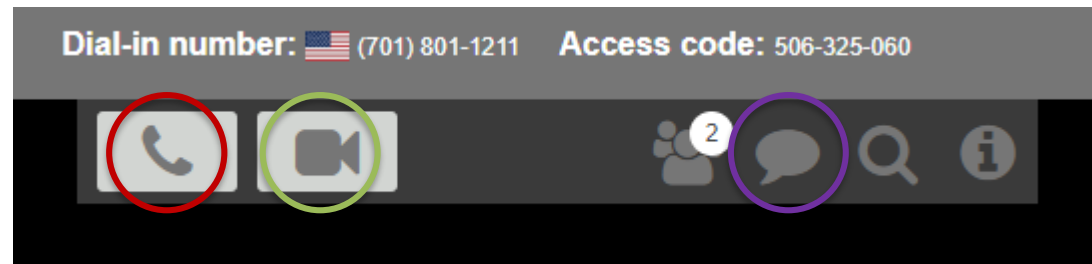


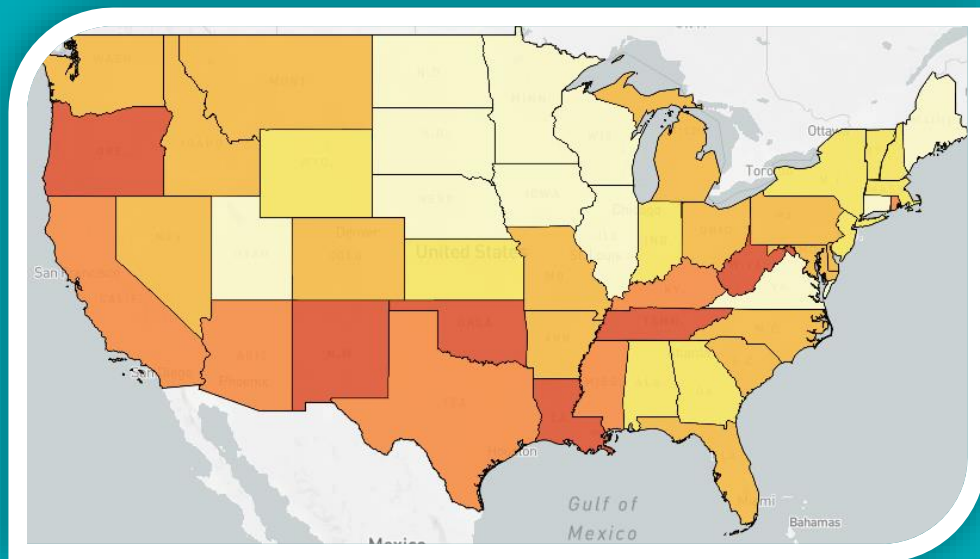
Thank you for joining

HepVu's 2019 Data Launch

The webinar will begin at 2 pm ET/ 11 am PT



- *Join the call via phone or computer by clicking the phone button*
- *We will not be using webcams for this presentation, turn off your webcam with the camera button*
- *To submit questions, click the chat icon and type your question before hitting the "enter" key*



HepVu Data Launch:

**New Hepatitis C Prevalence
Estimates and the Impact of the
Opioid Epidemic**

January 16, 2019

Overview

I. Introduction: Hepatitis C in America

Heather Bradley, Ph.D.

Assistant Professor of Epidemiology, Georgia State University, and Project Director, HepVu

II. Hepatitis C Estimates: Data Methods and Findings

Eli Rosenberg, Ph.D.

Associate Professor of Epidemiology and Biostatistics, University at Albany School of Public Health, State University of New York

III. HepVu Overview and Deeper Look at Opioids

Heather Bradley

Visit HepVu.org's News & Updates to download today's presentation

Introduction: HepVu and Hepatitis C in America

Heather Bradley, Ph.D.

Assistant Professor of Epidemiology, Georgia State University

Project Director, HepVu

Overview

- **HepVu is an interactive online resource** that visualizes the Hepatitis C epidemic in the U.S.
- Established in 2017 to **present the first standardized state-level estimates** of people living with Hepatitis C
- HepVu is a **Powered By AIDSVu project** presented by the Rollins School of Public Health at Emory University in partnership with Gilead Sciences

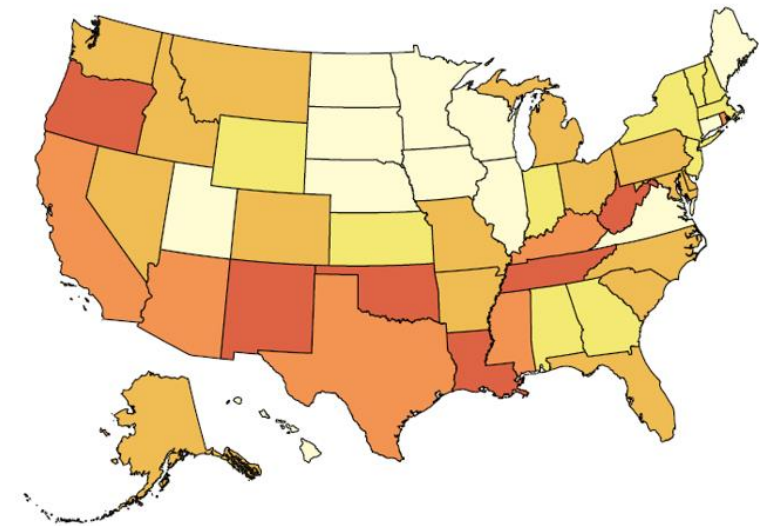


AIDSVu and HepVu's Mission

Making data widely available, easily accessible and locally relevant to inform public health decision-making



JAMA Network Open Public Health				Hepatitis C Virus Infection in US States and the District of Columbia, 2013 to 2016	
Table 2. Estimated Total and Prevalence of Persons With Current HCV Infection, US States and District of Columbia, 2013 to 2016					
State	2016 Adult Population, No.*	HCV RNA Positive (95% CI), No.*	% (95% CI)†	HCV RNA Positive, No.‡	Total Adult Population 2016, No. (4)
Alabama	5 071 100	26 100 (21 100–30 600)	0.51 (0.43–0.61)	30 700	5 730 700 (0.82)
Alaska	742 100	4700 (2900–5700)	0.66 (0.51–0.85)	5200	840 000 (0.61)
Arizona	7 020 100	55 300 (40 000–64 100)	1.10 (0.96–1.28)	61 500	7 090 100 (0.21)
Arkansas	2 215 100	19 100 (16 800–21 800)	0.86 (0.76–0.99)	21 800	2 238 700 (0.97)
California	39 180 100	288 300 (233 600–343 800)	0.76 (0.67–0.86)	318 900	39 544 700 (1.08)
Colorado	6 057 100	32 500 (20 000–48 400)	0.80 (0.69–0.93)	36 300	6 108 500 (0.88)
Connecticut	2 771 800	16 500 (14 200–19 700)	0.60 (0.51–0.71)	18 300	2 812 700 (0.65)
Delaware	712 400	5000 (4000–6000)	0.70 (0.61–0.80)	6000	730 500 (0.82)
District of Columbia	537 500	12 400 (10 500–14 800)	2.32 (1.95–2.76)	12 700	542 400 (2.54)
Florida	15 620 600	133 200 (117 700–152 100)	0.85 (0.75–0.97)	151 000	15 860 200 (0.95)
Georgia	7 460 300	46 400 (41 300–52 300)	0.62 (0.55–0.70)	58 800	7 597 700 (0.78)
Hawaii	1 064 200	5700 (4700–7000)	0.53 (0.45–0.64)	6700	1 077 400 (0.60)
Idaho	1 187 300	9900 (8400–11 800)	0.84 (0.71–0.99)	11 200	1 203 300 (0.93)
Illinois	12 700 700	47 700 (42 200–54 300)	0.49 (0.44–0.54)	54 900	12 754 600 (0.56)
Indiana	6 110 800	34 400 (29 900–40 700)	0.56 (0.49–0.63)	40 300	6 150 100 (0.66)
Iowa	3 330 300	11 100 (9 500–13 100)	0.47 (0.40–0.54)	12 600	3 379 300 (0.53)
Kansas	2 137 000	12 600 (10 900–14 800)	0.59 (0.51–0.69)	14 400	2 173 600 (0.67)
Kentucky	3 331 300	36 600 (32 600–40 800)	1.14 (1.01–1.29)	42 500	3 390 700 (1.25)
Louisiana	5 445 000	44 900 (40 000–50 400)	1.30 (1.16–1.46)	50 000	5 518 100 (1.42)
Maine	1 058 600	6500 (5400–7800)	0.61 (0.51–0.74)	7000	1 069 400 (0.65)
Maryland	5 647 800	37 300 (32 700–43 300)	0.66 (0.57–0.76)	40 600	5 692 900 (0.71)
Massachusetts	5 263 400	35 800 (30 600–42 500)	0.68 (0.58–0.80)	38 100	5 346 600 (0.71)
Michigan	10 074 800	62 800 (55 800–70 900)	0.63 (0.56–0.70)	69 100	10 143 900 (0.68)
Minnesota	4 111 000	22 300 (19 400–26 000)	0.54 (0.47–0.63)	24 300	4 139 300 (0.58)
Mississippi	2 260 100	19 600 (17 100–22 200)	0.89 (0.79–1.01)	22 300	2 311 700 (1.02)
Missouri	6 176 700	35 200 (31 100–40 200)	0.57 (0.48–0.68)	40 300	6 227 000 (0.65)
Montana	1 061 100	6800 (5700–8000)	0.64 (0.55–0.75)	7400	1 075 500 (0.69)
Nebraska	1 911 400	8900 (8000–10 000)	0.46 (0.40–0.53)	9700	1 921 100 (0.50)
Nevada	2 148 500	19 300 (16 800–22 400)	0.90 (0.78–1.04)	21 900	2 170 400 (1.00)
New Hampshire	1 044 300	7200 (5900–8900)	0.69 (0.57–0.85)	7700	1 058 000 (0.73)
New Jersey	8 910 300	43 400 (37 900–50 300)	0.49 (0.43–0.56)	47 200	8 957 500 (0.53)
New Mexico	1 957 100	25 000 (21 600–29 100)	1.28 (1.10–1.49)	26 700	1 979 800 (1.36)
New York	19 280 100	107 100 (94 900–121 800)	0.56 (0.49–0.64)	116 000	19 396 100 (0.59)
North Carolina	10 440 100	60 200 (53 600–68 100)	0.58 (0.51–0.66)	66 400	10 506 500 (0.63)
North Dakota	759 100	2200 (1800–2600)	0.29 (0.24–0.35)	2400	761 500 (0.31)
Ohio	11 787 100	61 500 (54 100–69 700)	0.52 (0.46–0.59)	68 600	11 855 700 (0.58)
Oklahoma	2 062 800	48 900 (42 700–56 500)	2.37 (2.08–2.70)	53 300	2 116 100 (2.52)
Oregon	3 986 200	40 700 (35 400–47 000)	1.02 (0.89–1.16)	44 700	4 030 900 (1.12)
Pennsylvania	12 700 700	64 500 (56 900–73 100)	0.51 (0.45–0.58)	70 000	12 770 700 (0.55)
Rhode Island	1 061 100	6800 (5700–8000)	0.64 (0.55–0.75)	7400	1 075 500 (0.69)
South Carolina	5 180 100	31 900 (28 400–36 100)	0.62 (0.55–0.69)	35 600	5 215 700 (0.68)
South Dakota	828 400	3000 (2500–3700)	0.36 (0.30–0.43)	3700	832 100 (0.44)
Tennessee	6 972 200	65 500 (58 200–73 800)	0.94 (0.83–1.06)	71 000	6 993 200 (1.02)
Texas	28 100 100	176 000 (157 000–200 100)	0.63 (0.56–0.70)	202 000	28 302 100 (0.72)
Utah	2 024 600	11 000 (9500–13 100)	0.54 (0.46–0.63)	12 300	2 036 900 (0.60)
Vermont	609 100	3500 (2900–4200)	0.57 (0.48–0.68)	3700	612 800 (0.61)
Virginia	8 540 100	43 900 (38 400–50 300)	0.51 (0.45–0.58)	47 200	8 587 300 (0.55)
Washington	7 412 700	50 000 (43 100–58 900)	0.67 (0.60–0.75)	54 200	7 466 900 (0.73)
West Virginia	1 839 300	19 100 (16 700–21 800)	1.04 (0.91–1.19)	20 600	1 859 900 (1.11)

