

Preventing Hepatitis A, B & C Among People Who Inject Drugs (PWID)

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Objectives

- discuss links between injection drug use and viral hepatitis
- describe evidenced-based strategies for preventing hepatitis A, B and C among PWID

Hepatitis A

Hepatitis A Virus (HAV)

- outbreaks are infrequent in U.S.
- typically associated with...
 - contaminated food items
 - point source can be a store or a restaurant
- ...but can also be spread by person-to-person contact
- very contagious- spread occurs before symptoms (nausea, abd pain, jaundice) appear
- disease severity increases in persons who have chronic liver disease (HBV, HCV, cirrhosis)

Hepatitis A Morbidity & Mortality

- older persons and those coinfectd with hep B or C more likely to experience severe disease and adverse outcomes
- while death due to massive liver damage is rare...
- *...disease severity increases in persons with chronic liver disease (hepatitis B & C, cirrhosis) and other underlying health conditions*
 - ***this is a key concept***

Shifting Hepatitis A Virus Epidemiology

- past: foodborne outbreaks
- recent: multistate outbreak among illicit drug users and/or homeless
- large population of adults not immune to hep A



Shift in HAV Epidemiology Began in 2016

- primarily from ongoing multistate HAV outbreaks associated with person-to-person transmission
- started among homeless individuals and PWUD in southern CA and spread eastward
- as of October 2018, >7,000 outbreak-associated cases had been reported from 12 states
- on October 24, 2018, ACIP voted unanimously to add “homelessness” as an indication for HAV vaccination

Foster M, et al. Hepatitis A Virus Outbreaks Associated with Drug Use and Homelessness — California, Kentucky, Michigan, and Utah, 2017. *MMWR Morb Mortal Wkly Rep* 2018;67:1208–1210. DOI: http://dx.doi.org/10.15585/mmwr.mm6743a3external_icon

Hepatitis A Outbreak in West Virginia, 2018

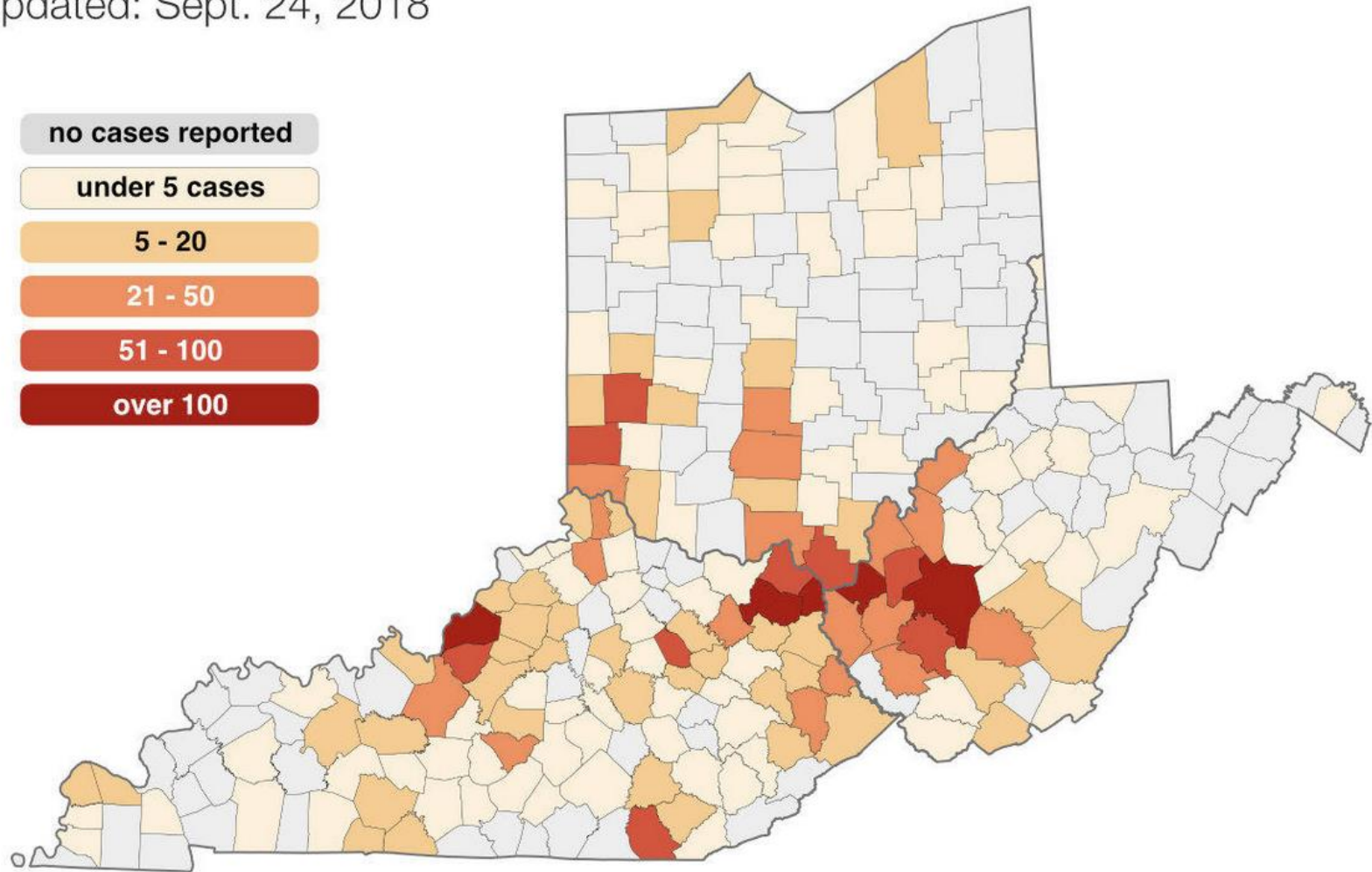
- median age 37 years (range, 14-77)
- 60% male (n=698), 57% hospitalized (n= 380) , 1 death (0.1%)
- 81% (n= 540) had current or past drug use
- 15% (n= 100) homeless or had transient living situation
- 47% (n= 314) had past or current hepatitis C infection
- 10% (n= 65) had past or current hepatitis B infection

Wilson E, et al. *Notes from the Field: Hepatitis A Outbreak Associated with Drug Use and Homelessness — West Virginia, 2018*. MMWR Morb Mortal Wkly Rep 2019;68:330–331. DOI:

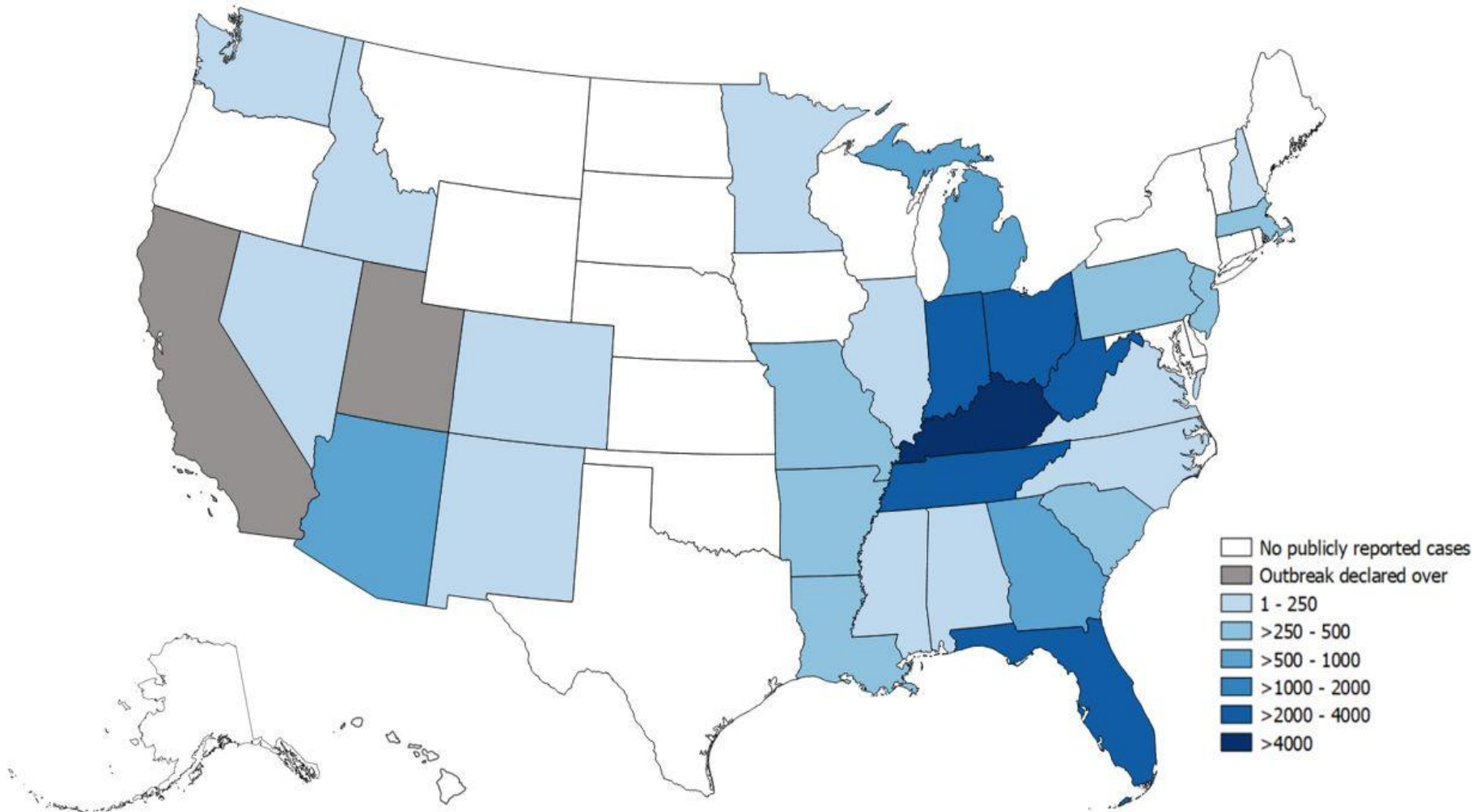
<http://dx.doi.org/10.15585/mmwr.mm6814a4>

