

# Tackling the Trifecta

Bianca Huff, Mikaela Earl, & Suzanne Wilson

STD Program Director, Hepatitis Program Director, HIV Surveillance Program Director

May 14, 2026

West Virginia Infectious Disease  
and Immunization Summit

# Learning Objectives

1. Describe the epidemiologic overlap and syndemic patterns of substance use disorder, syphilis, HIV, and Hepatitis C (the Trifecta) and their impact on morbidity and mortality at the state level.
2. Present state-level surveillance data and analytic approaches used to identify high-risk populations, geographic hotspots, and co-occurring trends.
3. Highlight data-driven strategies implemented to address co-occurring substance use disorder, Syphilis, HIV, and hepatitis C, including cross-program collaboration and integrated prevention efforts.
4. Discuss lessons learned, challenges, and opportunities to strengthen integrated surveillance and response efforts to improve outcomes and reduce health disparities.

# Syndemic Definition

A syndemic is defined as a “population-level clustering of social and health problems. The criteria of a syndemic are:

- Two (or more) diseases or health conditions cluster within a specific population;
- Contextual and social factors create the conditions in which two (or more) diseases or health conditions cluster; and
- The clustering of diseases results in adverse disease interaction, either biologic or social or behavioral, increasing the health burden of affected populations.”

## Bacterial infection caused by *Treponema pallidum*

- Symptoms are general, easily mistakable for other conditions (“The Great Imitator”), and go away on their own without treatment.
- Incubation period: average 21 days, ranging nine to 90 days
- Long-term sequelae include late clinical manifestations (e.g., gummas, aortic dissection).
- Neurosyphilis involving the ears, eyes, and brain can happen at any time.
- Vertical transmission always a risk so long as pregnant mother not treated.
  - Congenital syphilis can cause stillbirth, death, or serious health consequences for the infant.

## Broken into two broad categories

- Early syphilis defined as signs/symptoms **OR** contact with sex partners with signs/symptoms in the previous 12 months, treatable with one dose of 2.4 million units of penicillin G
- Late or unknown duration syphilis defined as signs/symptoms longer than a year ago **OR** no symptoms reported, treatable with 2.4 million units of penicillin G weekly for three weeks

## Transmission Routes

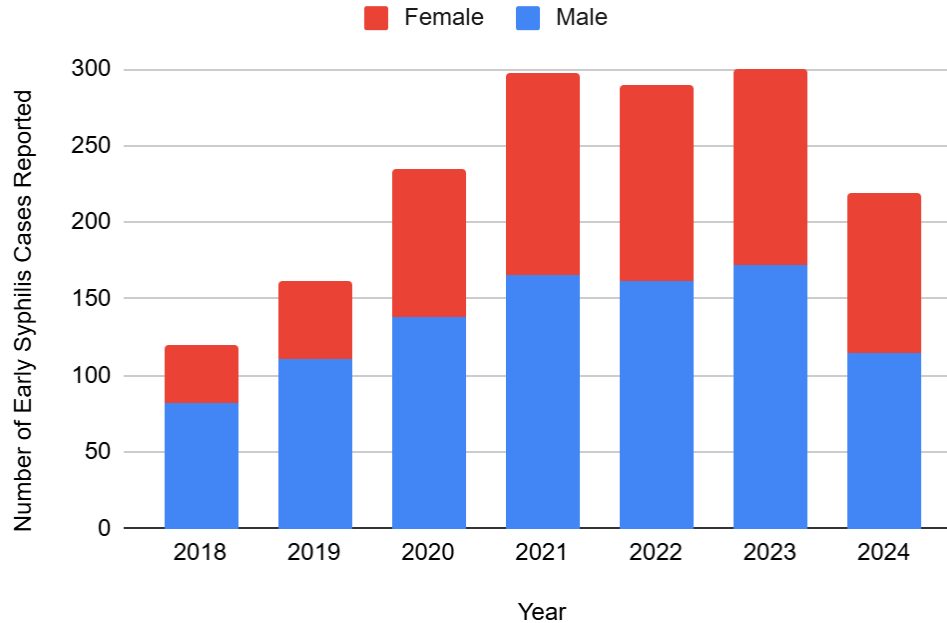
- Sexual contact with chancre, or other lesions, of syphilis
- Transplacental transmission from mother to infant in utero, or contact with chancre during birthing

## Prevention

- Condom and dental dam use can help, but condoms/dams must cover lesions.
- Frequent testing of high-risk patients identifies syphilis early to break the chain of infection.
- Epidemiological treatment of close contacts to early syphilis kills incubating bacteria.
  - Negatives aren't always negatives for those partners - it could be too early for testing to become positive.
- For eligible male patients, DoxyPEP after a sexual encounter is highly effective at preventing syphilis transmission.
- Notification of partners to seek testing and treatment where applicable

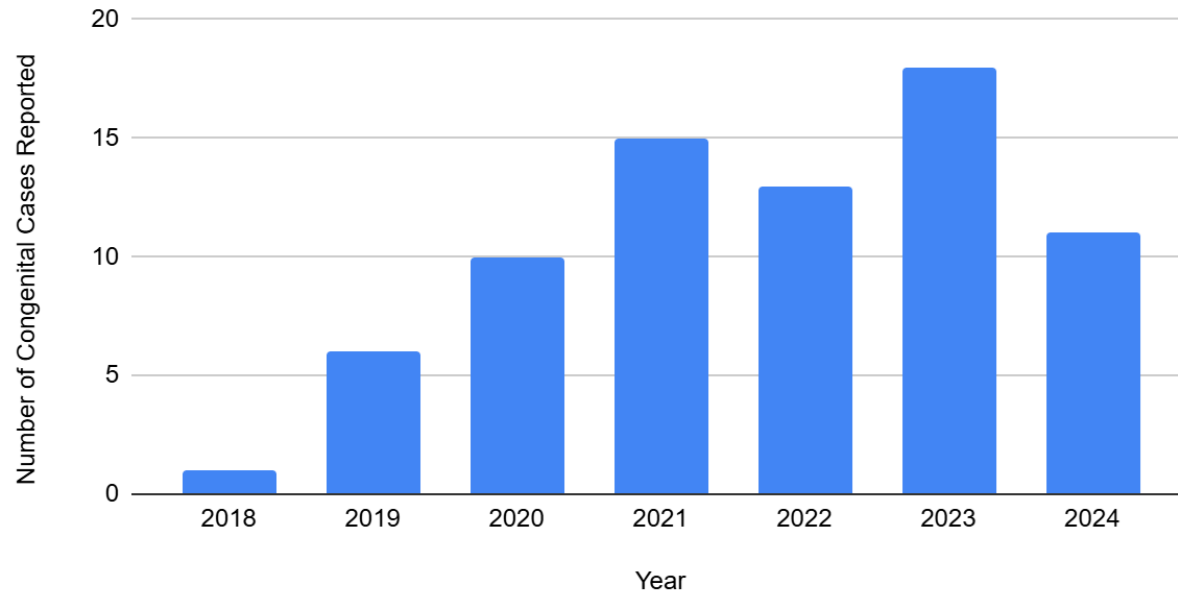
# Early Syphilis in West Virginia, 2018-2024

## Early Syphilis Cases Reported to the West Virginia Department of Health, 2018-2024



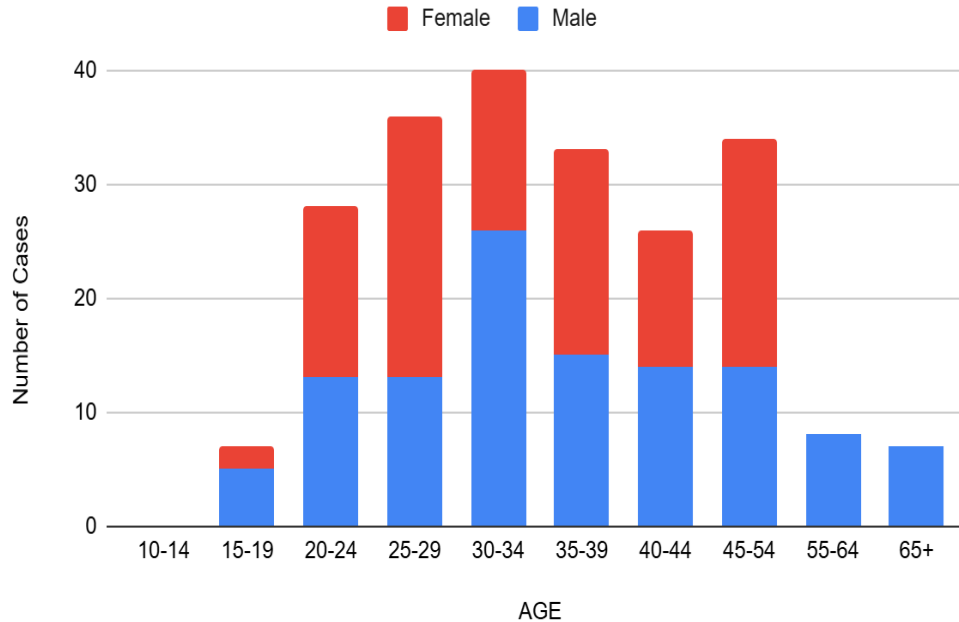
# Congenital Syphilis in West Virginia, 2018-2024

## Congenital Syphilis Cases Reported to the West Virginia Department of Health By Year, 2018-2024

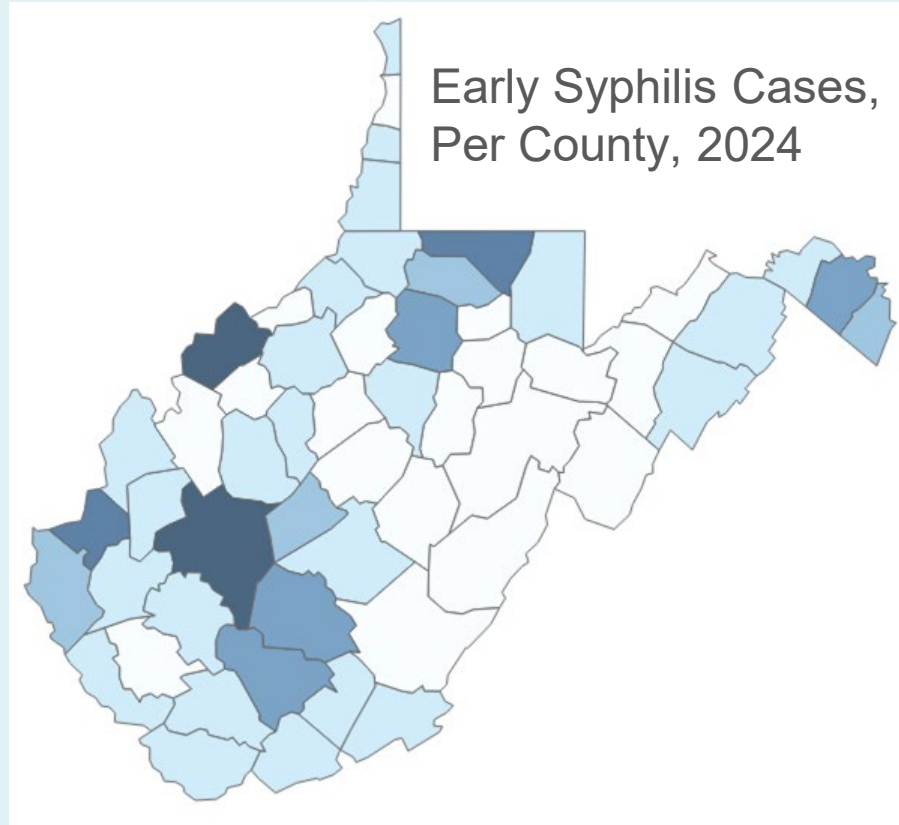


# Sex and Age of Early Syphilis Cases, West Virginia, 2024

Early Syphilis Cases by Sex and Age reported to the West Virginia Department of Health, 2024



