Opioid Drug Use & Intervention in Appalachia

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November 17, 2016
Disclosures

• none
Addiction

- Addiction is a chronic, often relapsing, brain disease that causes compulsive drug seeking and use, despite harmful consequences to the addicted individual and to those around him/her.

- Although the initial decision to take drugs is voluntary for most people, the brain changes that occur over time challenge an addicted person’s self-control and hamper his/her ability to resist intense impulses to take drugs.
A healthy brain, left, shows synapses firing. A brain on drugs, right, shows diminished activity.
Endocarditis Cases at University Hospital, 1999-2009

Year

Endocarditis Hospitalizations

1999  28
2000  31
2001  30
2002  38
2003  58
2004  51
2005  83*
2006  67
2007  62
2008  58
2009  66
Results from UH Retrospective Endocarditis Study, 1999-2009

- 2x increase overall in admissions for endocarditis
- 3x increase in endocarditis pts who had + hep C blood test
- 6x increase in endocarditis pts with + opioid drug screens
- reflects a sharp local increase in people who inject drugs (PWID) from 1999-2009
- started advocating for syringe exchange program (SEP) in 2005 to minimize infectious diseases harm from injection drug use (IDU)
- received the required emergency order for a SEP in 2012
- started Ohio’s 3rd SEP in 2014

Hamilton County* Coroners Crime Lab Heroin Submissions

<table>
<thead>
<tr>
<th>Year</th>
<th>Heroin submissions (Percent of total submission of elicit drugs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>3.7%</td>
</tr>
<tr>
<td>2001</td>
<td>2.5%</td>
</tr>
<tr>
<td>2002</td>
<td>3.1%</td>
</tr>
<tr>
<td>2003</td>
<td>3.3%</td>
</tr>
<tr>
<td>2004</td>
<td>3.1%</td>
</tr>
<tr>
<td>2005</td>
<td>4.4%</td>
</tr>
<tr>
<td>2006</td>
<td>4.6%</td>
</tr>
<tr>
<td>2007</td>
<td>4.3%</td>
</tr>
<tr>
<td>2008</td>
<td>6.5%</td>
</tr>
<tr>
<td>2009</td>
<td>10.7%</td>
</tr>
<tr>
<td>2010</td>
<td>19%</td>
</tr>
</tbody>
</table>

*also includes Batavia, Blue Ash, Amberley, **Butler County, Clermont County**, Cleves, Madeira, Mariemont
Cincinnati PWID Data, 2009

- age at first use of IV and other drugs—IDU starts early
WE ARE NOT ONLY DEALING WITH AN EPIDEMIC OF OPIOID INJECTION DRUG USE.....
Multiple Injection Opioid Syndemics (intertwined epidemics)

- opioid injection, Rx & street drugs (heroin, fentanyl, carfentanil, other synthetic opioids)
- endocarditis and other serious bacterial infections (osteomyelitis, CNS & visceral abscesses, etc)
- hepatitis C (KY has highest & WV has 2nd highest US rate)
- hepatitis B (WV has highest US rate)
- risk of HIV (>50% of at-risk counties are in Appalachia)
- mother-to-child transmission of hepatitis B, C, HIV
- syphilis and other STDs, incl. congenital syphilis
- overdoses and OD fatalities (WV has highest rate)
- Neonatal Abstinence Syndrome (WV has highest rate)
69/101 (68%) reported finding used/dirty syringes

Where did you find syringes

- Public spaces: 60
- Family/Friends House: 36
- Home: 17
- Treatment Facility: 11
Cincinnati PWID Data, 2009

- 39% reused found syringes, half without cleaning them (most of others used inadequate methods)
Discarded syringes are a public hazard

playground near UC Med Center

YWCA entrance downtown Cincy
### University Hospital costs* for 3 representative IE admissions