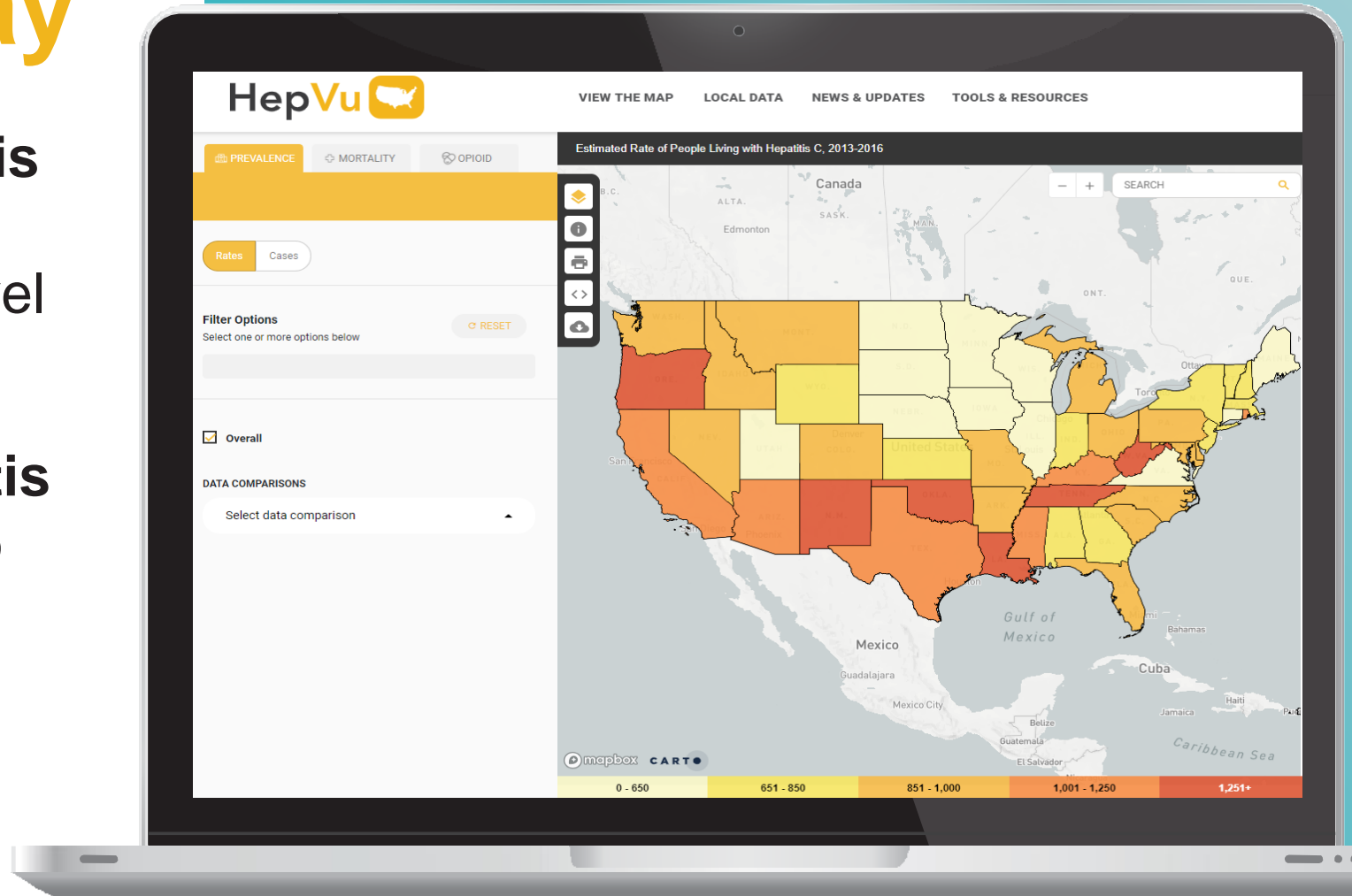


HepVu Advisors

- **Co-Chair: Patrick Sullivan**, Ph.D., DVM, Professor, Department of Epidemiology, Emory University, Rollins School of Public Health, and Principal Scientist, AIDS-Vu and HepVu
- **Co-Chair: Ron Valdiserri**, M.D., MPH, Senior Research Associate and Distinguished Scholar, Johns Hopkins University, Bloomberg School of Public Health, Former Deputy Assistant Secretary for Health, Infectious Diseases, U.S. Department of Health and Human Services
- **HepVu Working Group Advisors:**
 - amfAR
 - CDC
 - Hepatitis B Foundation
 - Howard University Hospital
 - Kaiser Family Foundation
 - Massachusetts Department of Health
 - MedStar Health Research Institute
 - NASTAD
 - National Viral Hepatitis Roundtable
 - NIDA
 - Philadelphia Health Department
 - UAB Emergency Medicine Department
 - UCSD

New Data Launched Today

- Recently published **Hepatitis C prevalence estimates** (2013-2016) at the state-level
- **Intersection of the Hepatitis C and opioid epidemics** to advance awareness, programs, and policies to address the syndemic



The Hepatitis C Epidemic

- **Hepatitis C is a leading cause of liver-related morbidity and mortality in America**
 - Hepatitis C-related deaths were greater than deaths from 60 other infectious diseases combined in 2013
- **An estimated 2.3 million people were living with Hepatitis C between 2013 and 2016**
 - Three-fourths were Baby Boomers, or those born between 1945 and 1965
- **Hepatitis C and other infectious diseases are often-overlooked consequences of America's opioid crisis**
 - Hepatitis C infections have nearly tripled in recent years, with the largest increases among persons under 40, largely due to injection drug use

Eliminating Hepatitis C

- The public health surveillance system for Hepatitis C is **not as robust** as it is for other infectious diseases, such as HIV
- **Accurate estimates of the burden of Hepatitis C infection in each state are essential** to inform policy, programmatic, and resource planning for elimination strategies
- HepVu is a powerful tool to communicate the Hepatitis C epidemic in a clear and compelling way to **inform researchers and public health decision-makers' prevention and care efforts**



Estimation of State-level Hepatitis C Prevalence

Eli Rosenberg, Ph.D.