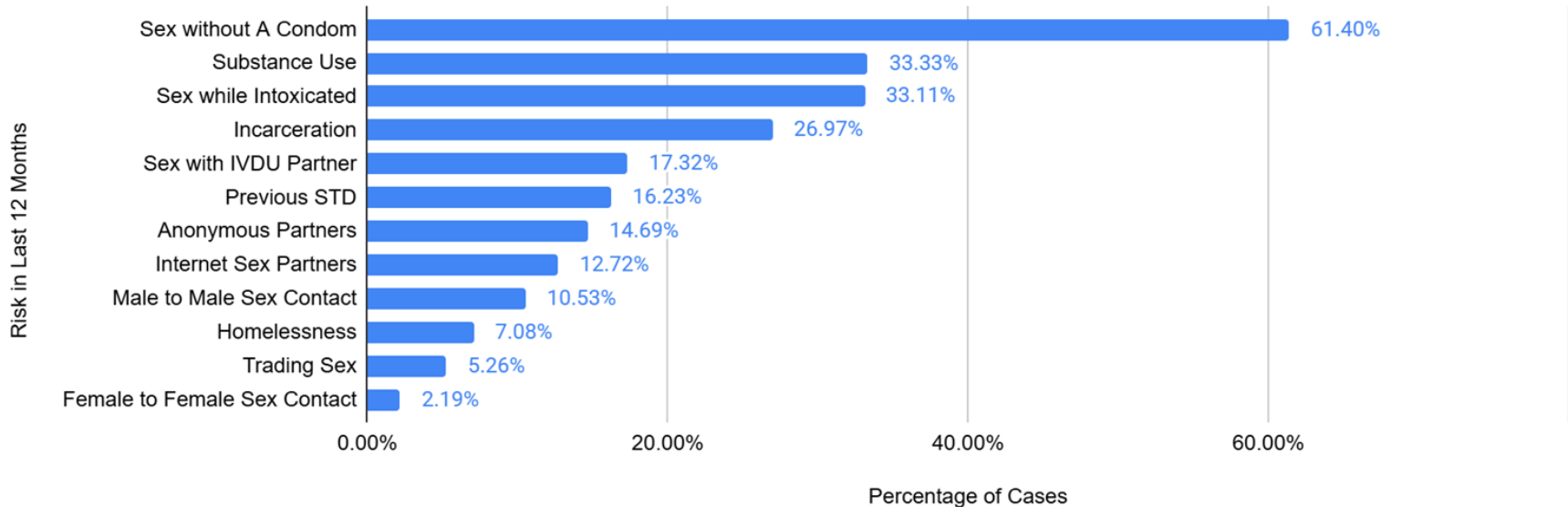
# Early Syphilis Case Counts by County, West Virginia, 2024



number of cases	
0	
1 - 5	
6 - 10	
11 - 15	
16 - 20	
21+	

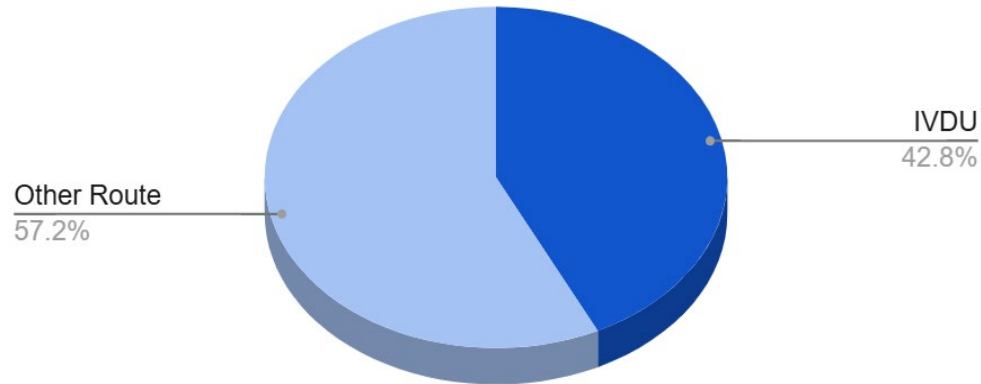
# All Syphilis Stages and Risk

Percentage Risks of All Syphilis Cases Reported, Non-Exclusive, Reported to the West Virginia Department of Health, 2024

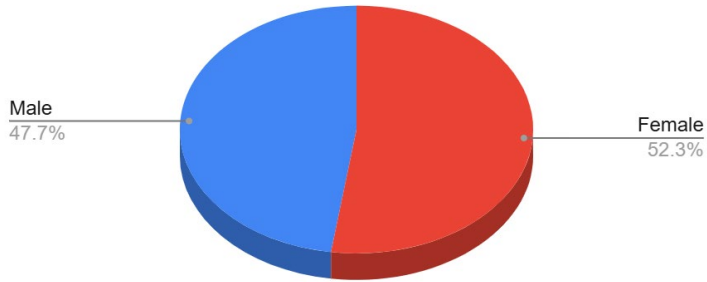


Risks are not exclusive, and multiple risks can be endorsed by one interviewee.

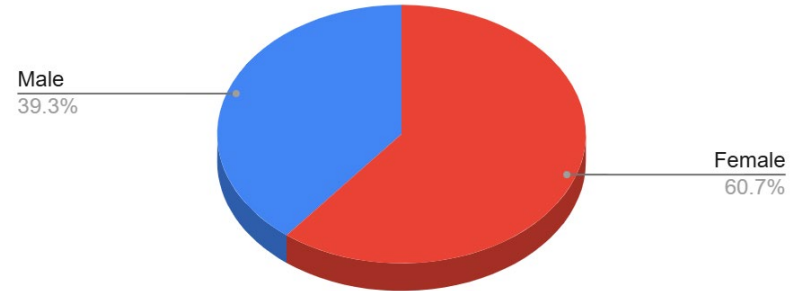
Drug Use Routes of All Syphilis Cases reported to West Virginia Department of Health, 2024



Sex of All Syphilis Cases Reporting Injection Drug Use, West Virginia, 2024



Sex of All Syphilis Cases Reporting Sharing Injection Drug Equipment, West Virginia, 2024



## Drug Use Statistics Among All Syphilis Cases in 2024

- Methamphetamine is the most commonly reported drug used among drug users (69%).
- Polysubstance use, or use of simultaneous drugs, among drug users is common (64%).
- Of those reporting injection drug use, 43% report sharing injection drug equipment in 2024.
- Of those reporting injection drug use, 76% report using more than one drug in 2024.
- Of those reporting injection drug use, 85% report using methamphetamine in 2024.

## Drug Use Statistics Among Syphilis Cases Resulting in Congenital Syphilis in 2024

- Substance use was reported in 72% of syphilis cases resulting in a congenital case.
- Methamphetamine was reported in 36% of syphilis cases resulting in a congenital case.
- Polysubstance use was reported in 36% of syphilis cases resulting in a congenital case.
  - 100% of Intravenous Drug Use (IVDU) who had a congenital case reported polysubstance use.
- One case was human immunodeficiency virus (HIV) positive, hepatitis B virus (HBV) positive, had a history of or present hepatitis C virus (HCV) infection, polysubstance use, and IVDU risk.
- Of all pregnant cases resulting in congenital cases who reported substance use, 38% were diagnosed with syphilis during the first trimester.

## Drug Use, Hepatitis C, and Syphilis Coinfections During Pregnancy, 2019-2023

- 42.9% had past or present HCV infection alongside syphilis infection.
- 50.7% of those with past or present HCV infection reported past-year substance use.
- 21.7% of those with past or present HCV infection reported past-year incarceration.

## Past-Year Incarceration Statistics Among All Syphilis Cases in 2024

- 27% of all syphilis cases were incarcerated in the last year.
- 12% identified as Black or African American.
  - 80% male, 20% female
- 13% were currently homeless at the time of the interview.
- 50% were institutionalized at the time of the interview (detox program, jail, prison).
- Of all HIV-coinfected cases, 13% reported past-year incarceration
- 71% reported past-year substance use.
  - 37% reported injection drug use.
- 80.5% were treated for their stage of infection.



