



# **HCV Elimination: Can the US be free of HCV?**

Stacey B Trooskin MD PhD  
Executive Medical Officer  
Mazzoni Center

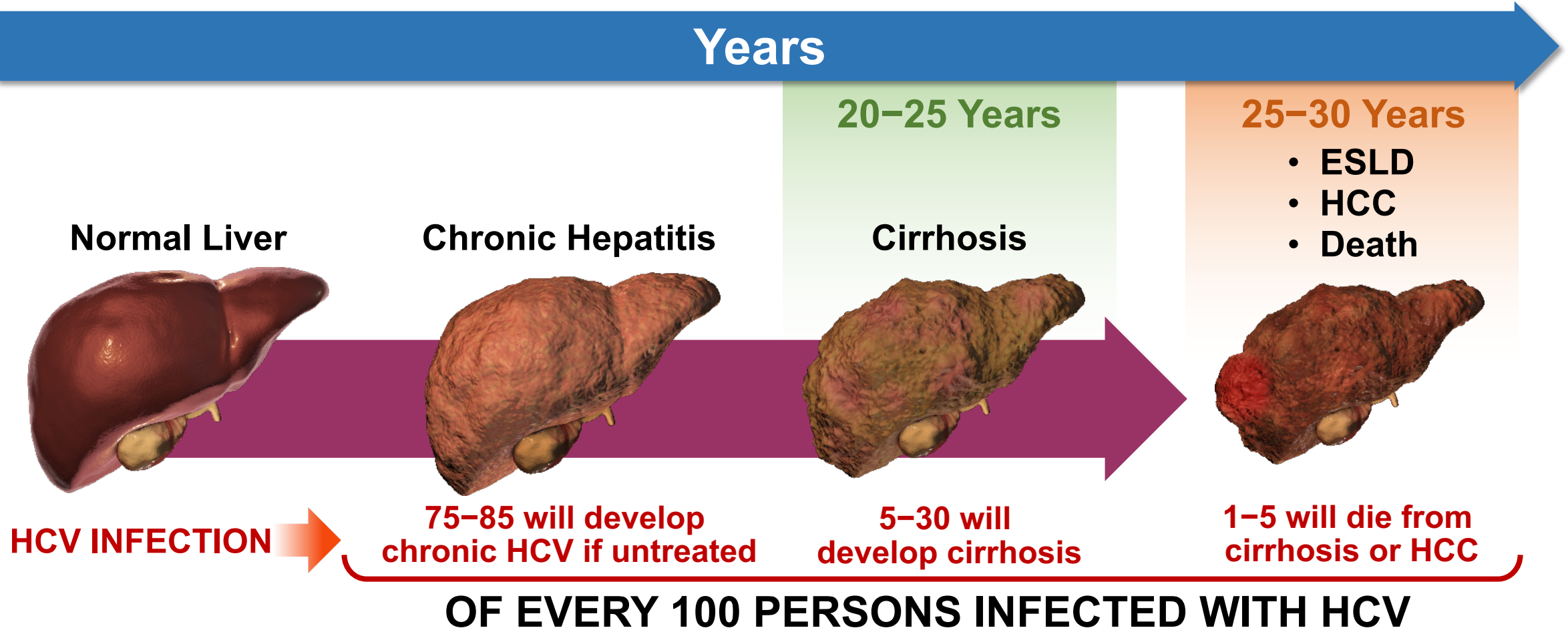


# Learning Objectives



- Understand the Global and National Epidemiology of HCV
- Understand the complex barriers to HCV elimination in the US
- Understand recent developments and opportunities that support HCV elimination in the US

# HCV: Disease Progression



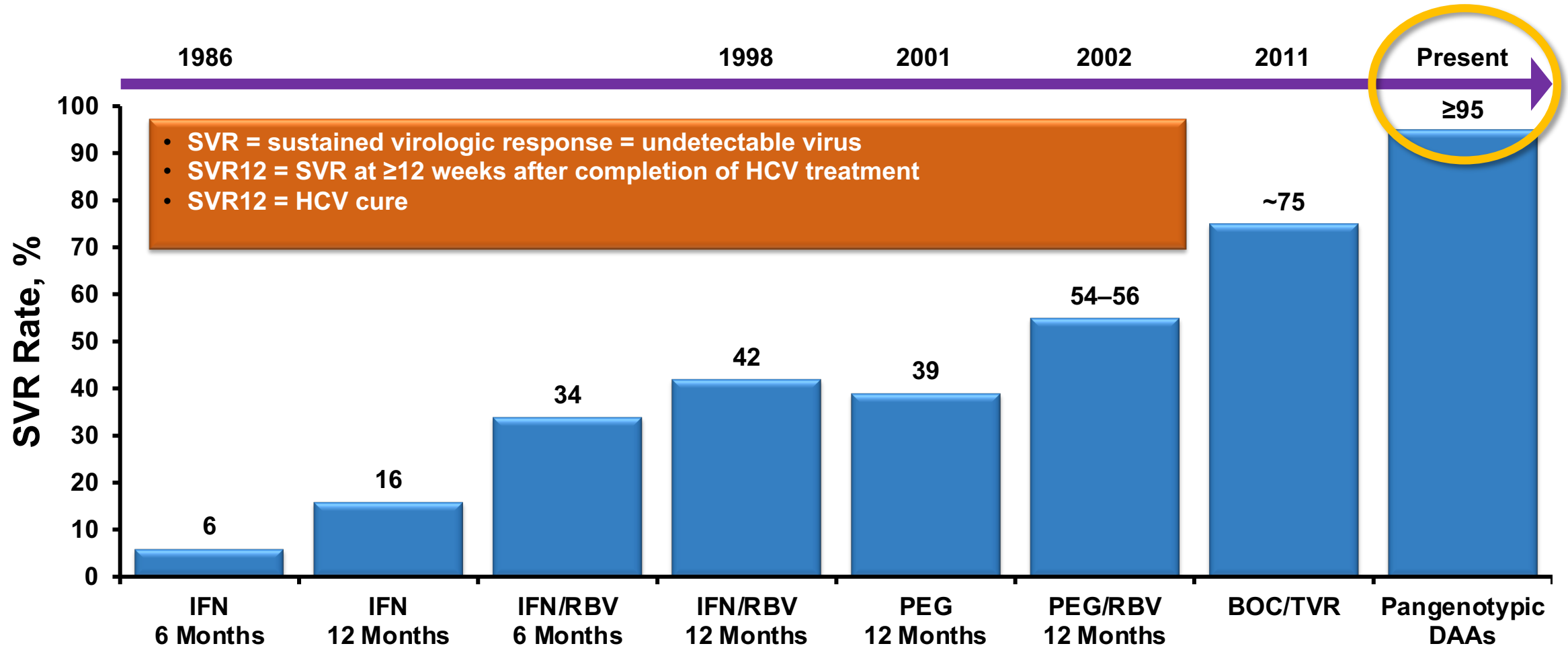
ESLD, end-stage liver disease; HCC, hepatocellular carcinoma.

Emory University Coalition for Applied Modeling for Prevention (CAMP). [www.hepvu.org](http://www.hepvu.org). Accessed August 2, 2018. Image adapted from Hepatitis C Online. 2015.

<https://www.hepatitisc.uw.edu/go/evaluation-staging-monitoring/natural-history/core-concept/all>. Accessed August 2, 2018.

# Evolving HCV Treatment

*It's Come a Long Way*



BOC, boceprevir; DAA, direct-acting antiviral (drug); IFN, interferon; PEG, pegylated interferon; RBV, ribavirin; SVR, sustained virologic response; TVR, telaprevir.

Adapted from Strader DB, Seeff LB. *Clin Liver Dis.* 2012;1(1):6-11.

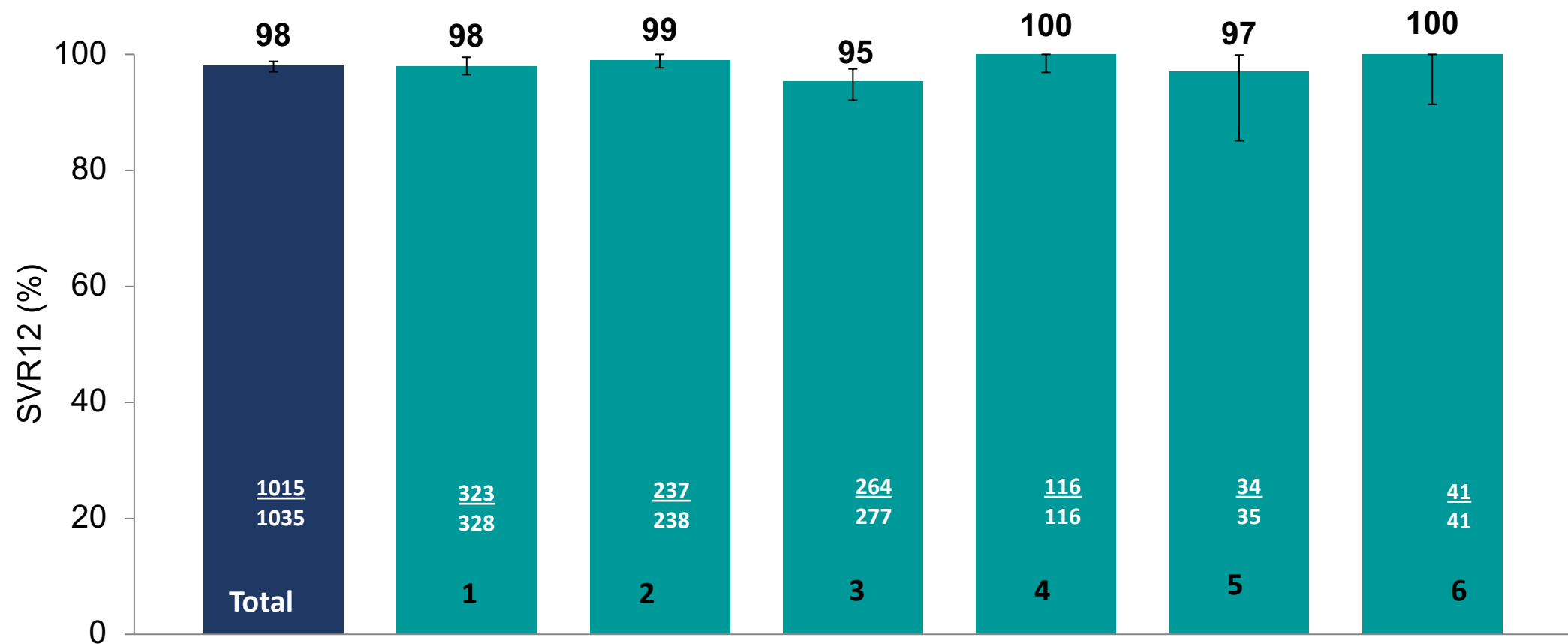


# Treatment with Pangenotypic Regimens

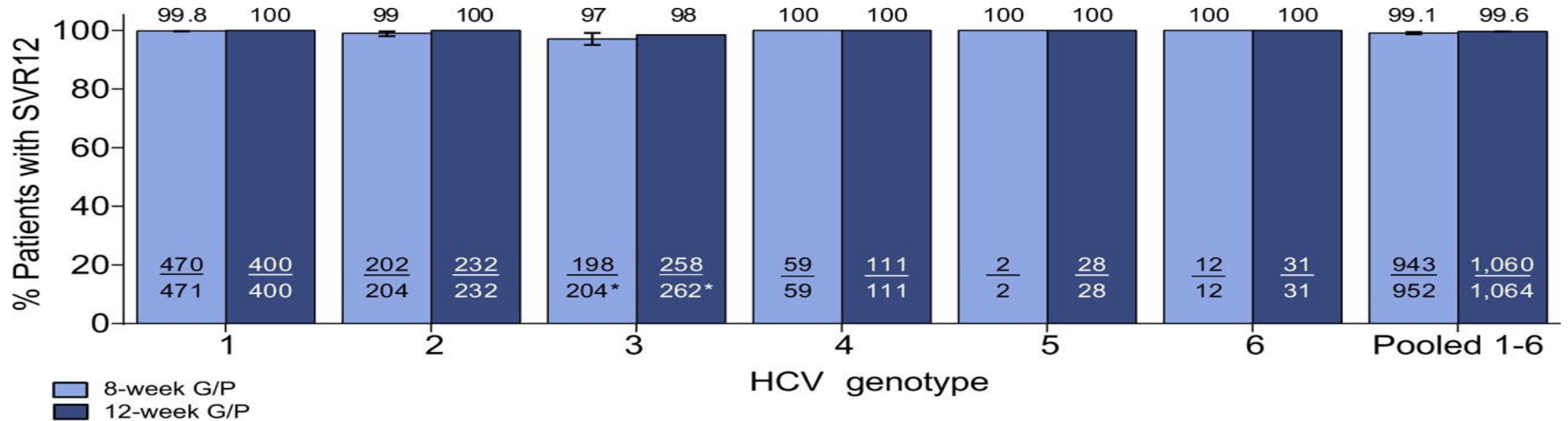


- Sofosbuvir + Velpatasvir (EPCLUSA)
- Glecaprevir + Pibrentasvir (MAVYRET)

