Hepatitis B Virus among Participants of a Syringe Services Program in Philadelphia, PA

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Philadelphia Department of Public Health
Hepatitis B Virus (HBV)

Hepatitis B is spread through bodily fluids: Semen, Vaginal, Blood, Mother-Child

Often Asymptomatic. Life-long infection with no cure.

Symptoms: Fatigue, Nausea, Jaundice, Stomach Pain, Dark Urine, Grey or Clay-colored Stool.

Prevented by practicing safe sex, vaccination, and accessing care if infected.
Hepatitis B Virus (HBV)

- Infection can be acute or chronic
- Infection longer than 6 months is chronic
- Those with chronic infection are unable to rid the virus from their body
- Chronicity is related to age at infection
  - 90% of babies and children develop chronic infection
  - These are the individuals at highest risk for liver disease, cirrhosis, liver cancer and premature death
  - There is no cure, but there are FDA approved treatments that slow the virus down and can prevent liver damage
- 5-10% of those infected as adults develop chronic infection
- Increasing among people who use drugs (PWUD)
Hepatitis D Virus (HDV)

• An incomplete DNA virus
• Only capable of replicating in the presence of HBV
• Has been noted among PWUD
• Getting the HBV vaccine protects from HDV, too!
High-Risk Groups

- Individuals born in endemic areas of the world, and their children
- Persons who live with or have sexual contact with infected persons
- Sexually active individuals
- Men who have sex with men (MSM)
- Those who received blood before 1992
- Infants born to mothers infected with hepatitis B
- Healthcare workers and providers, 1st responders
- Dialysis patients
- Individuals receiving blood products (i.e. hemophilia)
- Long-term care residents
Risk Factors of HBV in Philadelphia

Primary Risk Factor Distribution of Investigated Chronic HBV Cases
2013 - Q3 2018
(n = 2043)

*Cases with unknown risk factors (n = 450) not included*
Study Objectives

• Assess HBV and HDV prevalence and immunity among PWUD
  – HBV infection
  – HBV immunity
  – HDV infection
• Assess HBV and HDV among certain sub-groups with known risk factors
• Educate study participants about viral hepatitis prevention and harm reduction
• Link participants with infections to care
METHODS
Study Overview

- Design: cross-sectional serological study
- Setting: syringe services program (SSP) in Philadelphia
- Eligibility:
  - Client of the SSP
  - Adults (≥18 years old)
  - English- or Spanish-speaking
  - Self-reported history of drug use or current homelessness
- Timeframe: January – April, 2018
- Goal sample size: 400 participants
Serological Testing

• Blood specimens obtained for eligible participants

• Measurements of:
  – HBV surface antigen (HBsAg)
  – HBV surface antibody (anti-HBs)
  – Total HBV core antibody (anti-HBc)
  – HDV total antibody (anti-HDV)

• Testing performed at the Philadelphia Public Health Laboratory
Study Process

Day of:
• Recruitment
• Consent
• Blood draw
• Questionnaire
• Harm reduction

Follow-up:
• Communicate results
• Link to care*
• Provide vaccine*

*where applicable
RESULTS
Participants

- 438 enrolled
- 388 (89%) with successful blood draws
- 369 (95%) classified as “high risk”*

*High-risk was defined as having a self-reported history of drug use or currently homeless
Participants

438 enrolled

388 (89%) with successful blood draws

369 (95%) classified as “high risk”*

*High-risk was defined as having a self-reported history of drug use or currently homeless
Participant Characteristics

Participant Demographics

<table>
<thead>
<tr>
<th></th>
<th>N=369</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birth Year</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;1970</td>
<td>62</td>
<td>16.9%</td>
</tr>
<tr>
<td>1970-1979</td>
<td>68</td>
<td>18.5%</td>
</tr>
<tr>
<td>1980-1989</td>
<td>166</td>
<td>45.1%</td>
</tr>
<tr>
<td>1990+</td>
<td>72</td>
<td>19.6%</td>
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<tr>
<td>Gender</td>
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<tr>
<td>Female</td>
<td>188</td>
<td>32.4%</td>
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<tr>
<td>Male</td>
<td>242</td>
<td>66.5%</td>
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<tr>
<td>Race</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>67</td>
<td>18.2%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>74</td>
<td>20.1%</td>
</tr>
<tr>
<td>White</td>
<td>204</td>
<td>55.3%</td>
</tr>
<tr>
<td>Other</td>
<td>24</td>
<td>6.5%</td>
</tr>
</tbody>
</table>

Participant Risk Factors or Possible Sources of Exposure

- History of Injection Drug Use: 69.9%
- History of Any Drug Use: 96.2%
- Currently Homeless: 57.8%
- Any Drug Use or Homeless: 100.0%
- Born outside US: 7.6%
• In addition, 4 individuals had evidence of HDV exposure, two of whom had current HBV infections.
# HBV Immunity