## Hepatitis B Virus (HBV)



**Virus Type:** Hepadnaviridae family; DNA virus.



**Transmission:** Percutaneous, mucosal contact with infectious blood or body fluids (e.g., semen, saliva).



**Incubation Period:** Average 90 days (range: 60–150 days).



**Clinical Course:** Can be acute or chronic. Risk of chronic infection decreases with age at infection.



**Prevention:** Vaccine-preventable; Hepatitis B Globulin (HBIG) for postexposure prophylaxis.



**Treatment:** Antiviral medications for chronic infection; not curative, suppresses virus.



## Hepatitis C Virus (HCV)



**Virus Type:** Flaviviridae family; RNA virus.



**Transmission:** Primarily bloodborne (e.g., injection drug use, healthcare exposures); less common via sexual contact.



**Incubation Period:** Average 14–84 days (range: 14–182 days).



**Clinical Course:** Acute infection often asymptomatic; ~75–85% develop chronic infection.



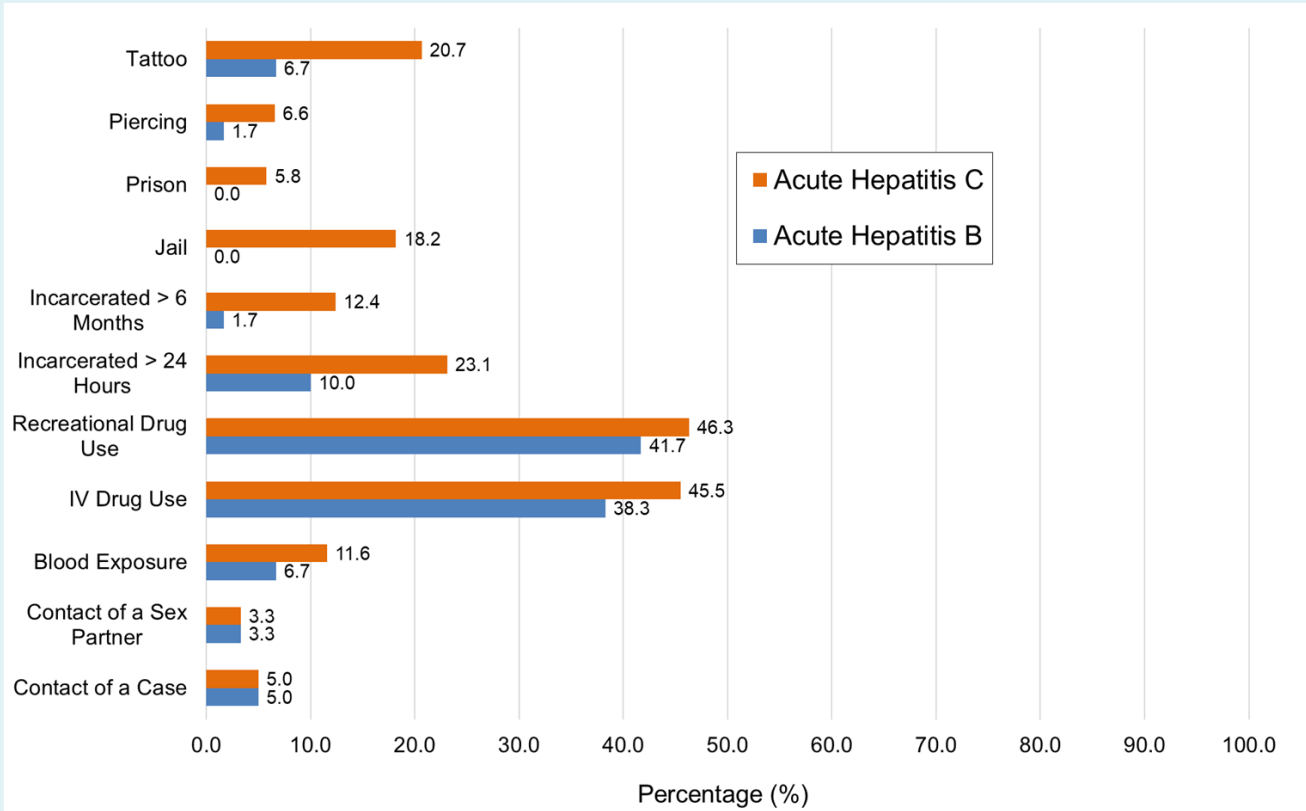
**Prevention:** No vaccine available; focus on blood screening, harm reduction, infection control.



**Treatment:** Direct-Acting Antivirals (DAAs); highly effective, curative (>95% cure rate).

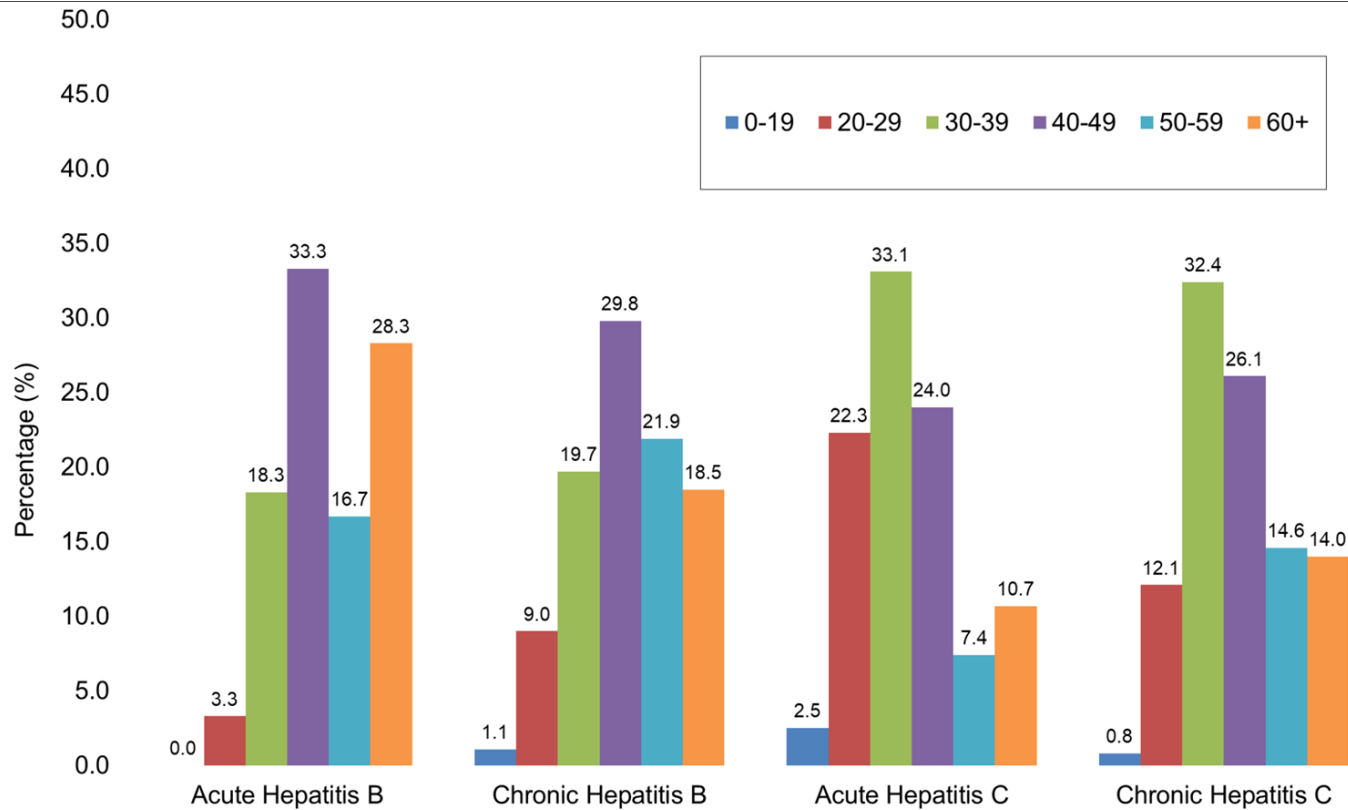


# Risk Factors by Hepatitis Condition in West Virginia, 2024



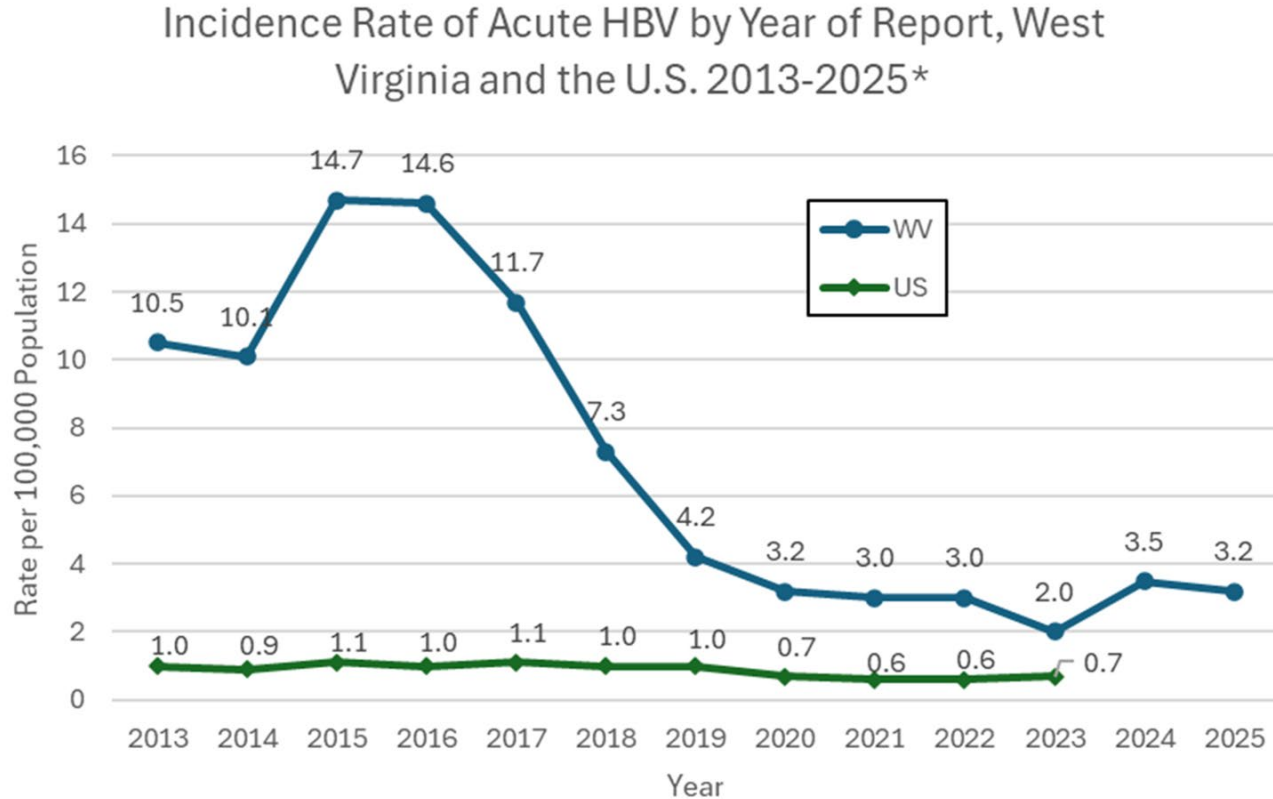
Data Source: West Virginia Electronic Disease Surveillance System (WVEDSS)

# Hepatitis Cases by Condition and Age Group in West Virginia, 2024



Data Source: West Virginia Electronic Disease Surveillance System (WVEDSS)

