

# Heroin in the Heartland: Dealing with Opioid Addiction and Its Consequences

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# Disclosures

- none

# Objectives

- Describe addiction as a disease with respect to its behavioral and neurophysiologic manifestations
- Describe how we got here
- Describe the links between the current opioid injection epidemic with regard to:
  - chronic viral hepatitis, including vertical transmission
  - new rural outbreaks of HIV
- Recognize the role of harm reduction efforts to limit the damage from the medical consequences of opioid injection drug use



# Defining Addiction

*per American Society of Addiction Medicine  
(ASAM)*

**Addiction is a primary, chronic disease of brain reward, motivation, memory and related circuitry.**

# Addiction Is...

- a chronic, relapsing brain disease that causes compulsive drug seeking and use, despite harmful consequences to the addicted individual
- brain re-wiring occurs....
- although the initial decision to take drugs may be voluntary, the brain changes that occur over time challenge an addicted person's self-control and hamper the ability to resist intense impulses to take drugs

# Characteristics of Addiction

- compulsive drug-taking
- erosion of inhibitory in control
- craving, or increased “hunger” for drugs or rewarding experiences
- obsessive thinking about drug
- diminished recognition of significant problems with one’s behaviors and interpersonal relationships
- a dysfunctional emotional response

# What Happens to Your Brain When You Take Drugs?

- drugs contain chemicals that tap into brain's communication system and disrupt the way nerve cells normally send, receive, and process information
- drugs cause this disruption in at least 2 ways
  - by imitating the brain's natural chemical messengers
  - by overstimulating the “reward circuit” of the brain
- drugs of abuse bind to the neural circuitry of REWARD

# What Happens to Your Brain When You Take Drugs?

- with continued drug use, the brain adapts to overwhelming dopamine surges by producing less dopamine or by reducing the number of dopamine receptors in the reward circuit
- results in lessening dopamine's impact on reward circuit, which reduces the ability to enjoy not only drugs but also other activities that previously brought pleasure
- this decrease compels the addicted person to keep using drugs to bring the dopamine function back to normal, but now larger amounts of the drug are required to achieve the same dopamine 'high', an effect known as ***tolerance***



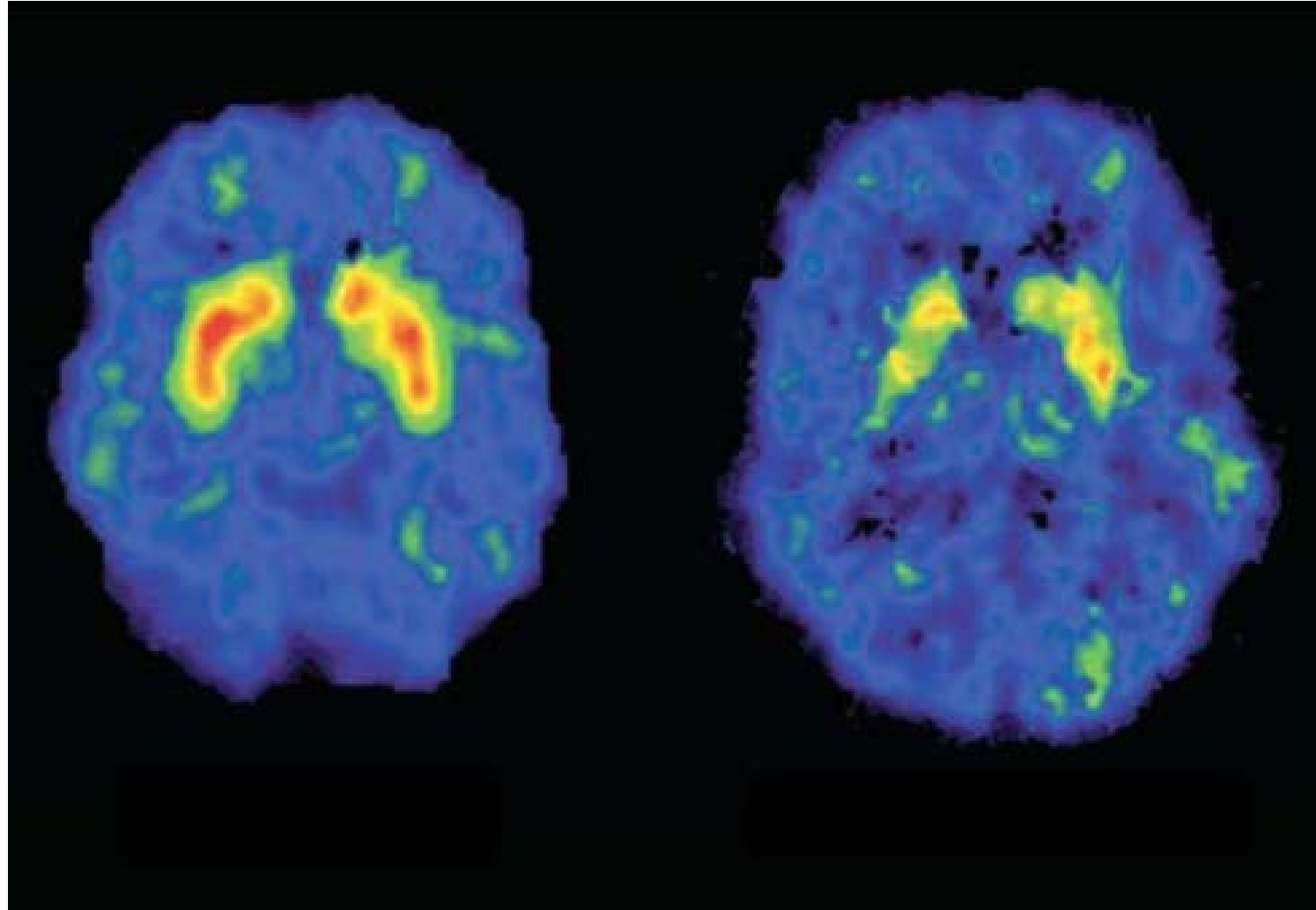
# What Happens to Your Brain When You Take Drugs?

- long-term use causes changes in other brain chemical systems and circuits as well
- imaging studies of addicted individuals show changes in areas of the brain that are critical to judgment, decision making, learning and memory, and behavior control.
- these changes can drive user to seek out and take drugs compulsively despite adverse, even devastating consequences—that is the nature of addiction

# Pathophysiology of Addiction

- behavioral changes in turn are associated with structural and functional changes in the reward, inhibitory, and emotional circuits of the brain
- genetics/epigenetics accounts for at least 40-50% of vulnerability to addiction
  - changes in opioid mu receptor
  - changes in metabolic pathway for opioids
  - possibly other changes

# Addiction is a Structural/Functional Brain Disease



A healthy brain, left, shows synapses firing. A brain on drugs, right, shows diminished activity.



# Why Do Some People Become Addicted While Others Do Not?

- no single factor predictive
- risk influenced by a combination of factors that include individual biology, social environment, age, stage of development
  - the earlier use begins, the more likely it will progress to more serious abuse, which poses a special challenge to adolescents
- co-occurring mental health disorders may influence risk (addiction as “self-medication”)
- the more risk factors, the greater the chance that taking drugs can lead to addiction

Why do we have an opioid/  
heroin problem?

# Factors Contributing to the Epidemic

- prescribers lack training on addiction & knowledge of abuse liability of Rx opioids
- pain medication is reimbursed by insurance, but non-pharmaceutical therapies, esp for chronic musculoskeletal pain— such as PT-- may not be, or high copay
- “Pain as the 5<sup>th</sup> Vital Sign”: JCAHO/VA integration of pain management/control into *all* patient encounters in 1998
  - claims that pain was “undertreated”
  - encouraged huge increase in Rx opioids
  - abetted by unscrupulous pharmaceutical companies

