High Rates of STIs among Men who have Sex with Men Using PrEP for HIV Prevention

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BACKGROUND

> Evidence regarding the impact of PrEP use on STI rates among MSM is mixed

> Several recent observational studies have reported associations between PrEP use and high rates of bacterial STIs among MSM\(^1\)
  > Some limited by lack of comparison group, failure to account for ascertainment bias

\(^1\)Traeger et al. *Clin Infect Dis.* 2018
RESEARCH QUESTIONS

1. Is PrEP use associated with increased incidence of bacterial STIs among HIV-negative MSM?

2. Is PrEP use associated with a difference in time to first symptomatic STI among HIV-negative MSM?
   - Symptomatic STIs less likely to be affected by bias from increased screening
   - Urethral gonorrhea, 1°, 2° syphilis
METHODS: STUDY POPULATION

> PrEP is offered through the municipal STD Clinic in Seattle, WA to:
  > Patients in ongoing sexual relationship with unsuppressed HIV+ partner
  > MSM or trans persons who have sex with men; with, in prior 12 months:
    > Diagnosis of rectal gonorrhea or early syphilis
    > Meth or popper use
    > Exchanging sex for money or drugs

> Quarterly visits after PrEP initiation for STI testing

> Study Population:
  > All HIV-negative MSM obtaining PrEP from the STD Clinic between October 2014 and September 2017
  > Picked up their initial prescription, and returned for 1-month visit
METHODS: COMPARISON GROUP FORMATION

> Historical Comparison Group
  – HIV-negative MSM who attended the STD Clinic between October 2011 and September 2014
  – Propensity score matched to PrEP patients, 2:1

> Propensity Score Model (included 73 variables)
  – PrEP eligibility
  – Sexual behavior
  – STI risk
  – Recent STI diagnoses
  – Demographic characteristics
  – Reasons for visiting the clinic

> Data Sources
  – STD Clinic patient records
  – WA State STI case report data
OUTCOMES

> Data source: Washington State STI Case Report Data
  – Provider and laboratory reporting

1. Incidence of bacterial STIs
   – Diagnosis of chlamydia, gonorrhea, early syphilis (1°, 2°, early latent)

2. Time to first symptomatic STI
   – Urethral gonorrhea
   – 1°, 2° syphilis
METHODS: FOLLOW-UP TIME CALCULATION

1. Incidence
   - PrEP patients followed from first prescription fill through 90 days after their last PrEP visit (mean length of time on PrEP: 365 days)
   - Comparison patients followed for 1 year after clinic visit

2. Time to first symptomatic STI
   - PrEP patients followed from first prescription fill
   - Comparison patients followed from clinic visit
   - Both groups censored at first diagnosis of urethral GC or 1\textsuperscript{o}/2\textsuperscript{o} Syphilis
METHODS: STATISTICAL ANALYSIS

1. Incidence
   - Poisson regression, clustering by patient ID
   - Adjusted for entry and exit dates to account for secular trends in STI rates

2. Time to first symptomatic STI
   - Kaplan-Meier survival analysis with log-rank test
RESULTS: PATIENTS INCLUDED IN ANALYSIS

557
MSM evaluated for PrEP, October 2014 – September 2017

466
Picked up their first prescription

365
Returned for their first follow-up visit (at 1 month)

91 patients: No prescription pick-up

101 patients: No follow-up visit

730
Matched comparison patients
## Results: Patient Characteristics

<table>
<thead>
<tr>
<th></th>
<th>PrEP Patients (N=365)</th>
<th>Historical Patients (N=730)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age (mean)</strong></td>
<td>30.6</td>
<td>30.1</td>
<td>0.33</td>
</tr>
<tr>
<td><strong>Race/Ethnicity</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White, non-Hispanic</td>
<td>50.1</td>
<td>53.4</td>
<td>0.11</td>
</tr>
<tr>
<td>Black, non-Hispanic</td>
<td>6.8</td>
<td>5.9</td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>24.7</td>
<td>18.8</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>18.4</td>
<td>21.9</td>
<td></td>
</tr>
<tr>
<td><strong>PrEP Eligibility</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rectal GC in Last Year</td>
<td>29.6</td>
<td>30.3</td>
<td>0.82</td>
</tr>
<tr>
<td>Early Syphilis in Last Year</td>
<td>15.9</td>
<td>14.5</td>
<td>0.55</td>
</tr>
<tr>
<td>Meth Use in Last Year</td>
<td>9.9</td>
<td>11.1</td>
<td>0.53</td>
</tr>
<tr>
<td>Popper Use in Last Year</td>
<td>47.9</td>
<td>42.9</td>
<td>0.11</td>
</tr>
<tr>
<td>Sex Work</td>
<td>3.0</td>
<td>2.9</td>
<td>0.90</td>
</tr>
</tbody>
</table>
## RESULTS: STI INCIDENCE

### Incidence of Bacterial STIs, Comparing PrEP Patients to Historical Patients

<table>
<thead>
<tr>
<th>STI</th>
<th>PrEP Patients (N=365)</th>
<th>Historical Patients (N=730)</th>
<th>aiRR*</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chlamydia</td>
<td>45.2</td>
<td>14.4</td>
<td>3.7</td>
<td>(1.7 – 7.8)</td>
</tr>
<tr>
<td>Gonorrhea</td>
<td>37.1</td>
<td>17.6</td>
<td>2.5</td>
<td>(1.2 – 5.3)</td>
</tr>
<tr>
<td>1°, 2°, Early Latent Syphilis</td>
<td>6.9</td>
<td>2.3</td>
<td>6.8</td>
<td>(1.5 – 30.5)</td>
</tr>
</tbody>
</table>

*Adjusted incidence rate ratios; all models adjusted for entry and exit dates
## RESULTS: TIME TO FIRST SYMPTOMATIC STI

<table>
<thead>
<tr>
<th></th>
<th>Time (Days)</th>
<th>95% CI</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>PrEP Patients</td>
<td>120</td>
<td>77 – 171</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Comparison Patients</td>
<td>185</td>
<td>163 – 256</td>
<td></td>
</tr>
</tbody>
</table>

*Symptomatic STI: Urethral GC, 1º/2º Syphilis

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### Kaplan-Meier Failure Estimates for First Symptomatic STI

![Graph showing Kaplan-Meier failure estimates for first symptomatic STI](image-url)
SUMMARY

> PrEP use is associated with a 2- to 3-fold higher incidence of bacterial STIs

> PrEP use is associated with a 50% faster median time to first symptomatic STI, and double the probability of experiencing a symptomatic STI within a year of follow-up
LIMITATIONS

> Ascertainment bias due to more frequent testing among PrEP patients compared to historical patients

> Propensity score matching assumes the variables included in the propensity score can predict likelihood of PrEP use

> Inclusion of entry and exit dates may not have resulted in complete adjustment for secular trends

> Generalizability of these results is uncertain
CONCLUSIONS

> Some evidence of increased STI risk among PrEP patients

> New and renewed STI prevention efforts among PrEP users may be warranted

> PrEP programs may be an opportunity to continue to engage MSM in STI prevention efforts
ACKNOWLEDGEMENTS

Study Contributors

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