The Medical Consequences of the Injection Opioid Epidemic in Rural West Virginia

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Disclosure

- an active research grant and a pending research grant from Gilead Sciences (vertical transmission of hep C, HIV PrEP in PWID)
We are not only dealing with an epidemic of opioid injection drug use.....
Multiple Injection Opioid Syndemics (intertwined epidemics)

- acute hepatitis C (WV has 2nd highest US rate)
- acute hepatitis B (WV has highest US rate)
- hepatitis A among homeless persons/people who inject drugs (2547 cases from 3/19/18-8/30/19, 4th highest US rate with 23 deaths)
- endocarditis and other serious bacterial infections (osteomyelitis, CNS & visceral abscesses, etc)
- mother-to-child transmission of hepatitis B, C, HIV
- HIV outbreaks in Huntington & Charleston
Multiple Injection Opioid Syndemics (intertwined epidemics)

- syphilis and other STDs, incl. congenital syphilis
- overdoses and OD fatalities (WV is #1)
- Neonatal Opioid Withdrawal Syndrome (NOWS)/Neonatal Abstinence Syndrome (NAS) [babies born in withdrawal from maternal opioid use] (WV has highest rate)
- increasing shift to stimulant use, esp methamphetamine, and polypharmacy with fentanyl & other drugs
## Similar Risk Factors for HIV, HBV & HCV

<table>
<thead>
<tr>
<th>Risk factor</th>
<th>HIV</th>
<th>HBV</th>
<th>HCV</th>
</tr>
</thead>
<tbody>
<tr>
<td>unprotected sex</td>
<td>+</td>
<td>+</td>
<td>+*</td>
</tr>
<tr>
<td><strong>injection drug use</strong></td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>tattoos, piercings, needlesticks</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>hemodialysis</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>transfusion/organ transplant</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>foodborne</td>
<td>+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>household contact</td>
<td></td>
<td>+</td>
<td></td>
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<tr>
<td>institutionalized</td>
<td></td>
<td>+</td>
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</tbody>
</table>

*primarily among MSM

*more common among MSM
Incidence Rate of Acute Hepatitis B & Hepatitis C by Year of Report & Age-adjusted Drug Overdose Mortality Rate — West Virginia, 2007-2016

Data sources: WV Office of Epidemiology and Prevention Services, Centers for Disease Control and Prevention, Drug Overdose Death Rates, Centers for Disease Control and Prevention, Viral Hepatitis Statistics and Surveillance
Acute HCV in Appalachian Youth < 30, 2006-2012

- 1,377 cases in WV, VA, TN, KY
- represents 346% increase
- tied to opioid injection among whites in rural & small urban areas
- IDU was risk factor in 73%

Zibbell JE et al. MMWR Weekly May 8, 2015
HCV Infection: Urban vs Nonurban\textsuperscript{1,2}

The first few years after onset of injection drug use constitute a high-risk period in which the rate of HCV infection can exceed 40\textsuperscript{3}.

\textsuperscript{a}95\% confidence interval.
Rapid Increase in Acute HCV
West Virginia: Chronic HCV, 2012-2015

Distribution of Chronic HCV Cases by Age Group, % WV, 2012–2015, N=21,307

Distribution of Chronic HCV Cases by Gender, % WV, 2012–2015. N=21,276

## Transmission Routes for HIV, Hepatitis B & C

<table>
<thead>
<tr>
<th>Route</th>
<th>HIV</th>
<th>Hepatitis C</th>
<th>Hepatitis B</th>
</tr>
</thead>
<tbody>
<tr>
<td>blood</td>
<td>++</td>
<td>++</td>
<td>++</td>
</tr>
<tr>
<td>sex</td>
<td>++</td>
<td>+*</td>
<td>++</td>
</tr>
<tr>
<td>mother-to-child</td>
<td>++</td>
<td>+</td>
<td>+++</td>
</tr>
</tbody>
</table>

*primarily among MSM*
HCV in women of child-bearing age & in children <2 y/o, KY 2011-14*

*KY had highest rate of acute HCV in U.S., 2011-14
Increasing Proportion of Infants Born to Hep C-infected Moms

**FIGURE 2.** Proportion* of infants born to hepatitis C virus (HCV)-infected women† — United States and Kentucky, 2011–2014

- **Proportion calculated annually as infants born to HCV-infected women divided by total infants born.**
- **HCV infection status of mother is determined by notation on infant’s birth certificate. Birth categorization is based on mother’s place of residence.**

**KY 2011-14**

**US 2011-14**
West Virginia had the highest infant HCV infection rate in 2014: 22.6 cases per 1,000 live births.
Increases in Acute Hepatitis B: Kentucky, Tennessee, and West Virginia, 2006–2013

- overall 114% increase
  - occurring after 2009 in whites, age 30-39, reporting IDU (all, p<0.001)
  - no difference in gender
- 42% in non-urban areas
- typically low HBV vaccination rates in young adults
- parallels the simultaneous increase in acute HCV in these states
- “The concurrent increase in reports of acute HBV and HCV infections, as well as an increase in IDU reported among this population is concerning.”