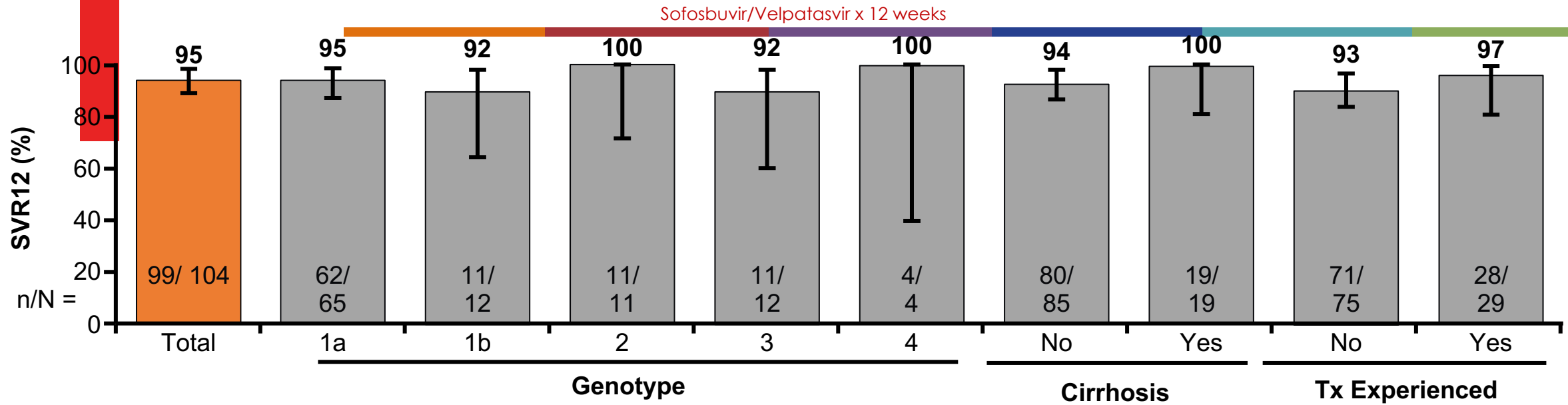
# Persons with HCV genotype 1, 2, 3, 4, 5, or 6 infection can be effectively treated with 1 tablet daily for 12 weeks Sofosbuvir/Velpatasvir



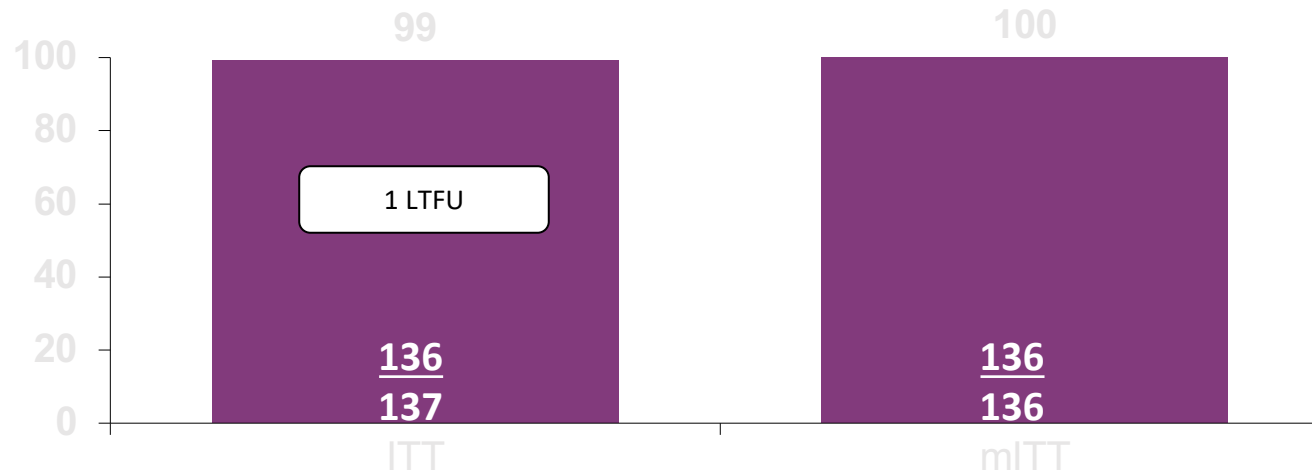
# Persons with HCV genotype 1, 2, 3, 4, 5, or 6 infection can be effectively treated with 3 tablets daily for 8 weeks Glecaprevir/Pibrentasivir



# HIV/HCV Coinfected Individuals Have Similar Cure Rates

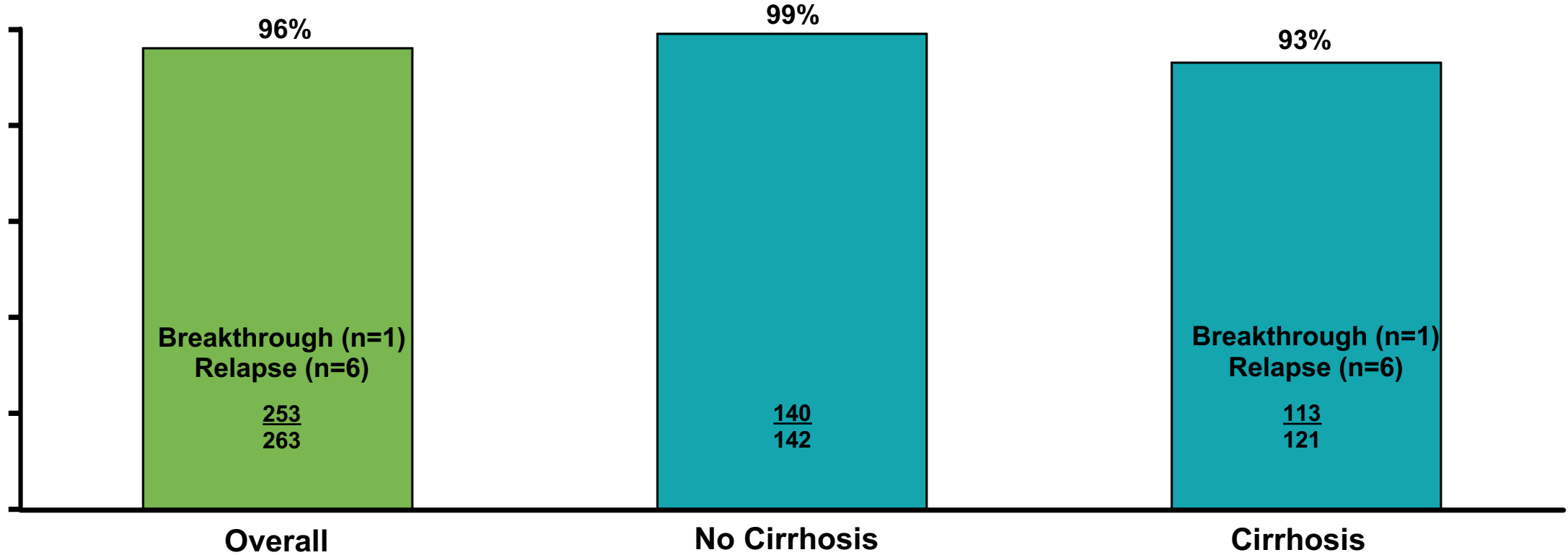


## Glecaprevir/Pibrentasvir for 8 weeks



# Overall Cure Rates in NS5A inhibitor – Experienced patients

**Sofosbuvir/Velpatasvir/Voxilaprevir  
(Genotypes 1-6)**



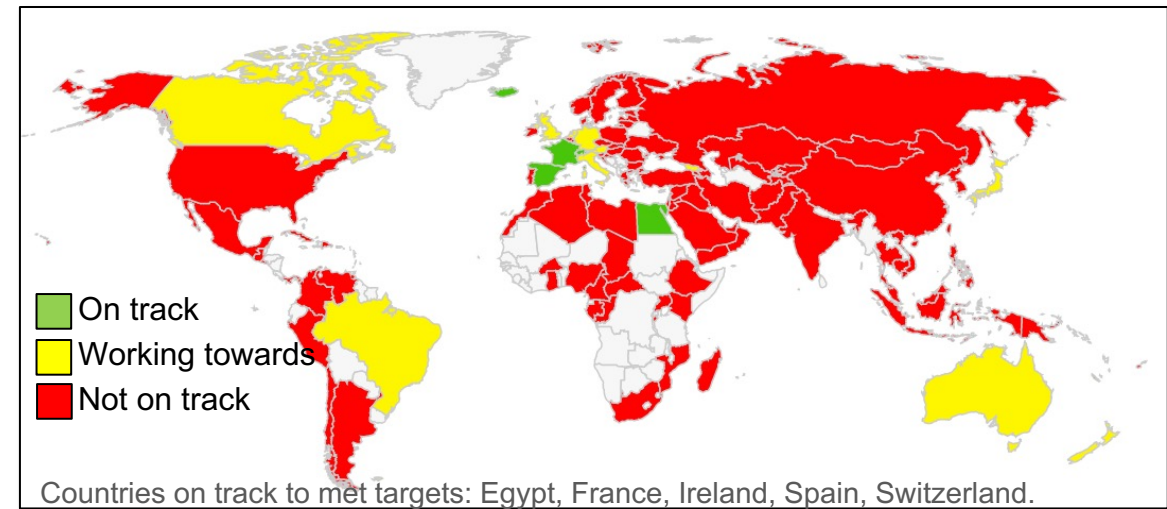
No placebo patients achieved an SVR12.

\* $P < 0.001$  for superiority versus pre-specified goal of 85% for sofosbuvir/velpatasvir/voxilaprevir.