Hep A Outbreak: Affected Counties

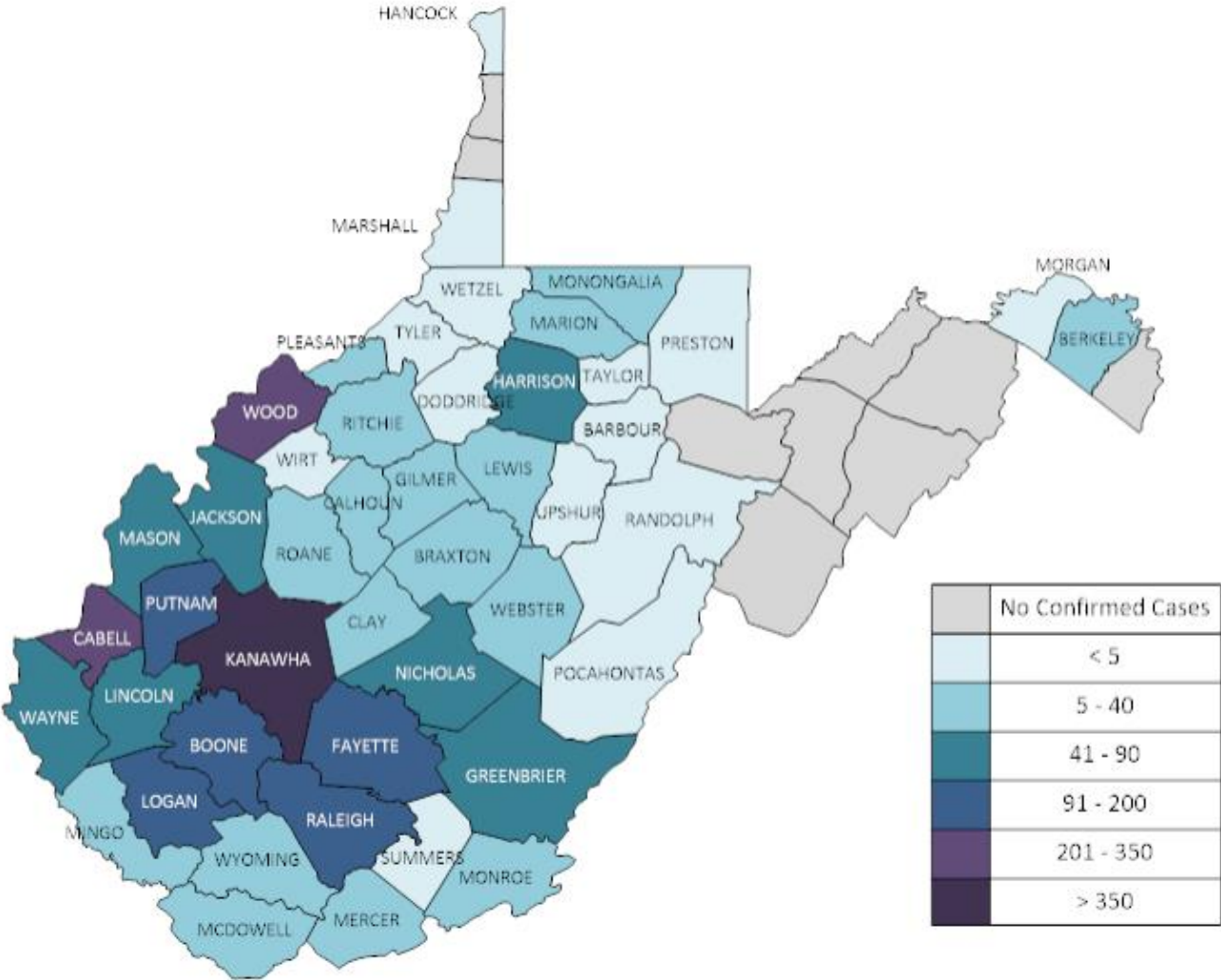
Updated: Sept. 24, 2018



Hepatitis A Outbreak-- August 23, 2019



West Virginia Hepatitis A Outbreak Cases as of August 30, 2019, n=2547



West Virginia Hepatitis A Outbreak Cases*

as of February 28, 2020**

Number of Cases **2702**

Demographics

Age Range	1-87
Median Age	37
Male	1576 (58.3%)
Hospitalizations	1366 (50.6%)
Deaths	23

Risk Factors

Co-infection with Hepatitis C (Information available for 2157 cases)	1209 (56.1%)
Co-infection with Hepatitis B (Information available for 2157 cases)	222 (10.3%)
Reports Illicit Drug Use (Information available for 2304 cases)	1571 (68.2%)
Homeless	250 (9.3%)

Management of Hepatitis A

- no Rx-- supportive care only
- hospitalization is common
- close monitoring of individuals who have chronic HBV and/or chronic HCV *because acute hepatitis is the setting of chronic liver disease can be deadly*

Preventing HAV

- **vaccination!** 2 shots 6 months apart
- the following are at highest risk for acquiring infection or developing serious complications and should be offered vaccination
 - **people who use drugs (injection or non-injection)**
 - **people experiencing unstable housing or homelessness**
 - **men who have sex with men (MSM)**
 - **people who are currently or were recently incarcerated**
 - ***people with chronic liver disease, including cirrhosis, hepatitis B or hepatitis C***

Vaccinating the Most Vulnerable

- opt-out vaccination at entry into homeless shelters
- vaccinations at meal centers, drop-in centers, and other locations where services are provided to homeless/unstably housed persons
- vaccination of persons who use drugs at syringe services programs, emergency medical services
- vaccination of close contacts of patients with confirmed HAV

CDC Letter to Public Health Professionals

July 10, 2020

- first full update on HAV vaccination recommendations in 14 yrs
- during hepatitis A outbreaks, vaccinate ≥ 1 y/o at risk for infection or for having a severe outcome*
- focus on settings providing services where many have HAV risk factors: use injection or non-injection drugs, group homes, nonresidential day care facilities for developmentally disabled persons
- catch-up vaccination for all children and adolescents aged 2-18
- all persons ≥ 1 y/o living with HIV
- pregnant women at risk for HAV or for having a severe outcome

**any person with chronic liver disease who acquires a superimposed acute hepatitis is at risk for severe disease, death*

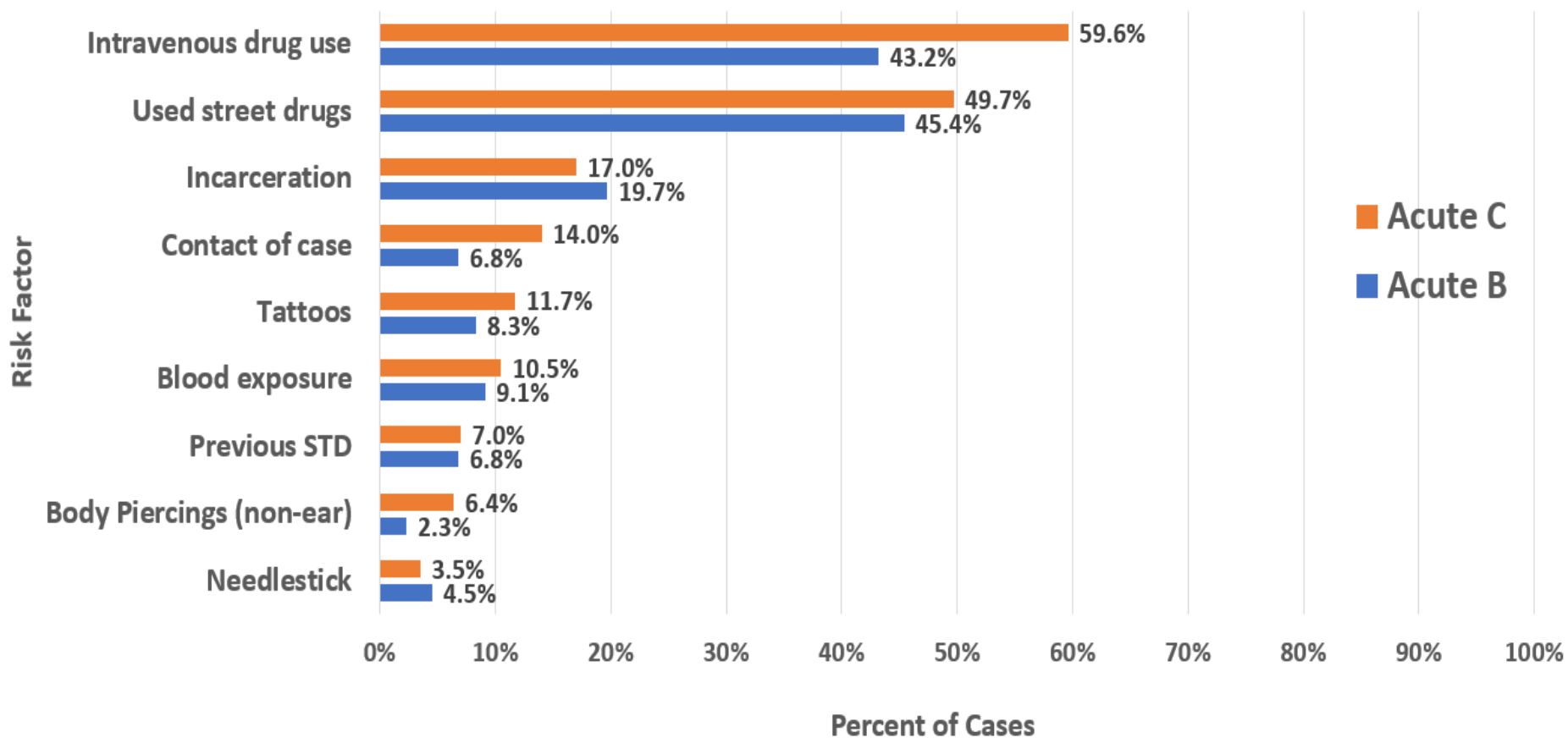
Similar Risk Factors for Hepatitis B & C, HIV

Risk factor	HIV	HBV	HCV
unprotected sex	+	+	+*
injection drug use	+	+	+
tattoos, piercings, needlesticks	+	+	+
hemodialysis	+	+	+
transfusion/organ transplant	+	+	+
foodborne		+	
household contact		+	
institutionalized		+	