<table>
<thead>
<tr>
<th>Birth Year*</th>
<th>N=369</th>
<th>Immune (from vaccine or infection), %</th>
<th>Susceptible, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1970</td>
<td>56</td>
<td>55.4%</td>
<td>44.6%</td>
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<tr>
<td>1970-1979</td>
<td>64</td>
<td>54.7%</td>
<td>45.3%</td>
</tr>
<tr>
<td>1980-1989</td>
<td>155</td>
<td>69.0%</td>
<td>31.0%</td>
</tr>
<tr>
<td>1990+</td>
<td>72</td>
<td>52.8%</td>
<td>47.2%</td>
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<table>
<thead>
<tr>
<th>Gender</th>
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<tbody>
<tr>
<td>Female</td>
<td>109</td>
<td>59.6%</td>
<td>40.4%</td>
</tr>
<tr>
<td>Male</td>
<td>230</td>
<td>61.7%</td>
<td>38.3%</td>
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<table>
<thead>
<tr>
<th>Race</th>
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</thead>
<tbody>
<tr>
<td>Black</td>
<td>60</td>
<td>61.7%</td>
<td>38.3%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>71</td>
<td>53.5%</td>
<td>46.5%</td>
</tr>
<tr>
<td>White</td>
<td>194</td>
<td>54.6%</td>
<td>45.5%</td>
</tr>
<tr>
<td>Other</td>
<td>22</td>
<td>63.9%</td>
<td>36.1%</td>
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<table>
<thead>
<tr>
<th>Birthplace</th>
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</thead>
<tbody>
<tr>
<td>USA</td>
<td>307</td>
<td>61.6%</td>
<td>38.4%</td>
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<tr>
<td>Other</td>
<td>27</td>
<td>59.3%</td>
<td>40.7%</td>
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</table>

*Statistically significant difference
**HBV Immunity**

*Statistically significant difference when comparing to participants without risk factor*

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Percent (%)</th>
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<tbody>
<tr>
<td>History of Any Drug Use</td>
<td>61.1</td>
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<tr>
<td>History of Injecting Drugs*</td>
<td>65.8</td>
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<tr>
<td>Currently homeless*</td>
<td>62.5</td>
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<tr>
<td>History of Incarceration</td>
<td>62.1</td>
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<tr>
<td>Past or Current HCV Infection (Serology)*</td>
<td>69.1</td>
</tr>
<tr>
<td>HIV Positive (Self-Report)</td>
<td>59.1</td>
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</tbody>
</table>

**Legend:**
- Immune (from vaccine or infection)
- Susceptible
## HBV Infection

<table>
<thead>
<tr>
<th></th>
<th>N=369</th>
<th>Past/ Present HBV Infection, %</th>
<th>No HBV Infection, %</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Birth Year</strong></td>
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<tr>
<td>1970-1979</td>
<td>68</td>
<td>35.3%</td>
<td>64.7%</td>
</tr>
<tr>
<td>1980-1989</td>
<td>163</td>
<td>12.3%</td>
<td>87.7%</td>
</tr>
<tr>
<td>1990+</td>
<td>72</td>
<td>6.9%</td>
<td>93.1%</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>116</td>
<td>21.6%</td>
<td>78.5%</td>
</tr>
<tr>
<td>Male</td>
<td>239</td>
<td>23.9%</td>
<td>76.2%</td>
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<tr>
<td><strong>Race/ethnicity</strong></td>
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</tr>
<tr>
<td>Black</td>
<td>65</td>
<td>33.9%</td>
<td>66.2%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>73</td>
<td>16.4%</td>
<td>83.6%</td>
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<tr>
<td>White</td>
<td>202</td>
<td>20.3%</td>
<td>79.7%</td>
</tr>
<tr>
<td>Other</td>
<td>23</td>
<td>30.4%</td>
<td>69.6%</td>
</tr>
<tr>
<td><strong>Birthplace</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>USA</td>
<td>322</td>
<td>22.7%</td>
<td>77.3%</td>
</tr>
<tr>
<td>Other</td>
<td>27</td>
<td>18.5%</td>
<td>81.5%</td>
</tr>
</tbody>
</table>

*Statistically significant difference
**HBV Infection**

- History of Any Drug Use: 76.5%
- History of Injecting Drugs: 73.1%
- Currently homeless: 19.8%
- History of Incarceration: 76.6%
- Non-Commercial Tattoo: 77.4%
- Past or Current HCV Infection (Serology): 70.6%
- HIV Positive (Self-Report): 45.5%

*Past/Present HBV Infection* (red) vs. *No HBV Infection* (light blue)

*Statistically significant difference when comparing to participants without risk factor*
CONCLUSIONS
Overall Findings

• Over 20% of participants had evidence of past or present HBV infection, most of whom cleared their infections
  – Most cleared the infection

• Nearly 40% of participants lacked detectable HBV immunity
  – Despite childhood HBV vaccination recommendations, susceptibility was present in 31% of those born during 1980-1989 and 47% of those born during 1990-1999
  – All individuals met criteria for risk-based vaccine recommendations

• HDV was identified
Recommendations

• Increase vaccination coverage among PWUD and those experiencing homelessness
  – Make it easy for PWUD to get vaccinated
  – Offer vaccine in non-traditional locations (e.g., SSPs, jails/prisons)

• Promote other methods of harm reduction

• Monitor for increases in HBV and HDV among PWUD

Source: UNAIDS
Acknowledgements

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• Public Health Lab Team

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• Caroline Johnson, MD

Prevention Point of Philadelphia

Hepatitis B Foundation
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