Associate Professor of Epidemiology and Biostatistics,
University at Albany School of Public Health, State University of New York

Outline

- Background on HCV prevalence estimation
- Overview of methodology
- Results
- Limitations and strengths
- Conclusions

Background on Hepatitis C Prevalence Estimation

- State-level burden of Hepatitis C infection informs policies, resource allocation, advocacy, and elimination efforts
- Prevalence of current infection (RNA)
 - Measured in nationally representative residential survey:
National Health and Nutrition Examination Survey (NHANES)
 - In most states, it is challenging to measure directly from diagnoses reported to surveillance
- Statistical models allow combining national NHANES Hepatitis C prevalence with local information to yield state-level results
 - National Vital Statistics System (NVSS) mortality
 - American Community Survey (ACS) population sizes

Original Investigation | Public Health

JAMA Network Open

December 21, 2018

Prevalence of Hepatitis C Virus Infection in US States and the District of Columbia, 2013 to 2016

Eli S. Rosenberg, PhD¹; Elizabeth M. Rosenthal, MPH¹; Eric W. Hall, MPH²; [et al](#)

» [Author Affiliations](#) | [Article Information](#)

JAMA Netw Open. 2018;1(8):e186371. doi:10.1001/jamanetworkopen.2018.6371

Key Points

Question During 2013 to 2016, what proportion of adults were living with hepatitis C virus (HCV) infection in each US state?

Findings In this survey study, US national HCV prevalence during 2013 to 2016 was 0.93% and varied by jurisdiction between 0.45% and 2.34%. Three of the 10 states with the highest prevalence and 5 of the 9 states with the highest number of HCV infections were in the Appalachian region.

Overview of Methodology

Method builds on previous approaches for national and state estimates

Clinical Infectious Diseases

MAJOR ARTICLE



Estimation of State-Level Prevalence of Hepatitis C Virus Infection, US States and District of Columbia, 2010

Eli S. Rosenberg,¹ Eric W. Hall,¹ Patrick S. Sullivan,¹ Travis H. Sanchez,¹ Kimberly A. Workowski,² John W. Ward,³ and Deborah Holtzman³

¹Department of Epidemiology, Emory University Rollins School of Public Health; ²Division of Infectious Diseases, Department of Medicine, Emory University School of Medicine; and ³Division of Viral Hepatitis, National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention, Centers for Disease Control and Prevention, Atlanta, Georgia

HEPATOLOGY

HEPATOLOGY, VOL. 0, NO. 0, 2018



Estimating Prevalence of Hepatitis C Virus Infection in the United States, 2013-2016

Megan G. Hofmeister,^{1,2} Elizabeth M. Rosenthal,³ Laurie K. Barker,¹ Eli S. Rosenberg,³ Meredith A. Barranco,³ Eric W. Hall,⁴ Brian R. Edlin,⁵ Jonathan Mermin,⁵ John W. Ward,^{1,6} and A. Blythe Ryerson¹

Hall et al. *BMC Infectious Diseases* (2018) 18:224
<https://doi.org/10.1186/s12879-018-3133-6>

BMC Infectious Diseases

RESEARCH ARTICLE

Open Access

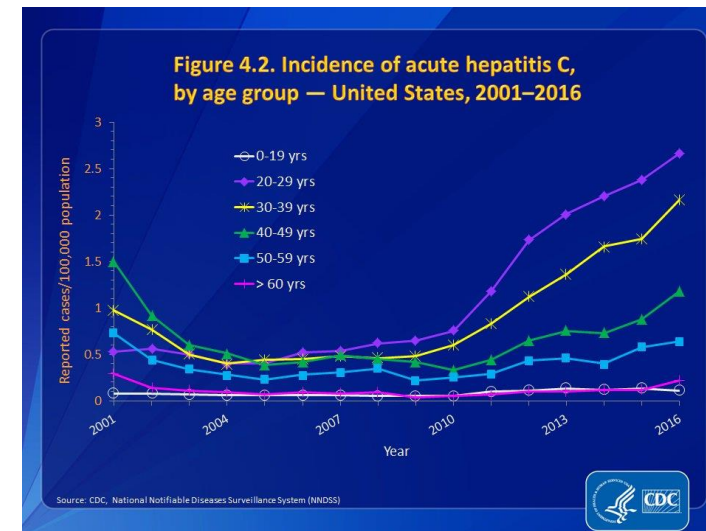
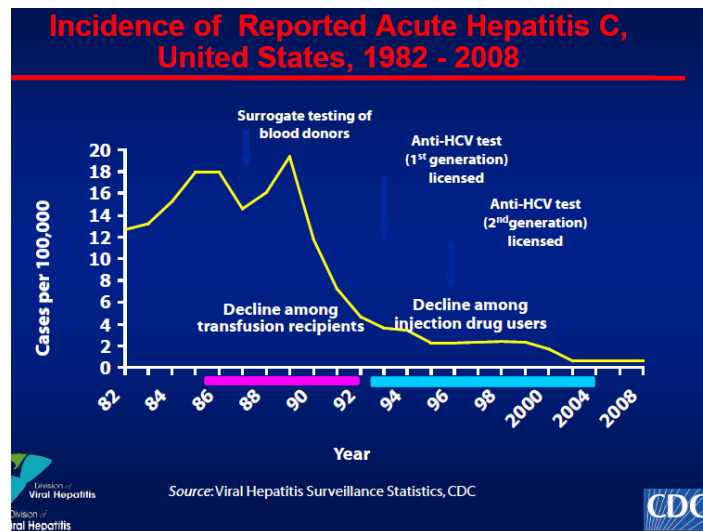


Estimates of state-level chronic hepatitis C virus infection, stratified by race and sex, United States, 2010

Eric W. Hall^{1*}, Eli S. Rosenberg² and Patrick S. Sullivan¹

Shifting Epidemiology of Hepatitis C

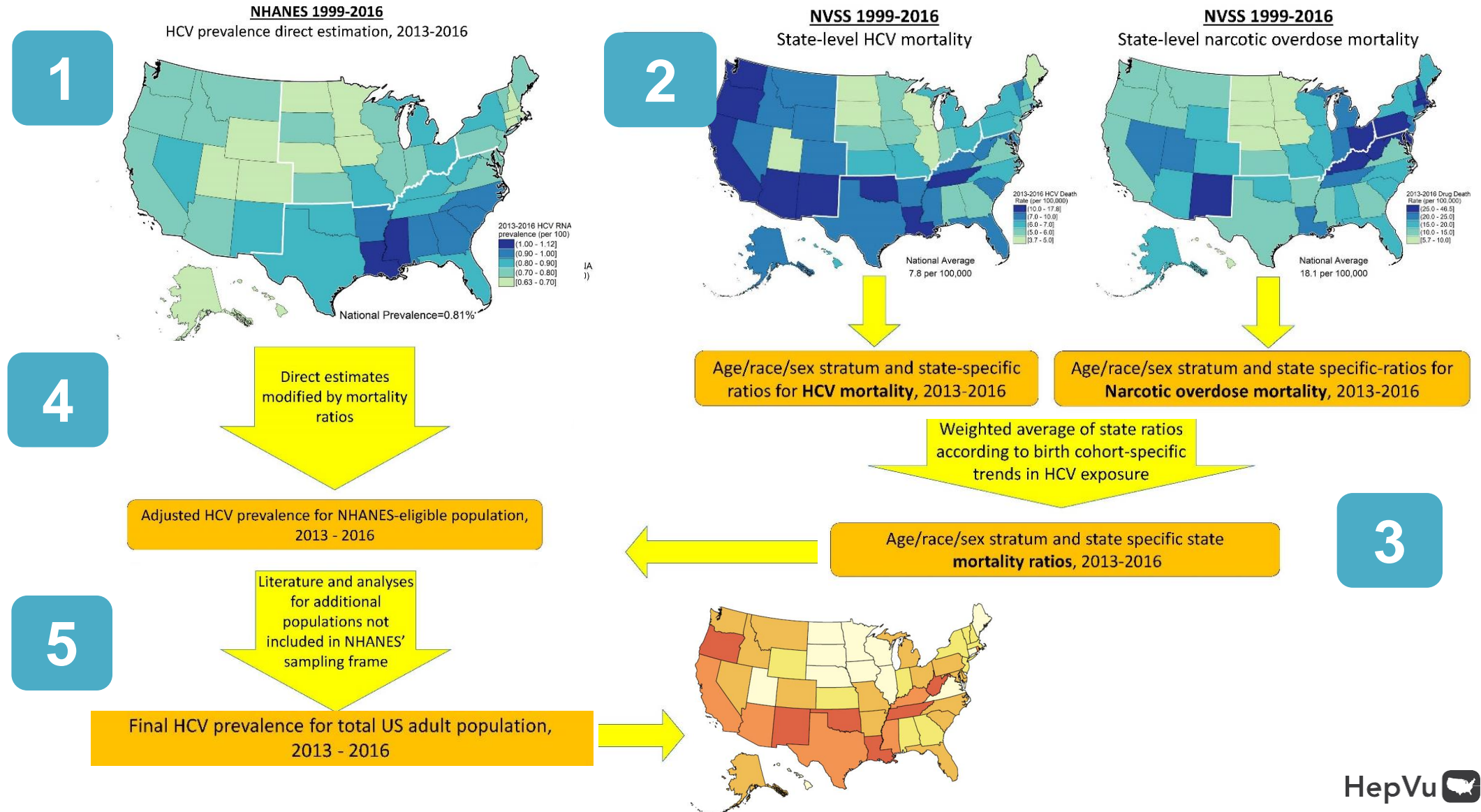
- Rapid rise in incidence in younger PWID due to opioid epidemic