# Factors Contributing to the Epidemic

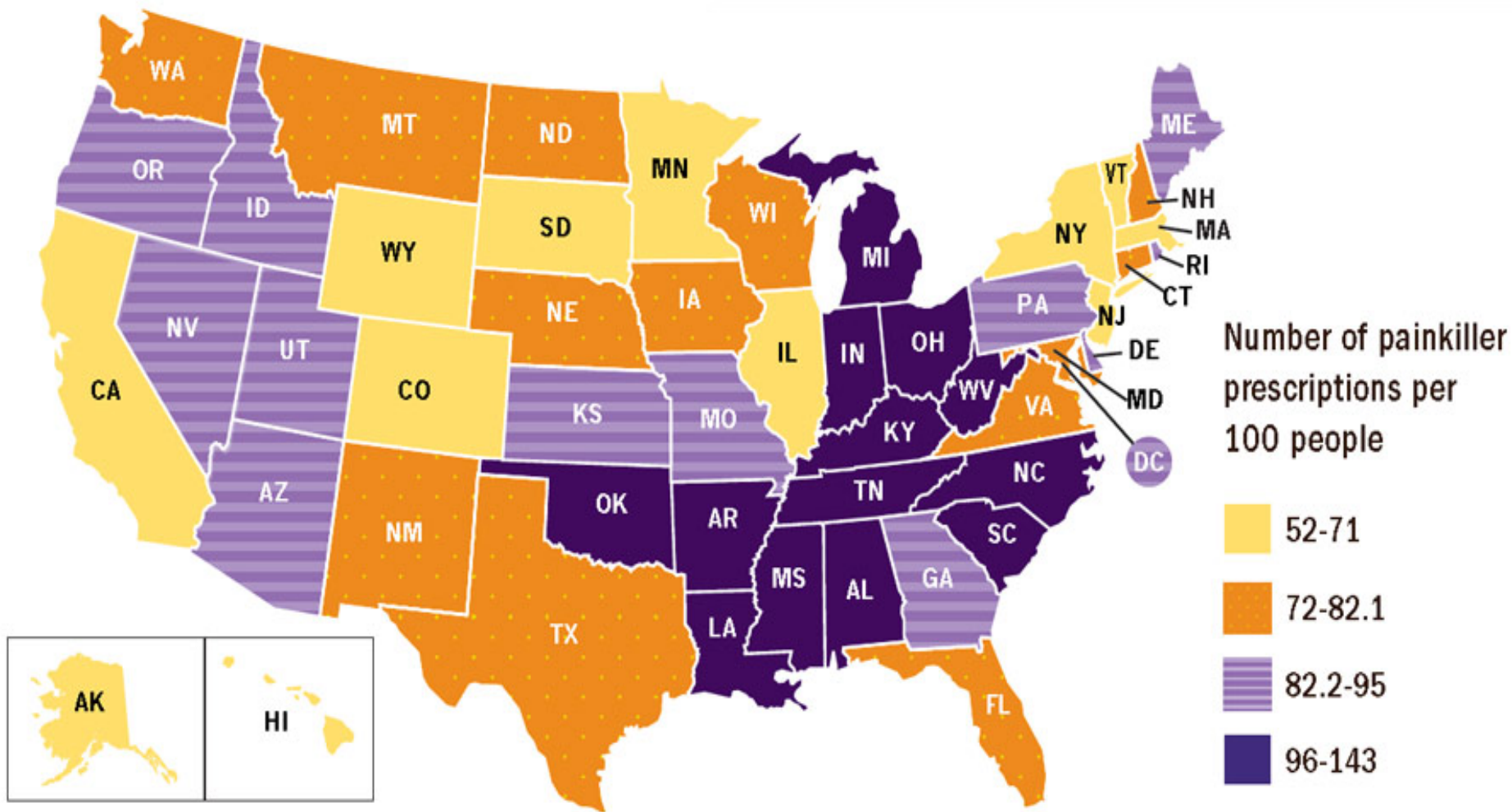
- patients lack education regarding risk of abuse/addiction
- patient surveys/Press Ganey scores
  - if no Rx=low score=decreased reimbursement, and maybe, no job
- Medicare reimbursement
  - now based on satisfaction surveys
- financial pressure to see more patients
  - less time with each patient
  - easier to write Rx than to use multiple modalities to deal with pain



# Factors Contributing to the Epidemic

- bad research
  - 12,000 patients TX'd for cancer pain, reportedly only 4 addicted
  - Letter to Editor, NEJM 1980: "Addictions rare in patients treated with narcotics"
  - misattributed *many* times by other authors in the medical literature
- pharmaceutical marketing
  - leaned heavily on this NEJM letter
  - direct advertising to public
  - CME: trips, dinners, other goodies
  - Valium: 1<sup>st</sup> million/billion dollar drug

Some states have more painkiller prescriptions per person than others.



# Wholesale Delivery of Opioids to WV

**2007 TO 2012  
DELIVERED  
100  
MILLION  
OPIATES  
TO A STATE WITH  
1.8 MILLION  
PEOPLE**

Plaintiff, RECEIVED  
Civil Action No.: 16-C-1  
McKESSON CORPORATION  
**WEST VIRGINIA**  
MCKESSON

IN THE NAME OF THE STATE OF WEST VIRGINIA, you are hereby summoned and required to serve upon Plaintiff's attorney, Vaughn T. Sizemore, Assistant Attorney General, at the address of West Virginia Office of the Attorney General, State Capitol, Building 1, Room 25305, an answer, including any related counterclaim you may have, to the complaint against you in the above-captioned civil action, a true copy of which is herewith delivered to you. You are required to serve your answer within thirty (30) days after service of this Summons upon you, exclusive of the day of service. If you fail to do so, judgment by default will be taken against you for the relief demanded in the complaint and you will be



# Why the Heroin Problem Exists

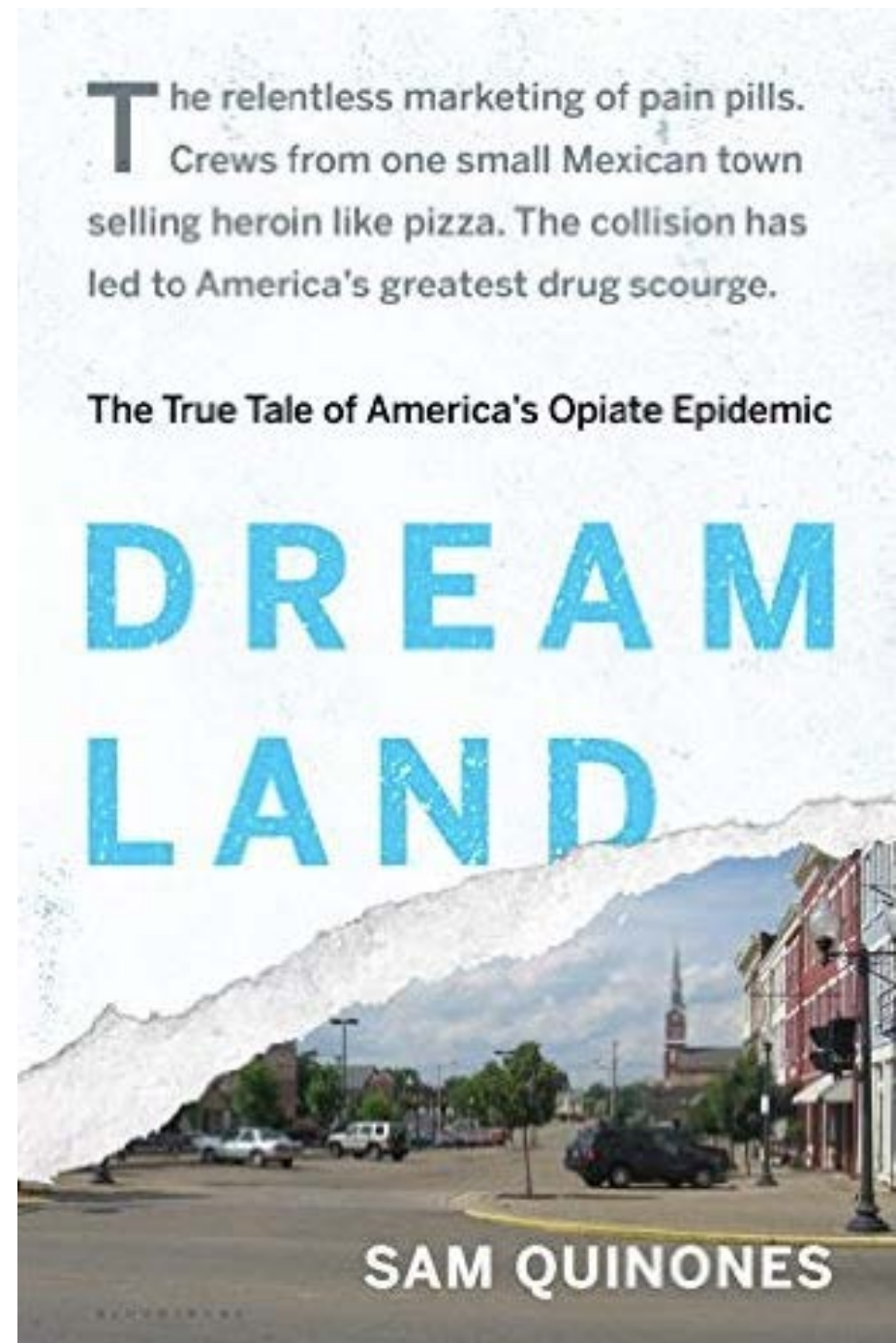


- illicit pain clinics: “pill mills”
- abuse-deterrent formulations made Rx opioids harder to inject
- heroin is cheap, readily available
  - 2008: 500 kg seized at border
  - 2013: 2196 kg seized at border