# HBV Acute Rate in West Virginia by Year

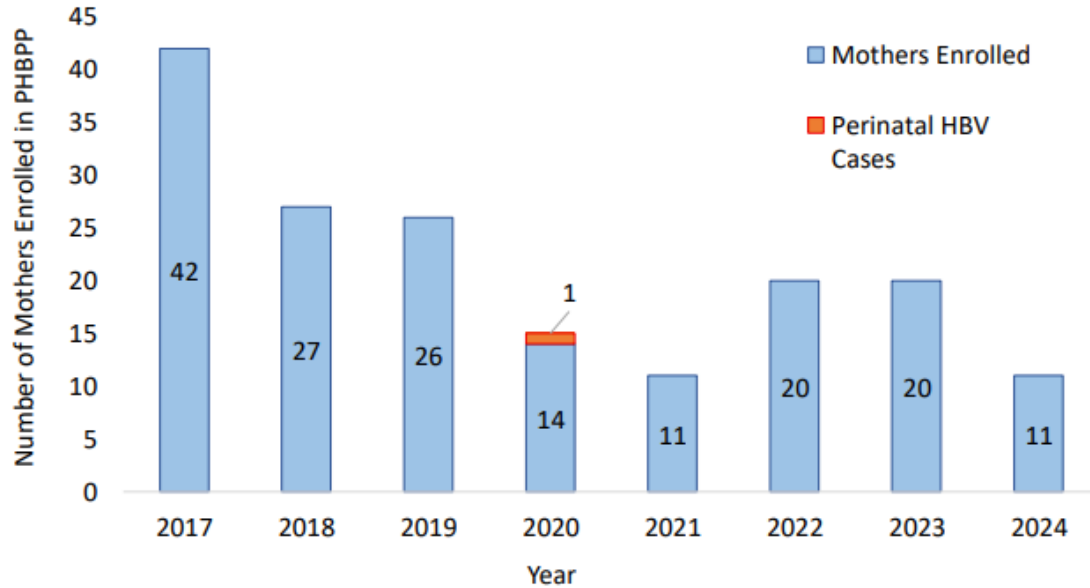


\*2024-25 US data is not yet available, 2025 WV data is preliminary

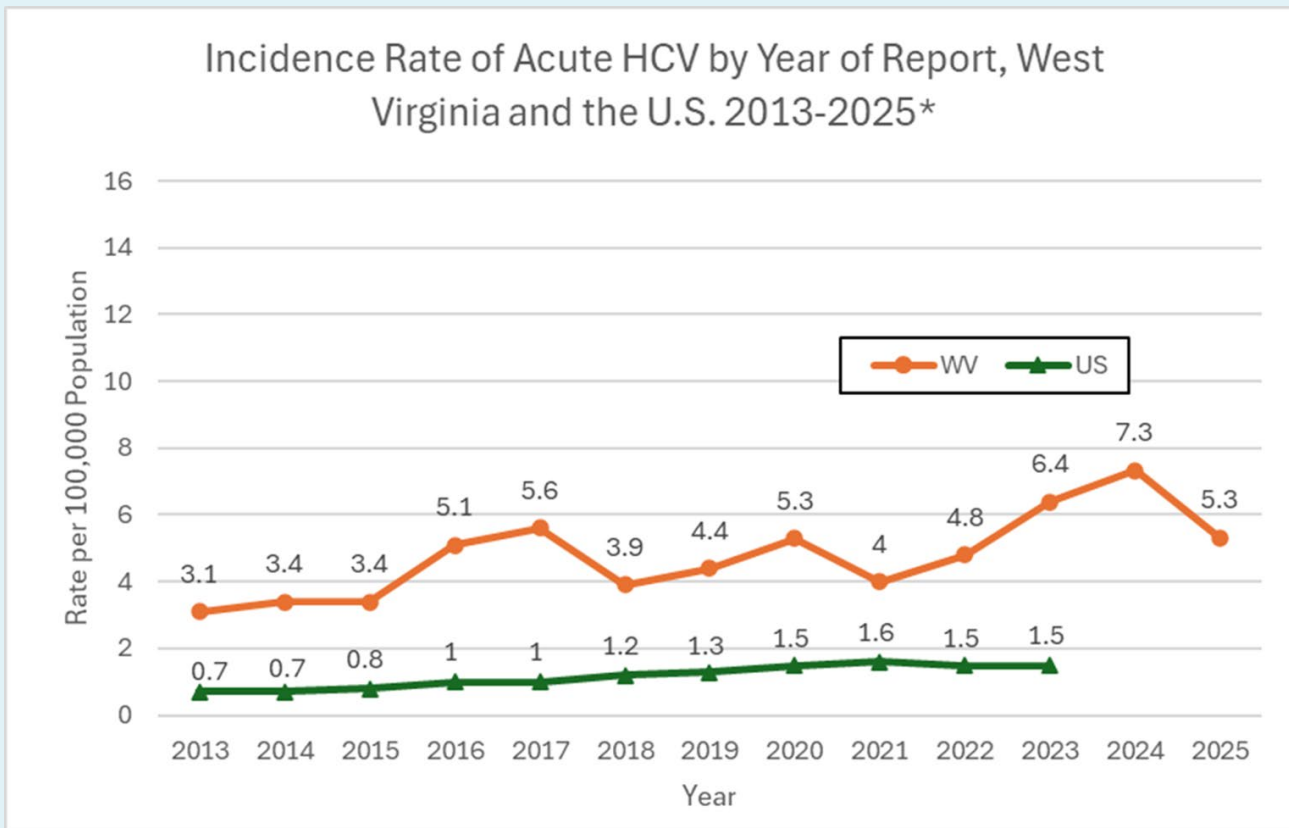


# HBV Perinatal Exposures/Case Counts in West Virginia

Figure 2.5 Mothers Enrolled in PHBPP and Perinatal HBV Cases in West Virginia, 2017-2024

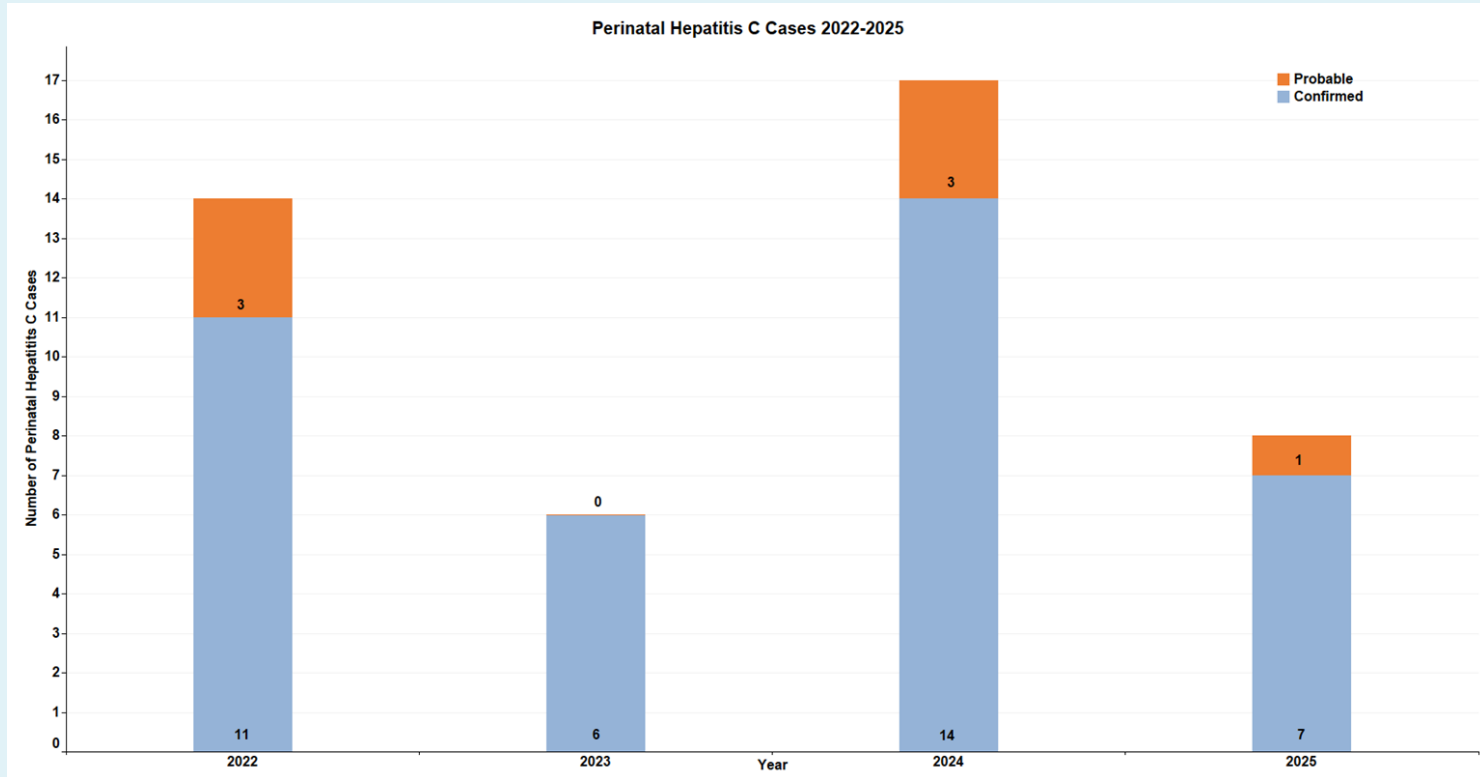


# HCV Acute Rate in West Virginia by Year



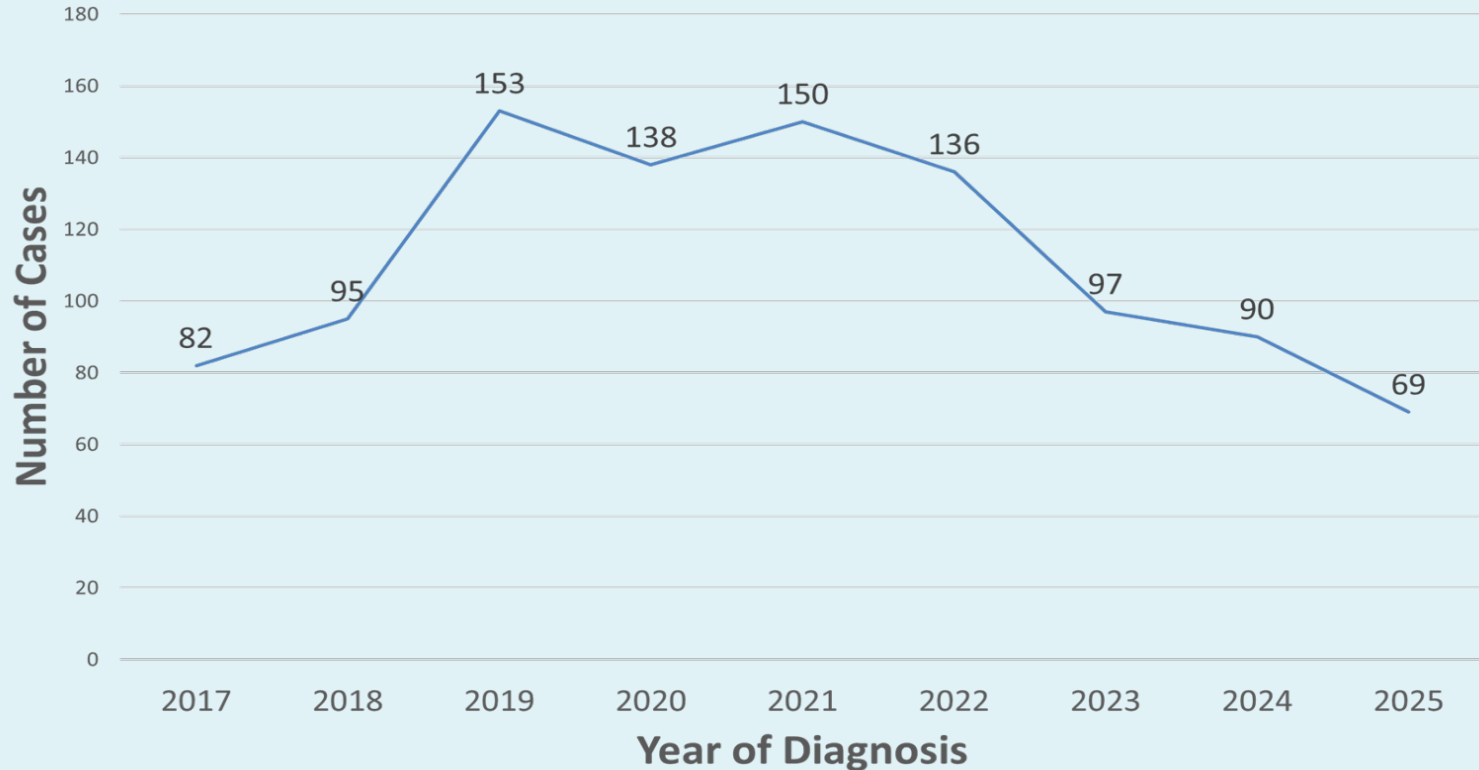


# HCV Perinatal Exposures/Case Counts in West Virginia



# Newly Diagnosed HIV in West Virginia

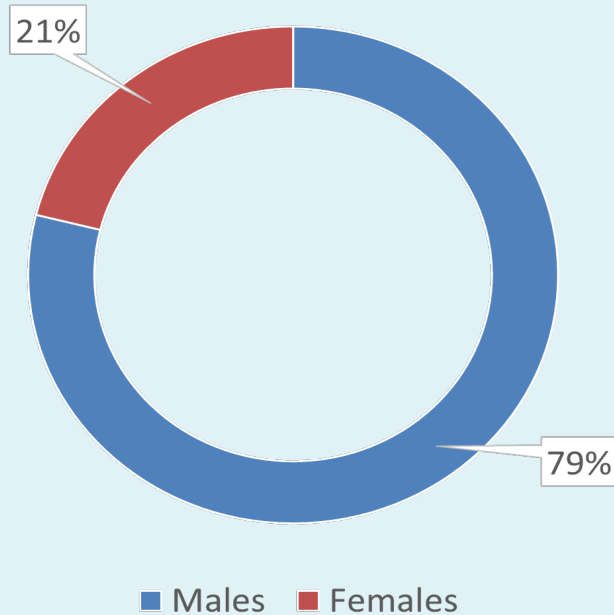
## Newly Diagnosed HIV Cases, 2017-2025 – West Virginia