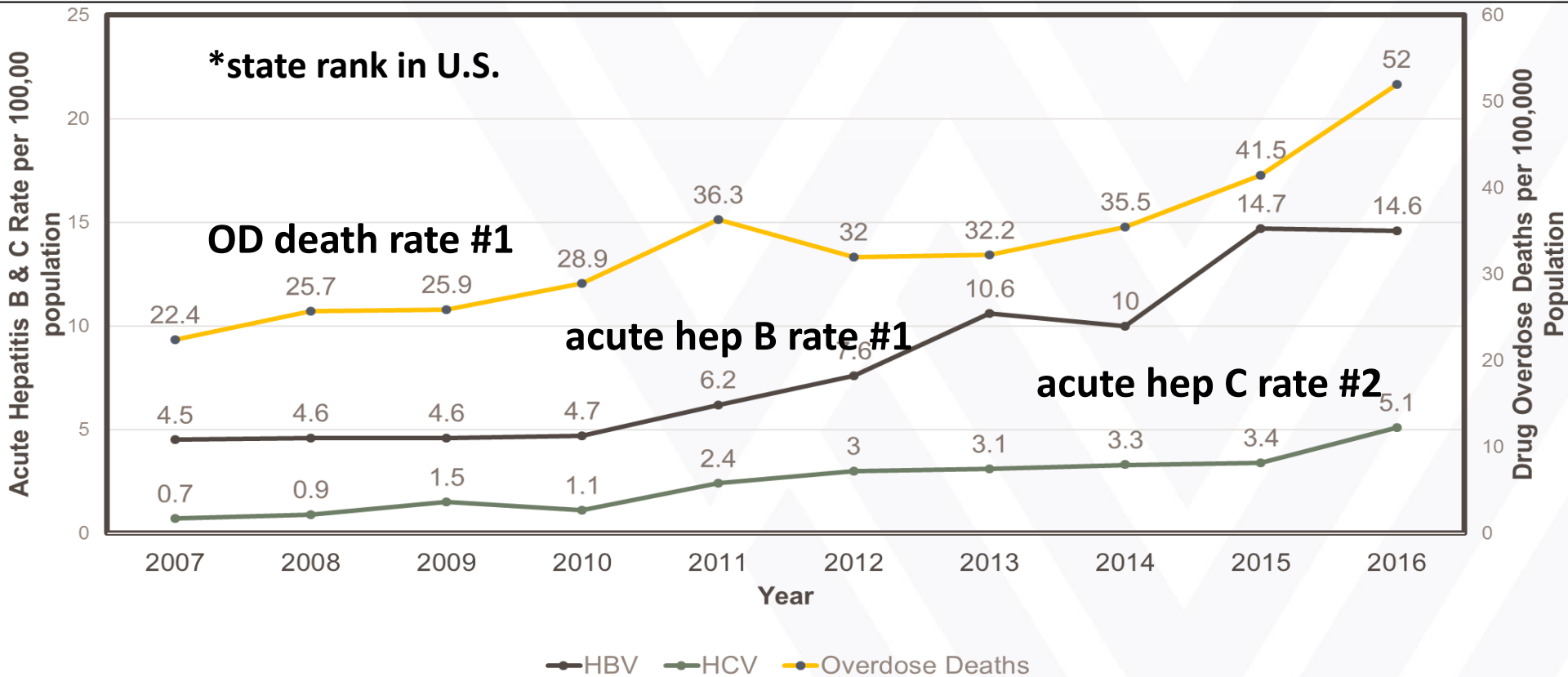
*primarily among MSM

Risks for HBV and HCV in WV, 2018

Percent of Acute HBV and HCV Cases Reporting Risk Factors, West Virginia in 2018 (HBV N=132, HCV N=171)



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

Hepatitis C

Key Hepatitis C (HCV) Risk Factors

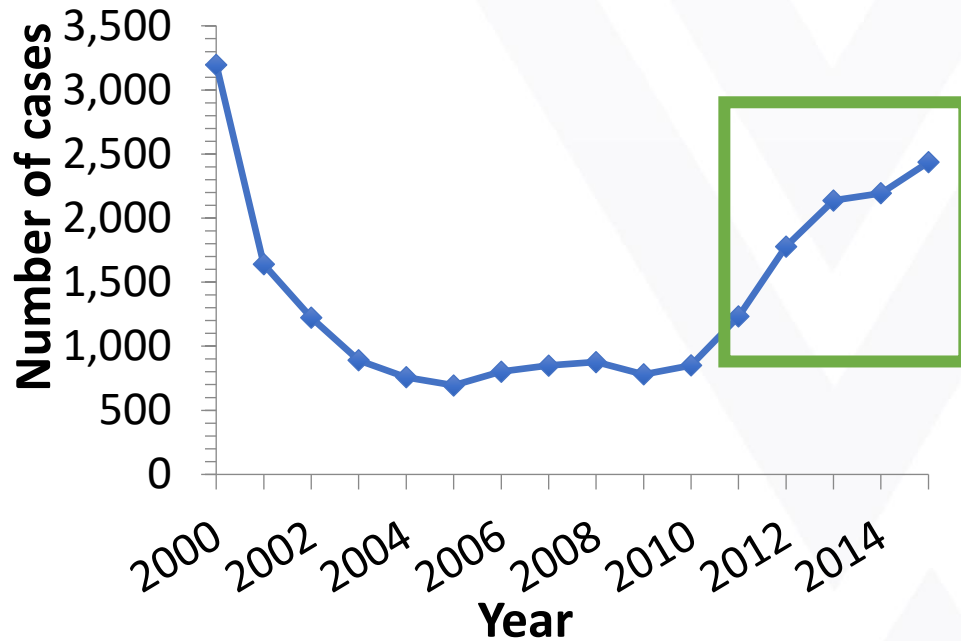
- injection drug use accounts for 70%
 - even “*only once, many years ago*”
- receipt of organ transplant or factor concentrates prior to 1987
- blood transfusion prior to 7/92
- male-to-male sex
- non-professional tattoos
- intranasal drug use
- baby born to infected mom (4-7% per pregnancy)
- hemodialysis
- needlestick injury



highest risk: sharing needles and syringes (virus persists up to 60 days)

can also occur with sharing injection paraphernalia such as water, cookers, and cotton filters

IDU Is Driving New Hepatitis C Infections

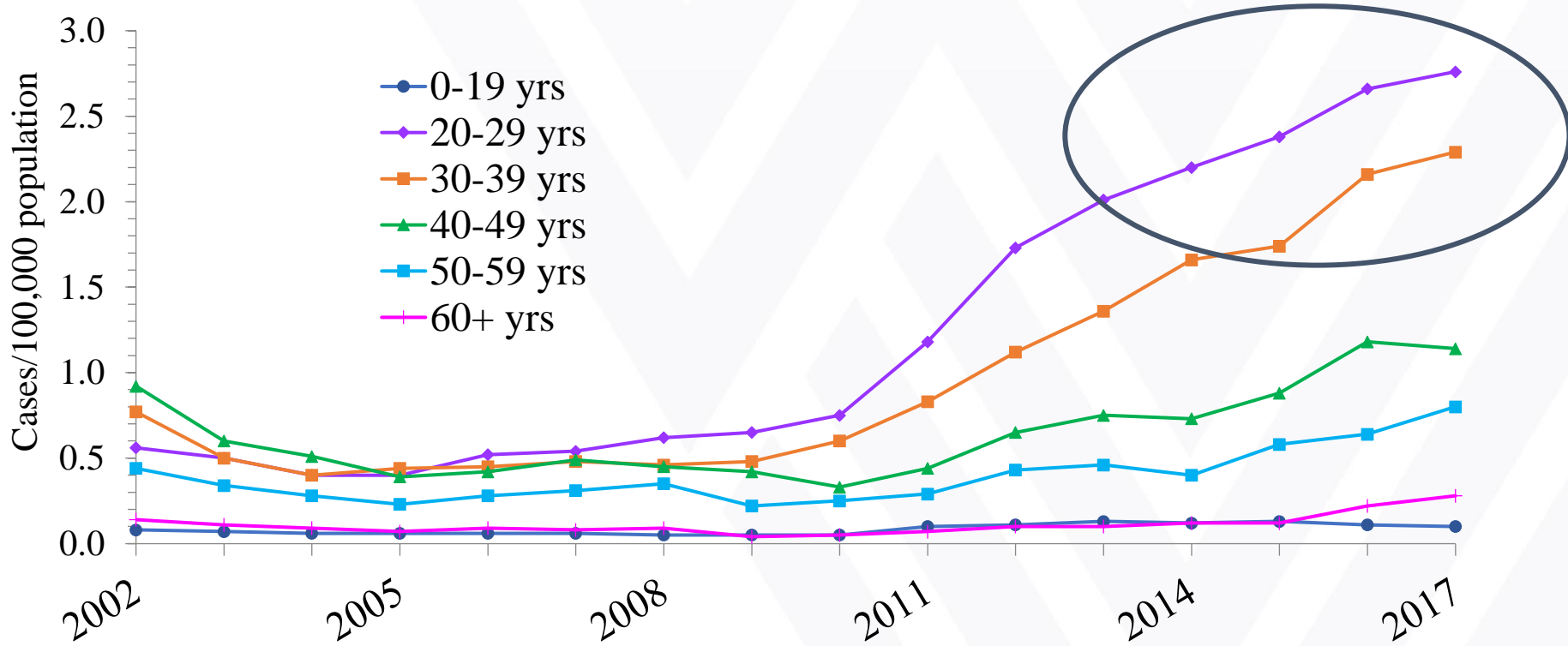


National Notifiable Diseases Surveillance System (NNDSS)

- estimated $\geq 70\%$ of new infections since 2006 due to injection drug use
- <40 years old have highest rate due to opioid crisis
- ~31,000 new infections in 2015
- 1:1 male: female, predominantly white

combination of SSPs + MAT reduce 74% of new infections

Reported Acute Hepatitis C Rates by Age, 2002-2017 (CDC)



Acute HCV in Appalachian Youth ≤ 30 , 2006-2012

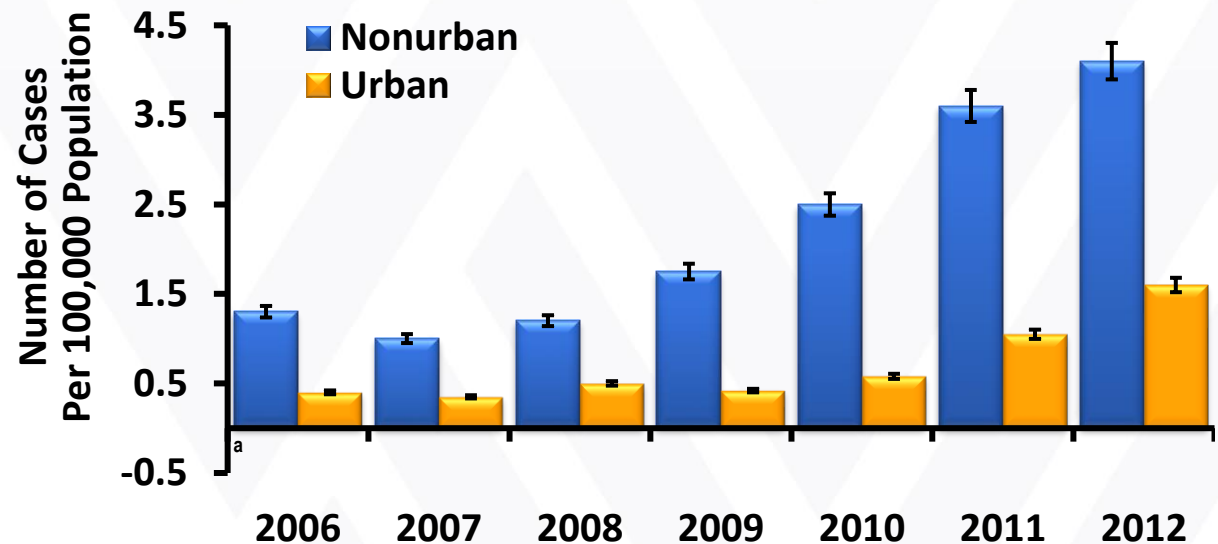
- 1,377 cases in WV, VA, TN & KY
- represents **346% increase**
- similar dramatic increases from upstate NY, MA, WI and OH in same period
- tied to opioid injection among whites in rural & small urban areas
- IDU was risk factor in 73%