# WHO HCV Elimination 2030 Targets

- 2030 targets
  - 90% diagnosed
  - 80% treated
  - 65% reduced mortality
  - 90% reduction in HCV incidence
- HCV infection in United States: 2.9 million
- United States is not on track to meet all targets by 2030 (extrapolated from 2019 data)

Global Progress Towards Meeting  
WHO HCV Elimination Targets  
2019 Status





Health Topics ▾

Countries ▾

Newsroom ▾

Emergencies ▾

Data ▾

About WHO ▾

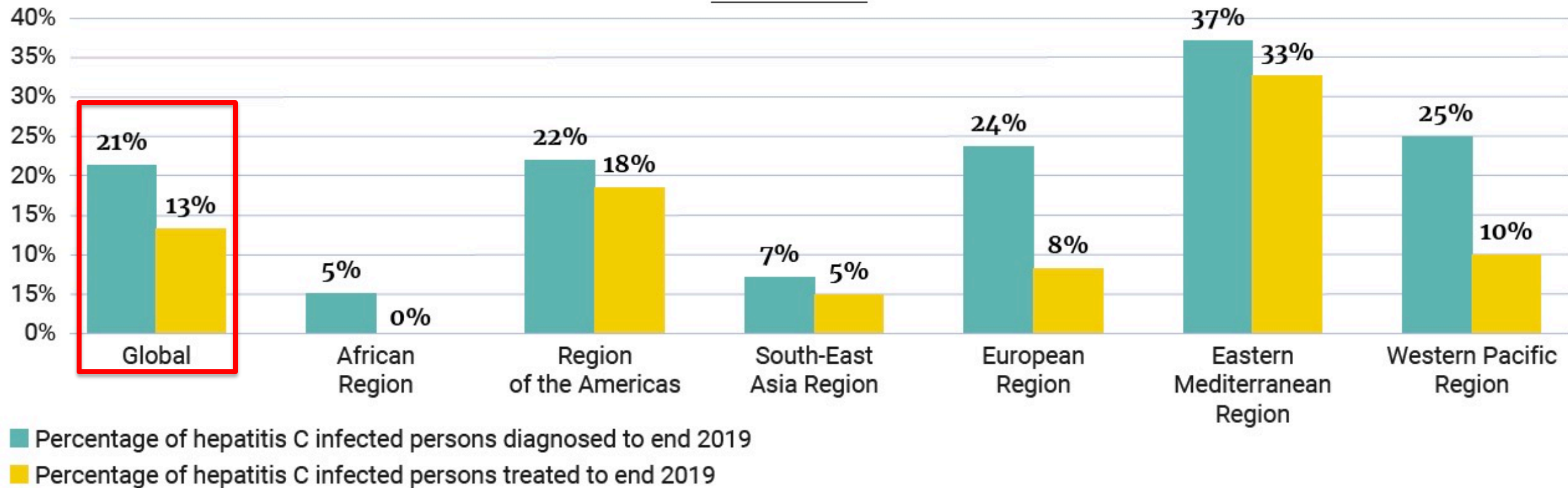
Home / News / WHO commends Egypt for its progress on the path to eliminate hepatitis C



## WHO commends Egypt for its progress on the path to eliminate hepatitis C



# HCV remains a major global public health problem

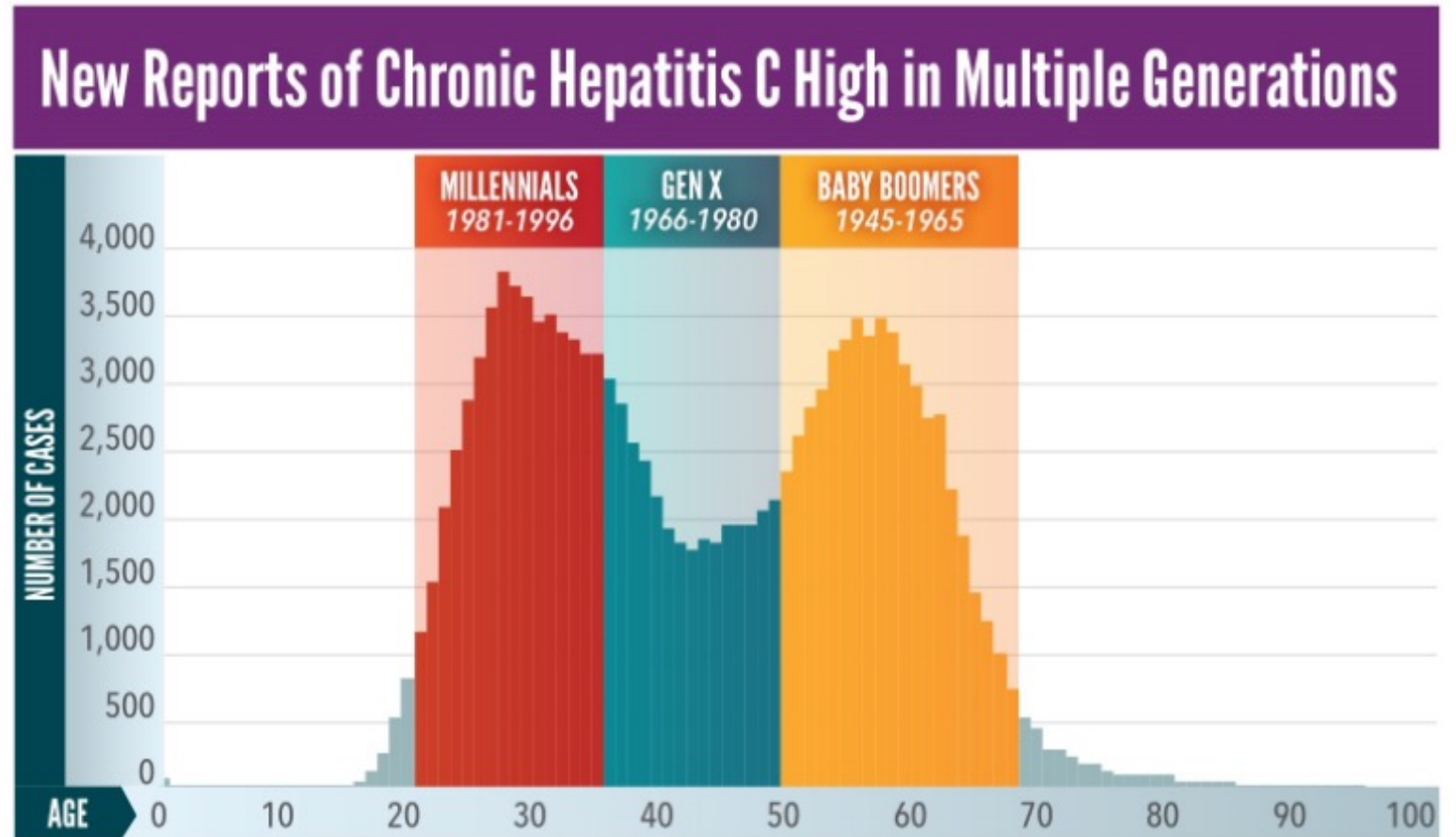


- By end of 2019 – **9.4 M people treated but only 21% diagnosed globally!**
- **In 2017 → 1.5M cures but estimated 1.6 M new infections**



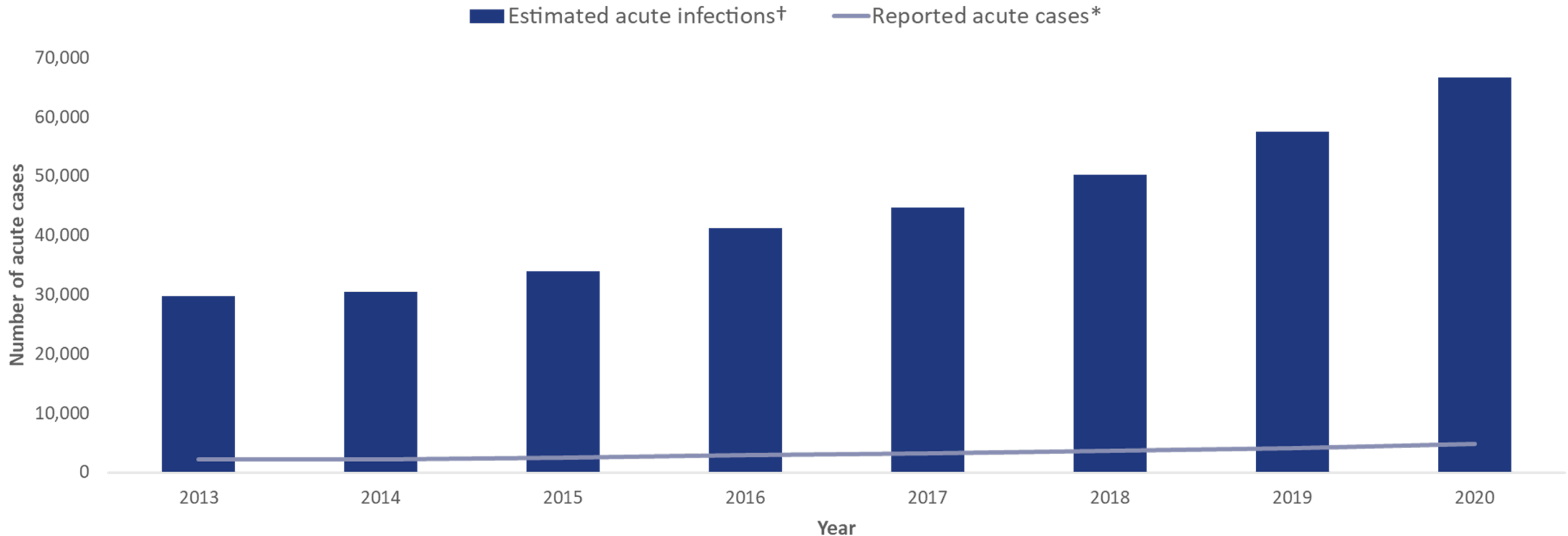
# HCV is a public health crisis in the US

- Estimated **2.4 million** (or possibly more) people living with hepatitis C
- About 40% of people with hepatitis C are unaware of their infection



SOURCE: National Notifiable Diseases Surveillance System, 2018

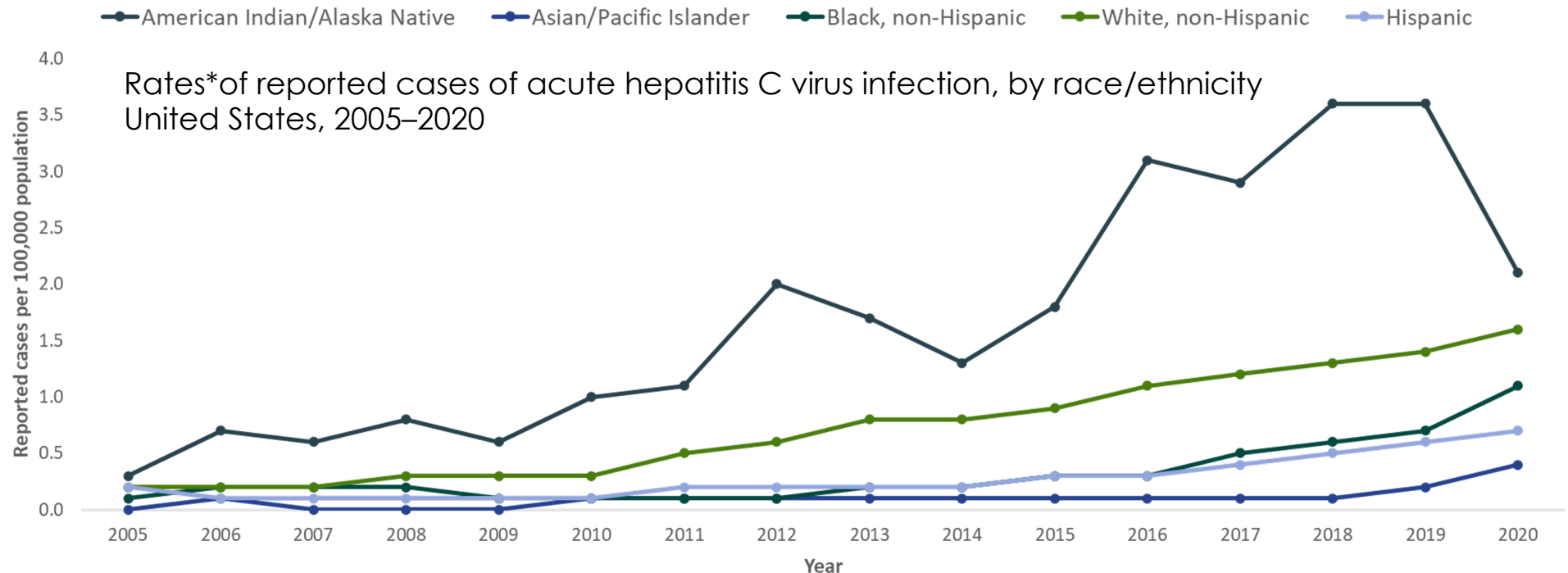
# HCV Infections are Rising in the US



- The incidence rate of acute hepatitis C has more than doubled since 2013, and increased 15% from 2019.
- Persons aged 20-39 years had the highest incidence of acute hepatitis C.
- 66% of cases with risk information reported injection drug use.