*50% of pain clinics in Ohio were felon-owned*

# Why the Heroin Problem Exists

- “pizza delivery” model of drug distribution
  - dealer network from town in Mexico; salaried at \$500/wk
  - dealers not themselves addicted
  - no guns, no violence
  - if arrested/jailed/deported, easily replaced
- read “Dreamland” by Sam Quinones



# Ohio Substance Abuse Monitoring Network (OSAM): Jan-June, 2017

Heroin	Current Street Prices for Powdered or Black Tar Heroin	
	1/10 gram (capsule, aka "cap")	\$10
	A gram	\$60-120
	An ounce	\$1,900-2,200

availability: 10 (scale, 0-10)

quality: 10 (scale, 0-10)

The other consequences....

# Opioid Injection (Rx, street drugs) Syndemics (multiple interconnected epidemics)

- hepatitis B (*WV has highest rate*)
- hepatitis C (*KY has highest rate, WV #2*)
- HIV (*>50% of at-risk counties are in central Appalachia*)
- syphilis and other STDs
- vertical transmission of hepatitis B, C, HIV & syphilis
- endocarditis and other serious bacterial infections  
(osteomyelitis, CNS & visceral abscesses, etc)
- overdoses and OD fatalities
- Neonatal Abstinence Syndrome (*WV has highest rate*)

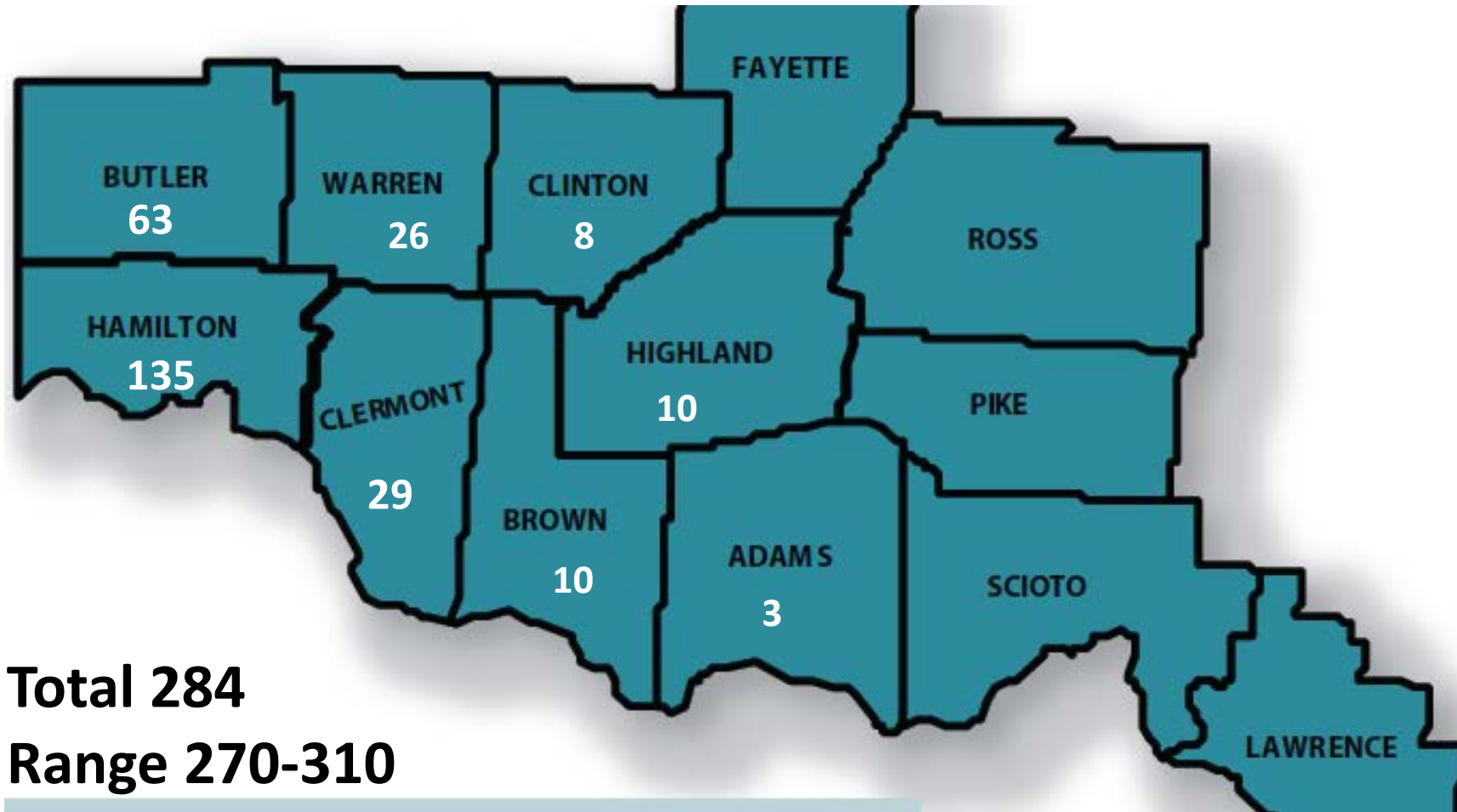


# Acute HCV in Central Appalachian Youth $\leq 30$

- 364% increase in cases (n=1377) from 2006-2012 in WV, VA, TN & KY
- tied to injection of opioids among whites in rural & small urban areas
- injection drug use (IDU) was risk factor in 73%
- (similar to data from upstate NY, MA, WI and OH in same period)