Zibbell JE et al. MMWR Weekly May 8, 2015

HCV Infection: Urban vs Nonurban^{1,2}

The first few years after onset of IDU constitute a high-risk period in which the rate of HCV infection can exceed 40%³

Incidence of Acute HCV Among Persons ≤30 years, by Urbanicity and Year¹



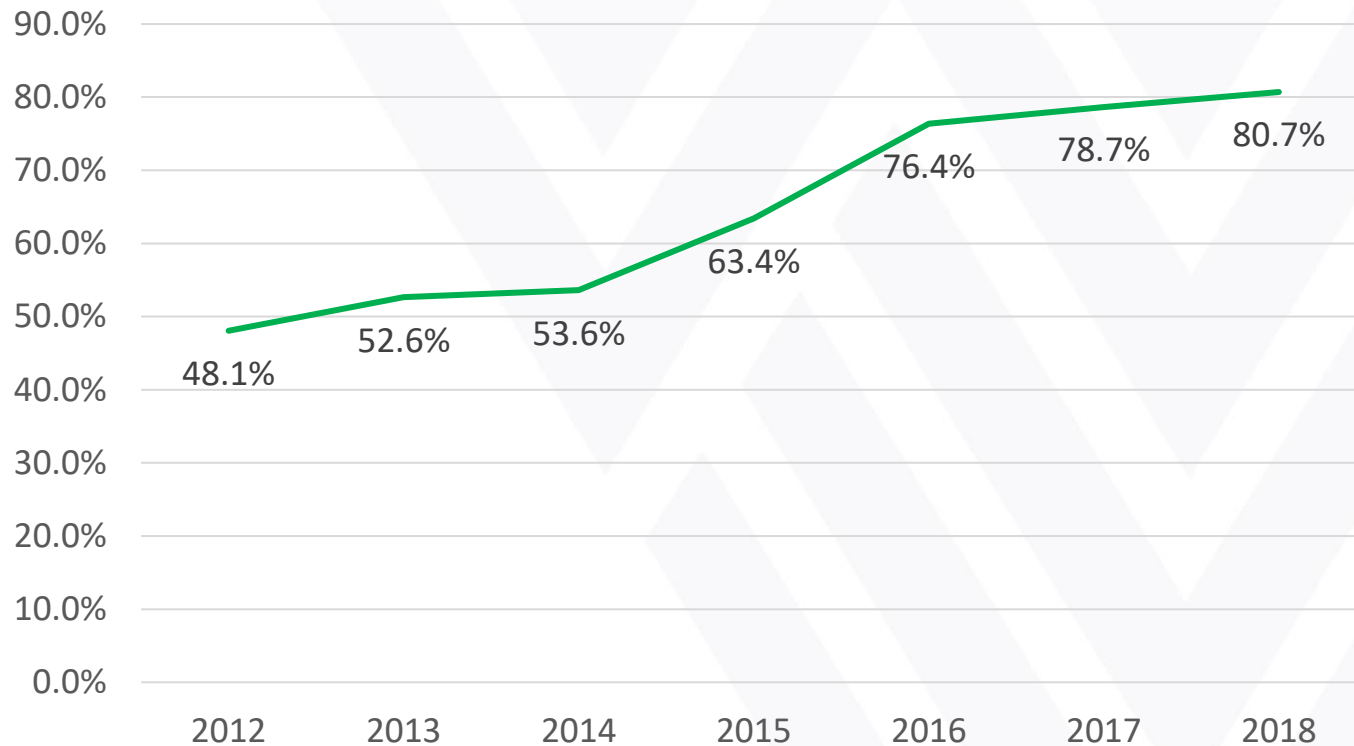
^a95% confidence interval.

1. Zibbell J, et al. *MMWR. Morb Mortal Wkly Rep.* 2015;64(17):453-458; 2. Suryaprasad AG, et al. *Clin Infect Dis.* 2014;59(10):1411-1419; 3. Colvin HM, Mitchell AE, eds. *Hepatitis and Liver Cancer: A National Strategy for Prevention and Control of Hepatitis B and C.* 2010.

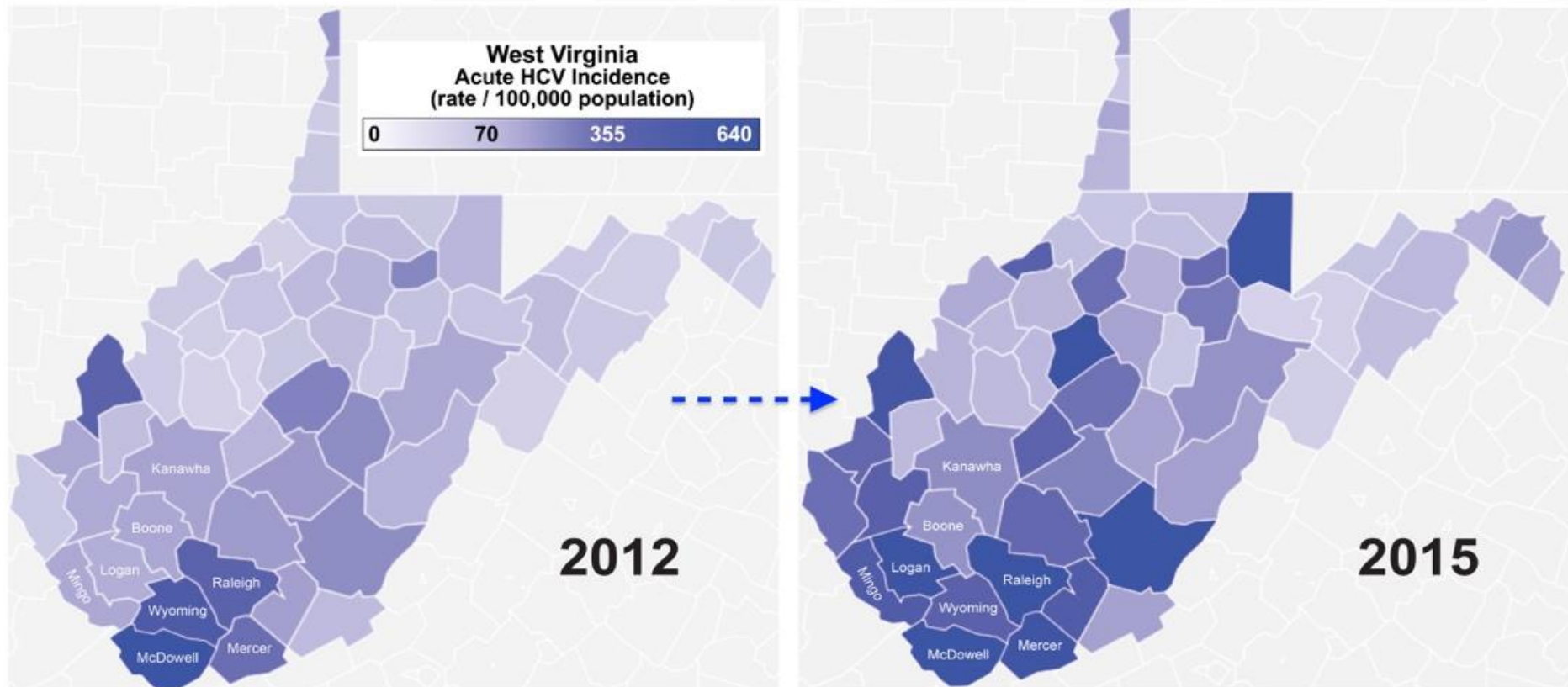
<https://www.cdc.gov/hepatitis/pdfs/iom-hepatitisandlivercancerreport.pdf>. Accessed April 8, 2018.