# People of Color Have Worse HCV Outcomes

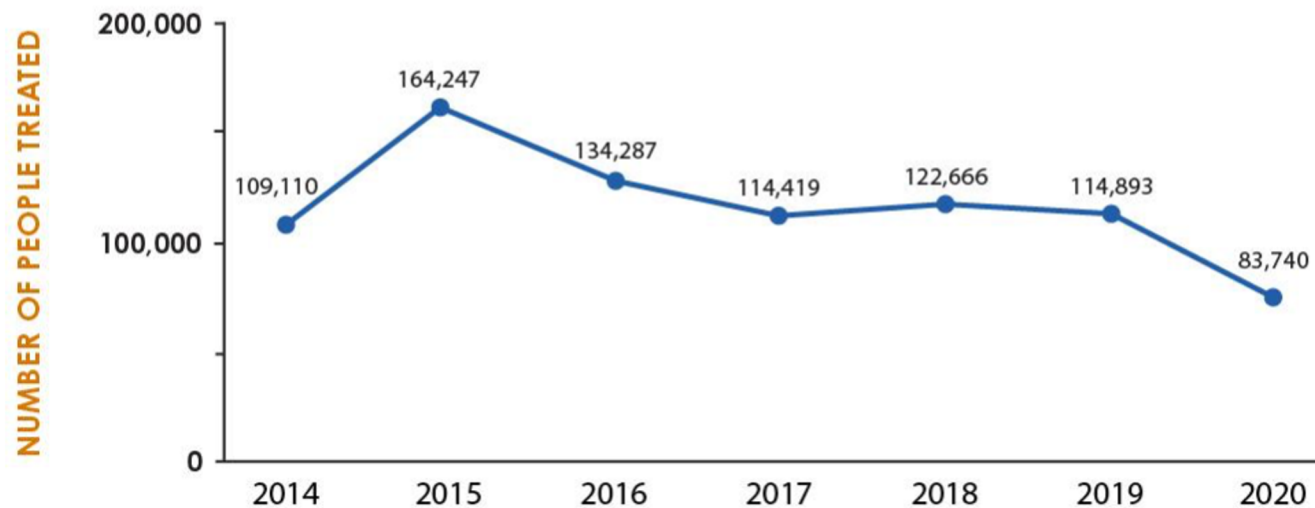
- Native Americans experience higher rates of acute HCV, and higher rates of HCV-related mortality, than any other racial/ethnic group
- Mortality rates are highest among Native American and Black people (3.2 times and 1.8 times, respectively) compared to white people



# As HCV Cases Rise, Treatment Rates are Declining

## THE NUMBER OF PEOPLE WHO INITIATED\* HEPATITIS C TREATMENT IN THE U.S. DECLINED FROM 2015 TO 2020

COVID-19-related disruptions to hepatitis C testing and treatment likely contributed to the decline in 2020



\*Based on national prescription claims data

For more information, visit  
[cdc.gov/nchhstp/newsroom](https://cdc.gov/nchhstp/newsroom)



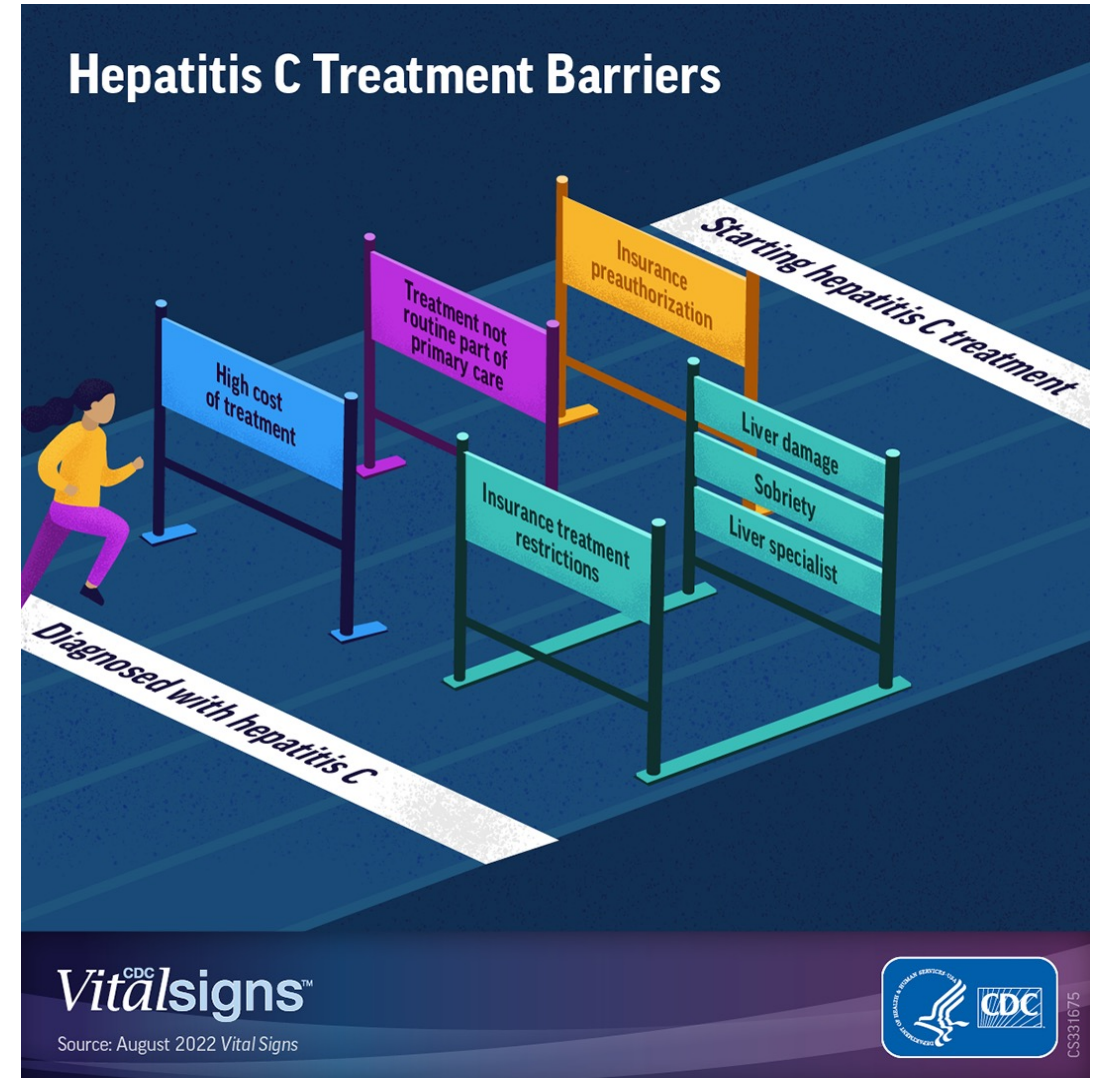
- To eliminate hepatitis C, more than 260,000 people should be treated every year.
- The number of people treated was highest in 2015 and declined to its lowest level in 2020.

Eyasu H Teshale, MD, Henry Roberts, PhD, Neil Gupta, MD, MPH, Ruth Jiles, MS, MPH, PhD, Characteristics of persons treated for hepatitis C using national pharmacy claims data, United States, 2014–2020, Clinical Infectious Diseases, 2022; ciac139, <https://doi.org/10.1093/cid/ciac139>, slide credit NVHR/ CHLPI

# HCV is curable but millions remain untreated in the US

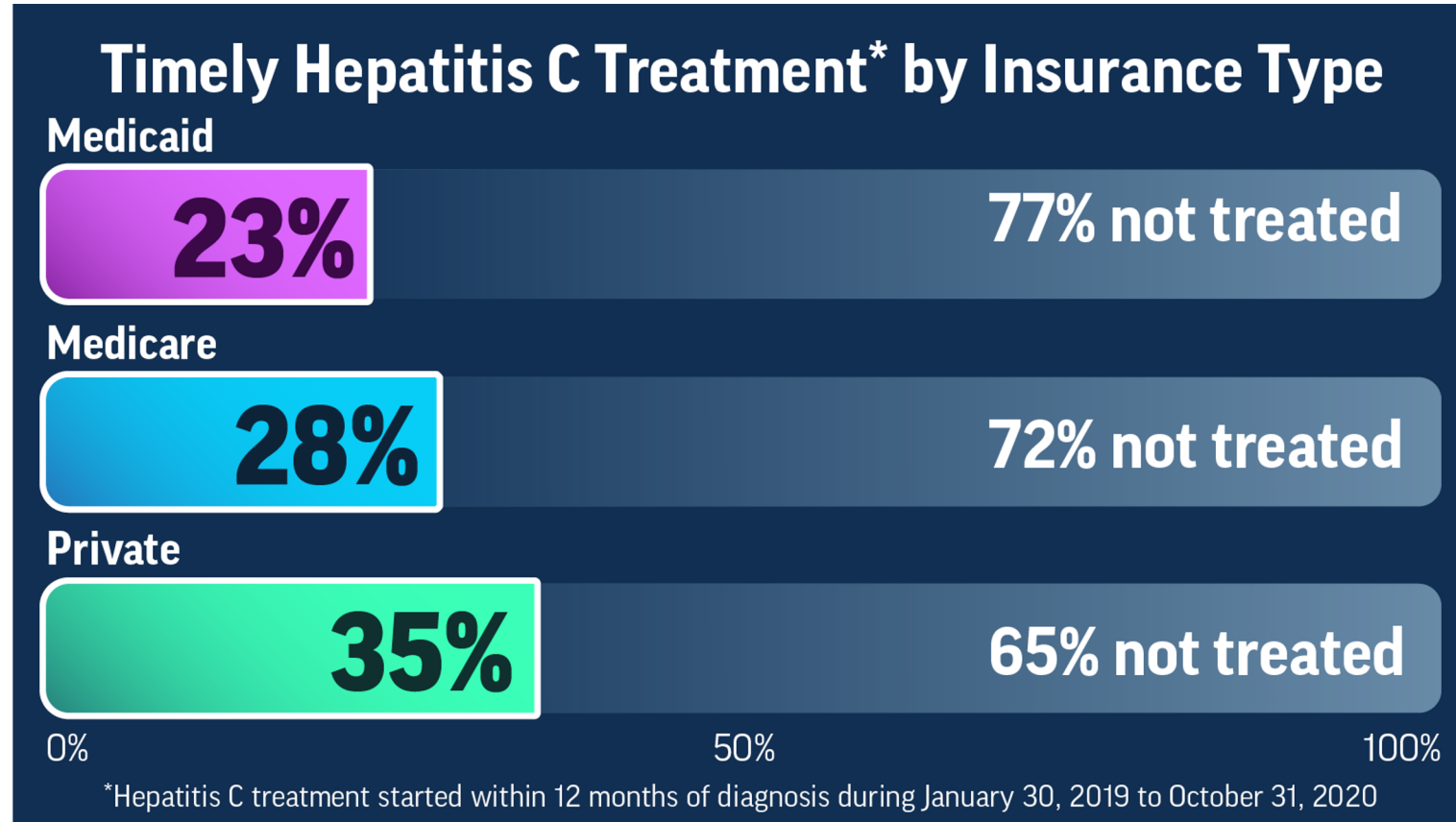
- Lack of awareness of infection in 40% of patients
- Lack of point-of-care diagnostics, 3 steps to treatment initiation and loss of contact
- Insurance prior-authorization requirements (liver damage, sobriety, specialists)
- Treatment not routine part of primary care
- Failure to serve disproportionately impacted populations:
  - People who inject drugs
  - Incarcerated populations

Slide credit: Division of Viral Hepatitis, CDC





# Only 1 in 3 of Insured Receive Timely HCV Treatment



Timely treatment rates drop to 1 in 4 among Medicaid Beneficiaries

Thompson WW, Symum H, Sandul A, et al. Vital Signs: Hepatitis C Treatment Among Insured Adults — United States, 2019–2020. MMWR Morb Mortal Wkly Rep 2022;71:1011-1017. DOI: <http://dx.doi.org/10.15585/mmwr.mm7132e1>. Slide credit: NVHR and CHLPI

# HCV Treatment Access is a Health Equity Issue



- Certain communities are disproportionately impacted by the HCV epidemic and have poorer treatment outcomes, including:
  - Black communities and other communities of color;
  - Rural communities;
  - People who are unhoused or housing insecure;
  - People who use drugs; and
  - People who have a history of incarceration.
- Treatment access restrictions often **disproportionately restrict access** to these same communities, widening disparities in both health care access and health outcomes