* does not include physician charges or 5-6 week stay in SNF for IV antibiotics

<table>
<thead>
<tr>
<th>3 PWID Cases</th>
<th>Demographics</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>13 day hospitalization cost:</strong></td>
<td>$85,643</td>
</tr>
<tr>
<td>Age, sex</td>
<td>59 y/o male</td>
</tr>
<tr>
<td>HCV</td>
<td>Yes</td>
</tr>
<tr>
<td>Insurance</td>
<td>None (Medicaid pending)</td>
</tr>
<tr>
<td><strong>20 day hospitalization cost (AVR):</strong></td>
<td>$173,753</td>
</tr>
<tr>
<td>Age, sex</td>
<td>47 y/o male</td>
</tr>
<tr>
<td>HCV</td>
<td>Yes</td>
</tr>
<tr>
<td>Insurance</td>
<td>Molina (OH Medicaid)</td>
</tr>
<tr>
<td><strong>17 day hospitalization cost (AVR):</strong></td>
<td>$267,037</td>
</tr>
<tr>
<td>Age, sex</td>
<td>47 y/o male</td>
</tr>
<tr>
<td>HCV</td>
<td>Yes</td>
</tr>
<tr>
<td>Insurance</td>
<td>None (Medicaid pending)</td>
</tr>
</tbody>
</table>
## Similar Risk Factors for HIV, Hepatitis B & C

<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>injection drug use</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>
</tr>
<tr>
<td>institutionalized</td>
<td></td>
<td></td>
<td>+</td>
</tr>
</tbody>
</table>

*more common among MSM*
Southeast Indiana: Recent Scott County HIV Outbreak (190 cases)*

* ~93% are co-infected with hepatitis C
<table>
<thead>
<tr>
<th>Exposure Route</th>
<th>Risk Per 100 Exposures to an Infected Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood Transfusion</td>
<td>90%</td>
</tr>
<tr>
<td>Needle-sharing (IDU)</td>
<td>0.67%</td>
</tr>
<tr>
<td>Receptive Anal Intercourse</td>
<td>0.5%</td>
</tr>
<tr>
<td>Percutaneous Needle Stick</td>
<td>0.3%</td>
</tr>
<tr>
<td>Receptive Vaginal Intercourse</td>
<td>0.1%</td>
</tr>
<tr>
<td>Insertive Anal Intercourse</td>
<td>0.065%</td>
</tr>
<tr>
<td>Insertive Vaginal Intercourse</td>
<td>0.05%</td>
</tr>
<tr>
<td>Receptive/Insertive Oral Sex</td>
<td>0.005%-0.01%</td>
</tr>
</tbody>
</table>

Antiretroviral Postexposure Prophylaxis After Sexual, Injection-Drug Use, or Other Nonoccupational Exposure to HIV in the United States Recommendations from the U.S. Department of Health and Human Services. MMWR 54(RR02);1-20.
Demographic Characteristics of Scott County

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

Counties vulnerable to outbreaks of HIV and hepatitis C
West Virginia Counties at Risk for HIV and/or Hepatitis C Outbreaks

- KY is #1 (54/120 counties, 25% of total)
- WV is #2 (28/55 counties, 13% of total)
- >50% are in Appalachia
HIV is Now a Manageable Chronic Disease

• requires good adherence to costly lifelong therapy
• lifespan of well-suppressed HIV (undetectable viral load) for a man diagnosed and treated at 20 is 70 years
• because of ongoing low-level infection and resulting inflammation, greater susceptibility to diseases of aging
  – cardiovascular disease
  – non-AIDS-defining cancers
  – frailty
• viral suppression so successfully limits ongoing transmission that....
• ... “treatment as prevention (TasP)” is goal now
Acute HCV in Appalachian Youth ≤ 30, 2006-2012

• 1377 cases in WV, VA, TN & KY
• represents **346% increase**
• similar dramatic increases from upstate NY, MA, WI and OH in same period
• tied to injection of opioids among whites in rural & small urban areas
• IDU was risk factor in 73%

Zibbell JE et al. MMWR Weekly May 8, 2015
New Chronic HCV Cases, Southwest OH
August, 2015

Total 307
Total in July: 278

Per CDC, acute hepatitis C rates increased in Ohio by 400% in 2015 alone
HCV is Now a Curable Disease

• once or twice daily combination therapy for 12 weeks
• well-tolerated, limited toxicity
• most combinations are coformulated into single tablet
• >97% cure rate in studies, incl. those in PWID
• very expensive, so access limited by Medicaid & private payers, esp to those with substance abuse
• so, although PWID are the primary reservoir for HCV in resource-rich world, they are largely excluded from TX
• cure and access to harm reduction (sterile syringes, clean injection materials) would limit ongoing transmission and re-infection....
• ... “treatment as prevention (TasP)”
PCORI “HERO” Study
(HEpatitis C Real Outcomes)

- treatment of HCV for active injectors (within last 3 months) at methadone clinics and community health clinics, comparing modified Directly Observed Therapy (mDOT) vs. Peer Navigation (support from a ‘near peer’)
- 8 sites across U.S. incl Morgantown, WV
- enroll 1000, expect 600 to be treated
- 5 yr study: initiation of treatment, hep C cure, reinfection, resistance development
Prevention of Hepatitis B

• VACCINATION!!!
• part of infant vaccination schedule since early 1990s
• many adolescents and adults have not been vaccinated and are vulnerable
• important to screen for those at risk and protect by vaccination
### Routes of Transmission of HIV and Hepatitis B & C

<table>
<thead>
<tr>
<th></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>

Mother-to-child transmission (MTCT) of these viruses occurs at varying rates but may have serious consequences for the neonate.
Why is this important?