HCV and SUD in WV Medicaid Patients, 2012-18

% of HCV patients with SUD



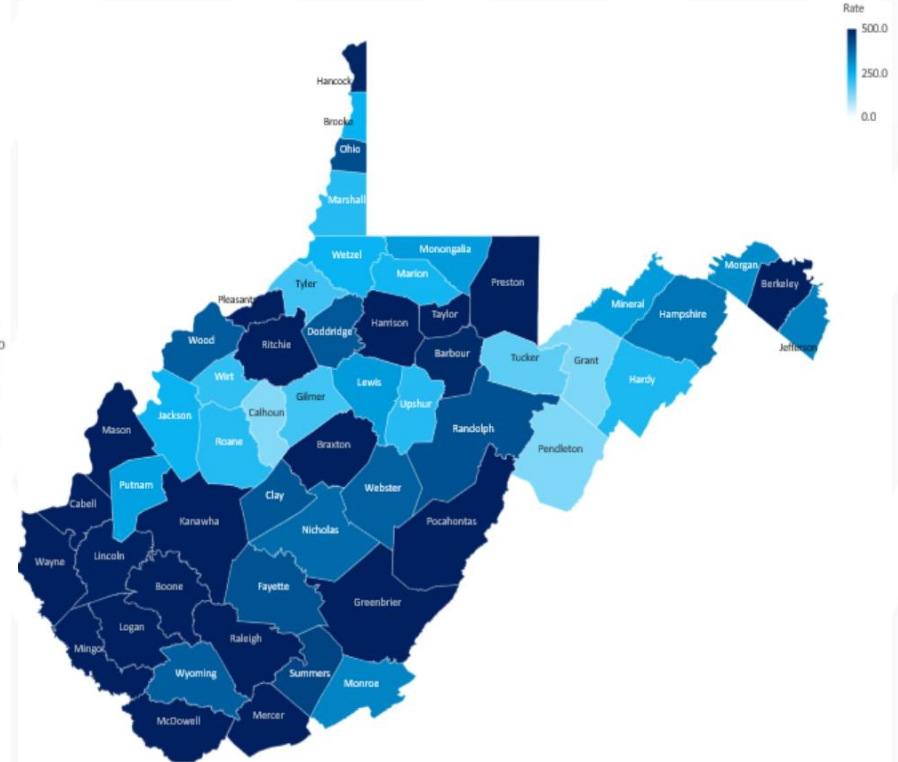
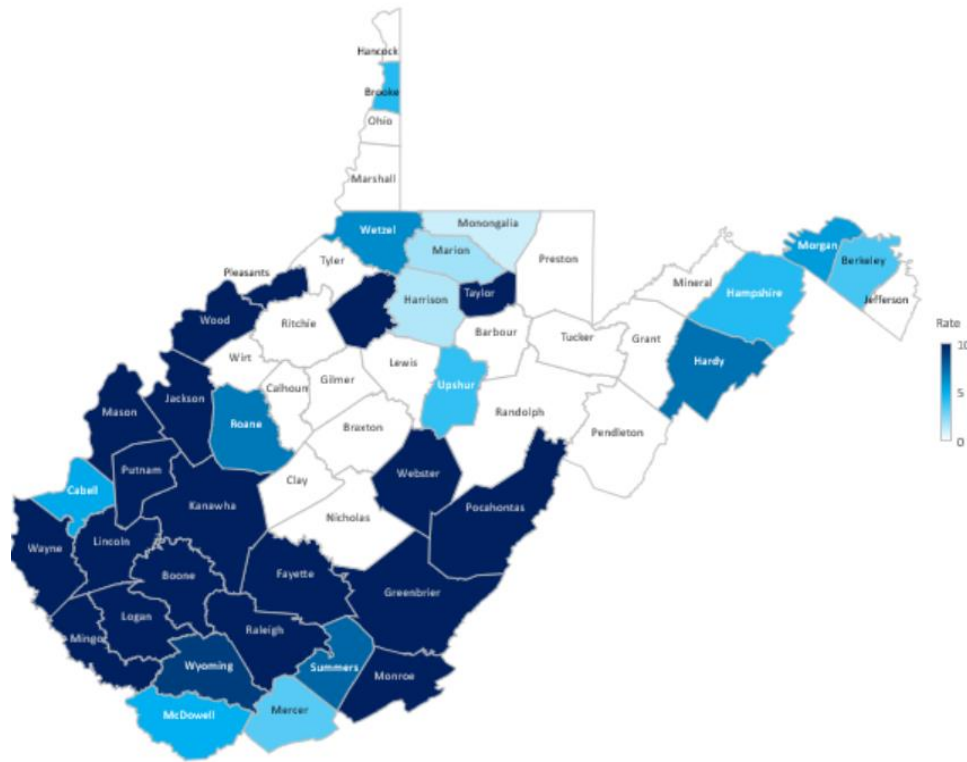
Rapid Increase in Acute HCV Incidence in West Virginia



HCV Infection, WV 2018

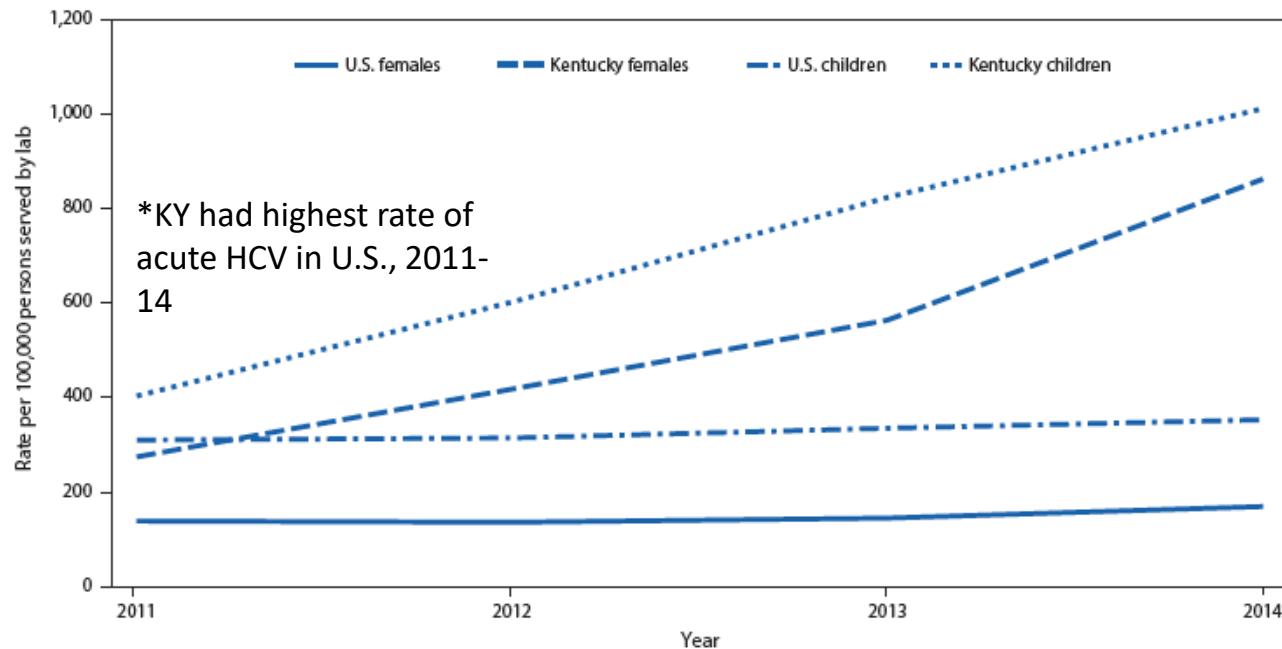
Rate* of Acute HCV Infection, n = 171

Rate* of Chronic HCV Infection, n = 9,002



HCV in women of childbearing age & in children ≤ 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 ≤ 2 years — United States and Kentucky, 2011–2014*

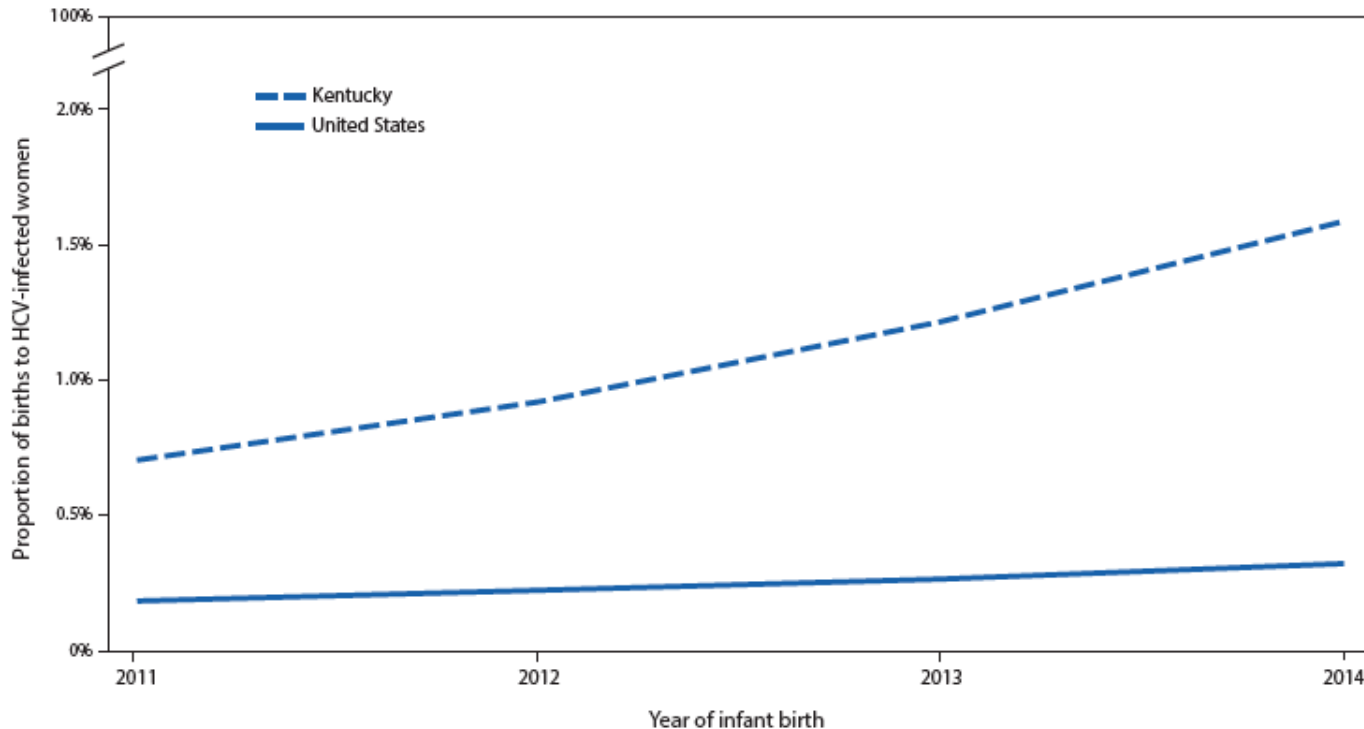


Source: Quest Diagnostics laboratory data.

* 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.

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
- **current USPSTF recommendation: screen pregnant women for HCV in each pregnancy, ideally at first visit**
- rate higher in mothers with:
 - high HCV viral load at delivery
 - HIV co-infection
 - PROM
 - use of internal fetal monitoring device

Hepatitis C Virus

NEARLY **2.4 MILLION** AMERICANS
ARE LIVING WITH HEPATITIS C*



Visit www.cdc.gov/hepatitis for more information



- RNA virus first identified in 1989
- most common bloodborne infection in the U.S.
 - **no vaccine**
 - majority develop chronic infection
 - often asymptomatic
 - up to half may not be aware of infection¹
 - only reservoir is humans
- **in U.S., deaths from HCV now outnumber those from HIV and from 60 other infectious conditions combined²**

¹Kim HS et al, J Viral Hepat 2019 May;26(5):596-602; ² Ly et al, Clin Infect Dis 2016 May 15;62(10):1287-1288.