# Disparities are Widened by Prior Auth Requirements

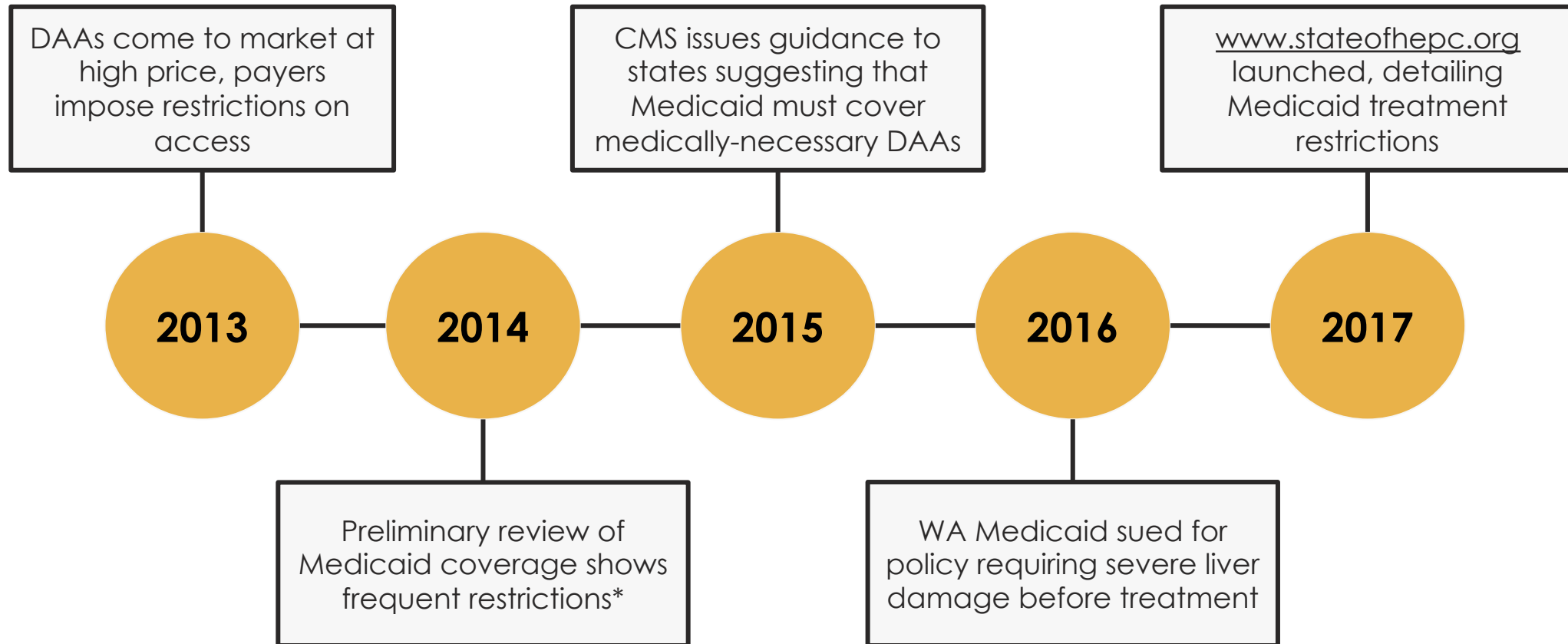


Treatment access restrictions can widen already-existing disparities for groups that already experience disproportionate rates of infection

- People who use drugs are at higher risk for hepatitis C, but may be denied treatment in states that impose substance use restrictions
- People who are unhoused and without access to reliable transportation may have difficulting meeting prior authorization requirements, like submitting multiple rounds of lab work within a certain timeframe
- Providers who serve rural communities with low populations may face difficulty scheduling a specialist consultation, particularly if there are only a few specialists in network



# History of HCV Treatment Access in Medicaid



\*Barua S, Greenwald R, Grebely J, Dore GJ, Swan T, Taylor LE. Restrictions for medicaid reimbursement of sofosbuvir for the treatment of hepatitis c virus infection in the united states. Ann Intern Med. 2015;163(3):215-223. Slide credit: NVHR and CHLPI

# Hepatitis C: State of Medicaid Access

---

- Launched in 2017 as a partnership between the Center for Health Law and Policy Innovation (CHLPI) and the National Viral Hepatitis Roundtable (NVHR)
- Documents the current state of Medicaid HCV treatment access across 52 jurisdictions, including state-by-state “report cards”
- Findings are based on publicly available documents, including published clinical criteria, prior authorization forms, meeting minutes, and press releases



# Medicaid Treatment Access Restrictions

**Historical Restrictions**



**Fibrosis**



**Substance Use**



**Prescriber**

**Managed Care**

**Added June 2022**

**Prior  
Authorization**

**Retreatment**

**Additional  
Restrictions**

Slide credit: NVHR and CHLPI

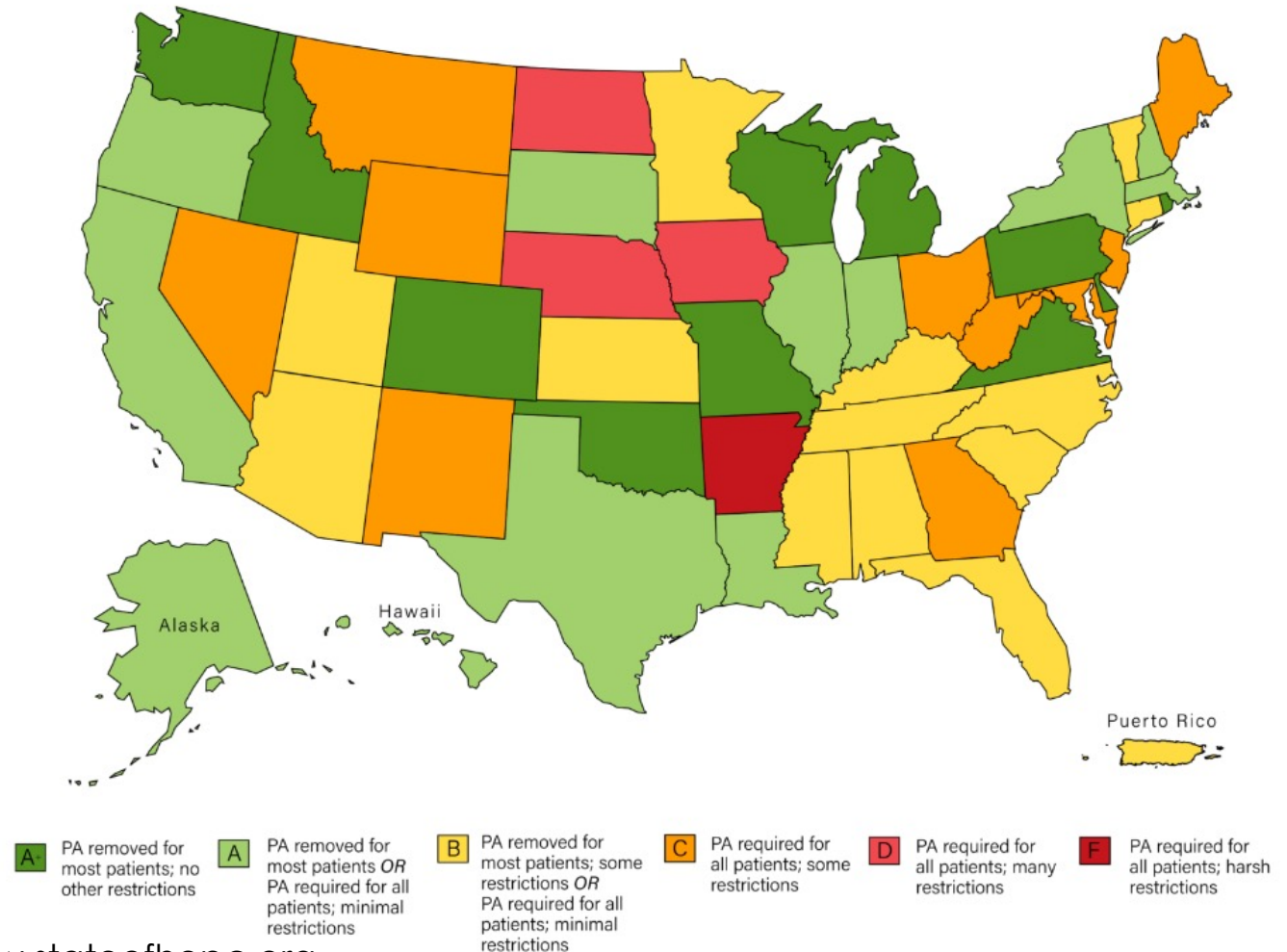
# Overall State Grades



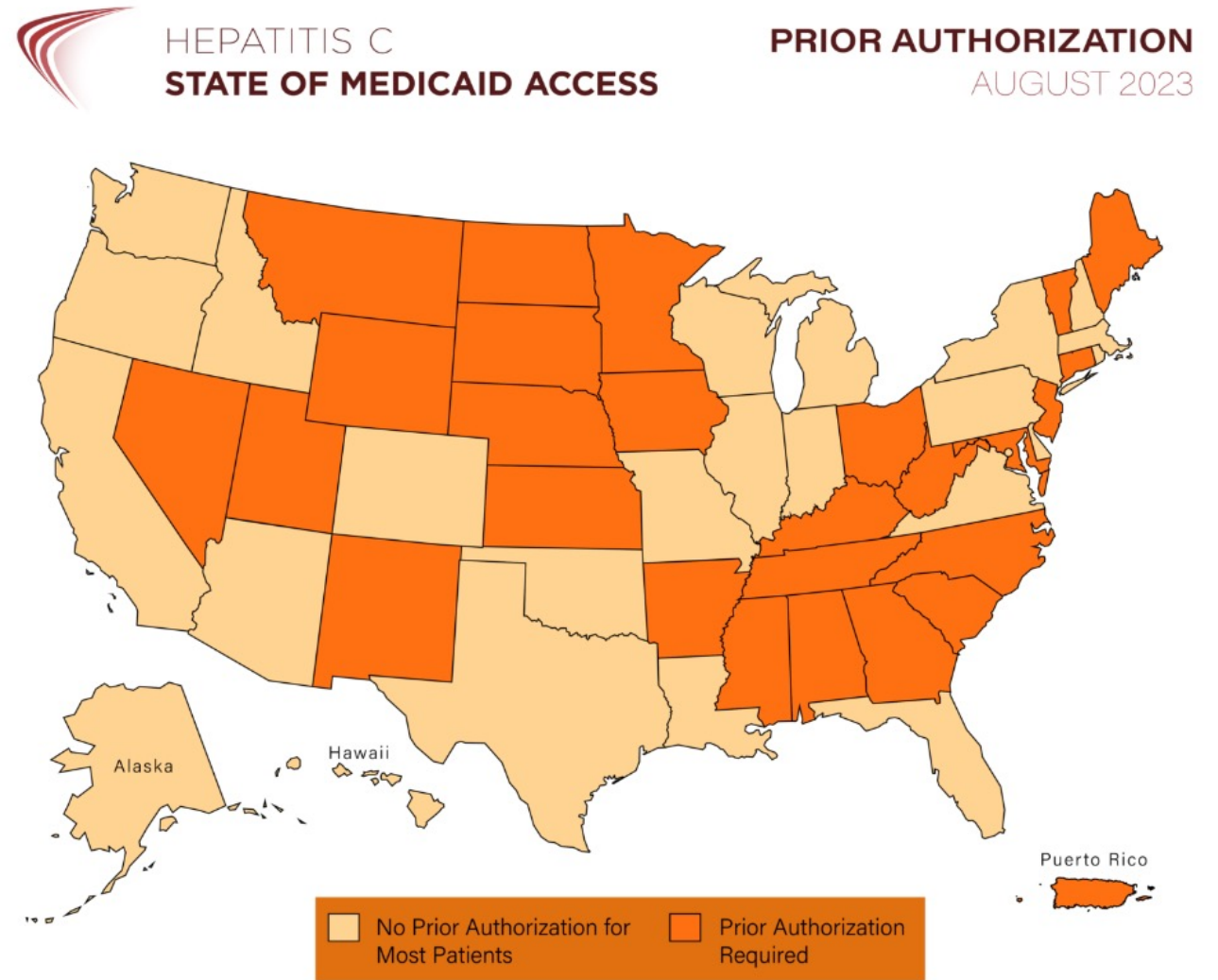
HEPATITIS C  
STATE OF MEDICAID ACCESS

OVERALL STATE GRADES  
AUGUST 2023

Since 2017, 34 states either eliminated or reduced fibrosis restrictions, 39 loosened sobriety restrictions, and 36 scaled back prescriber restrictions.