- Mortality in high prevalence group: 1945-1965 birth cohort
- Scale-up of cure via DAAs



Overview of Analytic Approach

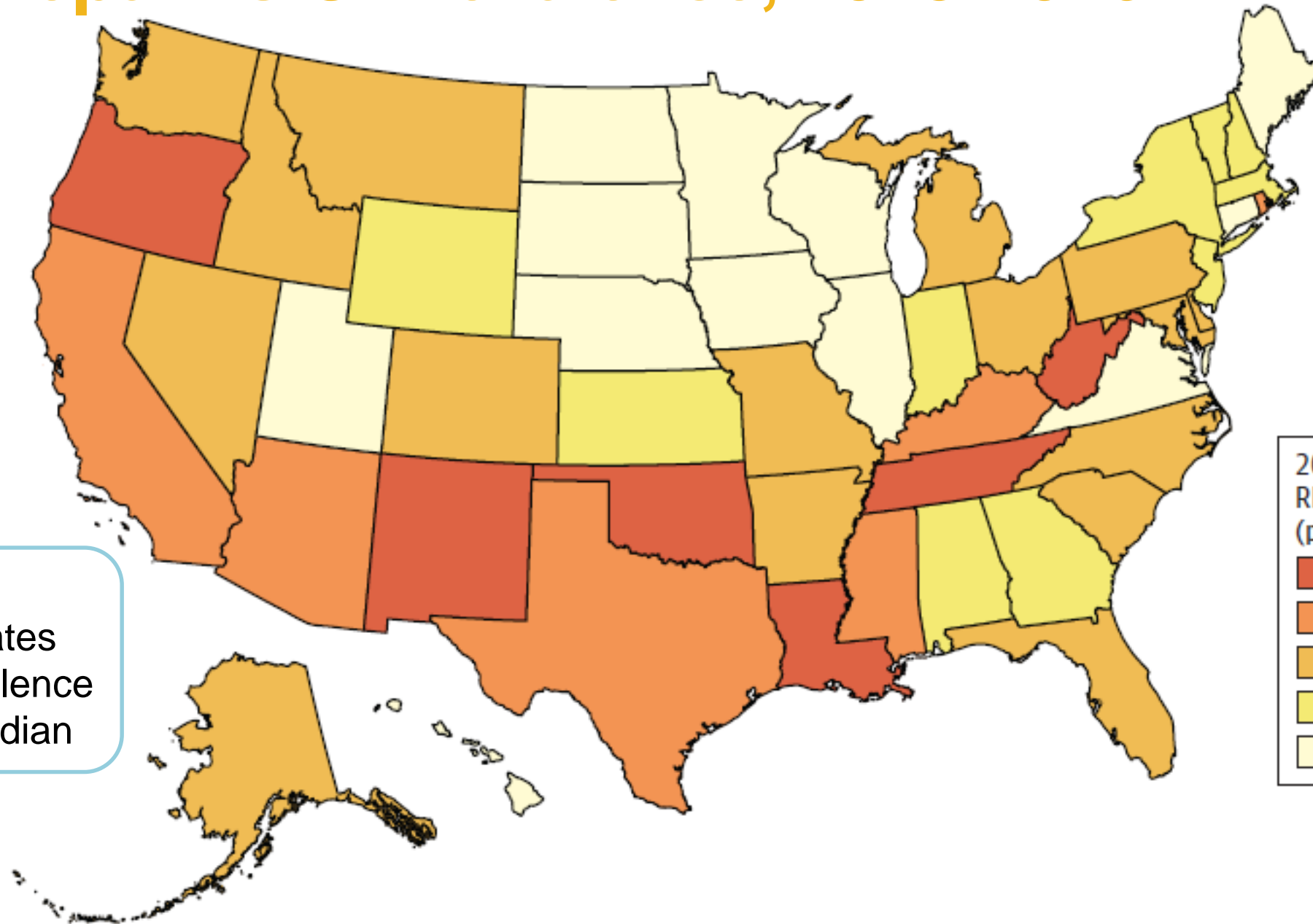


Data Sources for Steps 1- 4

Data source	Years	Purpose	Number of individuals represented	Number of cases
National Health and Nutrition Examination Survey (NHANES)	1999-2016	National HCV RNA prevalence overall and by strata of sex, race/ethnicity, birth cohort and poverty. Trends in anti-HCV inform analysis weights.	47,387 with non-missing HCV RNA test results 47,590 with non-missing anti-HCV test results	575 with positive HCV RNA test 874 with positive anti-HCV test
U.S. Census intercensal data	1999-2016	Population structure for modeling HCV- and overdose-related mortality rates.	4,109,869,228 person-years age 18 or above	n/a
U.S. Census American Community Survey (ACS)	2012-2016	Noninstitutionalized United States population structure for final estimates.	12,023,450 observations of noninstitutionalized persons aged 18 or above	n/a
National Vital Statistics System (NVSS)	1999-2016	Distribution of Hepatitis C-related mortality, signaling underlying HCV prevalence, to inform distribution of older HCV infections.	44,071,310 decedents age 18 or above who resided in the 50 states or Washington DC	261,858 with HCV as underlying or multiple cause of death
National Vital Statistics System (NVSS)	1999-2016	Distribution of narcotic overdose mortality, signaling underlying injection patterns, to inform distribution of newer HCV infections.	44,071,310 decedents age 18 or above who resided in the 50 states or Washington DC	541,130 with unintentional or undetermined cause narcotic or unknown drug as cause of death

State-Level Results

Hepatitis C Prevalence, 2013-2016



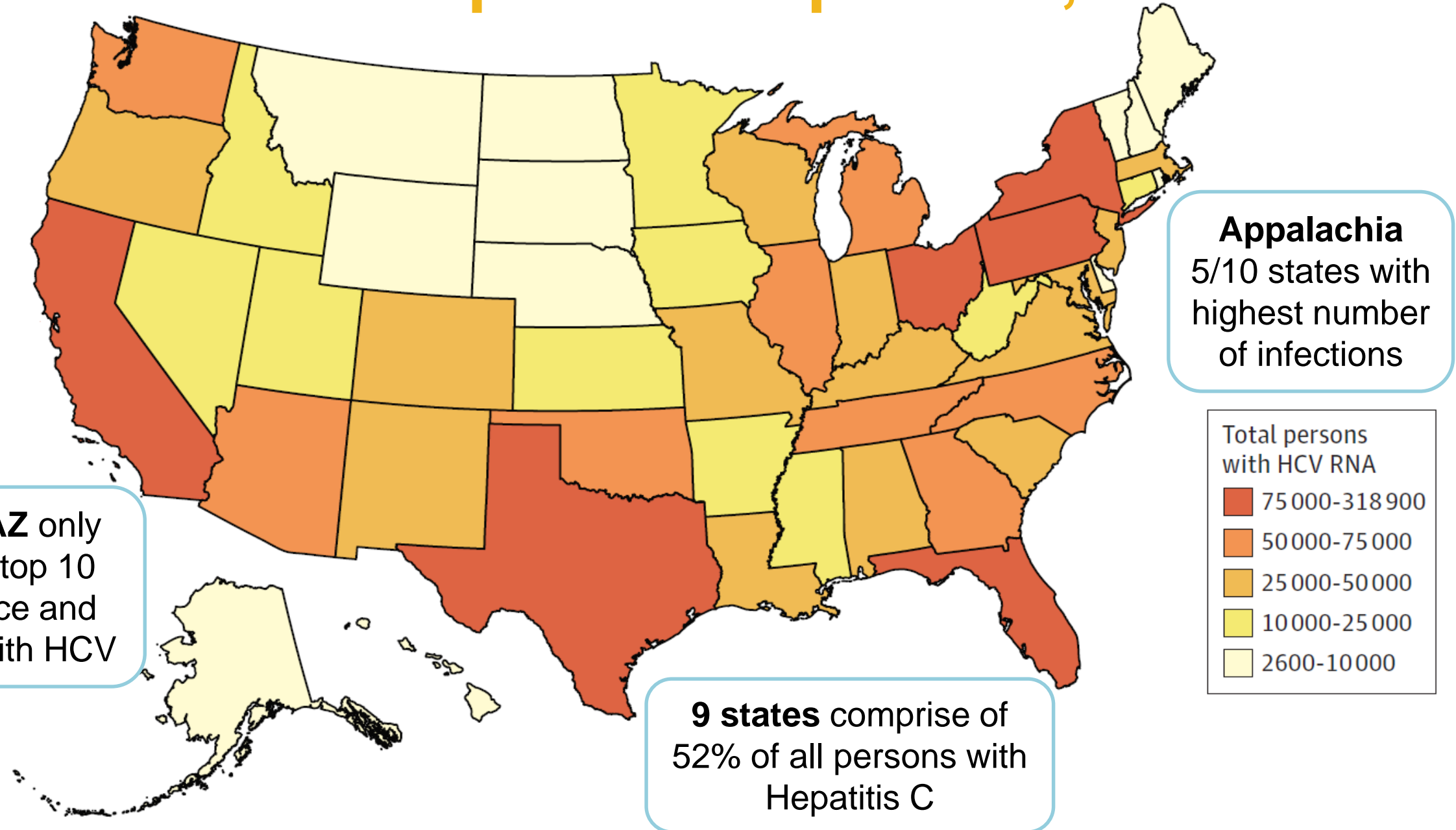
Appalachia
3/10 highest
prevalence
states