HCV Transmission

- *most efficiently* spread through percutaneous exposures to infectious blood, esp. IDU
 - young PWID, 18–30 years old: 1/3 are infected
 - older PWID (needle use in 1970s-80s): ~70-90% have HCV
- *less efficient route of transmission*
 - men who have sex with men who have HCV infection
 - HCV is an STD among MSM with HIV
- *inefficient (unusual) routes of transmission*
 - sharing personal items contaminated with infectious blood, such as razors or toothbrushes
 - heterosexual sex

Management of Hepatitis C

- curable with well-tolerated daily drug combinations typically for only 8-12 weeks
- hep C antibody is not protective, so reinfection can and does occur
- requires access to harm reduction program/syringe services program for sterile syringes and clean injection supplies (cookers, cottons, water, alcohol swabs)
- *vaccinate against hep A & hep B to prevent acute hepatitis on top of chronic disease*

DAA (“direct acting antiviral”) Treatment for Chronic Hepatitis C

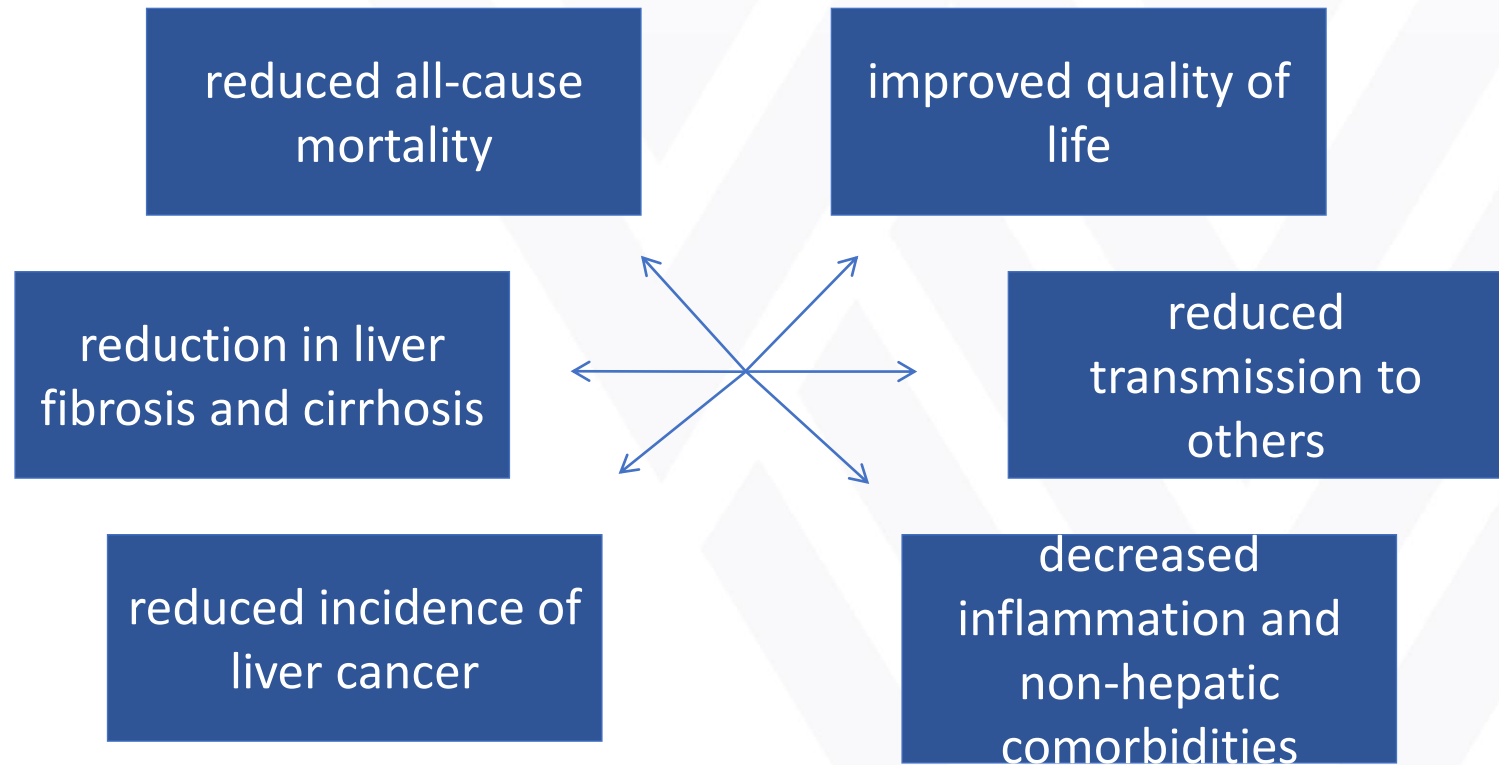
- duration of treatment typically 8-12 weeks
- cure (sustained virologic response-12, SVR12) assessed 12 weeks after last dose is achieved by ~95-99%, even in what were originally considered to be “special populations” such as PWID and persons with HIV co-infection
- side effects manageable and rarely treatment-limiting
- used as daily regimen that combines 2 or more DAAs

AASLD/IDSA Guidelines for Treatment of Hepatitis C

“HCV treatment is indicated for ***all*** patients... Scale up of HCV treatment in persons who inject drugs is necessary to positively impact the HCV epidemic in the US and globally.”

<http://www.hcvguidelines.org/full-report/when-and-whom-initiate-hcv-therapy>

Benefits of Hepatitis C Cure



Treatment as Prevention for HCV among PWID

treating population that actively transmits HCV



reduces new infections



reduces prevalence over time



brings us closer to HCV elimination

Medication Assisted Treatment (MAT) for Opioid Use Disorder (OUD)

- MAT has been shown to decrease overall morbidity and mortality
- excellent opportunity for universal HCV, HBV and HIV screening in a population that is addressing OUD
 - timely motivation to seek treatment for concurrent chronic infectious diseases
 - MAT providers are optimally situated to provide curative HCV care because patients are seen at regular intervals and are trusted source of care

Harm Reduction and HCV

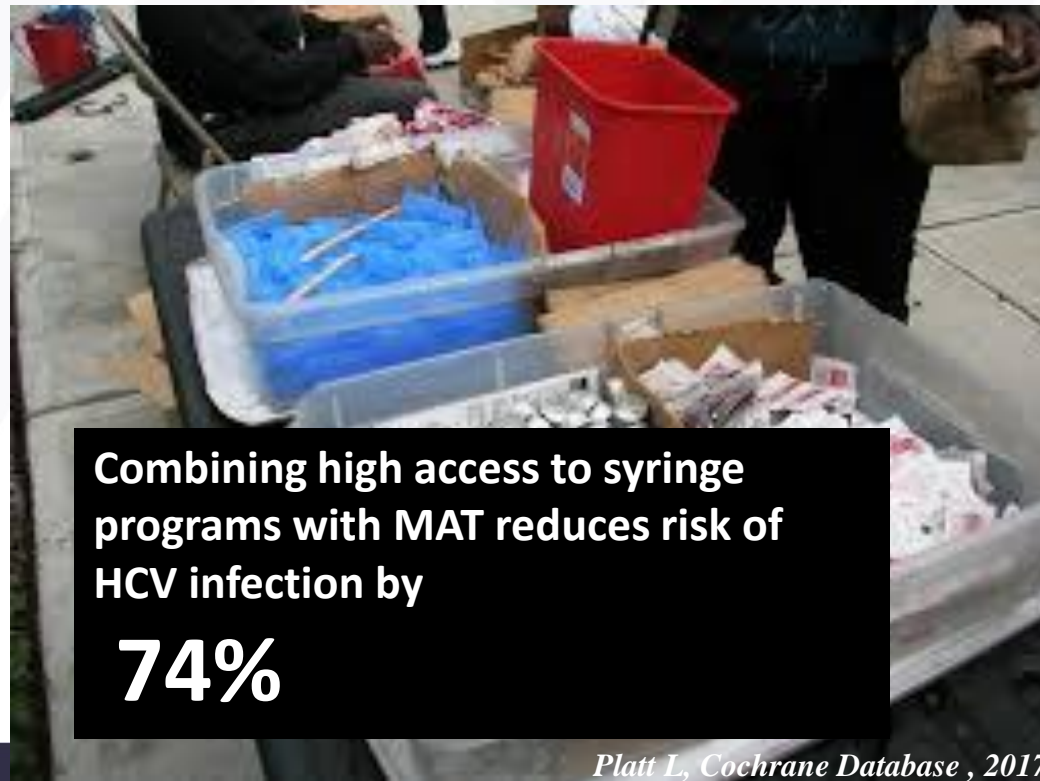
- harm reduction/syringe services programs (SSPs) have been shown to limit the ongoing transmission of HCV and HIV by limiting sharing of syringes, injection supplies
- offering screening for HCV is a key role for SSPs, although often PWID don't avail themselves of this opportunity
- a second key role: prevent re-infection among PWID who have been successfully cured
 - WVU PCORI-funded Hepatitis C Real Options (HERO) study has cured 60/62 PWID, and thus far we have 1 reinfection
- a third key role: provision of hep A & B vaccination

Combined Use of Syringe Services Programs and Medication Assisted Treatment Reduces HCV Transmission Among People Who Inject Drugs

HCV remains infectious up to 6 weeks on improperly cleaned surfaces and cottons used in preparation

Syringe Services Programs:

- are an effective component of an integrated approach to reduce HIV/HBV/HCV in PWID
- also offer alcohol swabs, sterile water, condoms, naloxone, testing, and referral to treatment
- reduce overdose deaths and increase entry into treatment



Platt L, Cochrane Database, 2017

Hepatitis B

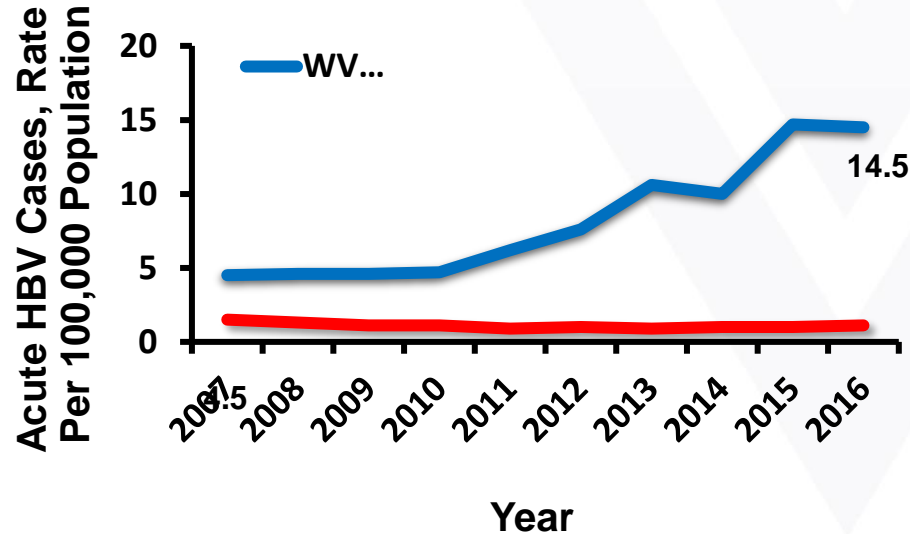
Increases in Acute Hepatitis B: Kentucky, Tennessee, and West Virginia, 2006–2013

- 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.”