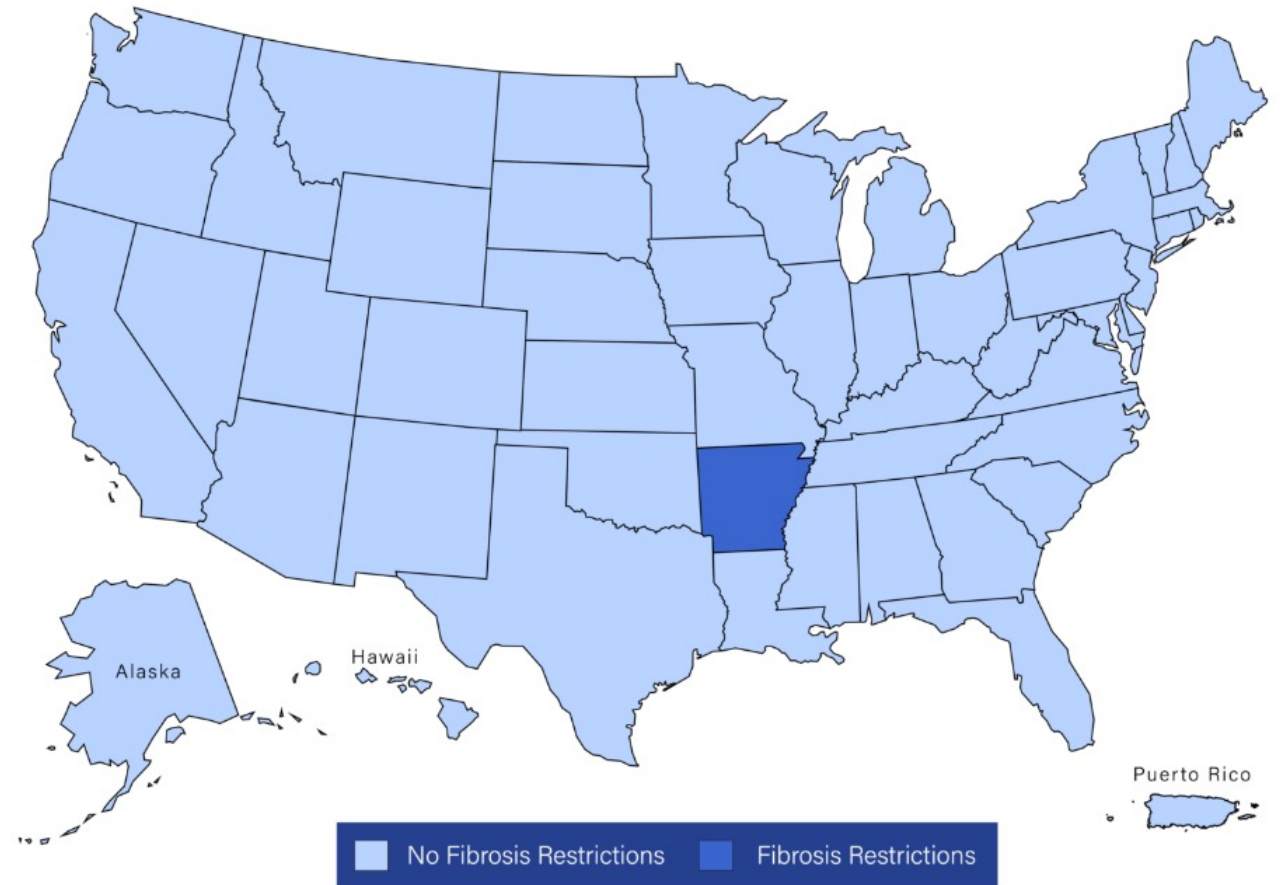


- **25 states (48%)** have removed prior authorization for treatment-naïve patients and/or preferred drug regimens, significantly reducing administrative barriers to care



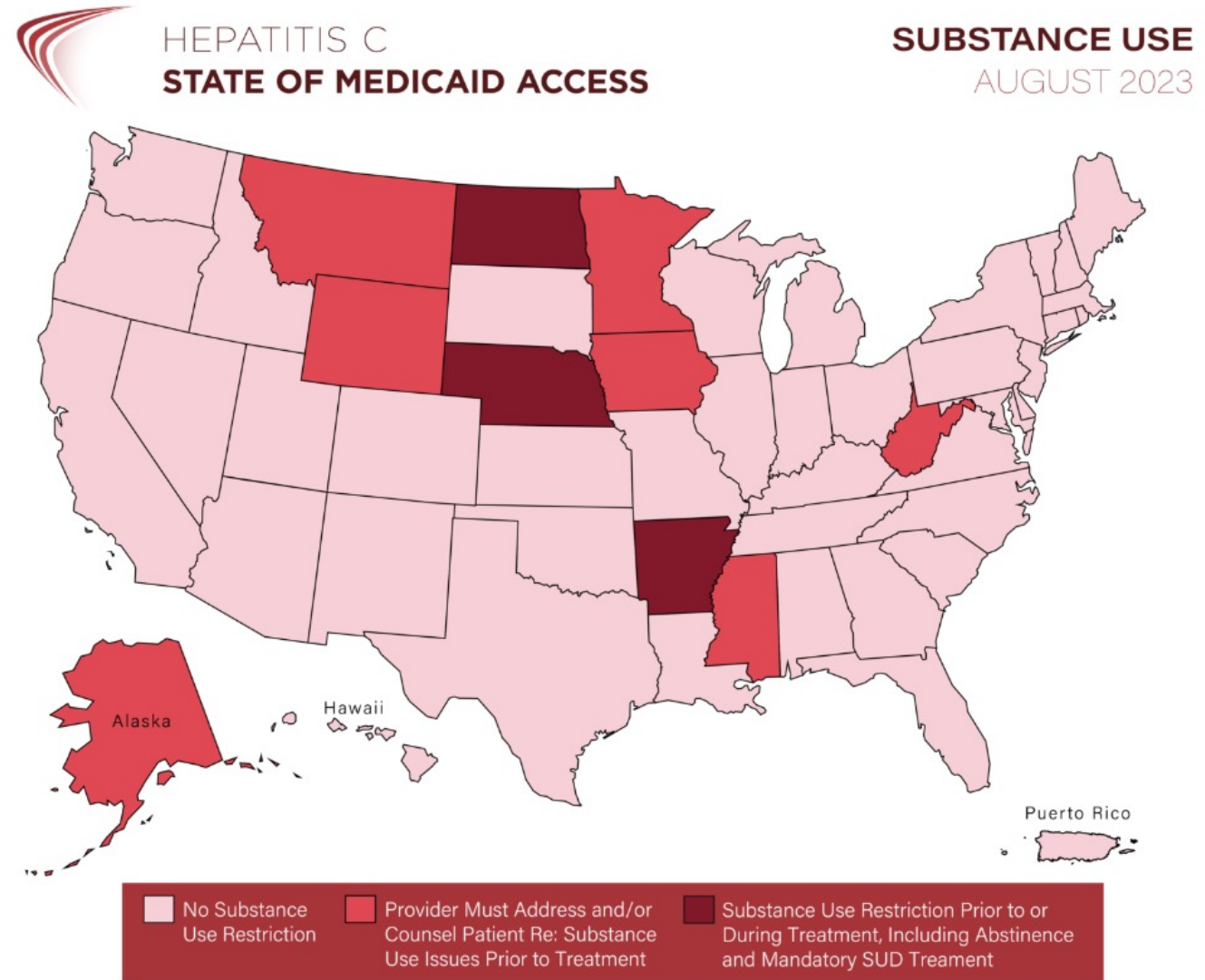


- **Arkansas** is the only state that has not yet removed restrictions based on liver damage (fibrosis)
- This is a significant change. In 2017, **34 states (65%)** imposed some kind of liver damage requirement





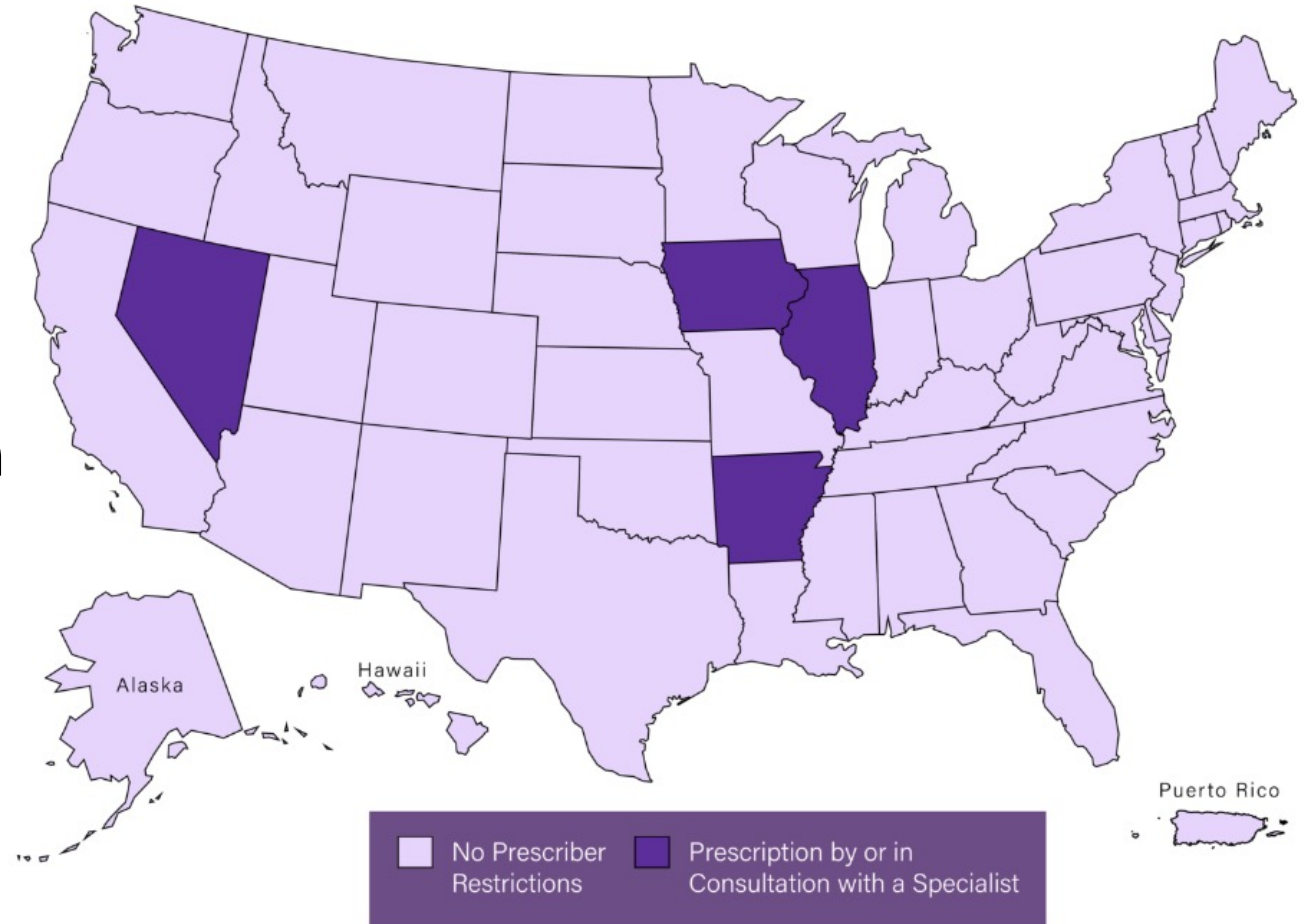
- **3 states (6%)** require abstinence from alcohol/substances prior to or during treatment, including participation in a substance use treatment program
- **7 states (13%)** require a provider to counsel or address substance use issued prior to treatment
- **42 states (81%)** have no substance use restriction