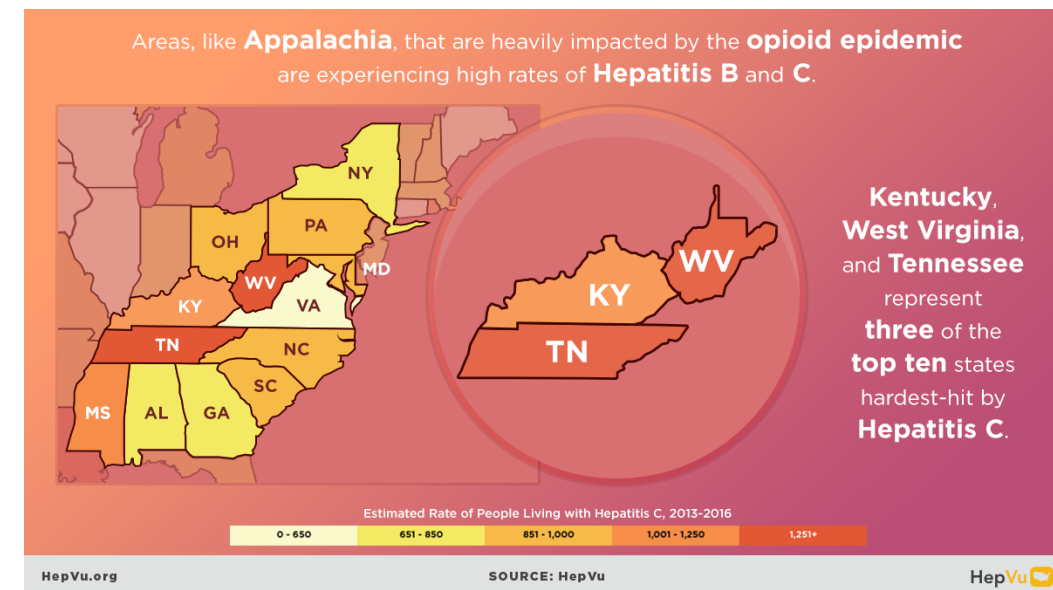
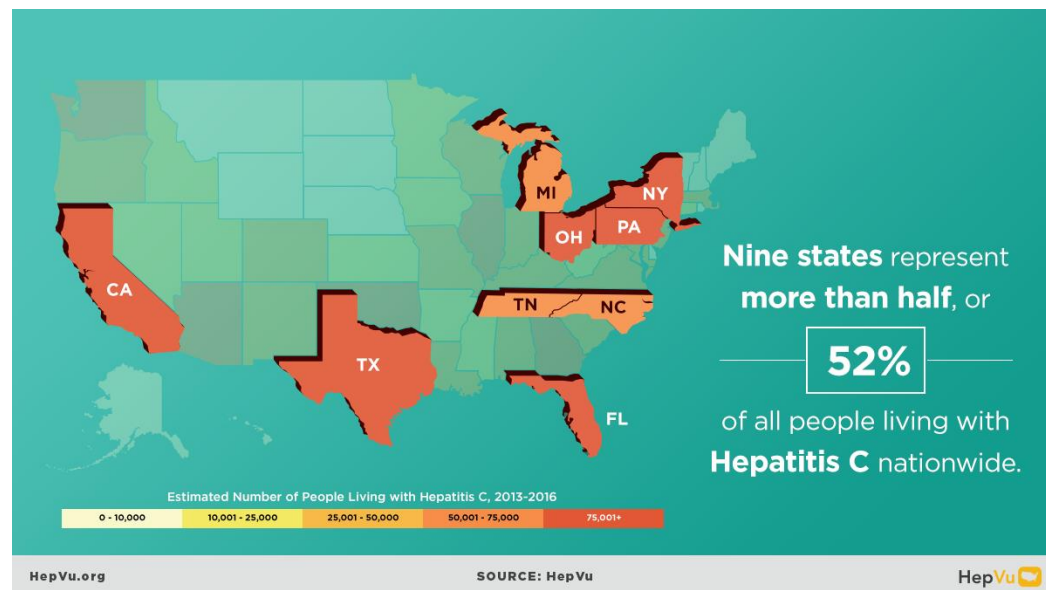
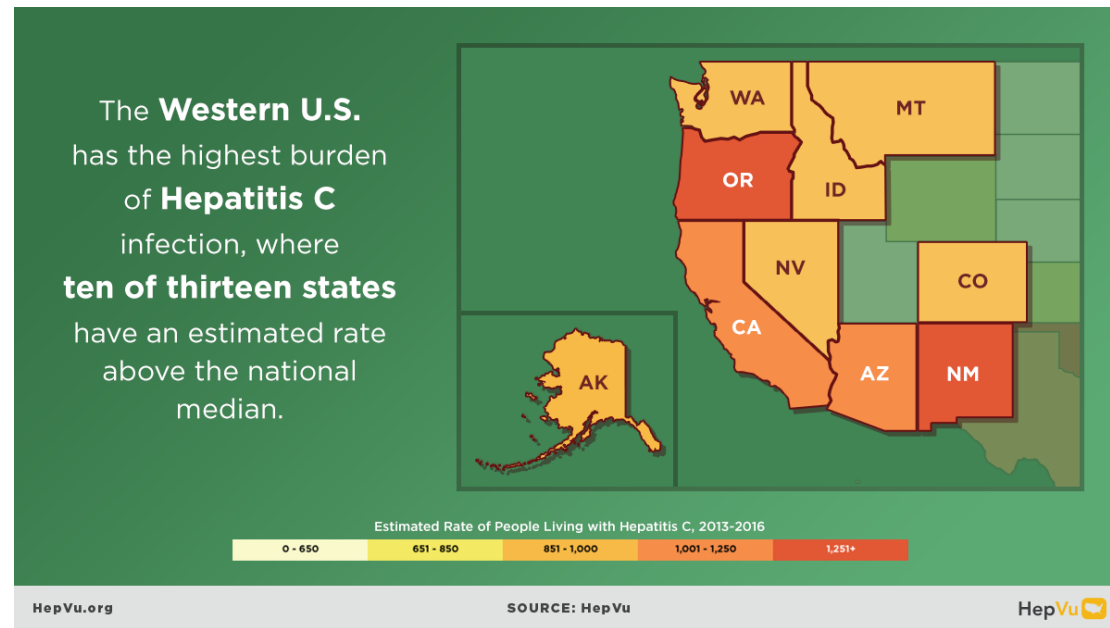
West
10/13 states
have prevalence
above median

2013-2016 HCV
RNA prevalence
(per 100 population)

- 1.25-2.34
- 1.00-1.25
- 0.85-1.00
- 0.65-0.85
- 0.45-0.65

Number of People with Hepatitis C, 2013-2016





Limitations and Strengths

- **Limitations to consider**
 - NHANES representation of Hepatitis C increases among PWID
 - Hepatitis C- and narcotic-related mortality are incomplete proxies for underlying Hepatitis C infection
 - Estimates represent average during 2013-2016
 - Period of rising incidence
 - Likely increasing >2016
- **Strengths of approach**
 - Synthesis of large national datasets, with local information
 - Few model assumptions
 - Allows apples-to-apples comparisons between states

Differences From Some Jurisdictions' Data

- Prevalence estimates may differ from some states' own internal estimates
 - Common approach: make adjustments to go from diagnosed cases to prevalent infections
 - Different data sources
 - Different methods, models, and assumptions
 - Differences in time periods described
- Best estimates from national prevalence surveillance and vital statistics data
 - State-specific methodologies not replicable in most jurisdictions with different or no case surveillance. Different assumptions required per jurisdiction
 - Previous 2010 estimates closely mirrored local estimates in most states
- **Primary objective:** Standardized approach to allow state-to-state comparisons
 - Some jurisdictions may have additional data to inform HCV epidemic estimates, which are valuable and should be taken into consideration for local decision-making

