How likely is it that you will have *anal* sex with a *casual* male partner tomorrow?

- Absolutely sure
- I will **not**
- 0 10 20 30 40 50 60 70 80 90 100
- Absolutely sure
- I will

Likelihood: [ ]

Is there anything else you would like to tell us about your day that will help us to understand your responses?

When you’ve finished, please click ‘Submit Survey!’ below to complete today’s survey.
RESULTS
Participants ($n = 170$) ï all verified HIV-negative

<table>
<thead>
<tr>
<th>Race/ethnicity</th>
<th>Black</th>
<th>Latino</th>
<th>White</th>
<th>Multi.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employment</td>
<td>Full-time</td>
<td>Part-time</td>
<td>Other</td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>Less than BA</td>
<td>BA or more</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sex. ID</td>
<td>Gay</td>
<td>Bi</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Income</td>
<td>&lt; $30k</td>
<td>O$30k</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rel. Status</td>
<td>Single</td>
<td>Partnered</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lifetime STI Dx</td>
<td>No</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Matching likelihood to behavior

- Overall, $M = 23$ (77%), $Mdn = 26$ (87%) completed days per person
- Contiguous reporting was required to have valid values for the lagged variable - a total of 2907 days worth of matched data

<table>
<thead>
<tr>
<th>Day 1</th>
<th>Day 2</th>
<th>Day 3</th>
<th>Day 4</th>
<th>Day 5</th>
<th>Day 6</th>
<th>Day 7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Useable days: 2

- Average of 17.1 days of usable data (81% of reports)
- $M = 19.2$, $Mdn = 22$ for those with complete cycles
Analysis plan

1. Descriptive information (ignoring nesting)
   - What proportion of days include sex at different levels of reported likelihood?
   - What is the average reported likelihood on sex days and non-sex days?

2. Multilevel modeling (nested data)
   - Examining days (Level 1) within individuals (Level 2)
   - Daily reported likelihood predicting the odds/probability of sex (binary outcome)
   - Examining the correspondence between different levels of reported likelihood and the odds/probability of sex
Distribution of self-reported likelihood
Distributional groups

- 0-25% “Unlikely”
- 26-74% “Unsure”
- 75-100% “ Likely”

Frequency

Self-Reported Likelihood
Results: Descriptive information

- On “unlikely” days, 7% turned out to be sex days
- On “unsure” days, 22% turned out to be sex days
- On “likely” days, 49% turned out to be sex days
Results: Descriptive information

- On days when participants **did not** have sex, their self-reported likelihood of having sex was:
  - Mode: 0.0%
  - Mean: 26.9%
  - Median: 42.0%

- On days when participants **did** have sex, their self-reported likelihood of having sex was:
  - Mode: 100.0%
  - Mean: 55.4%
  - Median: 54.0%
Results: Multilevel model

- Overall, the odds of sex on an average day were 0.22 (18% probability) - regardless of their predicted likelihood
- Self-reported likelihood was significantly associated and an increase in the odds of sex - every 10% increase in self-reported likelihood was associated with a 36% increase in the odds of sex
Another look at the distribution
Examining gradations in the trend

Model-Implied (Observed) Probability of Sex

Self-Reported (Predicted) Likelihood

<table>
<thead>
<tr>
<th>Predicted Likelihood</th>
<th>Observed Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>0%</td>
<td>3.6%</td>
</tr>
<tr>
<td>1-10%</td>
<td>7.2%</td>
</tr>
<tr>
<td>11-20%</td>
<td>10.0%</td>
</tr>
<tr>
<td>21-30%</td>
<td>11.4%</td>
</tr>
<tr>
<td>31-40%</td>
<td>20.5%</td>
</tr>
<tr>
<td>41-50%</td>
<td>21.3%</td>
</tr>
<tr>
<td>51-60%</td>
<td>24.8%</td>
</tr>
<tr>
<td>61-70%</td>
<td>29.9%</td>
</tr>
<tr>
<td>71-80%</td>
<td>40.2%</td>
</tr>
<tr>
<td>81-90%</td>
<td>43.4%</td>
</tr>
<tr>
<td>91-100%</td>
<td>55.0%</td>
</tr>
</tbody>
</table>
Likelihood-sex correspondence

- In order to minimize false-negatives:
  - 10% cutoff: 92% sensitivity
  - 15% cutoff: 84% sensitivity
  - 20% cutoff: 82% sensitivity
  - 25% cutoff: 78% sensitivity
  - 30% cutoff: 76% sensitivity
DISCUSSION
Summary of findings

- Moderate correspondence between prediction and behavior
- This sample of highly sexually active gay and bisexual men was more accurate at predicting non-sex than sex days
- Three “types” of decisions seemed to appear
  - Unlikely, unsure, and likely
- These corresponded to jumps in actual behavior
Implications

- Men may be better suited to accurately predict when they will *not* have sex than when they will *will*
- Guidelines might focus on categories of likelihood
  - On days when sex is “unlikely” (lower than 20-30% chance), PrEP doses might be skipped
  - On days when sex is “unsure” or “likely” (above 20-30%), PrEP doses should be taken in advance
- However, 18-24% of actual sex days would still be non-PrEP days
- Number of “unlikely” days would lead to significant decreases in the number of dosing days
Limitations

- The study relied on a sample of highly sexually active GBM
- Missing data may have biased some results
- Only examined anal sex with casual partners
- Did not look at condom use
Remaining questions

- Would non-highly sexually active men be better or worse at predicting sexual events?
- Is event-contingent dosing feasible from a patient burden perspective?
- How about planning non-dosing?
- What are the HIV infection risks associated with making recommendations based on perceived likelihood of sex?
Acknowledgements

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Thank you!

For a copy of these slides or further questions, please email me at:

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www.chestnyc.org