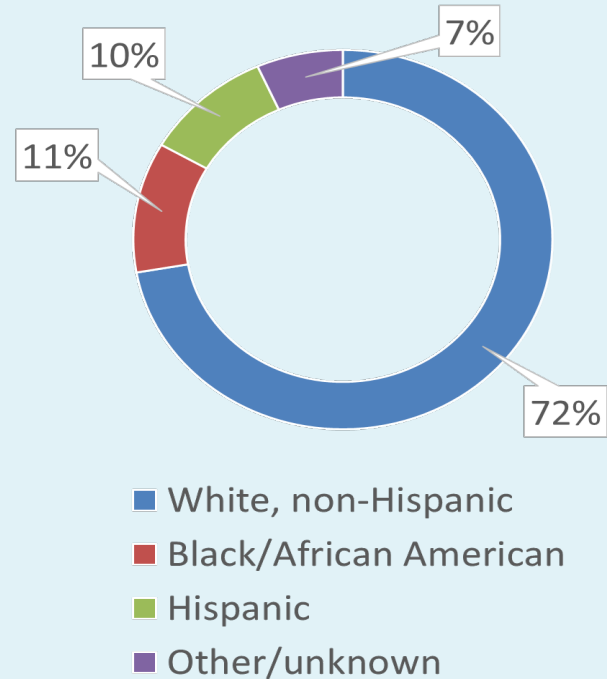


# Demographics of Newly Diagnosed HIV in West Virginia

## Newly Diagnosed HIV by Sex, 2024 – West Virginia (N=90)

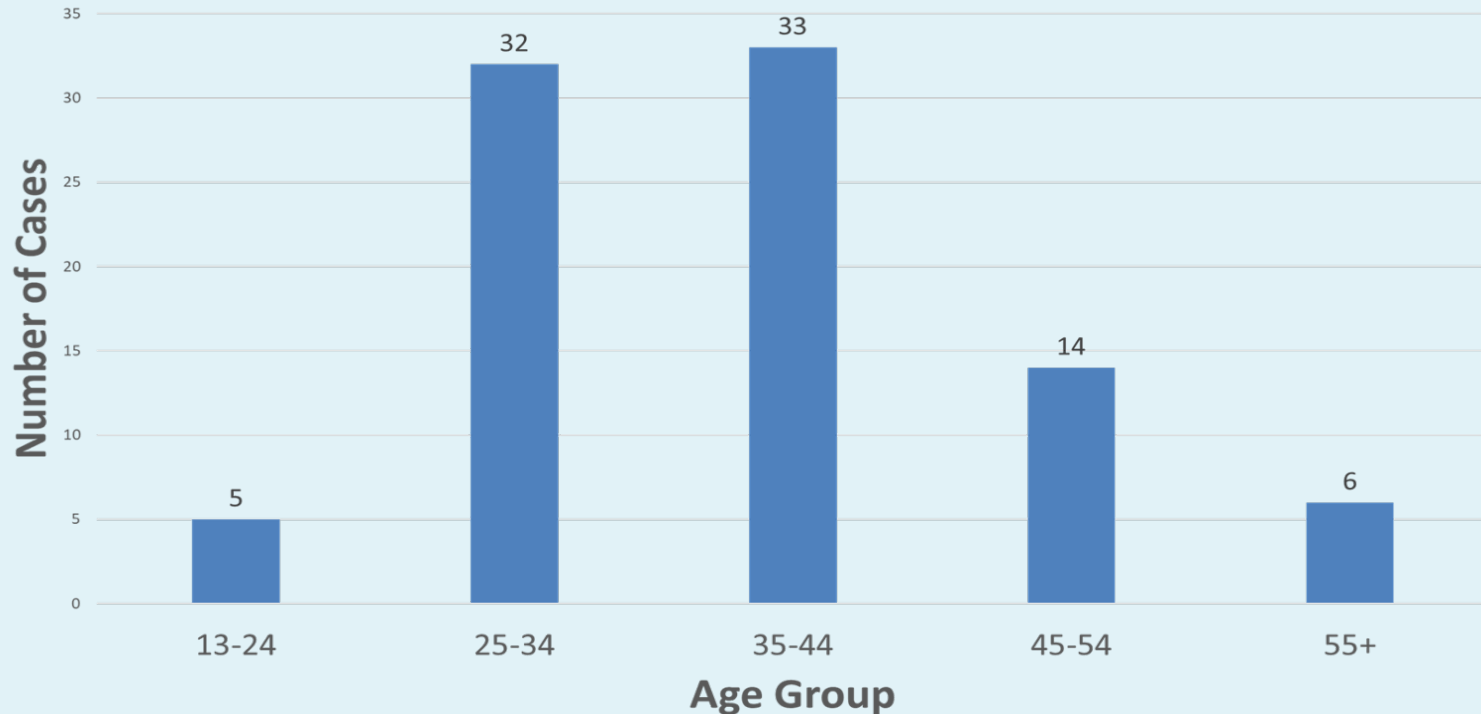


## Newly Diagnosed HIV by Race, 2024 – West Virginia (N=90)



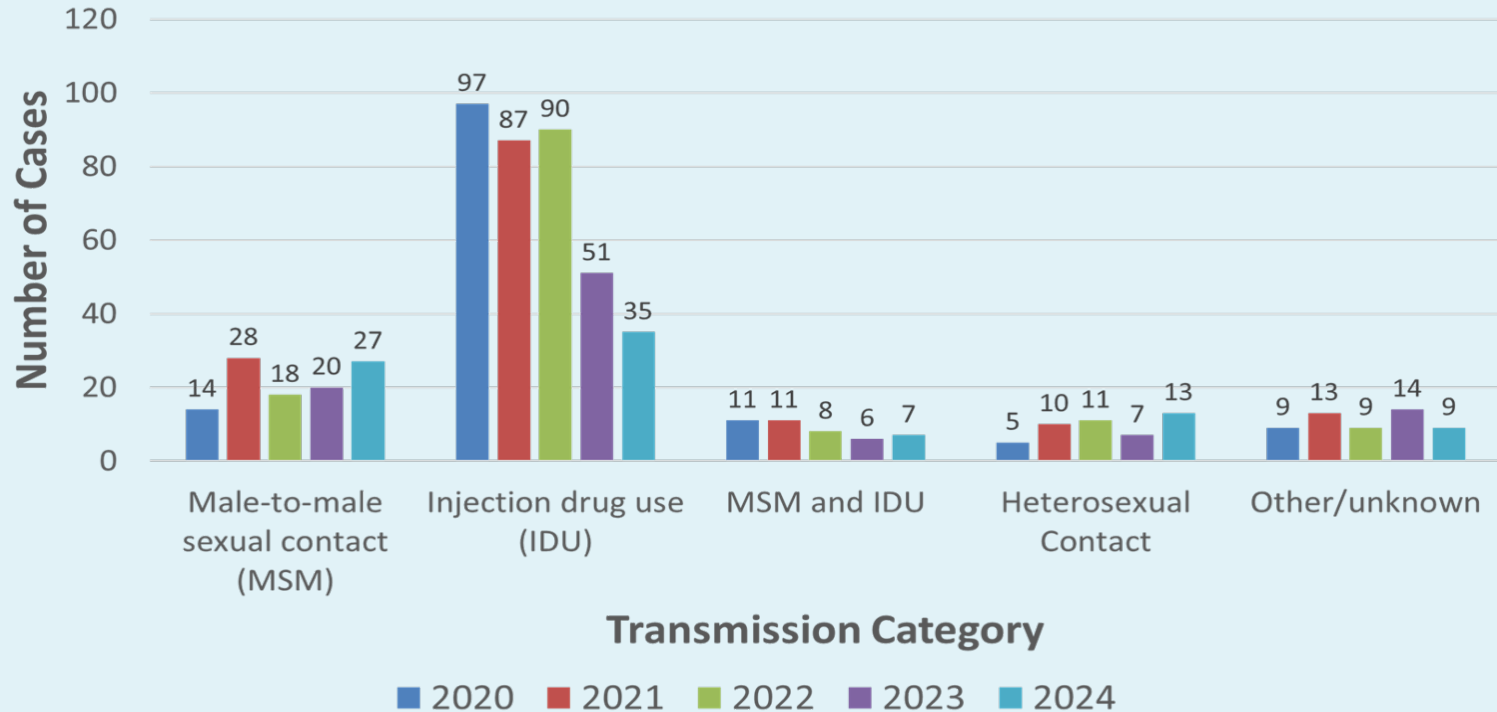
# Demographics of Newly Diagnosed HIV in West Virginia (cont'd)