Conclusions

- National surveys, in conjunction with local mortality data that capture multiple aspects of Hepatitis C epidemics, enable systematic estimation of state-level Hepatitis C prevalence
- Highest rates frequently in states:
 - With history of increased levels of injection drug use and chronic Hepatitis C infection
 - That are deeply affected by opioid crisis
- **Estimates can benchmark epidemic and guide prevention, diagnosis, and treatment efforts**

HepVu Overview and Deeper Look at Opioids

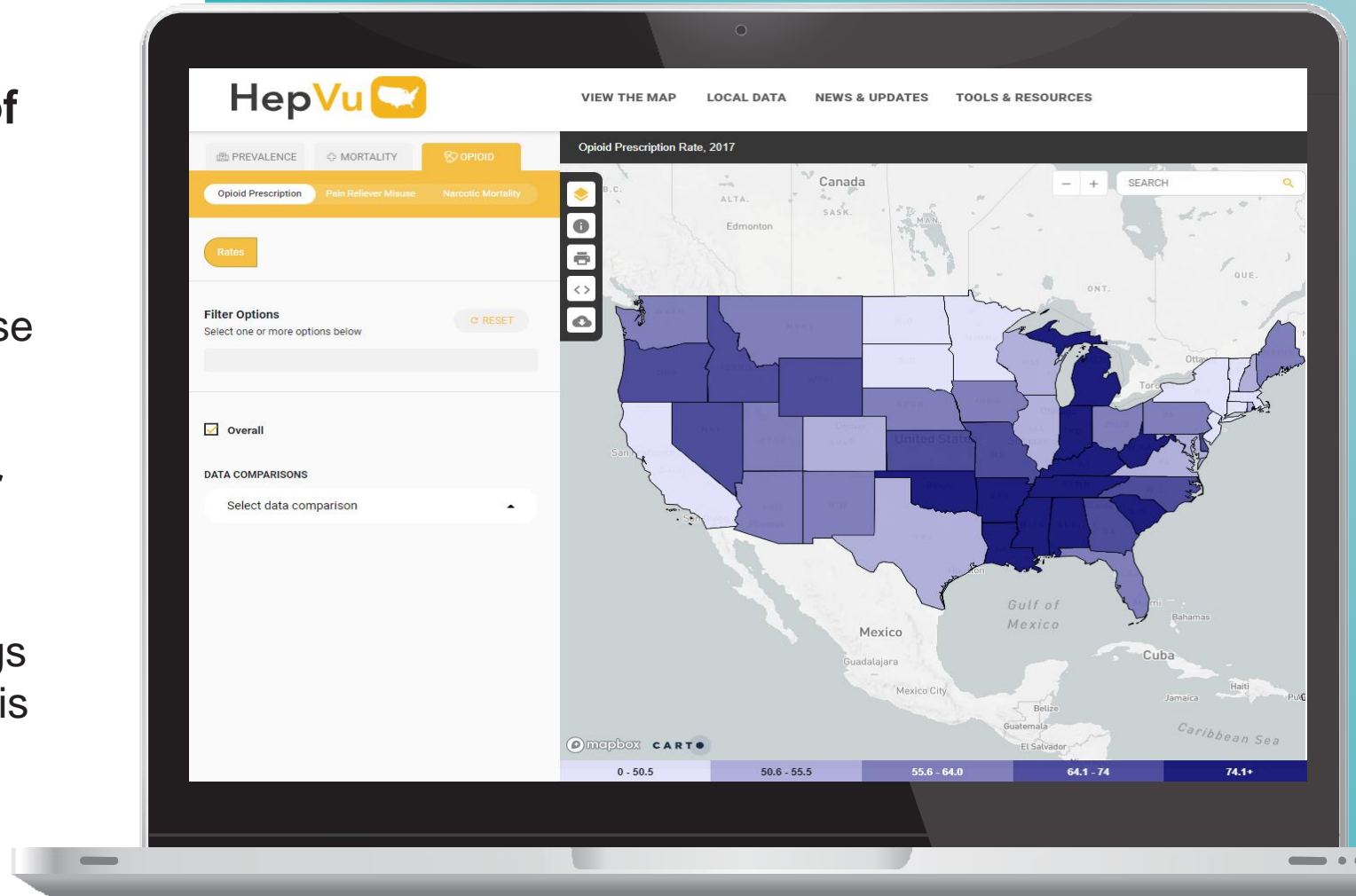
Heather Bradley, Ph.D.

Assistant Professor of Epidemiology, Georgia State University

Project Director, HepVu

Focus on Opioid Syndemic

- **New focus on the intersection of the hepatitis and opioid epidemics** to inform public health decision-making and raise greater awareness about the infectious disease consequences of the opioid epidemic
- **Maps, infographics, and Deeper Look page illustrate how opioid misuse** – and the sharing of needles or other equipment used to inject drugs – are driving new infections of Hepatitis C and other blood-borne viruses



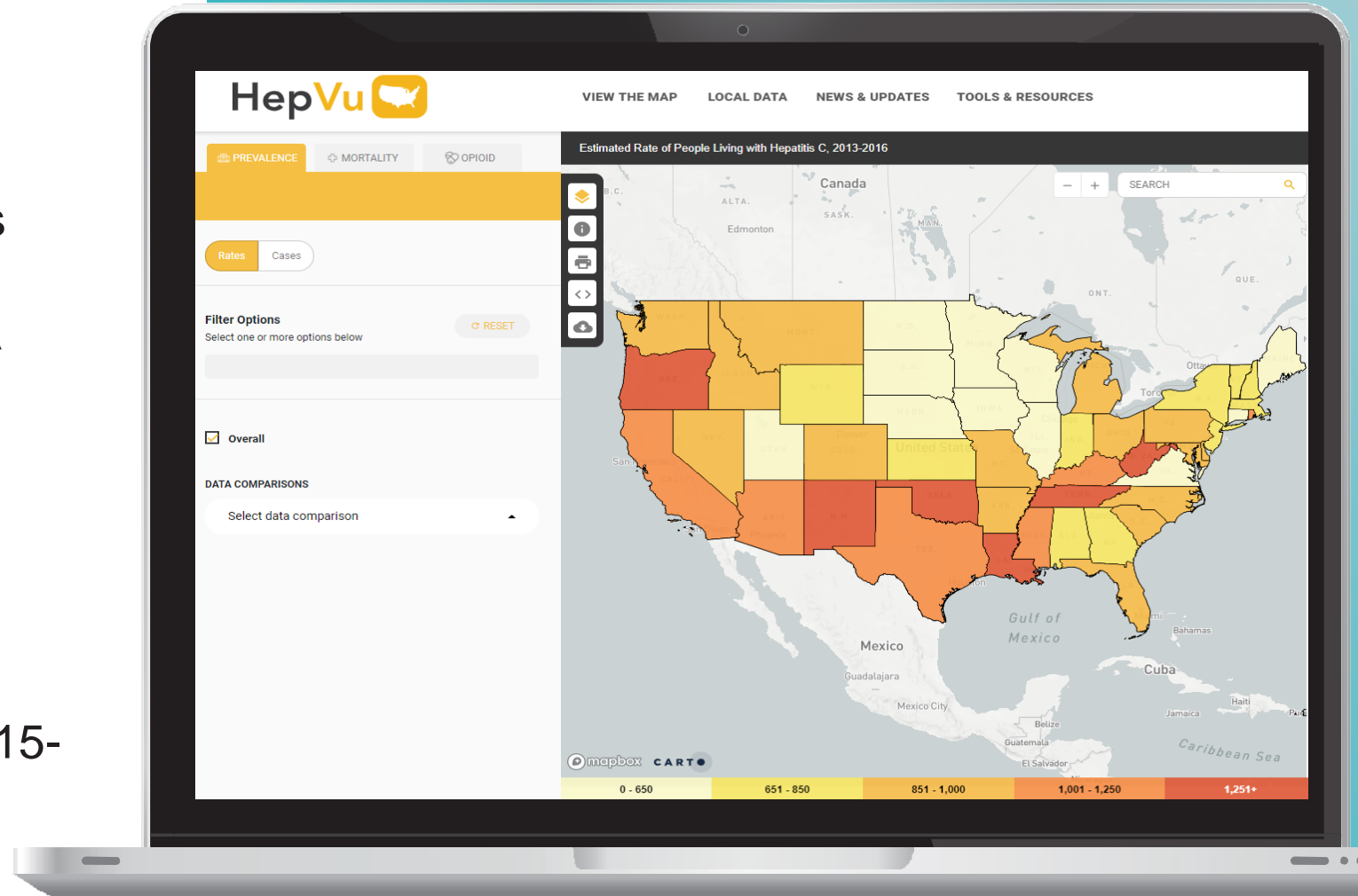
New Interactive Maps

View data at the state level, including:

- Hepatitis C prevalence estimates (2013-2016)
- Hepatitis C-related mortality data (2016)

Opioid Maps

- Opioid prescription rate (2017)
- Narcotic overdose mortality rate (2013-2016)
- Pain reliever misuse percent (2015-2016)



Deeper Look: Opioids

Deeper Look: Opioids

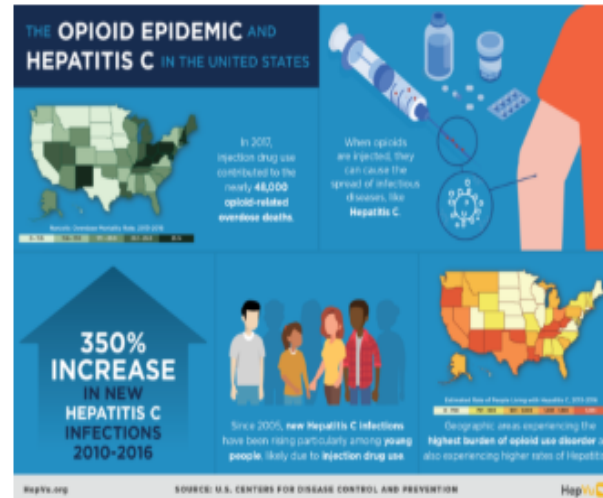
The opioid crisis is one of the greatest public health challenges facing the U.S., causing an unprecedented surge in drug overdose deaths, and fueling the rapid rise in new Hepatitis C infections from injection drug use in communities across the country.