# New Chronic HCV Cases, Southwest OH

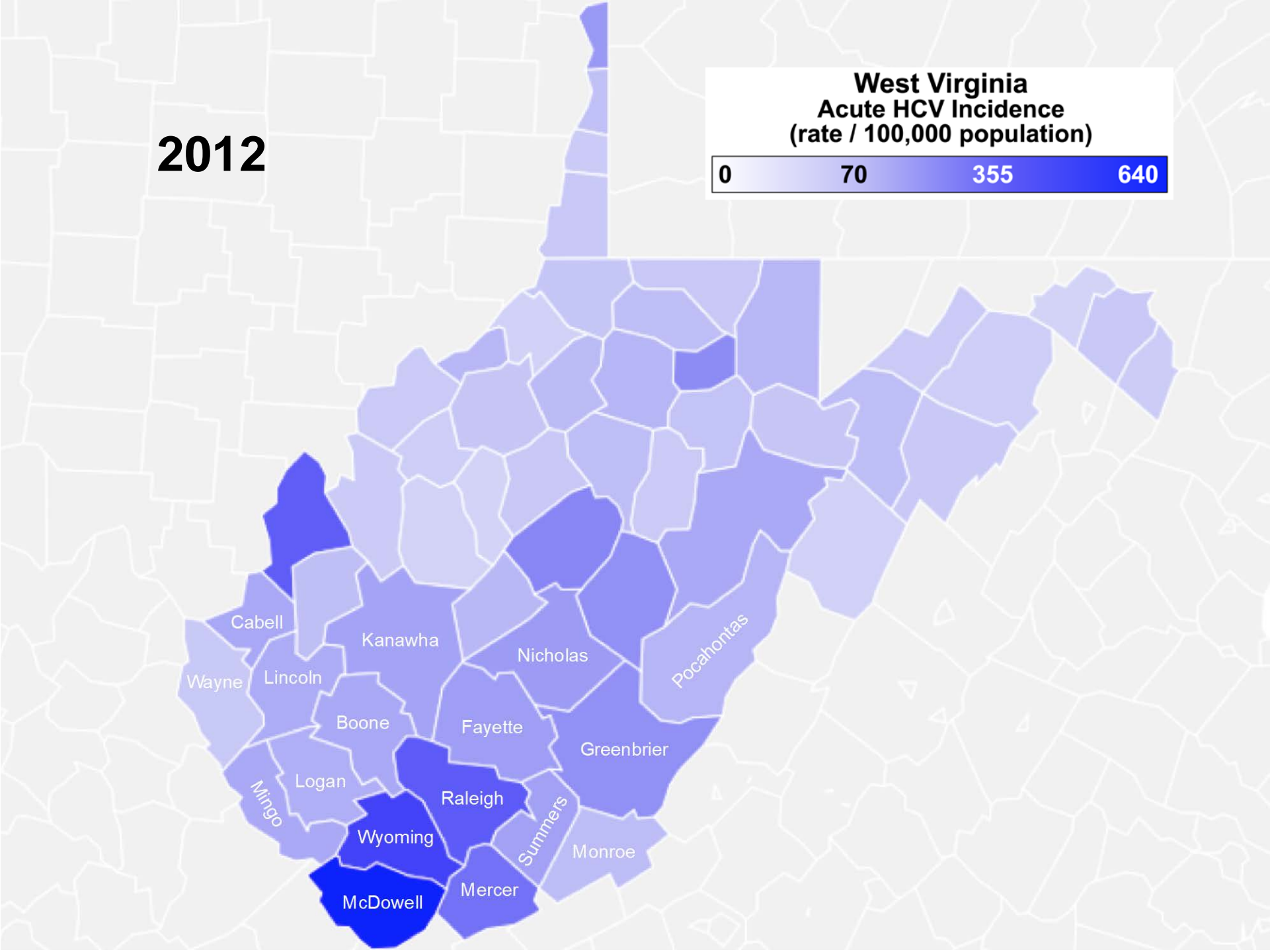
## August, 2017



**Per CDC, acute hepatitis C rates increased in Ohio by 400% in 2015 alone**

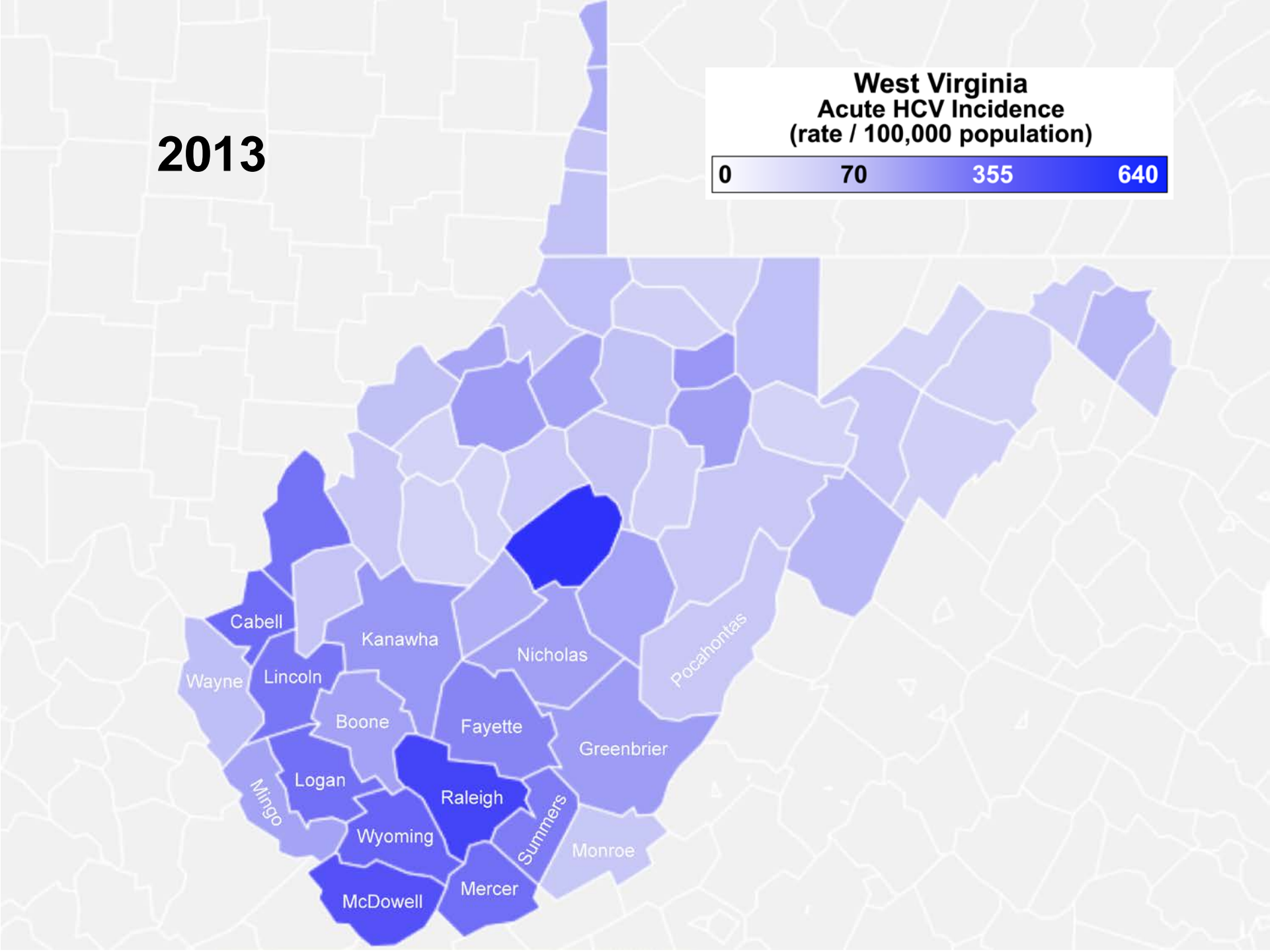
**2012**

**West Virginia  
Acute HCV Incidence  
(rate / 100,000 population)**



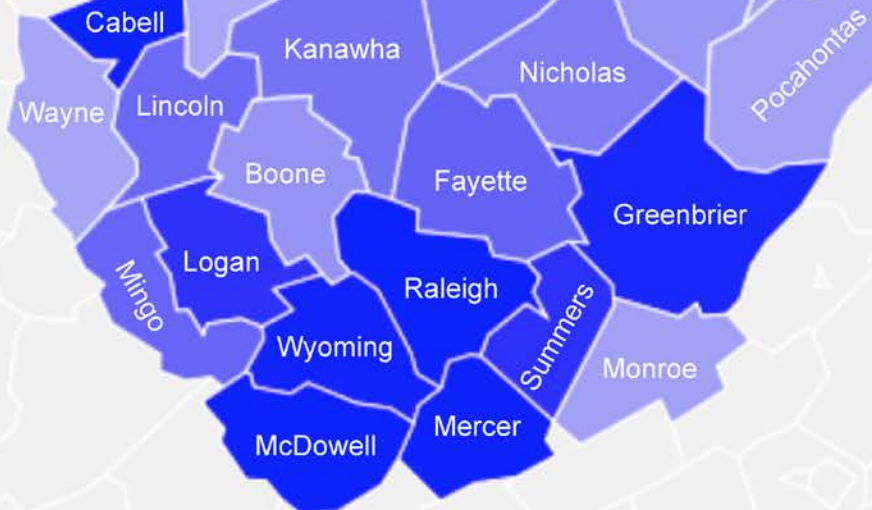
**2013**

**West Virginia  
Acute HCV Incidence  
(rate / 100,000 population)**



2014

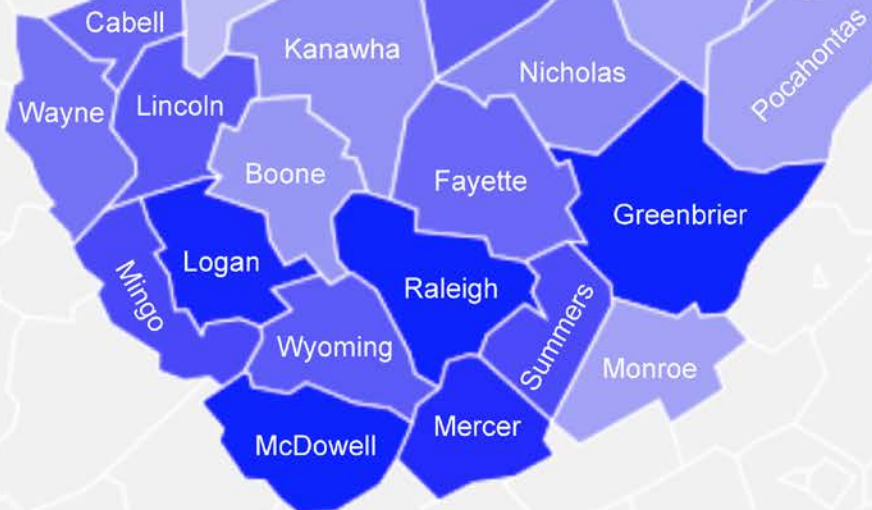
**West Virginia**  
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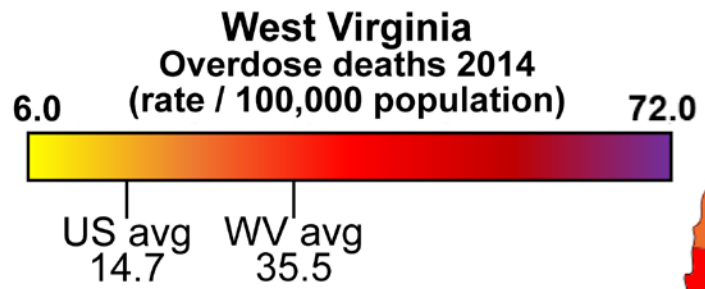