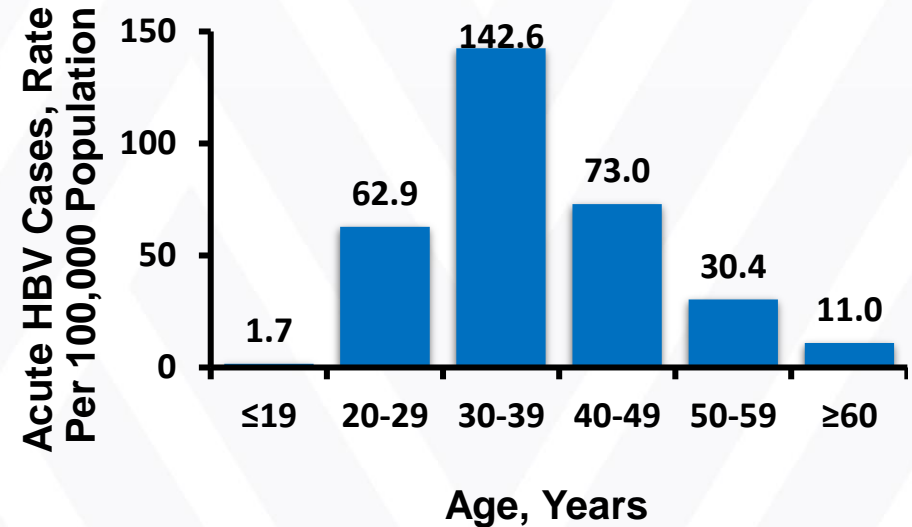
MMWR Jan. 29, 2016

Acute Hepatitis B in West Virginia, 2007-15

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



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



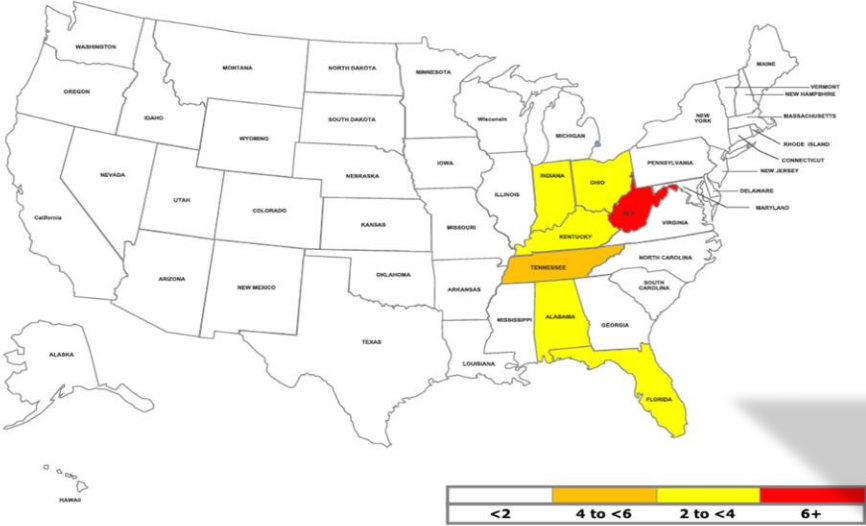
From 2012–2016, IDU and non-IDU were the most commonly reported risk factors among newly confirmed cases, with IDU = non-IDU in 2016

^a2016 data provisional.

WVDHHS. 2017. <https://dhhr.wv.gov/oeps/disease/ob/documents/viral-hep-profile-2017.pdf>. Accessed April 8, 2019.

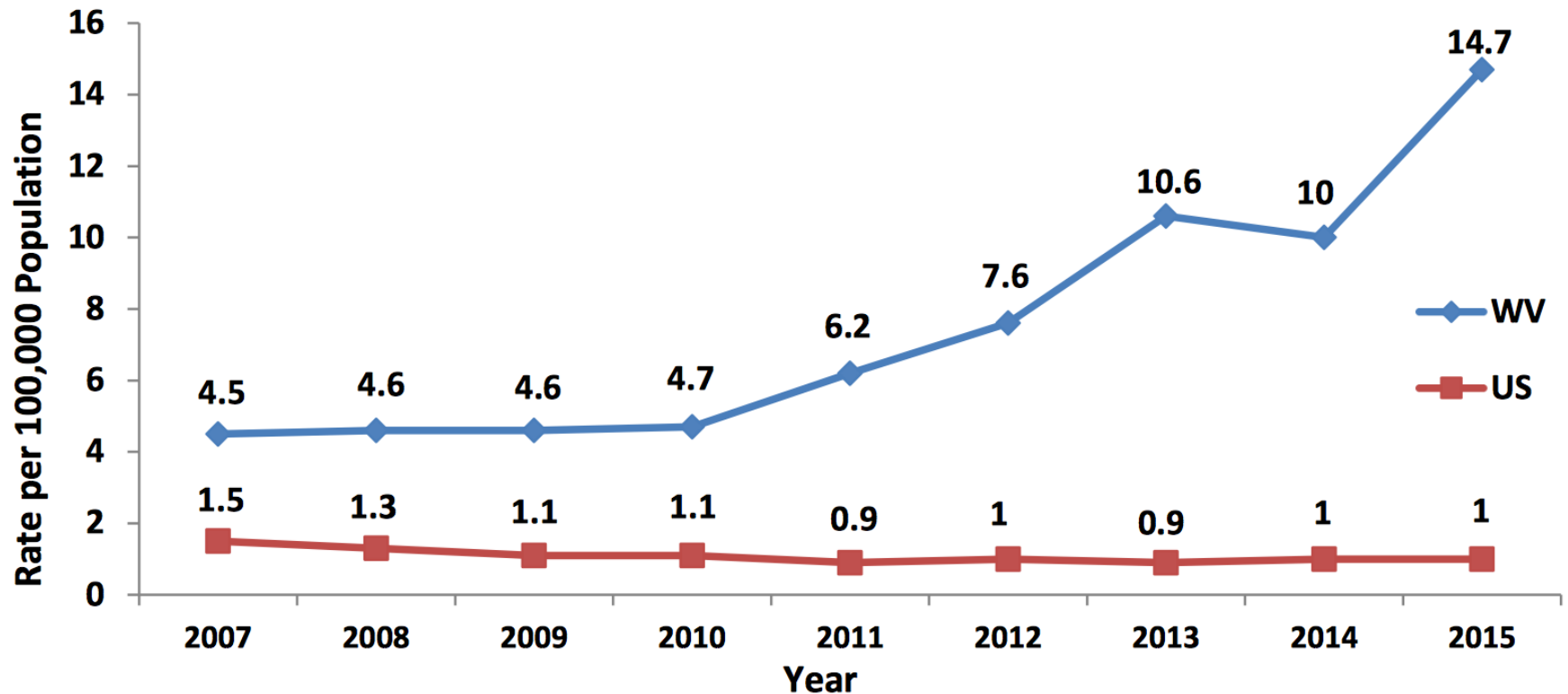
West Virginia Suffers from Highest Rate of HBV Infection in the U.S.

Figure 3. Rate of acute HBV infection per 100,000 population, U.S., 2016 (Source: CDC)



*Source: Center for Disease Control

Acute Hepatitis B, WV vs. US, 2007-2015

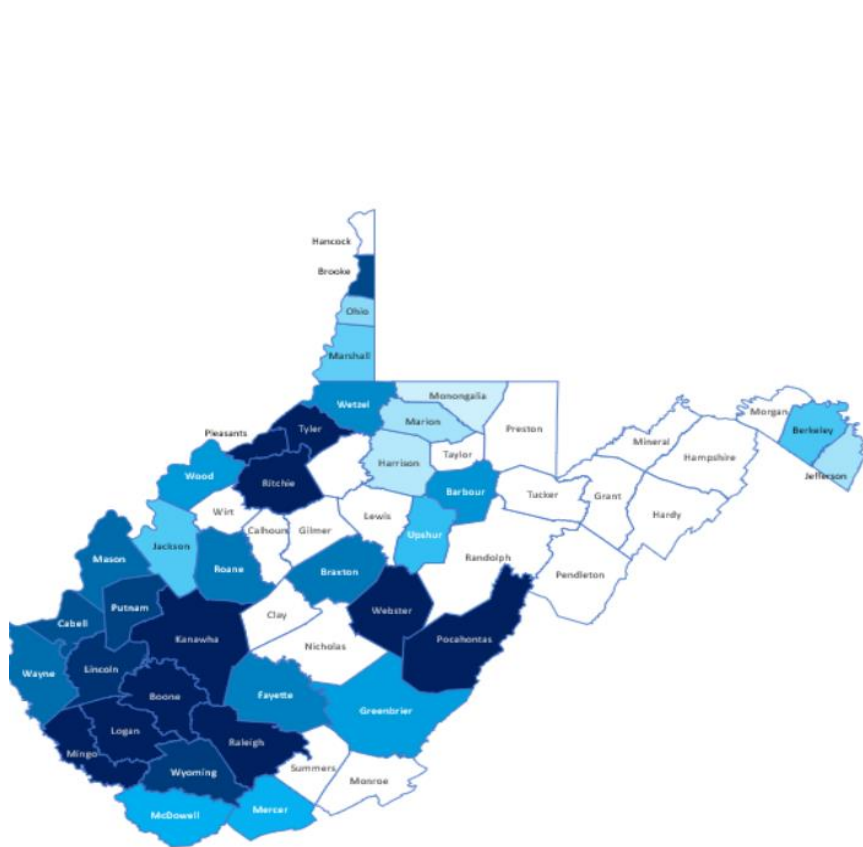


*West Virginia has ranked highest in the incidence of acute HBV in the U.S. since 2007.