- although initially concentrated among young men, now ~half of the opioid-dependent individuals in Appalachia are women of child-bearing age
Mother-to-Child Transmission of HCV

- vertical transmission is leading cause of pediatric HCV, up to 4,000 new cases each year in the U.S.
- 40-70% of HCV-infected pregnant women do not initially report major risk factors for HCV
- currently, no means of prevention (except birth control)

<table>
<thead>
<tr>
<th></th>
<th>HIV- moms</th>
<th>HIV+ moms</th>
</tr>
</thead>
<tbody>
<tr>
<td>range of MTCT risk</td>
<td>1.1%-10.7%</td>
<td>4.2%-28.5%</td>
</tr>
<tr>
<td>pooled risk (all studies)</td>
<td>5.8%</td>
<td>10.8%</td>
</tr>
</tbody>
</table>
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

FIGURE 1. Hepatitis C virus (HCV) detection rate among females aged 15–44 years and HCV testing rate among children aged ≤2 years — United States and Kentucky, 2011–2014*

Source: Quest Diagnostics laboratory data.
* HCV detection rates were calculated as number of females aged 15–44 years who received a positive HCV antibody and/or RNA result per 100,000 females aged 15–44 years served by Quest Diagnostics (i.e., received a laboratory test for any reason) by area of residence. HCV testing rates among children were calculated as number of children aged ≤2 years who received a test for HCV antibody and/or RNA per 100,000 children aged ≤2 years served by Quest Diagnostics by area of residence.
Increasing proportion of infants born to HCV-infected moms, KY 2011-14

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.
Long-term Outcome of HCV MTCT

• most children asymptomatic with mild liver abnormalities
• both transient and chronic infections occur
• studies following patients for 10 to 20 years after perinatal acquisition show*:
  – 5%-12% have significant fibrosis
  – 5% have cirrhosis

Rationale for Metro Cincinnati Health Collaborative (CHC) HCV Proposal

• CHC represents all the hospital systems in metro Cincinnati
• because of dramatic increase in NAS, per CHC decision all women giving birth in region are screened for opioids starting in 9/13
• in 2/15, we proposed adding screening for HCV antibody with reflex to HCV RNA PCR (“viral load”) to moms testing + for opioids....
  – identify moms who need further evaluation & management
  – identify babies who need appropriate pediatric follow-up for HCV MTCT
• HCV screening began April 1, 2016
• future possible intervention to prevent neonatal infection: cure of hep C during pregnancy
Perinatal AIDS in U.S., 1985-2010


Note: All displayed data have been statistically adjusted to account for reporting delays, but not for incomplete reporting.
Mother-to-Child Transmission of HIV

• without intervention, will occur in 25-66%, depending on country
• reduced almost to zero with appropriate use of HIV drugs during pregnancy
• prenatal screening recommended for all pregnant women
  – repeat test in 3rd trimester depending on risk
• if no prenatal care, then rapid test done during labor so treatment can be started before birth
• all sexually active individuals between ages of 13-66 should be screened for HIV at least once
Mother-to-Child Transmission of HBV

• 80-90% of infants born to chronically-infected (HBsAg+) moms also become chronically infected and have poor outcomes

• screening recommended for all pregnant women, even if previously vaccinated

• appropriate, timely infant immunoprophylaxis (vaccination + HBIG) prevents >90% of perinatal infections

• HBV-related complications occur more often in pregnancy and are associated with higher mortality
Neonatal Abstinence Syndrome

- postnatal opioid withdrawal
- CDC study of 28 states, 1999-2013, showed overall increase of ~300%, from 1.5 to 6.0/1,000 hospital births*
- in 2013, WV had 33.4 cases/1,000 hospital births = highest rate in U.S.
- est. 80% of hospital costs covered by WV Medicaid
- What is the future for these children?