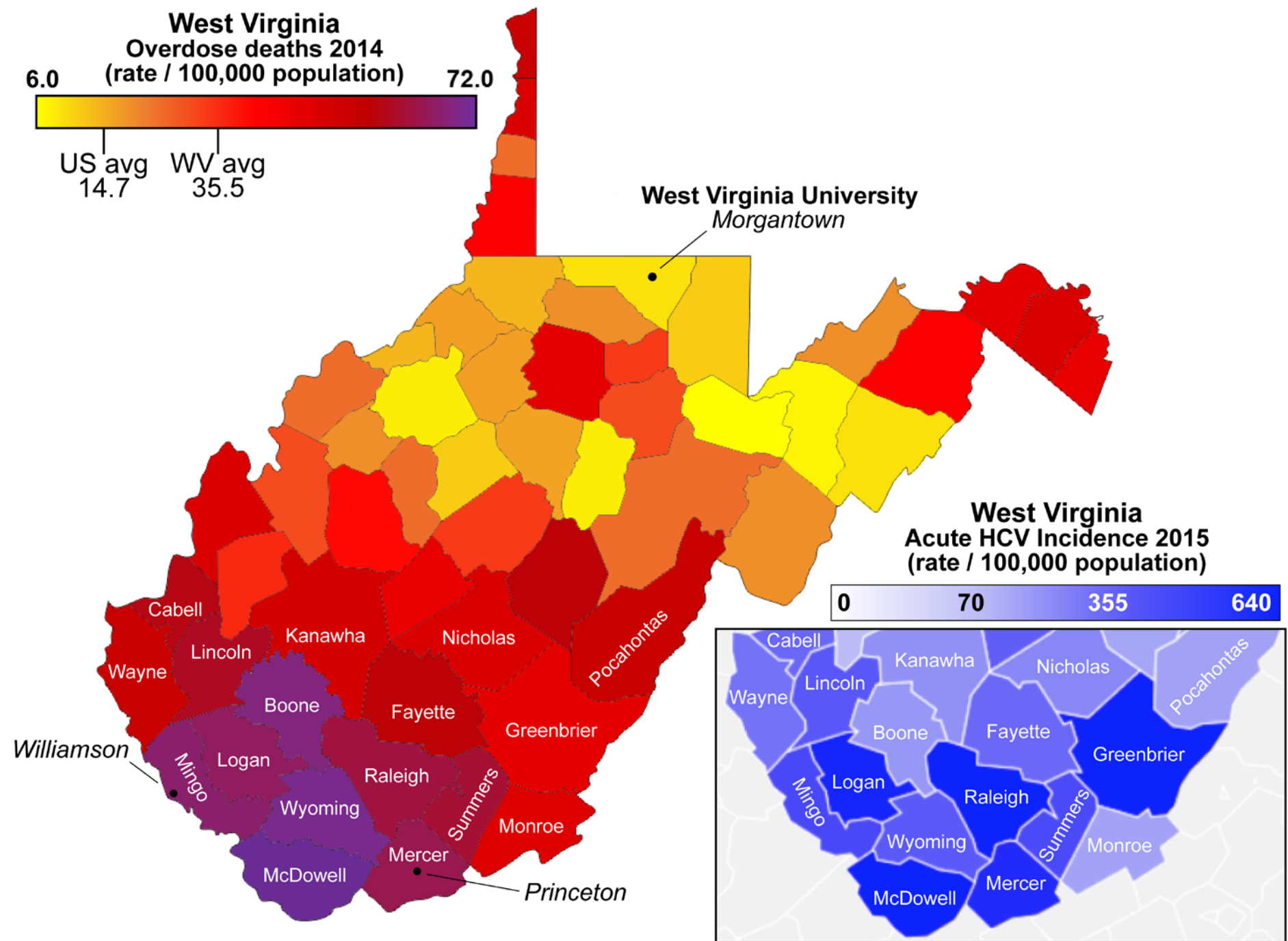
2015

**West Virginia**  
**Acute HCV Incidence**  
**(rate / 100,000 population)**

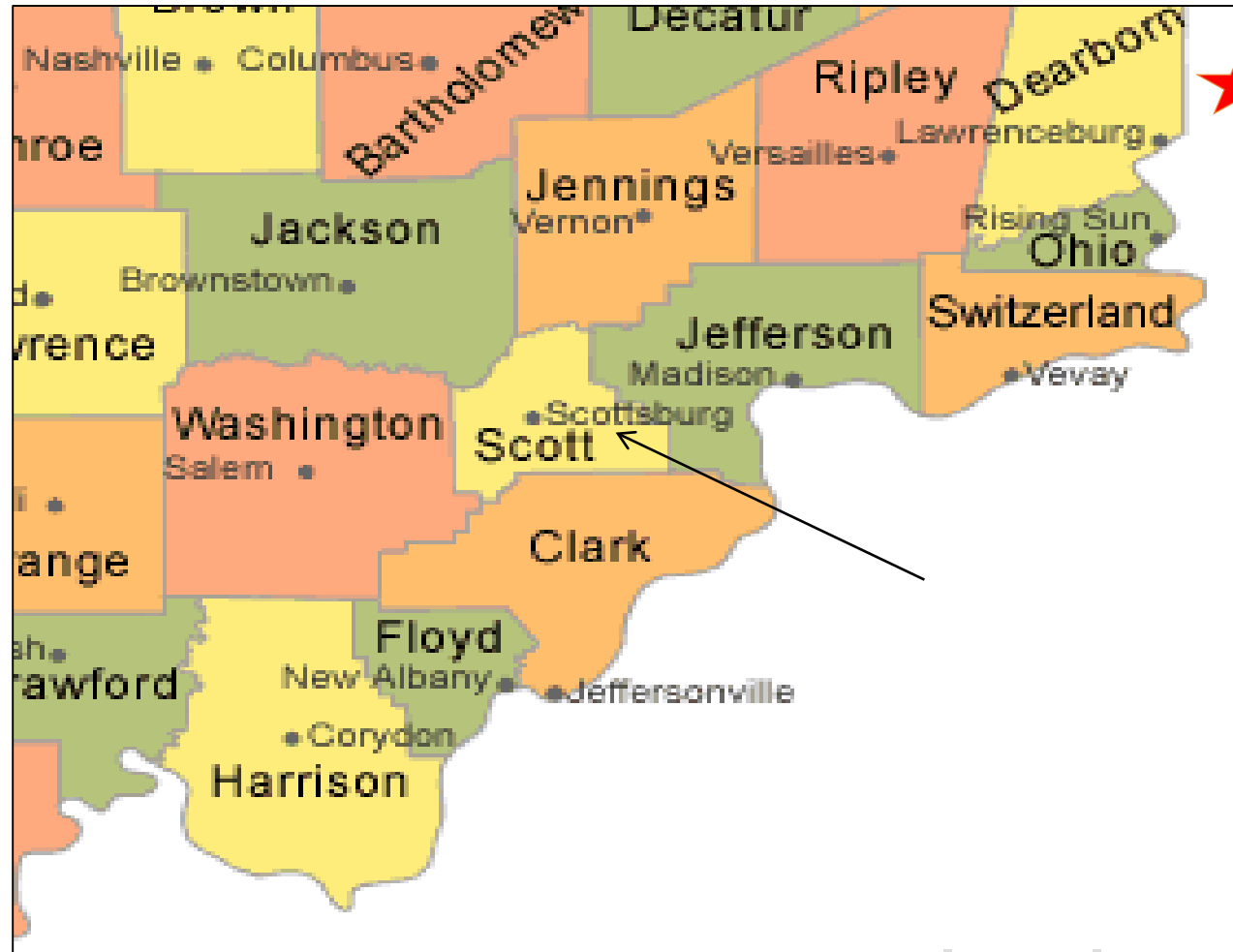




West Virginia University  
 Morgantown



# Southeast Indiana: Recent Scott County HIV/HCV Outbreak, 2014-16\*



Cincinnati

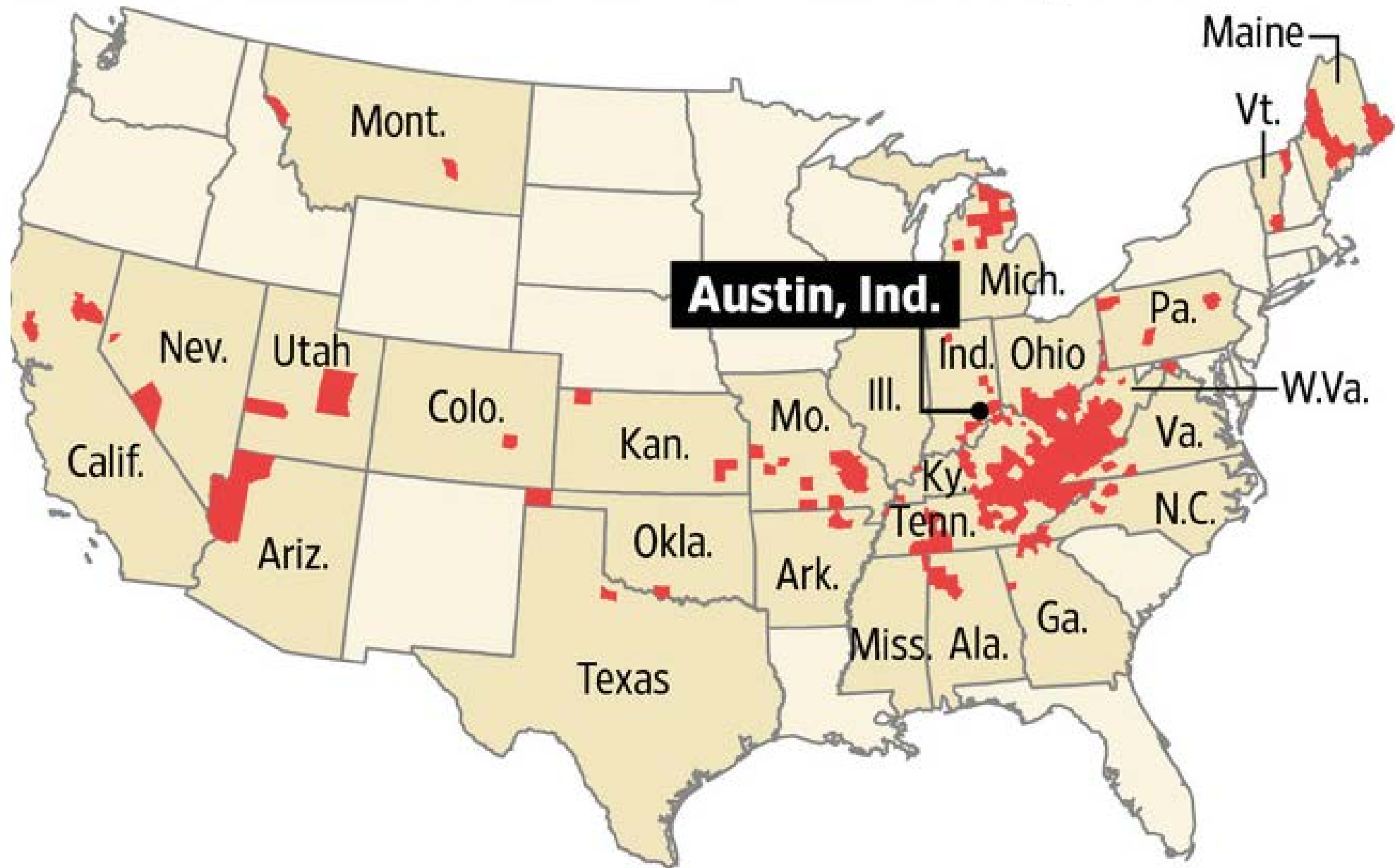
\* to date: 220 HIV+, 87% HCV+



# Characteristics of Scott County

- of 92 counties in Indiana, it ranks 92<sup>nd</sup> for health status
- limited access to healthcare
- 9% unemployment
- 19% poverty rate
- 21% without a high school diploma

# Counties vulnerable to outbreaks of HIV and hepatitis C



## County-level Vulnerability to Rapid Dissemination of HIV/HCV Infection Among Persons Who Inject Drugs





# Transmission of HIV and Hepatitis B & C

	HIV	Hepatitis C	Hepatitis B
blood	++	++	++
sex	++	+	++
mother-to-child	++	+	+++

# Why is this important?

- acquisition of HIV, hepatitis B (HBV) & hepatitis C (HCV) commonly occurs in women of child-bearing age
- primary routes of infection
  - unprotected sex
  - injection drug use
- vertical infection occurs at varying rates but may have serious consequences for the neonate

# Why is this important *now*?

- although initially concentrated among young men, now ~half of the opioid-dependent individuals in central Appalachia are women of child-bearing age



# 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 for all pregnant women
  - repeat test in 3<sup>rd</sup> 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 13-65 should be screened for HIV at least once