# Substance Use Restrictions



- **4 states (8%)** impose prescriber restrictions for initial treatment:
  - **Arkansas** requires that the prescription written be a specialist; all other states require specialist consultation

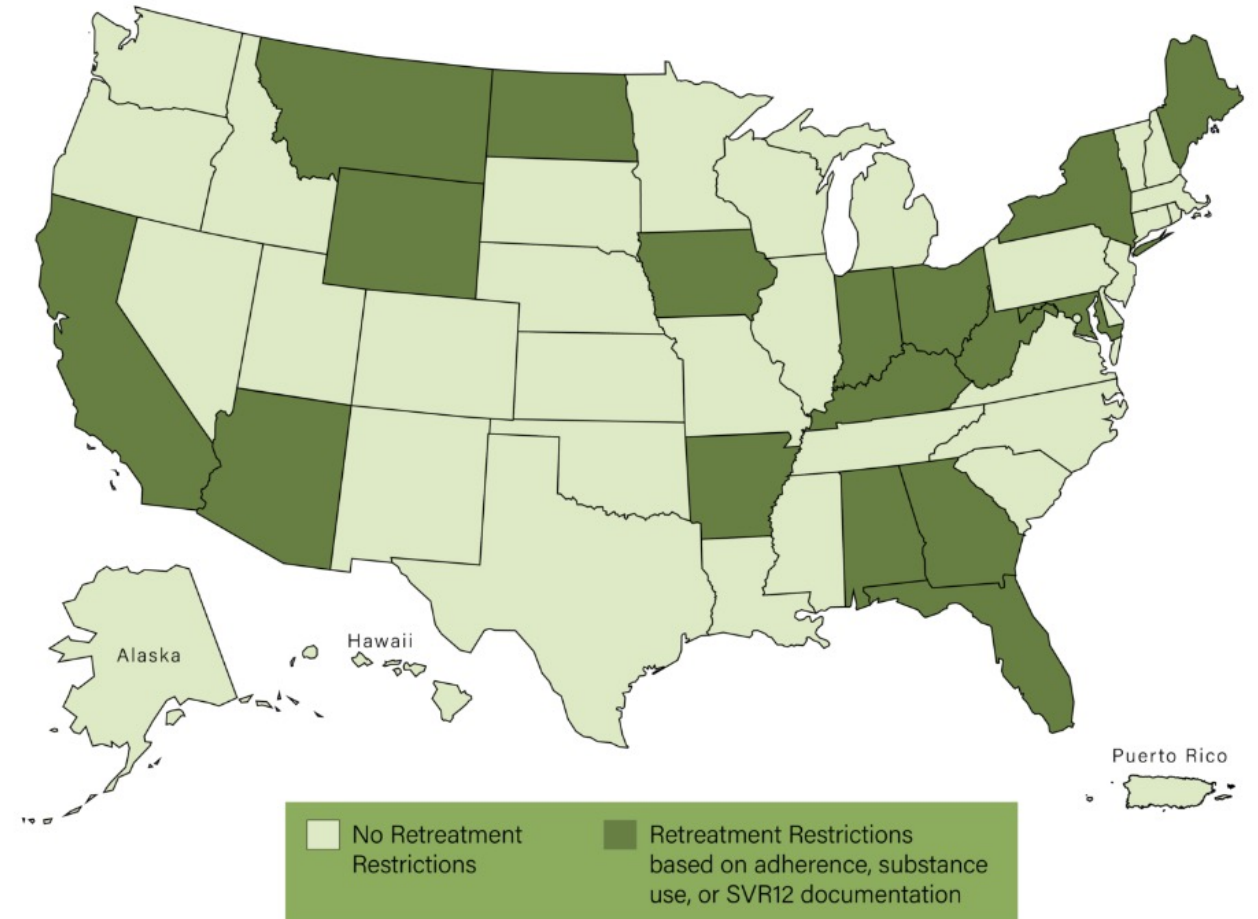


# Prescriber Restrictions





- **17 states (33%)** impose retreatment restrictions
- Such restrictions include lifetime restrictions on retreatment and policies that are otherwise more restrictive than those for treatment-naïve patients (e.g., denying retreatment based on past treatment adherence, substance use, SVR12 documentation)



# Retreatment Restrictions

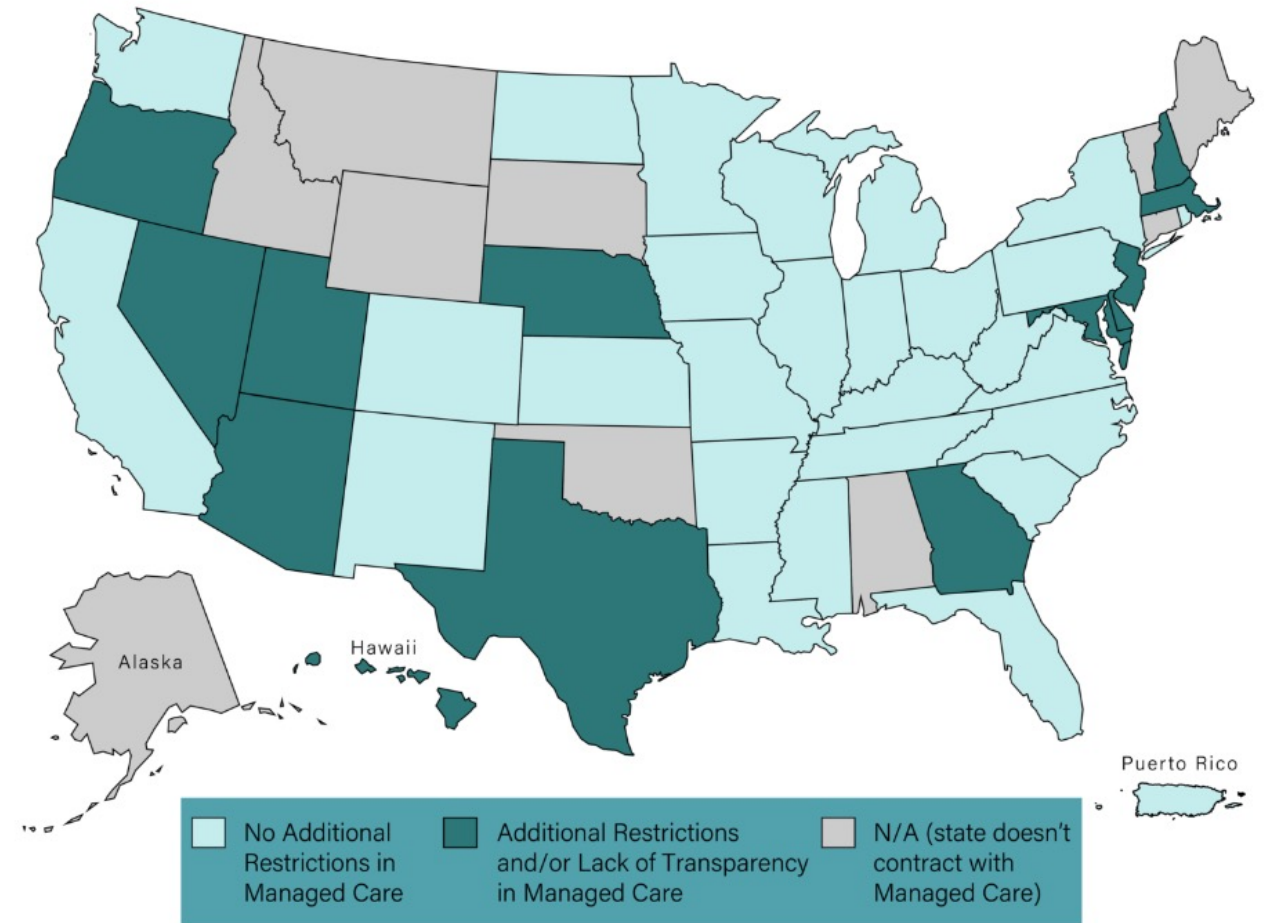
## HEPATITIS C

### STATE OF MEDICAID ACCESS

**MANAGED CARE**  
AUGUST 2023

- In states that operate managed care programs, **14 states** have at least one managed care organization (MCO) that imposes more stringent criteria to treatment access or does not provide publicly available HCV treatment criteria

Some states have strong FFS policies, but poor MCO enforcement (e.g., New Hampshire)



# Additional Restrictions



**18 states**

require  
documentation  
of **genotype**

**10 states**

require  
documentation  
of **chronic HCV**  
**infection**

**9 states**

require labs to  
be collected  
**within a certain**  
**timeframe**

**10 states**

impose  
**adherence**  
requirements

**6 states**

impose barriers  
to replacing  
**lost/stolen**  
**meds**

# Specialty Pharmacy Reinforces Barriers to Treatment

## Challenges

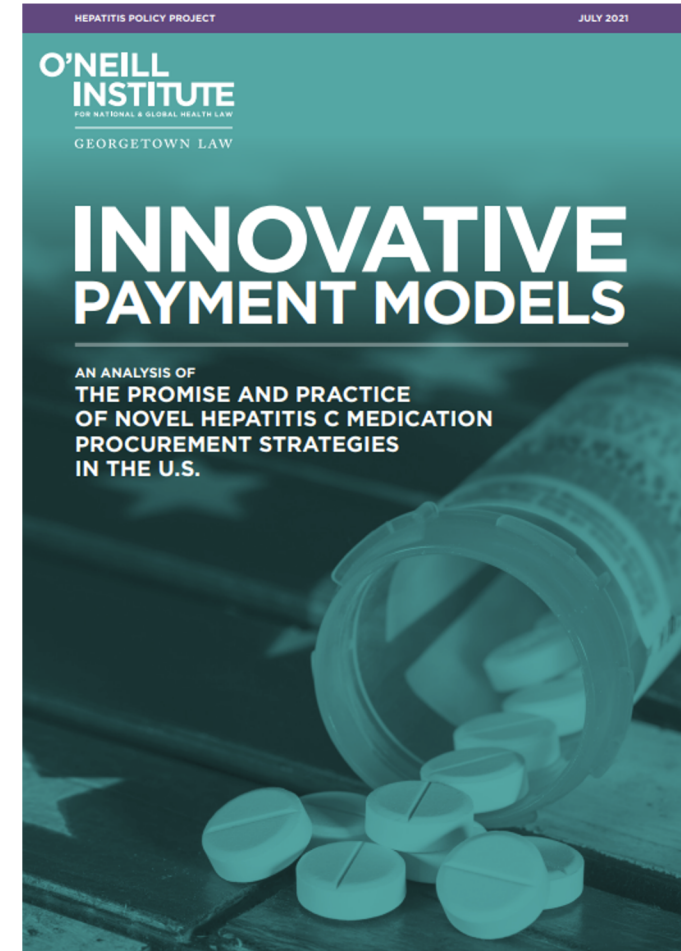
- Mail order and lock-in requirements
- Dispensing limitations (often 30-days' supply)
  - Two states (Connecticut and Maine) have 14-day limits
- Specialty pharmacy processes vary by plan
  - Intake forms often mimic PA forms
  - Signature/phone call requirements are challenging for historically marginalized communities

## Solutions

- Allow medication to be filled by non-specialty pharmacies
  - Louisiana and Virginia allow retail pharmacies to fill Rx
- Improve specialty pharmacy processes around communication and delivery
- Dispense full treatment course at treatment initiation
  - Colorado allows 90-day fills

# Growing # of States have Single Preferred Agent

- 10 states have a **single** preferred agent (Mavyret **OR** generic Epclusa) on their Preferred Drug List
  - DC, Louisiana, Michigan, Minnesota, Missouri, Montana, Oklahoma, Puerto Rico, Texas, Washington
- 5 of these states use an innovative payment model (subscription model)
  - Louisiana, Michigan, Missouri, Texas, Washington
- Other states may be purchasing through multi-state purchasing agreements