As opioid abuse rates have skyrocketed, new Hepatitis C infections have also increased. Data on HepVu show that an estimated 2.3 million Americans were living with Hepatitis C between 2013 and 2016. Though the majority, or roughly three-fourths, of all infections were among Baby Boomers (those born between 1945 and 1965), there has been a spike in new Hepatitis C infections among younger Americans.

The number of new Hepatitis C infections [more than tripled](#) from 2010 to 2016, largely reflecting infections due to the rise in injection drug use. This has created a syndemic, in which the opioid and Hepatitis C epidemics are linked – with the burden of Hepatitis C being directly exacerbated by injection drug use.

The Opioid Epidemic

In 2017, the U.S. Department of Health and Human Services (HHS) declared a public health state of emergency due to the opioid epidemic. Opioids are highly addictive and [include](#) prescription pain relievers, synthetic compounds such as fentanyl, and illegal drugs such as heroin. From 2002 to 2017, the number of deaths due to opioid abuse have [more than quadrupled](#). The opioid epidemic's growth even contributed to a decrease in [annual U.S. life expectancy](#), which declined to 78.6 years in 2016 primarily due to increases in suicides and opioid-related overdose deaths.

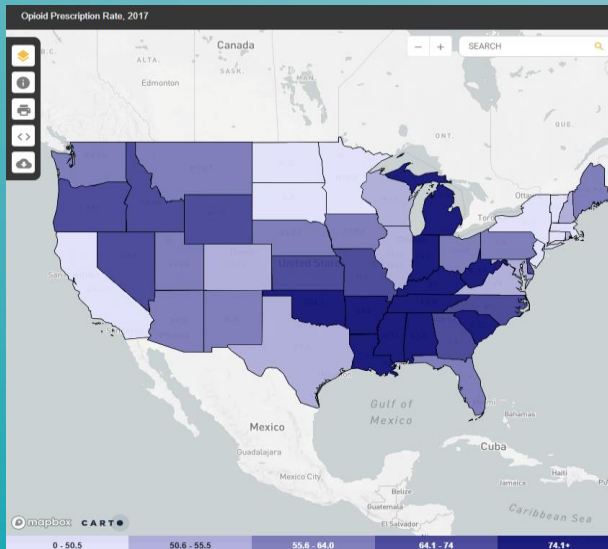


SHARE    

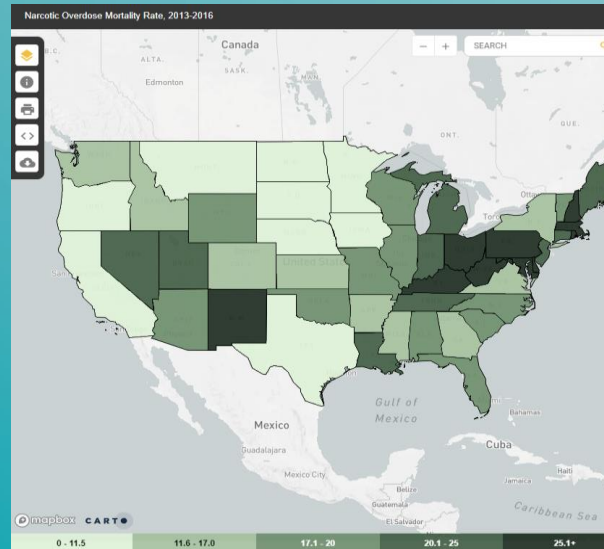
- **Deeper Look: Opioids** page presents an in-depth look at the opioid epidemic's impact on Hepatitis C in the U.S.
- Page includes resources, shareable infographics, related blogs, and a graphic illustrating the syndemic between Hepatitis C and injection drug use as a result of the opioid epidemic

Opioid Maps

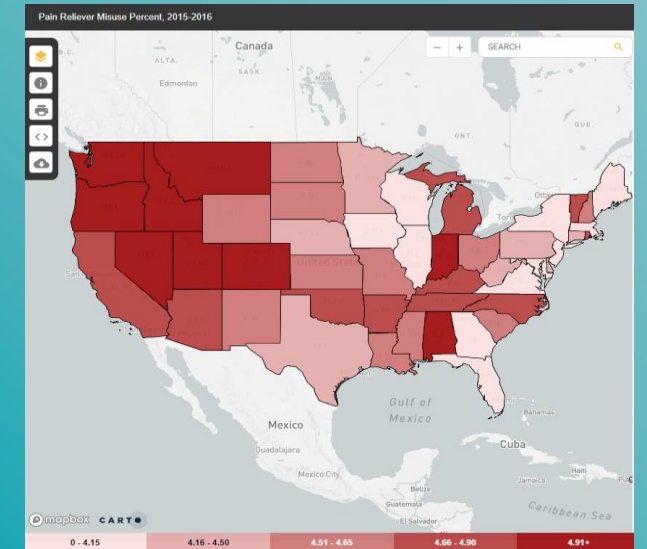
Opioid Prescription Rate



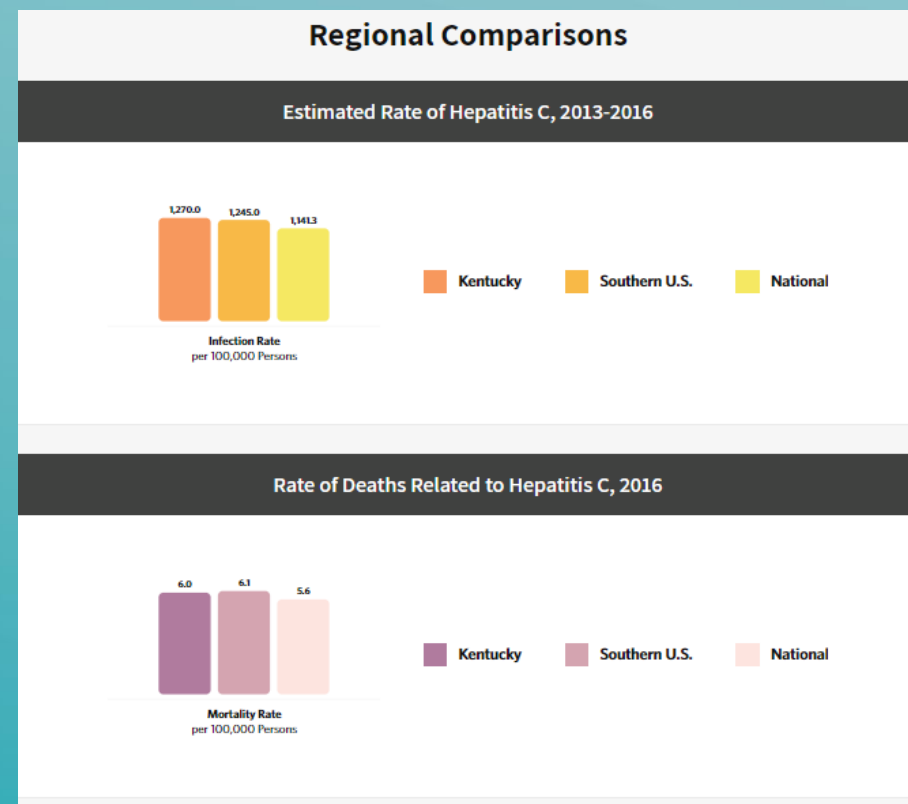
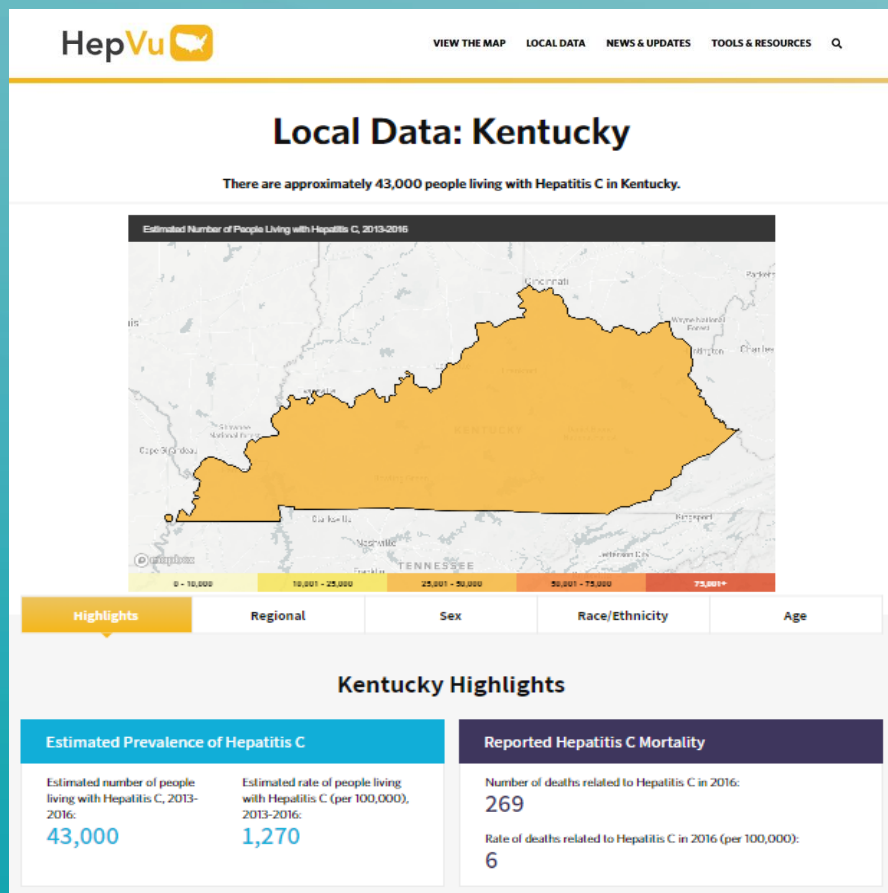
Narcotic Overdose Mortality Rate