# Perinatal AIDS in U.S., 1985-2010

## AIDS Diagnoses among Perinatally Infected Persons, 1985–2010—United States and 6 U.S. Dependent Areas



Note. All displayed data have been statistically adjusted to account for reporting delays, but not for incomplete reporting.



# Mother-to-Child Transmission of HCV

- vertical transmission is leading cause of pediatric HCV, up to 4,000 new cases/year in the U.S.
- 40-70% of HCV-infected pregnant women do not initially report major risk factors for HCV
- transmission rate higher in mothers with:
  - high viral load at delivery
  - HIV co-infection
  - PROM
  - use of internal fetal monitoring devices
- ~85%-95% of HCV-infected children have not been identified\*

\*Delgado-Borrego A, et al. Expected and actual case ascertainment and treatment rates for children infected with hepatitis C in Florida and the United States: epidemiologic evidence from statewide and nationwide surveys. *J Pediatr* 2012; 161: 915-92

# Most Recent Estimates of HCV MTCT Risk

- review and meta-analysis of observational studies published since the last review in 2001
- goal: define proportion of infants diagnosed with HCV at  $\geq 18$  months born to HCV AB+ and RNA+ women
- estimates of HCV vertical transmission:

	<b>HIV- moms</b>	<b>HIV+ moms</b>
<b>range of MTCT risk</b>	<b>1.1%-10.7%</b>	<b>4.2%-28.5%</b>
<b>pooled risk (all studies)</b>	<b>5.8%</b>	<b>10.8%</b>