*CDC. Incidence of Neonatal Abstinence Syndrome-28 States, 1999-2013. MMWR August 12, 2016; 65(31); 799-802.
Neonatal Abstinence Syndrome (NAS)*

- 5,100 hospitalizations in Ohio from 2004-11
- 1,649 in 2011 alone
- 6-fold increase per 100,000 live births from 2004 to 2011
- cost >$70M

Opioid Overdoses Drive Increased Death Rates

Drug overdose deaths involving opioids, by type of opioid, United States, 2000-2014

SOURCE:

www.cdc.gov/drugoverdose
States with Increase in OD Deaths from 2013 to 2014
Naloxone Use in Ohio, 2014

6/20 top zip codes for naloxone use are in metro Cincinnati
Progression from 1\textsuperscript{st} Opioid Use to 1\textsuperscript{st} OD in Metro Cincinnati\textsuperscript{*}

**CCAT OOPP Evaluation Results**

- 52.0\% (n=118) reported having been prescribed at least one psychiatric medication during their lifetime
- 23.0\% (n=53) reported having attempted suicide during their lifetime; 2.2\% (n=5) in the past month

\textsuperscript{*}Winstanley EL et al. Submitted 2106.
Interventions
Multiple intertwined epidemics require multiple approaches

- increased access to a range of drug treatment programs
  - treatment tailored to individual needs
  - more quality medication-assisted treatment (MAT) programs: methadone, buprenorphine/naloxone, naltrexone
  - less emphasis on abstinence only (only successful in ~5%)
- increased access to naloxone to prevent OD fatality
- increased screening, treatment and prevention for serious infectious diseases
- increased syringe services programs (SSPs) to prevent infections, provide OD prevention, link clients to services
- changes in prenatal care: screen for opioid dependence, hepatitis C
- primary prevention
What is Harm Reduction?

A public health approach to minimize the harm from certain behaviors

Calls for the non-judgmental, non-coercive provision of services and resources to PWID and the communities in which they live in order to assist them in reducing attendant harm
Improve Access to Drug Treatment

• more facilities needed for:
  – detox
  – inpatient and aftercare
  – intensive outpatient

• more Medication-Assisted Treatment (MAT) needed
  – Rx to control drug cravings
  – psychosocial support

• access to insurance (ACA has been very helpful)

• close & prevent Suboxone mills (have replaced pill mills)
Drug Treatment Is Only Evidence-based Practice that Reduces OD Fatalities

![Graph showing heroin overdoses and opioid agonist treatment](image)


*Sources: Schwartz et al. (2013) American Journal of Public Health*
Naloxone to Reverse Opioid OD

• much more widely available now
  – first-responders
  – PWID
  – schools and other institutions
• ... but increasingly expensive
• should be made available in public places like defibrillators are for heart attacks
• more overdose prevention programs
• many states have Good Samaritan laws
Syringe Exchange Programs (SEPs*)

- 16 peer-reviewed studies performed from 1996 to 2007 have shown that SEPs reduce the transmission of HIV, hepatitis B and C
- 6 studies looked at the effect on substance abuse, and all 6 found that SEPs do not promote substance abuse
- 8 studies looked at drug treatment enrollment, and all 8 found that SEPs increase entry into drug treatment
- no evidence for increase in crime
- no evidence that it encourages new, first-time injectors

* also referred to as Syringe Access Programs (SAPs), Syringe Services Programs (SSPs)
Prevention of Infection

• syringe services programs:
  – need both sterile syringes and clean injection supplies to prevent HCV
  – on-site rapid testing for HIV, HCV
  – safer injection education
  – male & female condoms, safer sex education
• Hep B vaccination
• HIV pre-exposure prophylaxis (PrEP)
  – one Truvada pill taken once daily prevents >90%
• screen and treat broadly for HIV & HCV: “treatment as prevention (TasP)”
• screen & treat for STDs
Prevention of Unplanned Pregnancy & Neonatal Abstinence Syndrome

- improve access to long-term implantable birth control
  - can be reversed when ready to plan for family
- screen for opioid use as part of both routine and prenatal care
- screen for opioid use at labor & delivery
- research needed for optimal care, growth and development of NAS babies
Reduce Stigma!

• decreases use of needed care
• does not solve the problem
• drug dependence not a character flaw or lack of will power
  – est. 40-60% of vulnerability to addiction is genetic
QUESTIONS??

Thank you!