MMWR Jan. 29, 2016
Acute Hepatitis B in West Virginia, 2007-15

Incidence of Acute HBV Cases by Year of Report, 2007–2016

Acute HBV Rates by Age Group, West Virginia, 2012-2015

From 2012–2016, IDU and non-IDU were the most commonly reported risk factors among newly confirmed cases, with IDU = non-IDU in 2016

*2016 data provisional.
Prevalence of HBcAb (naturally acquired infection) Positivity in Women of Childbearing Age, 15-44

- stable rates of HBV exposure over time
- lower overall rates in birth-dose cohort

- opposing trends in Mississippi, Kentucky, West Virginia, Ohio, and Maryland (Appalachian states)

Prevalence of Chronic HBV (HBsAg+) in Women of Childbearing Age, 15-44

Birth-dose cohort versus pre-1992 cohort

- overall decline in chronic HBV
- overall lower rate in birth-dose cohort

National trend vs states with opposing trends

- increase in MS, KY and WV (Appalachian states)
- no increase in any other states

All p<0.0001

Prevalence of Chronic HBV (HBsAg+) in Women of Childbearing Age, 15-44

doi.org/10.1093/cid/ciz841
Southeast Indiana: Scott County HIV Outbreak, 2014-16 (215 total cases)*

* ~93% are co-infected with hepatitis C
Demographic Characteristics of Scott County

- it had the worst health status of Indiana’s 92 counties
- few physicians
- limited access to healthcare
- 9% unemployment
- 19% poverty rate
- 21% without a high school diploma

220 Rural Counties at Risk for Outbreaks of HIV and/or Hepatitis C Among People Who Inject Drugs

Where Disease Eruption Is a Threat
A CDC report identified 220 counties where factors such as unemployment rates, overdose deaths and sales of prescription painkillers contribute to a high vulnerability for outbreaks of HIV and hepatitis C among injection drug users.

>50% are in central Appalachia

Source: Centers for Disease Control and Prevention

West Virginia Counties at Risk for HIV and/or Hepatitis C Outbreaks

- WV has highest proportion of at-risk counties (28/55 = 51% -- 13% of US total)
HIV Infection Investigation in a Rural Area* — West Virginia, 2017

- 10 cases identified Jan-July 2017 in 3 low incidence counties; contact tracing found 47 more
- all linked epidemiologically or by HIV molecular analysis

57 total persons diagnosed
- 89% male, 75% white
- 15 southern coalfield counties
- 49% < 30 years old

Mode of transmission
- 60% male-to-male sex
- 9% injection drug use (IDU)
- 5% male-to-male sex + IDU
- 4% heterosexual
- 23% unknown

Challenges to HIV Testing
- stigma
- limited healthcare access
- transportation
- poor health literacy
- provider lack of awareness

*across 15 southern coalfield counties, 14 of which are among the 220 at-risk counties in US
HIV Clusters in Huntington and Charleston

• from 2013-2017:
  • typical annual rate in WV = 77 and typical annual rate in Cabell Co. (Huntington) = 7 cases
  • new HIV cases started appearing in Huntington in fall 2018

• number and proportion new HIV cases in WV attributed to IDU rising steadily

<table>
<thead>
<tr>
<th>year</th>
<th>total</th>
<th>assoc with IDU</th>
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<tbody>
<tr>
<td>2018</td>
<td>87</td>
<td>39 (45%)</td>
</tr>
<tr>
<td>2019</td>
<td>146</td>
<td>91 (62%)</td>
</tr>
<tr>
<td>Jan-June 2020</td>
<td>50</td>
<td>34 (68%)</td>
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</tbody>
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* half of these diagnosed since May
HIV Clusters in Huntington and Charleston

- 6 new cases in PWID unrelated to Huntington cluster reported in Charleston (WV Health Advisory #162, 10/9/19)

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<tr>
<th>2018-June 2020</th>
<th>total</th>
<th>assoc with IDU</th>
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</thead>
<tbody>
<tr>
<td>Cabell (Huntington)</td>
<td>103</td>
<td>92 (89%)</td>
</tr>
<tr>
<td>Kanawha (Charleston)</td>
<td>57</td>
<td>26 (46%)</td>
</tr>
</tbody>
</table>

- Starting to see scattered cases around the state

<table>
<thead>
<tr>
<th>RWCA clinics</th>
<th>2019 referrals</th>
<th>total (%) IDU</th>
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<tbody>
<tr>
<td>WVU (north)</td>
<td>54</td>
<td>13 (24%)</td>
</tr>
<tr>
<td>CAMC (central)</td>
<td>42</td>
<td>16 (38%)</td>
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WV Vulnerability Assessment for HCV and HIV

#2 Cabell
#19 Kanawha
Summary

• WV, largely rural and the 10th least populous state in the US, has been devastated by the opioid epidemic

• although this talk has focused on the chronic viral sequelae of injection drug use, the opioid epidemic has given rise to multiple syndemics, all of which must be addressed in a comprehensive, evidence-based, harm reduction public health approach