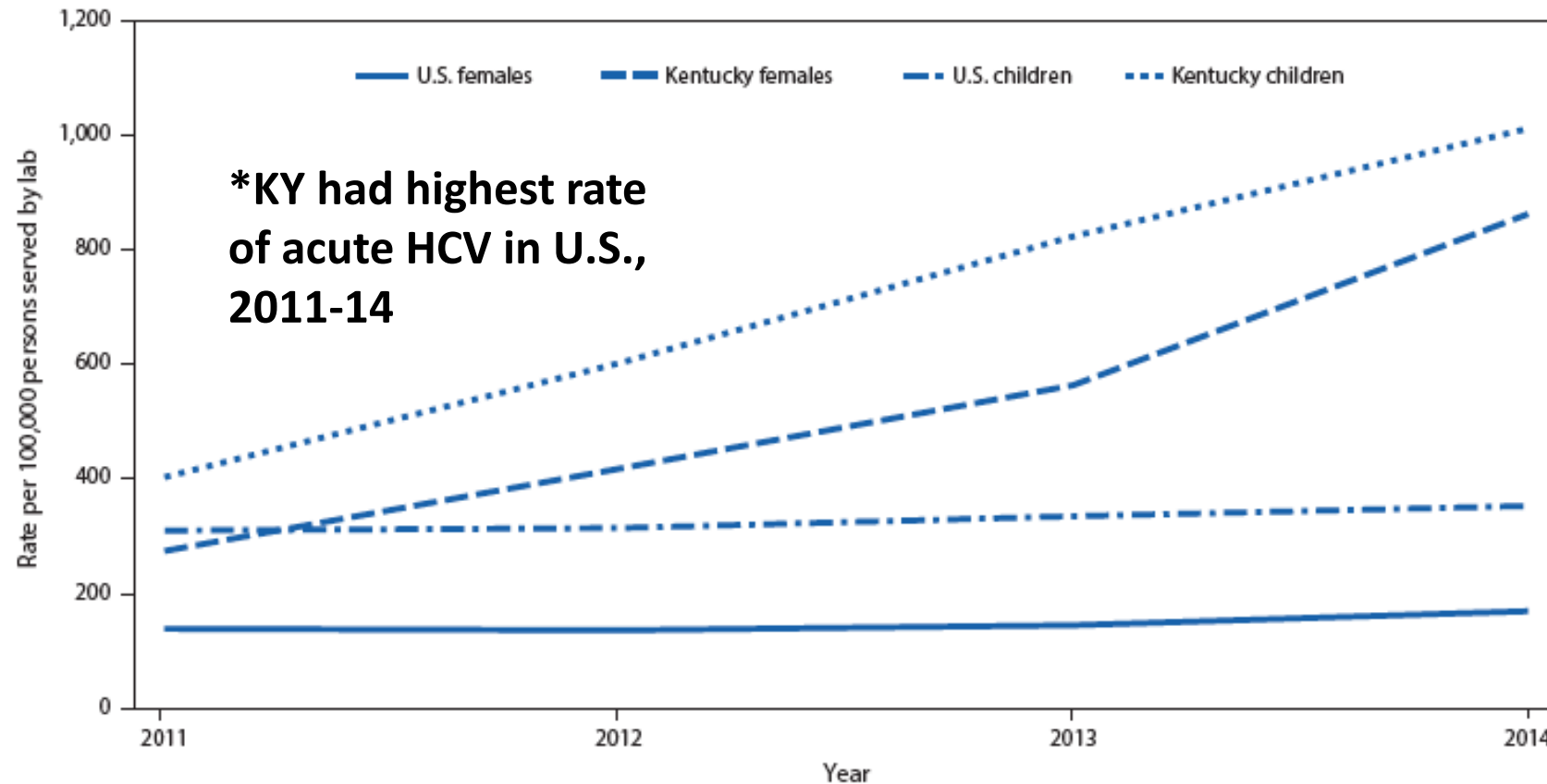
# Long-term Outcome of HCV MTCT

- 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 that 5%-12% have significant fibrosis and 5% have cirrhosis\*

\*Guido M et al. Fibrosis in chronic hepatitis C acquired in infancy: is it only a matter of time? *Am J Gastroenterol* 2003; 98: 660-663; Mohan P et al. Clinical spectrum and histopathologic features of chronic hepatitis C infection in children. *J Pediatr* 2007; 150: 168-174, 174.e1

# HCV in women of child-bearing age & in children $\leq 2$ y/o, KY 2011-14\*

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

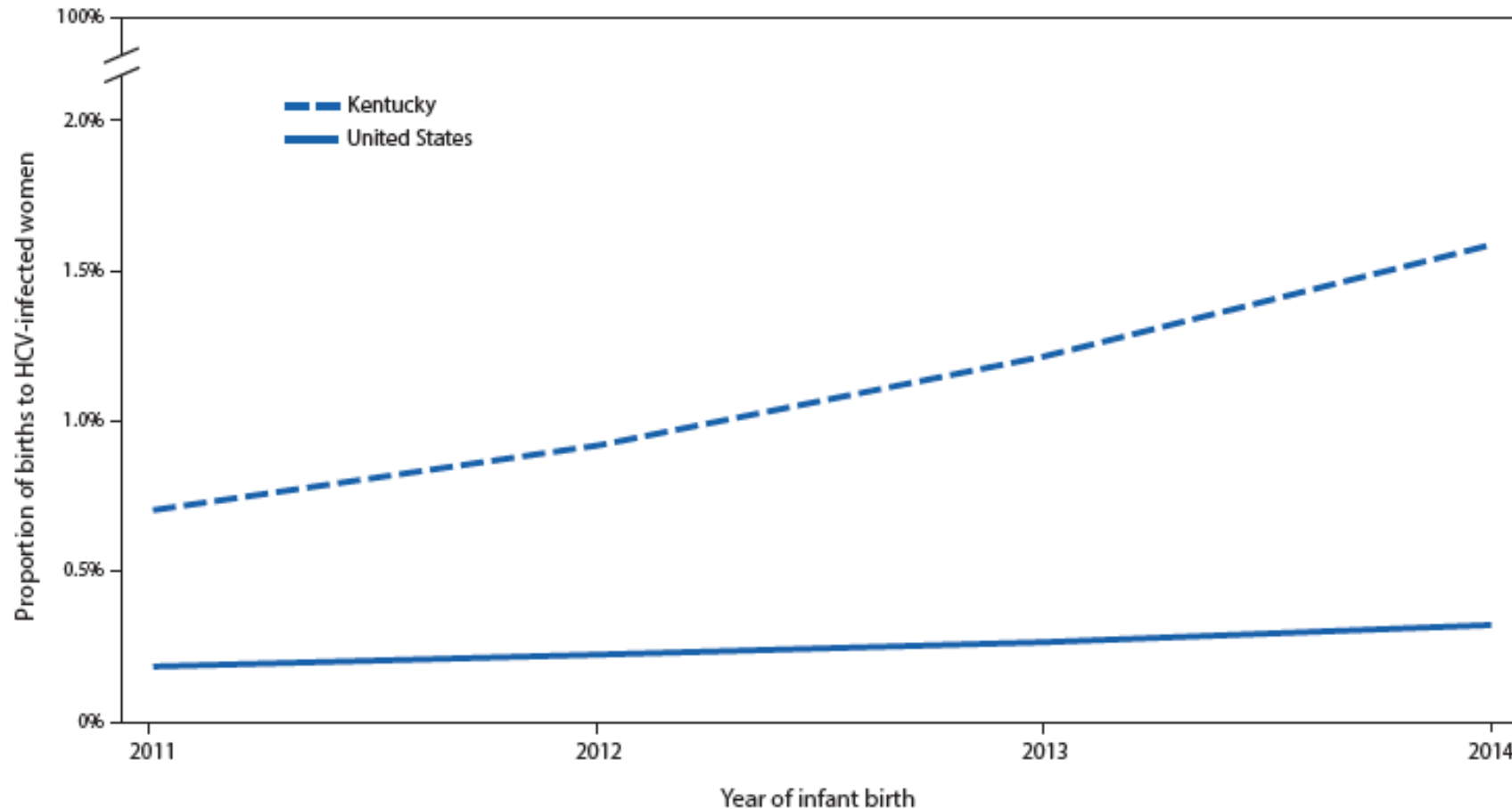


Source: Quest Diagnostics laboratory data.

\* 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  $\leq 2$  years who received a test for HCV antibody and/or RNA per 100,000 children aged  $\leq 2$  years served by Quest Diagnostics by area of residence.

# Increasing proportion of infants born to HCV-infected moms, KY 2011-14

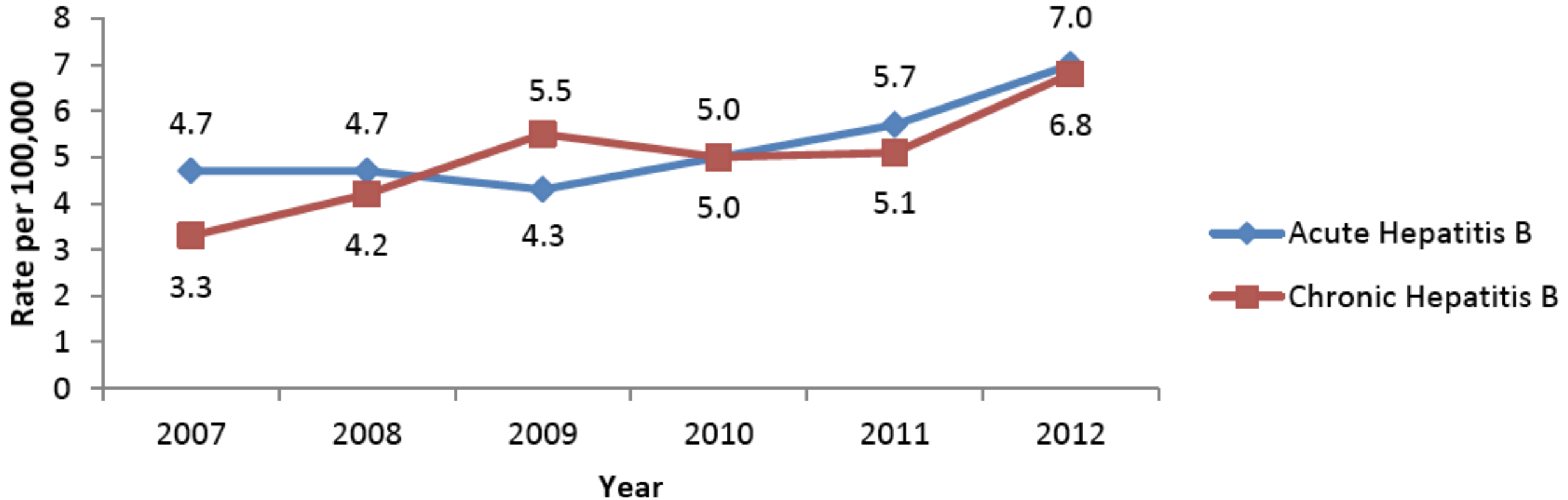
FIGURE 2. Proportion\* of infants born to hepatitis C virus (HCV)-infected women† — United States and Kentucky, 2011–2014



\* 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.