Pain Reliever Misuse Percent

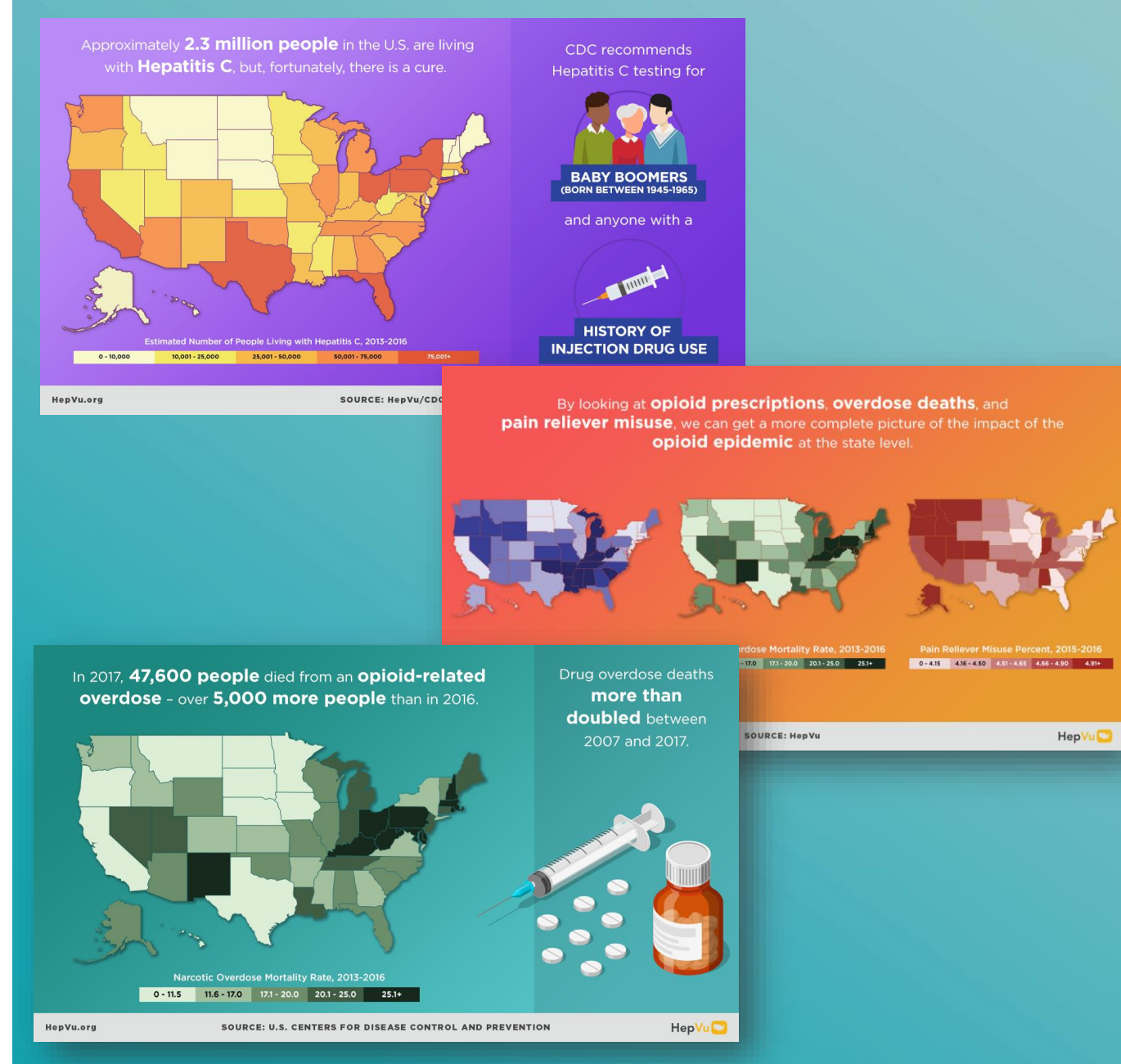


State Profiles



Shareable Resources

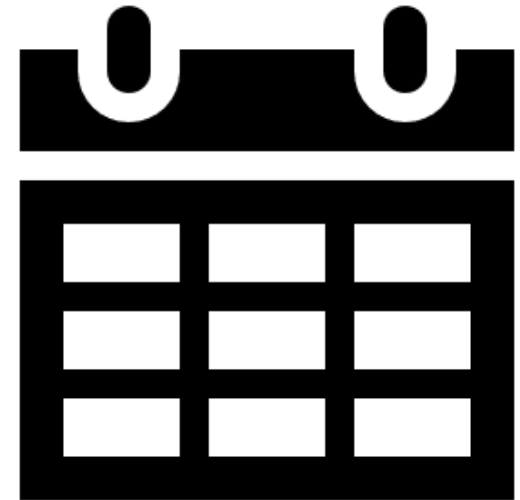
- Infographics on Hepatitis B and C, and the opioid syndemic
- Blogs from viral hepatitis and opioid experts, such as:
 - **Dr. Judith Feinberg**, West Virginia University School of Medicine professor of Behavioral Medicine & Psychiatry and Medicine/Infectious Diseases
 - **Thaddeus Pham**, Viral Hepatitis Prevention Coordinator at the Hawaii State Department of Health



Next for HepVu

2019:

- 2013-2016 Hepatitis C prevalence estimates, stratified by race, age, and sex
- Additional opioid indicators
- Hepatitis Awareness Month and Testing Day infographics (May)
- Ongoing blog series with experts

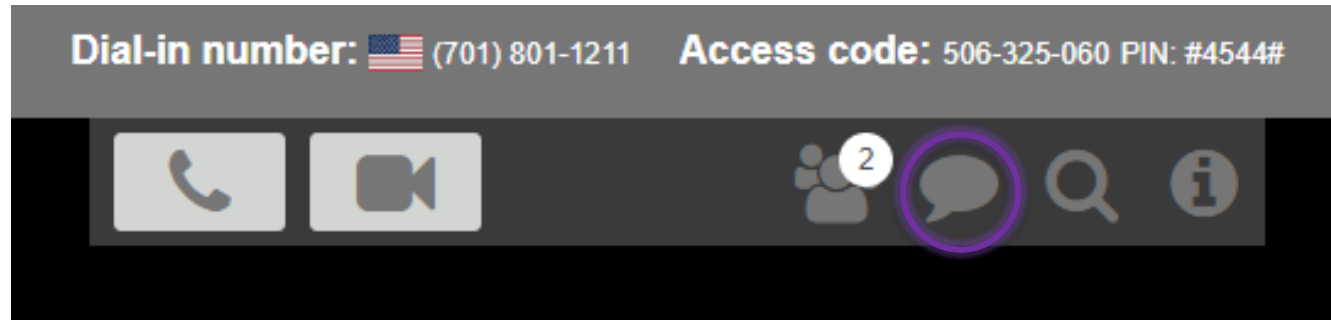


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- Share the data launch with your networks
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- Sign up for our newsletter: www.hepvu.org
- Let us know how you use HepVu: info@hepvu.org

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Questions



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