## Newly Diagnosed HIV by Age Group, 2024 – West Virginia (N=90)



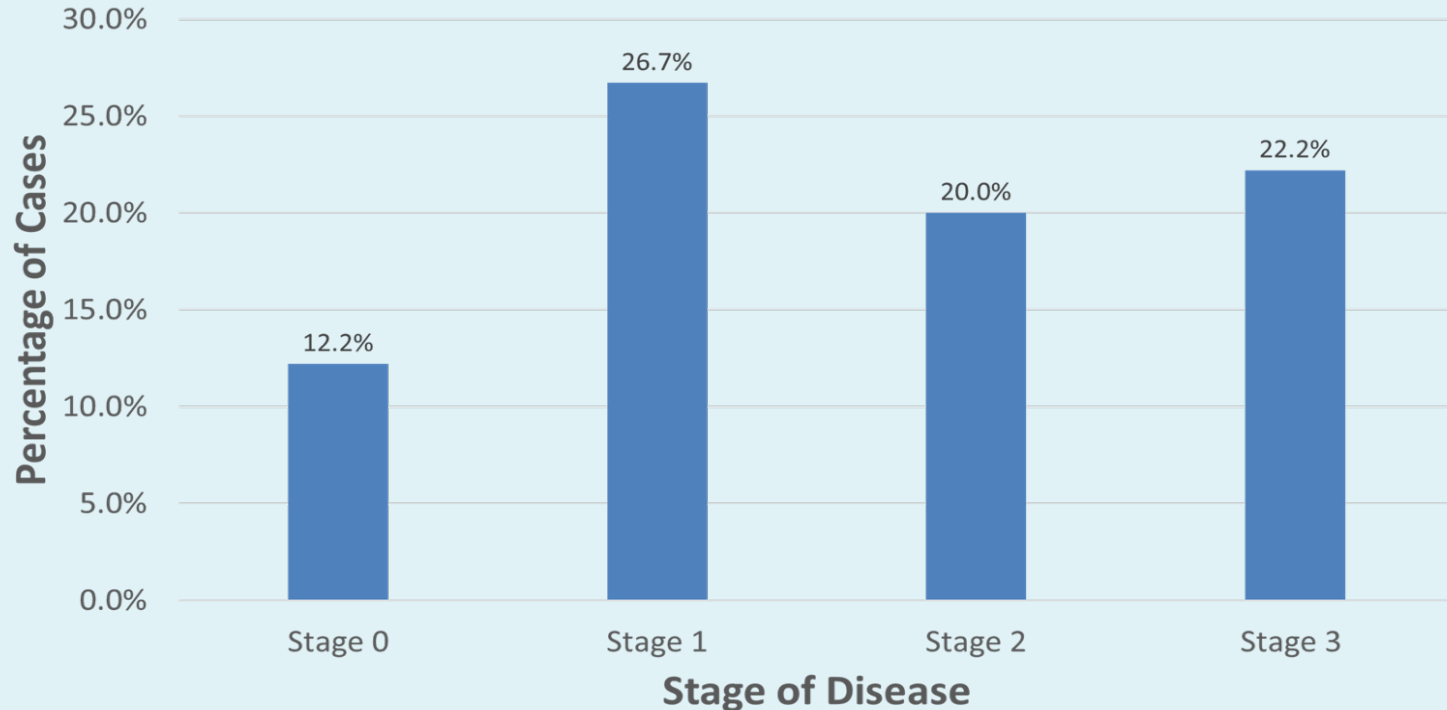
# Transmission Category of Newly Diagnosed HIV