# Hepatitis B Cases Rate in West Virginia: 2007-2012



Why do case rates for acute and chronic HBV track so closely? Most people get sick.



# Mother-to-Child Transmission of HBV

- perinatal transmission most common cause of chronic HBV infection in regions of high HBV endemicity
  - 80% to 90% of infants born to HBsAg/HBeAg-positive mothers become chronically infected with HBV
- screening recommended for ***all*** pregnant women, even if previously vaccinated
- appropriate, timely immunoprophylaxis (vaccination & HBIG) to neonate prevents >90% of perinatal HBV



# Long-term Outcome of HBV MTCT

- up to 90% of neonates born to moms with acute HBV or HbsAg+/HBeAg+ become infected
- most infants are asymptomatic but become chronic carriers due to failure to make HBsAB or cell-mediated responses
- 95% will develop chronic disease, with a 40% lifetime risk of cirrhosis or hepatocellular carcinoma

# Harm Reduction

# Principles of Harm Reduction

- important public health strategy to minimize the harmful consequences of behaviors that put individuals AND the community at risk
- harm reduction does **not** condone drug use or minimize the real and tragic dangers of drug use
- basic premise: many people will move toward health if given the opportunity.
  - if the basic supports are there, people will begin making positive changes

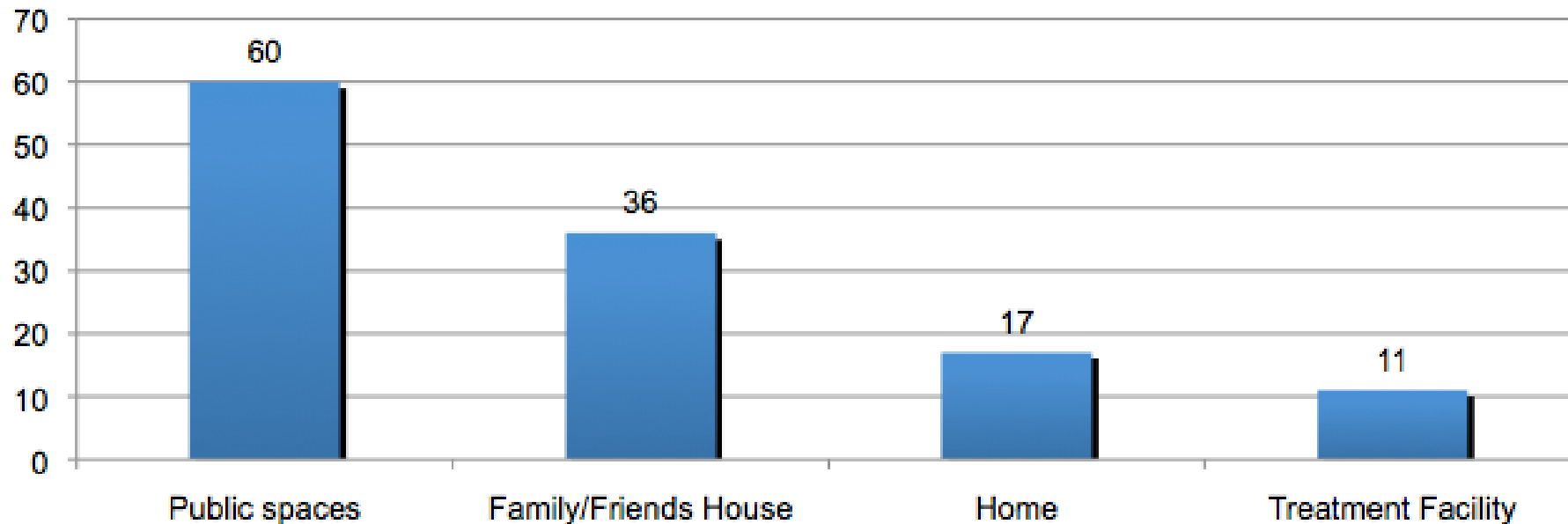
# Harm Reduction Methods

- it is about meeting people *where they are* vs. where we think they should be
- harm reduction is about building relationships, trust
- syringe services programs (SSPs) are good example: no one wants people to inject drugs, but access to sterile syringes and clean injection equipment can keep people alive & healthy until they are ready for treatment
- **SSPs reduce the risks of hepatitis B & C, HIV, overdose fatality**
- also protects the community from infection due to contact with discarded contaminated needles

# Cincinnati PWID Data, 2009

69/101 (68%) reported finding used/dirty syringes

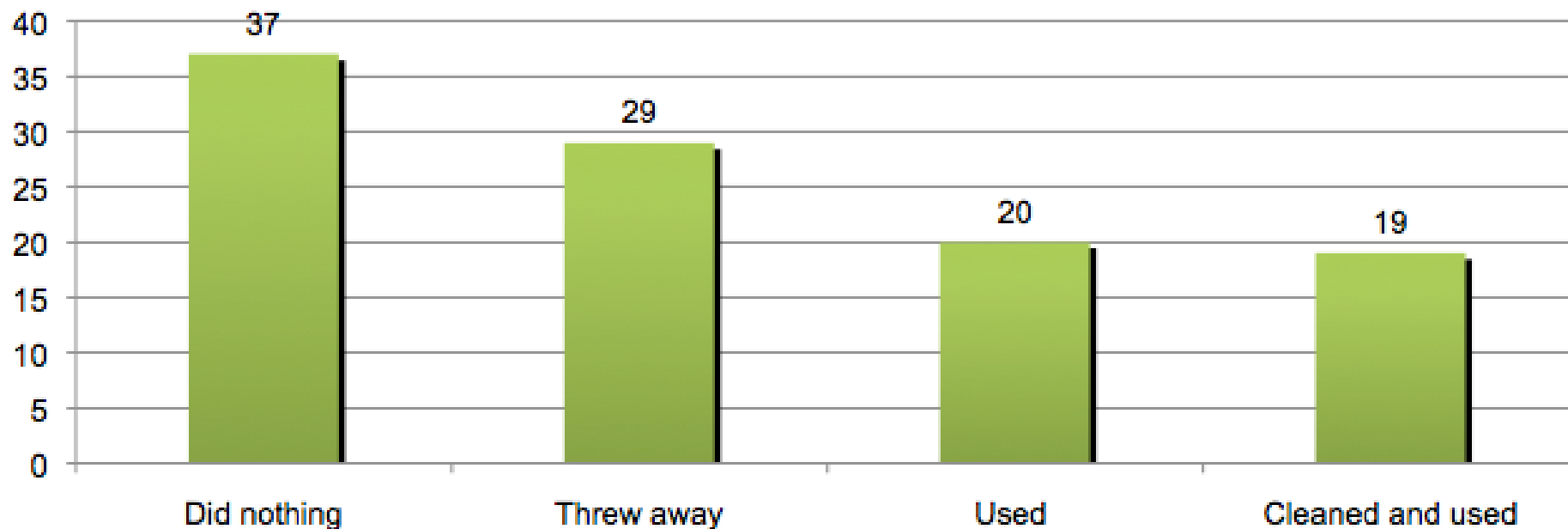
## Where did you find syringes



# Cincinnati PWID Data, 2009

- 39% reused found syringes, half without cleaning them (most of others used inadequate methods)

## What did you do with found syringe



# Discarded syringes are a public hazard



playground near UC Med Center



YWCA entrance downtown

# Preventing 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



# Preventing Unplanned Pregnancy, Vertical Transmission and Neonatal Abstinence Syndrome

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

Questions??

Thank you!