HBV Infection, 2018

Rate* of Acute HBV Infection, n = 132

Rate* of Chronic HBV Infection, n = 485



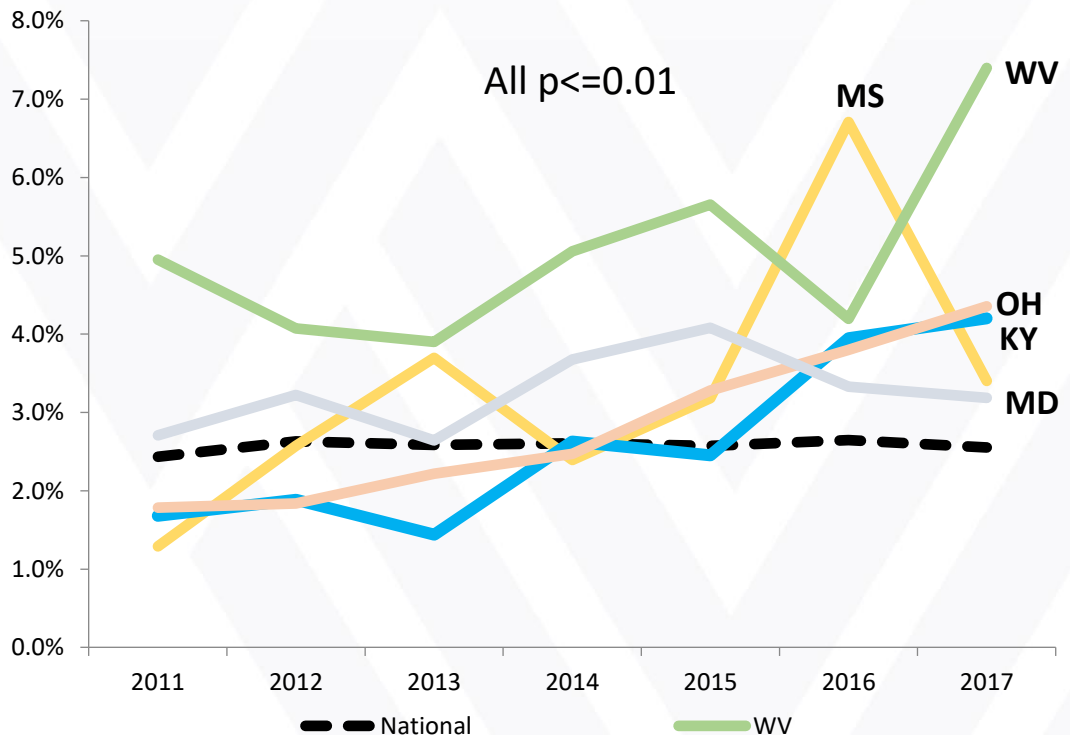
Mother-to-Child Transmission of HBV

- perinatal transmission of HBV
 - 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)
 - prevents >90% of perinatal HBV infections
- HBV-related complications occur more frequently in pregnant women and are associated with a higher mortality

Prevalence of HBcAb (naturally-acquired infection) in Women of Childbearing Age, 15-44

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

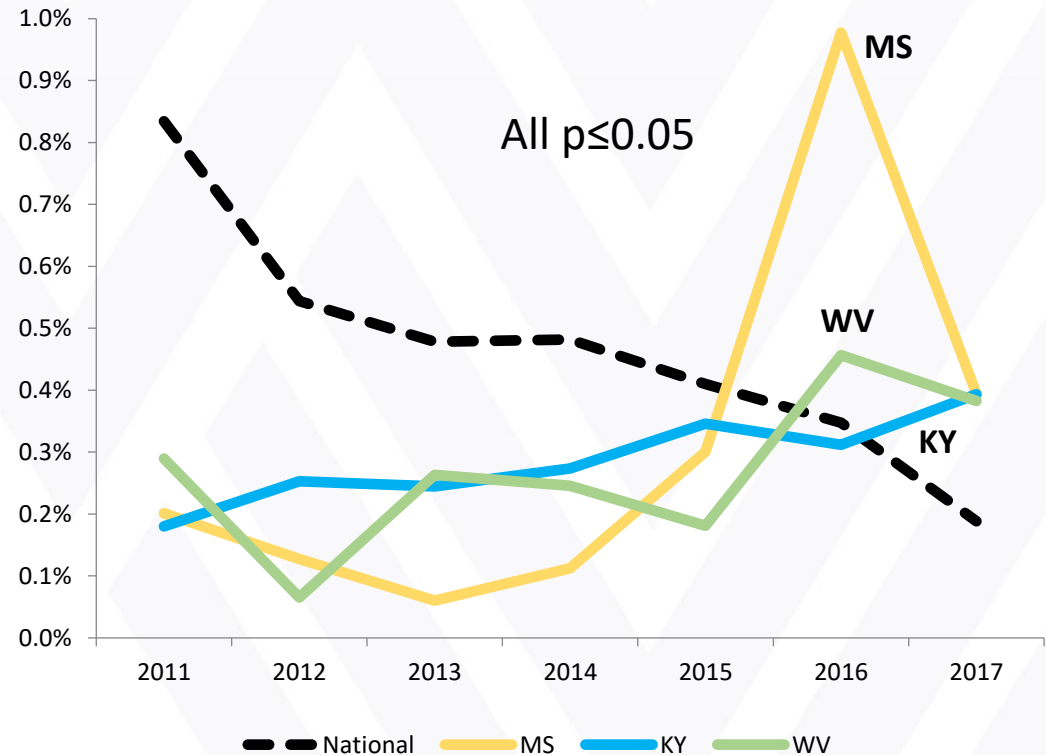
national trend vs states with opposing trends



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

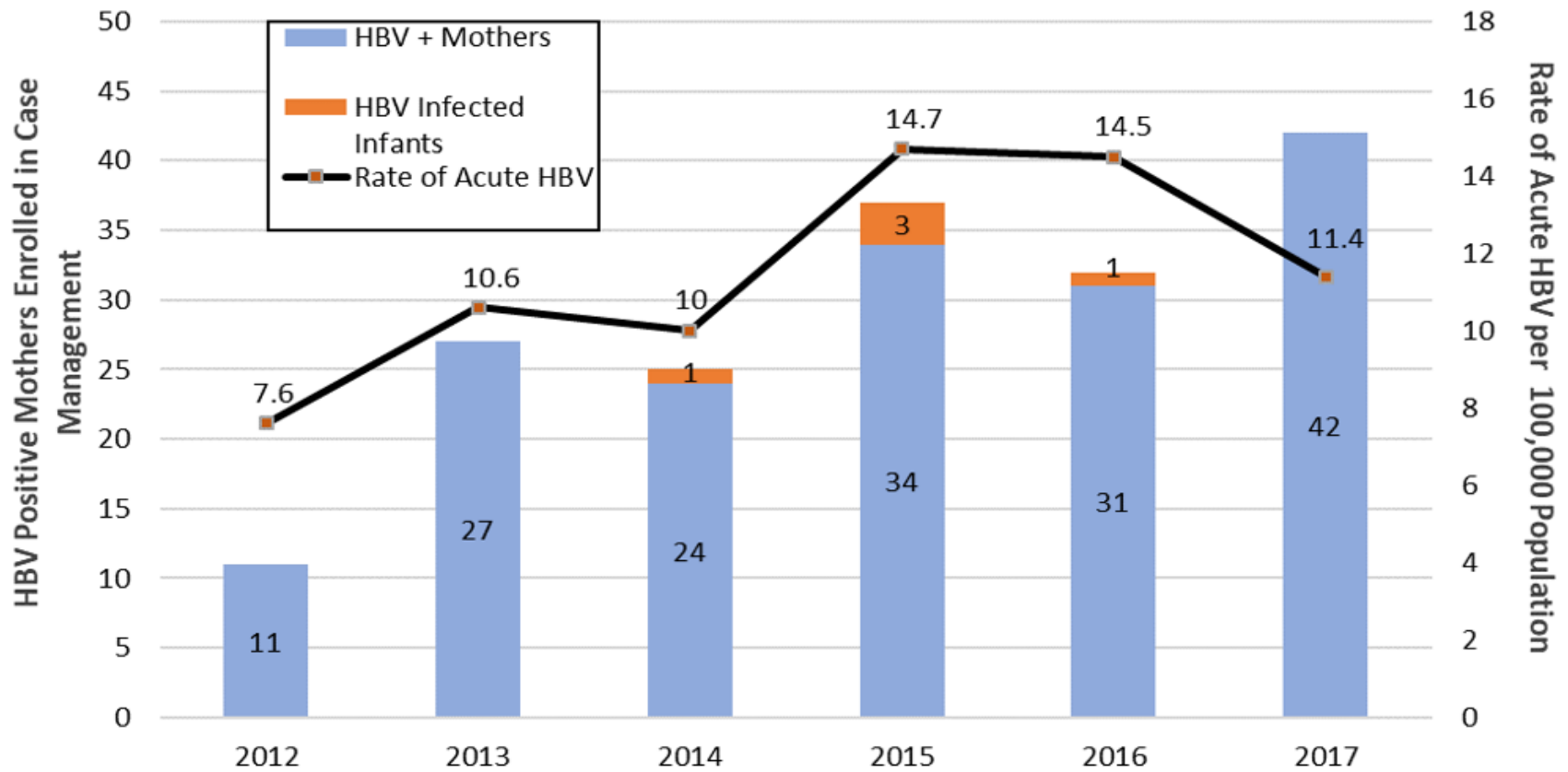
- increase in MS, KY and WV (all Appalachian states)
- no increase in any other states

national trend vs states with opposing trends



Perinatal HBV, 2012-2017

Perinatal HBV Infection Identified Among Infants vs Pregnant Mothers in Case Management, WV - 2012-2017*



*West Virginia 2017 HBV data are provisional as of

Long-term Outcome of HBV MTCT

- up to 90% of neonates born to moms with acute or chronic (HbsAg+/HBeAg+) HBV 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

Management of Hepatitis B

- not currently curable, but like HIV it can be suppressed to maintain health
- requires long-term (likely life-long) treatment with antivirals to suppress the amount of virus ('viral load') below the limit of the assay to determine ("undetectable viral load")
- *vaccinate against hep A*

Hep B Vaccination Choices

- 3-dose series (0, Month 1, Month 6)
 - some individuals– despite repeated vaccination– do not mount an antibody response
- 2-dose series (0, Month 1)
 - has immune adjuvant that improves vaccine response

What is Harm Reduction?

A public health approach to minimize the harm from undesirable behaviors

- non-judgmental
- non-coercive
- provision of services and resources to people who use drugs and the communities in which they live to assist them in reducing attendant harm

Syringe Services Programs (SSPs)*

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

Syringe Services Programs Prevent Infection

- need for syringe services programs
 - need both sterile syringes *and* clean injection supplies to prevent HCV
 - many offer on-site rapid testing for HIV, HCV
 - safer injection education
 - male & female condoms, safer sex education
- hep A & 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)”

SSB 334 Will Reduce SSP Access

- new law passed in 2021 legislative session
- describes requirements for SSP licensure that are expensive and not widely available to existing SSPs
 - treats SSPs more like a medical practice than a public health measure
- describes penalties (fines, incarceration)
- will decrease the number of current SSPs and limit development of new ones