## Newly Diagnosed HIV by Year of HIV Diagnosis and Transmission Category, 2020-2024 – West Virginia

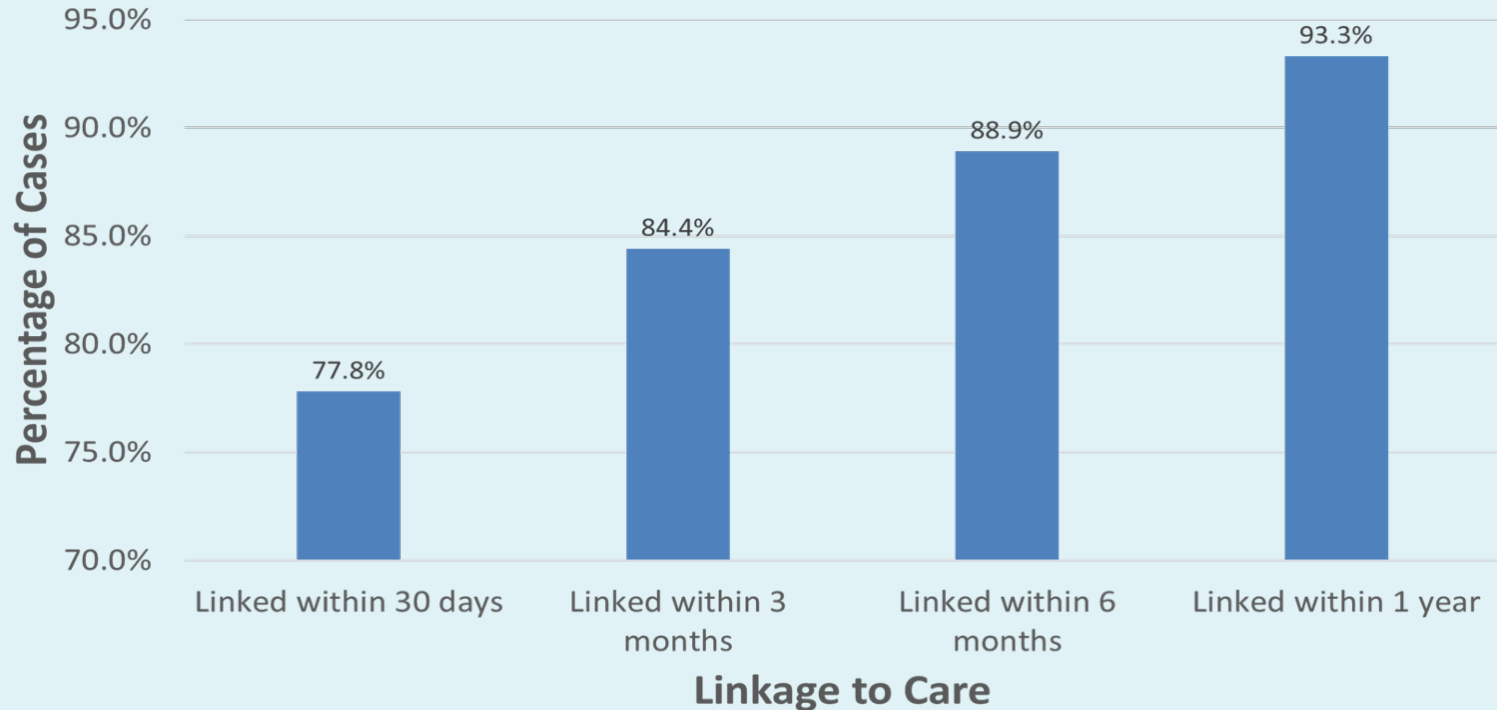


# Stage of Disease at Time of HIV Diagnosis

## Stage of Disease at Time of HIV Diagnosis, 2024 – West Virginia (N=90)

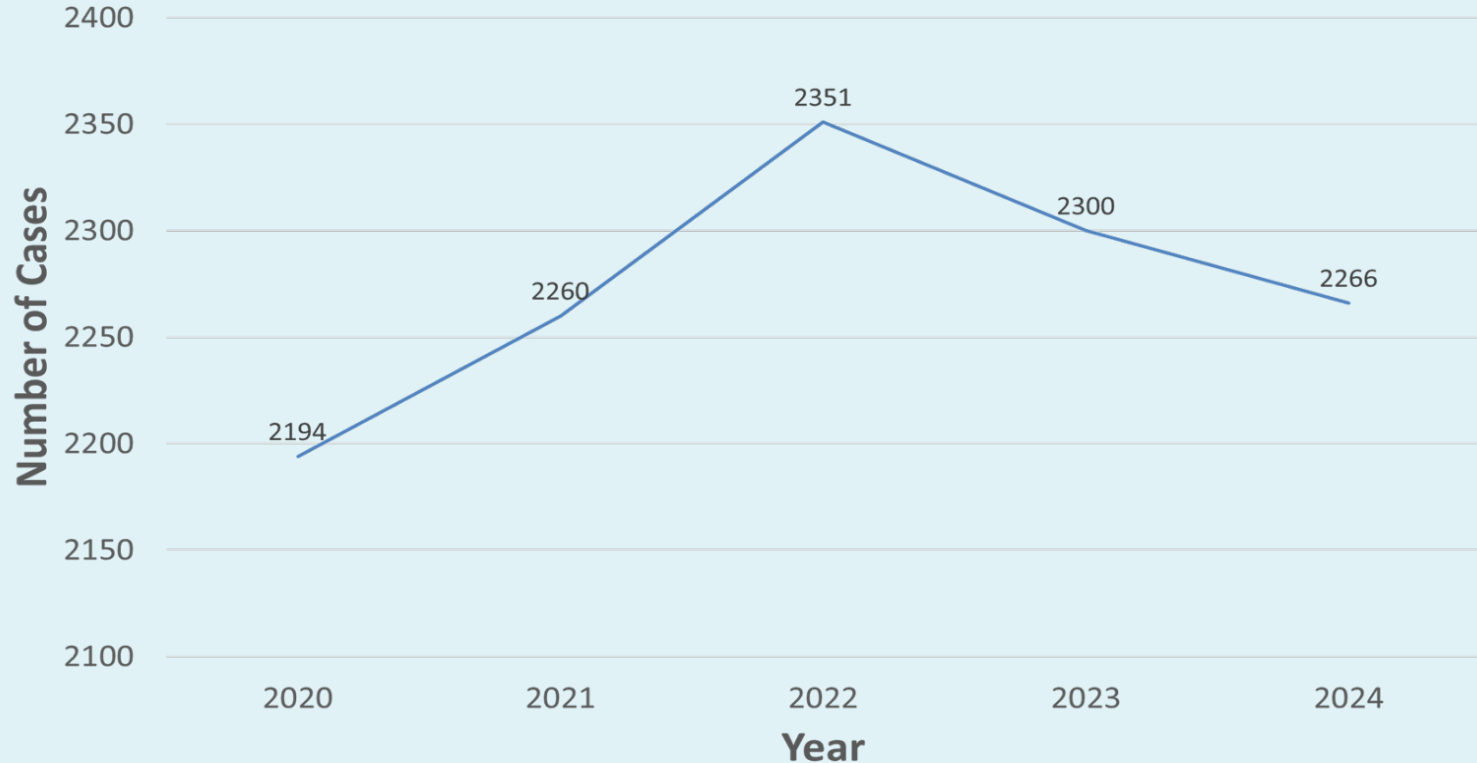


## Linkage of Newly Diagnosed HIV Infections to HIV Medical Care, 2024 – West Virginia

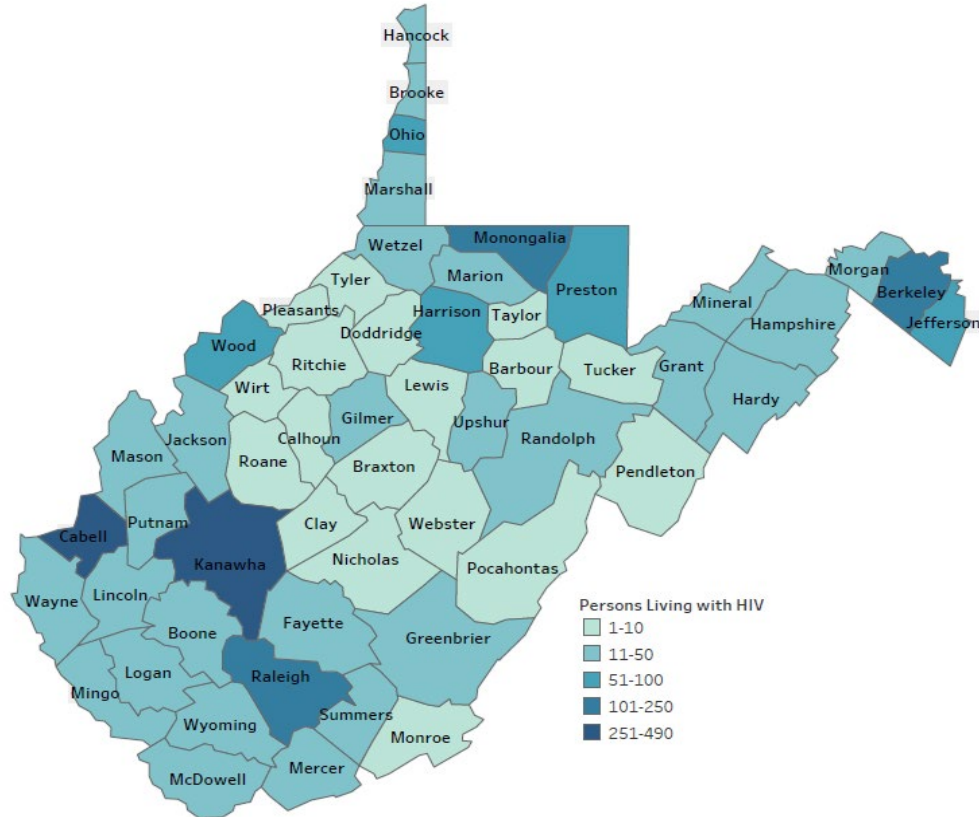


# Persons Living with HIV (PLWH) in West Virginia

## HIV Prevalence, 2020-2024 – West Virginia



# PLWH in West Virginia by County, 2024 (N=2,266)

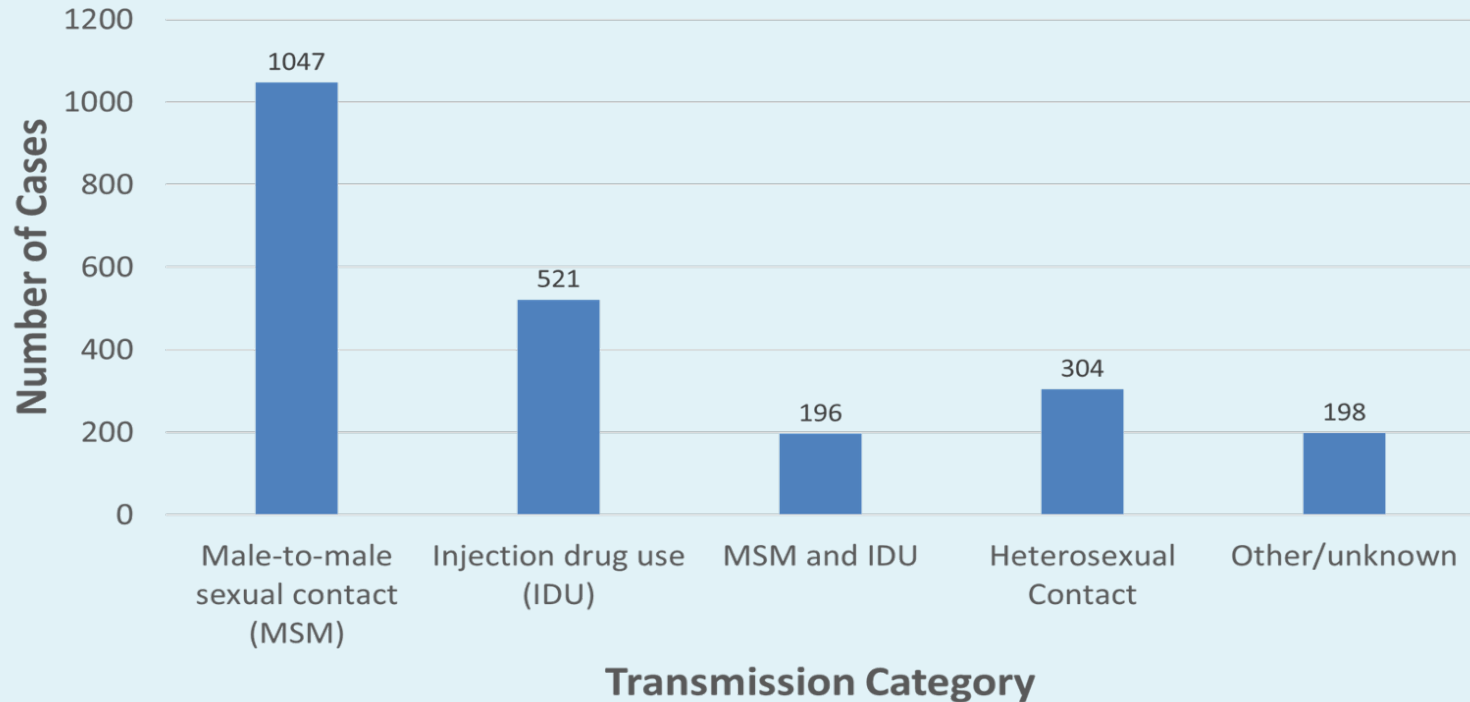


# Demographics of PLWH in West Virginia

- More males than females (76% male; 24% female)
- 71% report White as racial category
  - Black/African Americans disproportionately affected (15% versus 4% of population)
- Majority aged 45-54 (26%); More than 70% are over the age of 35
- Male to male sexual contact is the most common transmission category

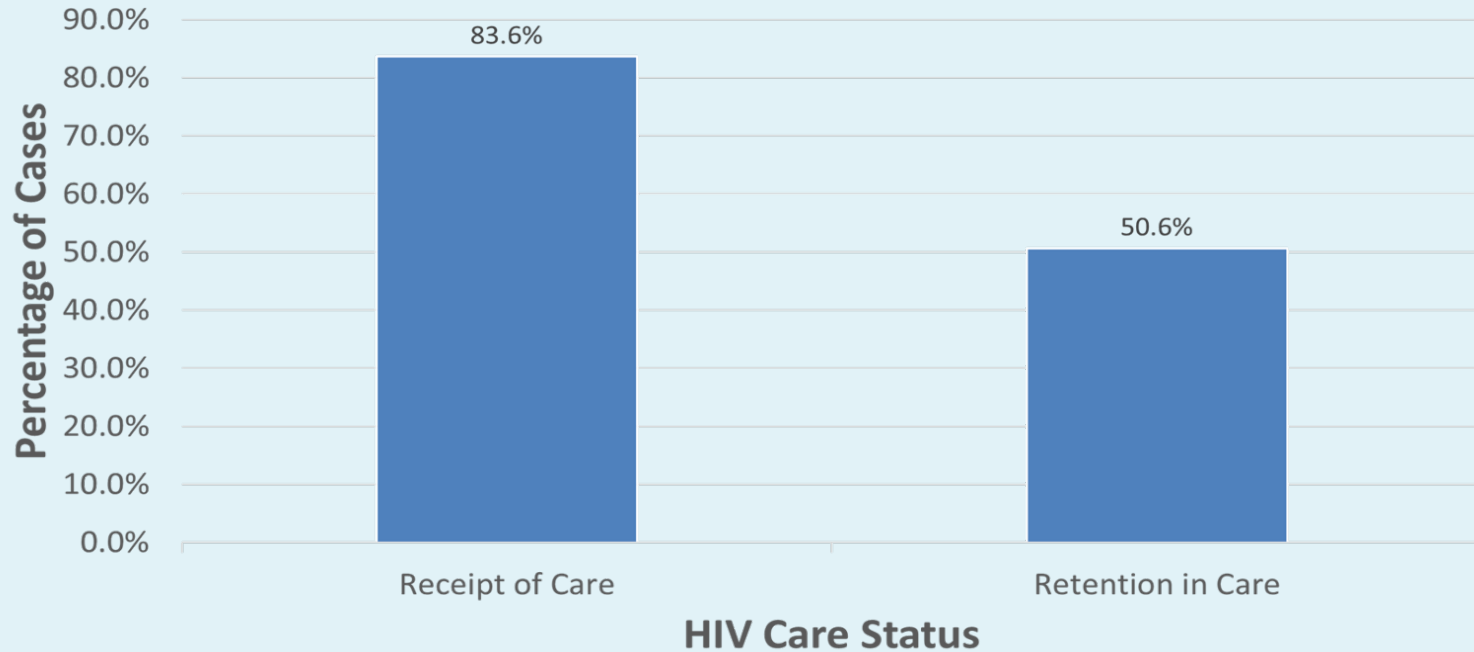
# Transmission Category of PLWH

## HIV Prevalence by Transmission Category, 2024 – West Virginia



# HIV Care Status of PLWH in West Virginia

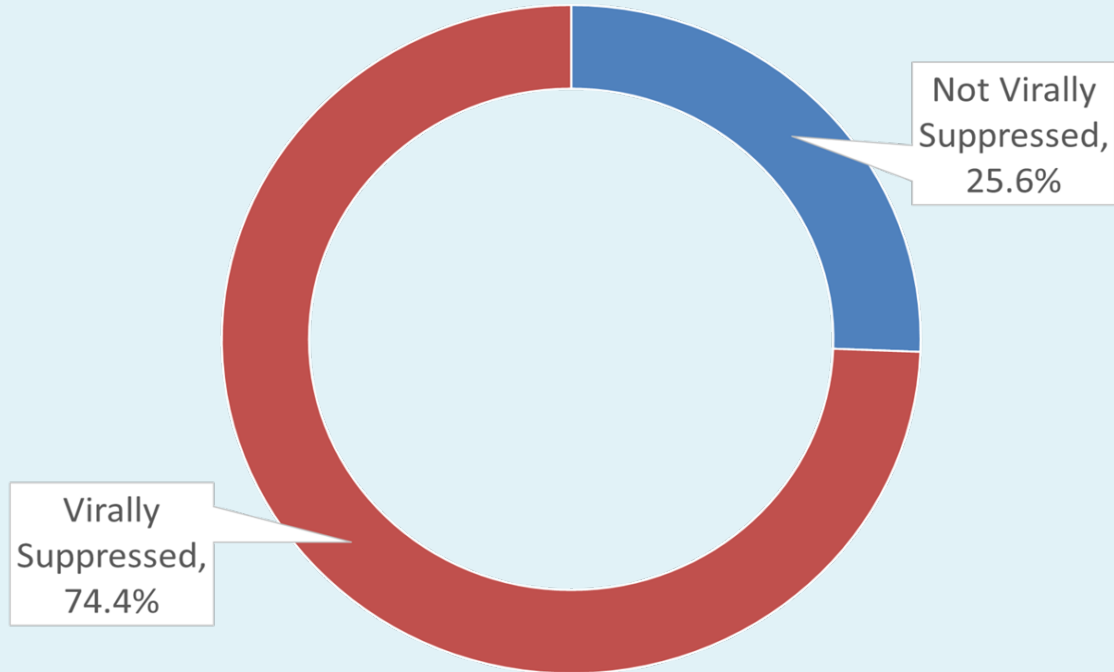
## HIV Prevalence by HIV Care Status, 2024 – West Virginia (N=2266)



\* Receipt of care was measured by documentation of  $\geq 1$  CD4 or VL test during the calendar year. Retention in care was measured by documentation of  $\geq 2$  CD4 or VL test at least 3 months ( $\leq 91$  days) apart in the calendar year.

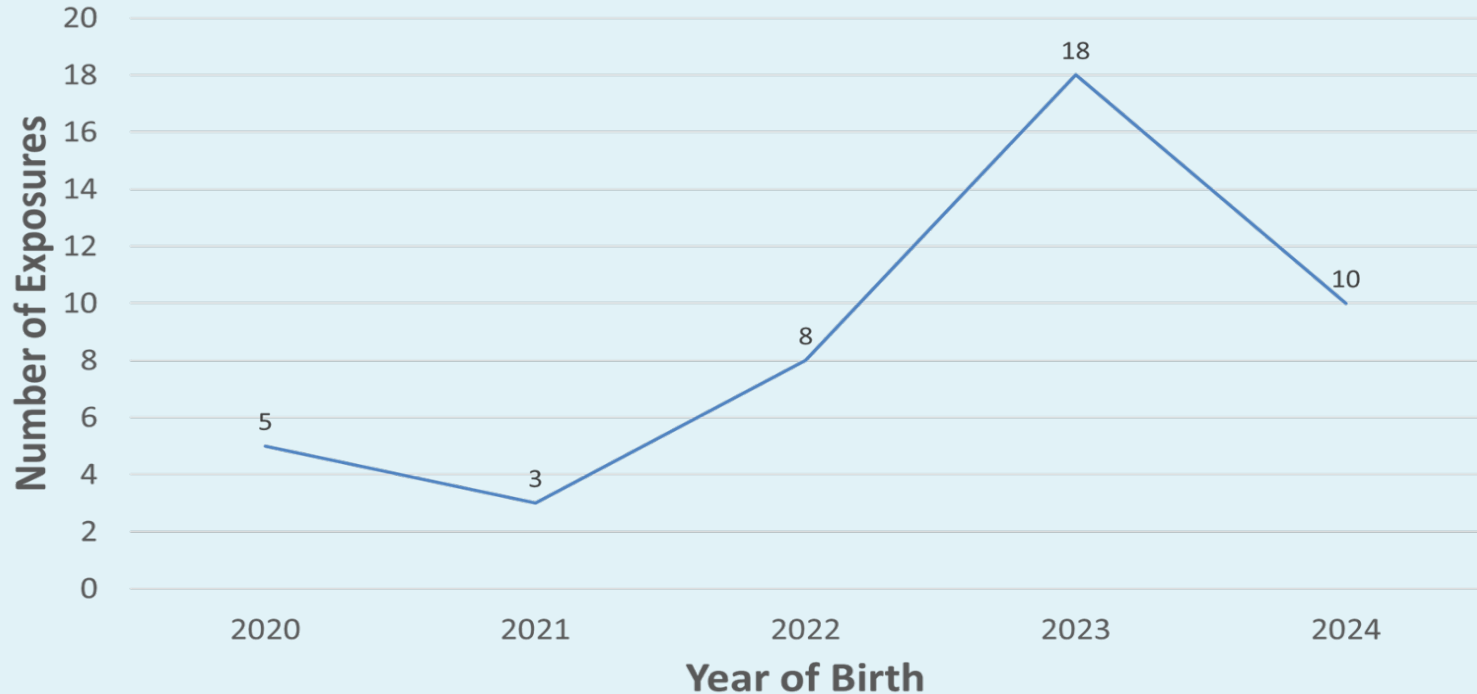
# HIV Viral Suppression of PLWH in West Virginia

## HIV Viral Suppression of PLWH, 2024 – West Virginia



# Perinatal HIV Exposures in West Virginia

## Number of Infants Born to an HIV Positive Mother, 2020-2024 – West Virginia



# Key Findings & Trends: The Trifecta in West Virginia

## Substance Use

- Persons who inject drugs are a population at risk for all three disease categories: HIV, Hepatitis B (HBV), and Hepatitis C (HCV), as well as Syphilis.
  - In 2024, substance use was reported in 72% of syphilis
  - Recreational drug use in 41.7% in Hep B and 46.3% for Hep C; IVDU in 38.3% in Hep B and 45.5% Hep C
  - Injection drug use was identified in 521 HIV cases
- Relatively new population for syphilis, known risk for HBV and HIV
- Justice-involved/incarcerated populations have unique challenges
- Points of contact are often peer recovery, homeless coalitions, and detox programs
- Overlapping issues with housing instability

# Key Findings & Trends: The Trifecta in West Virginia

## Incarceration

- Incarceration is a major risk factor:
  - 26.97% of syphilis cases for 2024
  - 33.1% of incarceration and 18.2% jail for Hepatitis B and C
- An overlap is also seen in incarcerated cases with co-infection:
  - 13% of all HIV-coinfected syphilis cases reported past-year incarceration
  - Among pregnant syphilis cases co-infected with HCV, 21.7% reported past-year incarceration

## Co-infections in Congenital Cases

- 42.9% of the syphilis congenital cases had past or present HCV infection.
- One case was human immunodeficiency virus (HIV) positive, hepatitis B virus (HBV) positive, had a history of or present hepatitis C virus (HCV) infection, polysubstance use, and IVDU risk.
- Co-infections with HIV, HBV, HCV and syphilis in pregnant women can significantly worsen clinical outcomes which include:
  - Increasing the risk of mother-to-child transmission.
  - Accelerating disease progression (higher risk of having cancers, etc).
  - Increasing the susceptibility to infections.
  - Low birth weight or preterm birth.
  - Stillbirth or miscarriage.
  - Congenital defects or death of the infant.
  - Prevention of perinatal/congenital infection requires early detection and treatment.

# Key Findings & Trends: The Trifecta in West Virginia

Location Most Common in 2024:

**Syphilis, Hepatitis, HIV all  
most common in Cabell Co.  
and Kanawha Co.**



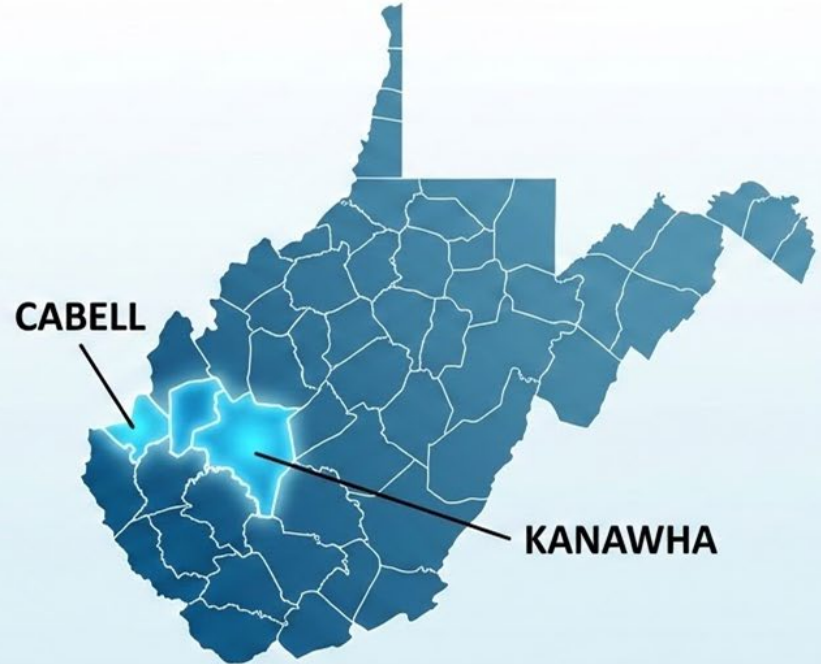
Syphilis



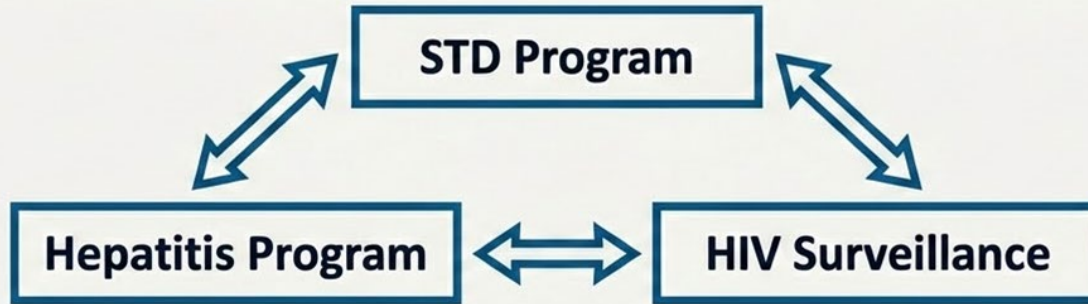
Hepatitis



HIV



# Cross-Collaboration & Integrated Prevention



**Joint Training & Education:**  
Shared workshops,  
Physician Pocket Guides,  
Behavioral Health Reporting  
Guide, Perinatal Serological  
Testing Recommendations.

**Integrated Testing, Treatment  
& Services:**  
Integrated clinics  
(STD/Hep/HIV), mobile units,  
point of care testing, Emergency  
Departments, support care  
management/linkage, Wexford  
Health incarceration testing  
contract

**Data Sharing &  
Analysis:** Common  
reporting platforms,  
sharing risk factor data,  
collaborative research  
(care cascades), infant  
morbidity and mortality  
review board

## Lessons Learned

- Integration improves patient outcomes and engagement.
- Shared resources lead to greater efficiency.
- Community partnerships are vital for outreach.

## Ongoing Challenges

- Stigma surrounding STD/Hep/HIV persists.
- Reaching rural & vulnerable populations is difficult.

## Opportunities for Enhancement & Impact

- **Routine data match to identify co-infections:**
  - Share risk factor data
  - Support care management/linkage
- **Integrated testing:**
  - Point of care testing
  - Emergency departments
  - Perinatal serological testing
- **Integrated education resources:**
  - Physician Pocket Guides
  - Behavioral Health Reporting Guide
- **Collaborative Research**
  - HIV and HCV Care Cascade

## Contact Information



### **Suzanne Wilson, MPH**

HIV Surveillance Program Director

350 Capitol Street, Charleston, WV 25301

Phone: 304-352-6255

Fax: 304-957-7753

Email: [suzanne.m.wilson@wv.gov](mailto:suzanne.m.wilson@wv.gov)

### **Bianca Huff**

STD Program Director

350 Capitol Street, Charleston, WV 25301

Phone: 304-352-6234

Fax: 304-558-6478

Email: [bianca.m.huff@wv.gov](mailto:bianca.m.huff@wv.gov)

### **Mikaela Earl**

Viral Hepatitis Program Director

350 Capitol Street, Charleston, WV 25301

Phone: 304-352-6280

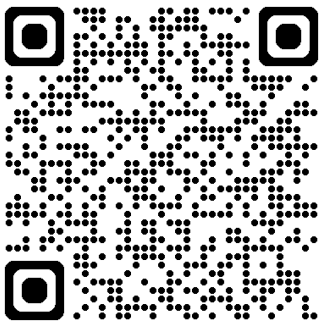
Fax: 304-558-8736

Email: [mikaela.h.earl@wv.gov](mailto:mikaela.h.earl@wv.gov)

Thursday, May 14



## Tackling the Trifecta: State Approaches to Addressing Co-Occurring Substance Use Disorders, HIV, and Hepatitis C



### PRESENTERS:

**Mikaela Earl**, PharmD, BS, West Virginia Bureau for Public Health

**Bianca Huff**, BS, West Virginia Bureau for Public Health

**Suzanne Wilson**, MPH, West Virginia Bureau for Public Health