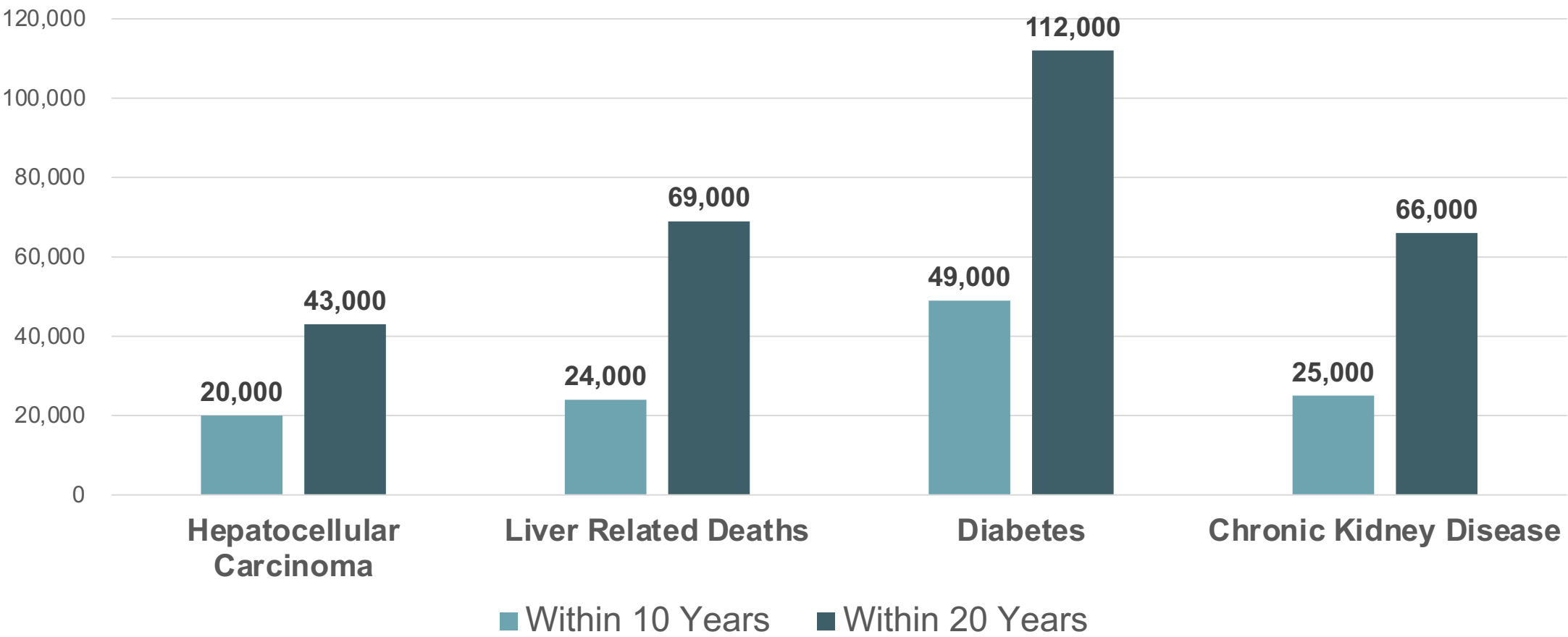


# US National Elimination Initiative

---

- Initiative formally proposed by the President on March 9, 2023
- Strong federal agency support (HHS and Bureau of Prisons)
- Detailed five-year implementation plan prepared
- Proposed as part of mandatory funding budget, starting in FY24
- Advocates organized: 126 organizations have signed a letter to Hill leadership
- Dr. Francis Collins et al, met with President Biden and received strong support on September 14, 2023
- Congressional interest growing but needs momentum
- Legislative language under construction, legislative champion still emerging

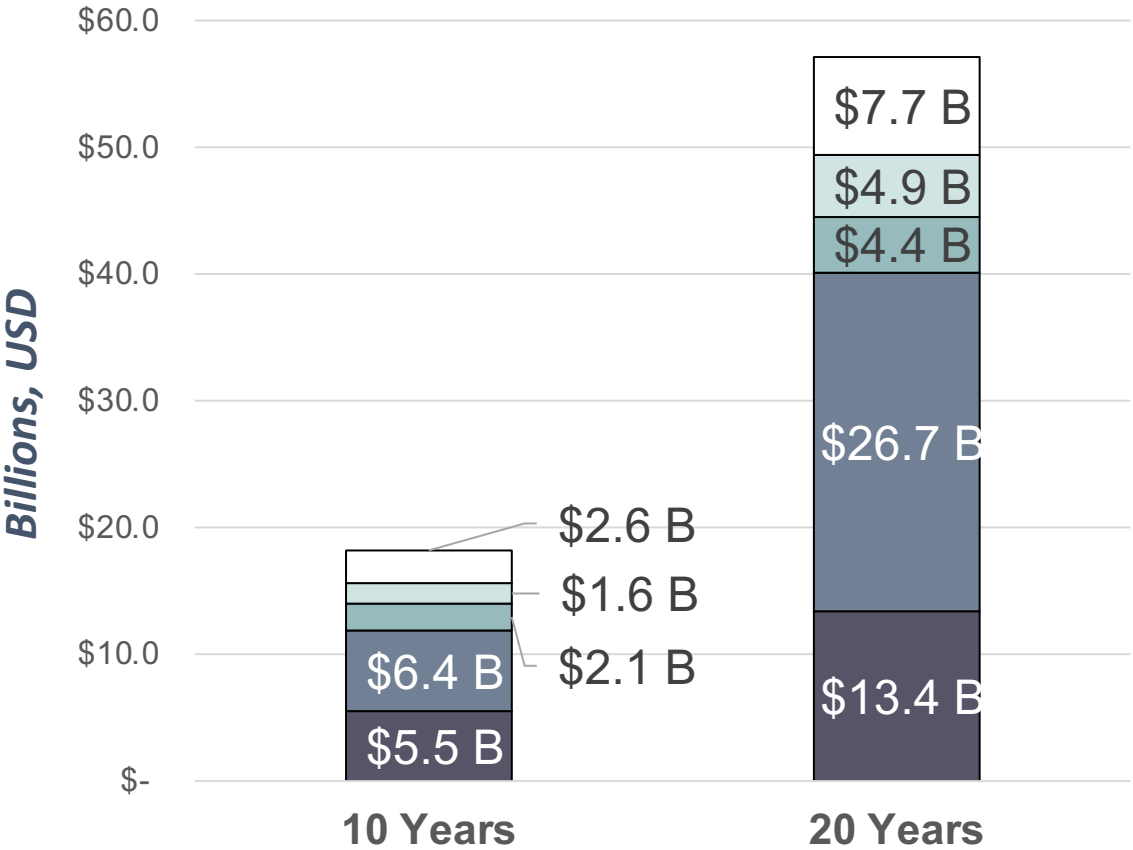
# HCV Related Complications Averted



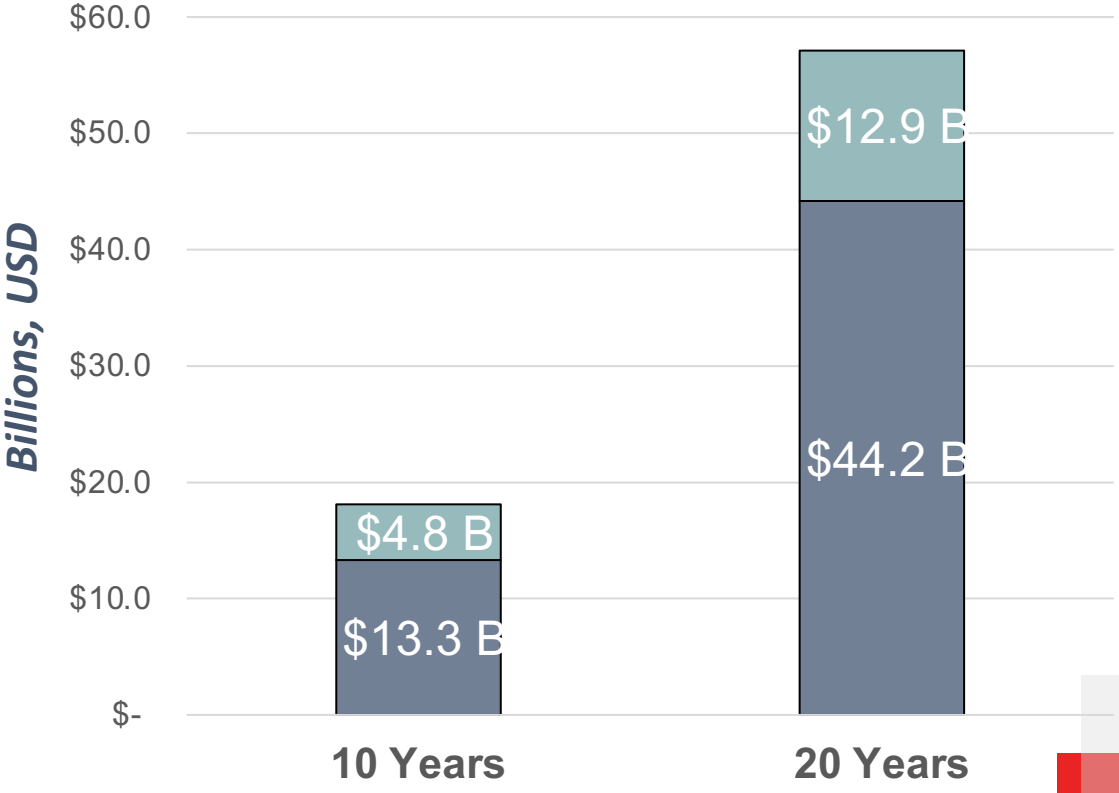
Economic benefits of a Hepatitis C elimination program: new analysis, Chatwal et al. (2023) NBER Working Paper.  
Slide Courtesy of Risha Irving, MD

# Cumulative Cost Savings of a Federal Elimination Plan

By Subpopulation



Attributable to the Federal Government versus Non-Federal



■ Medicaid ■ Medicare ■ Justice-Involved ■ Uninsured ■ Private

■ Federal ■ Non-Federal



# Components of Federal Elimination Plan

---

## Point-Of-Care (POC) diagnostic tests

- Enable hepatitis C **single-visit “test and treat” programs** to enhance cascade of care
- Obtain FDA approval of fingerstick test already in use in Australia and Europe

## Provide broad access to curative hepatitis C medications

- **National subscription “Netflix” model**
- Fixed sum for drug access negotiated by the US Government
- Drugs then provided for free to Medicaid, uninsured, incarcerated, opioid treatment programs, Native American reservations

## Empower health care delivery

- **Expand screening settings for high-risk populations**, including prisons
- Employ innovative telehealth methods, mobile units
- Expand number of community health workers
- Re-energize vaccine research

# Test and Treat models of care

- Routine Opt-out screening
- Single visit to facilitate engagement in care, integrated treatment
  - Harm reduction settings
    - Syringe service programs
    - Safe consumption spaces
  - Shelters
  - Mobile clinics
  - Jails
- Cepheid GeneXpert: already used in Europe and Australia
  - Fingerstick, no venipuncture required
  - Run time 60 minutes
  - 100 IU/ml-100,000,000 IU/ml
- Factors to consider
  - HBV Point of Care testing
  - Disease staging
  - Assay run time



# Components of Federal Elimination Plan

---

## **Point-Of-Care (POC) diagnostic tests**

- Enable hepatitis C **single-visit “test and treat” programs** to enhance cascade of care
- Obtain FDA approval of fingerstick test already in use in Australia and Europe

## **Provide broad access to curative hepatitis C medications**

- **National subscription “Netflix” model**
- Fixed sum for drug access negotiated by the US Government
- Drugs then provided for free to Medicaid, uninsured, incarcerated, opioid treatment programs, Native American reservations

## **Empower health care delivery**

- **Expand screening settings for high-risk populations**, including prisons
- Employ innovative telehealth methods, mobile units
- Expand number of community health workers
- Re-energize vaccine research

# Australia's DAA program: the “Netflix” model



The NEW ENGLAND  
JOURNAL of MEDICINE

## Universal Medicine Access through Lump-Sum Remuneration — Australia's Approach to Hepatitis C

Suerie Moon, M.P.A., Ph.D., and Elise Erickson,  
M.A.

February 14, 2019

The New York Times

## Treat Medicines Like Netflix Treats Shows

Australia seems to have found a way to entice Big Pharma into making essential new medicines affordable. Why can't the United States?

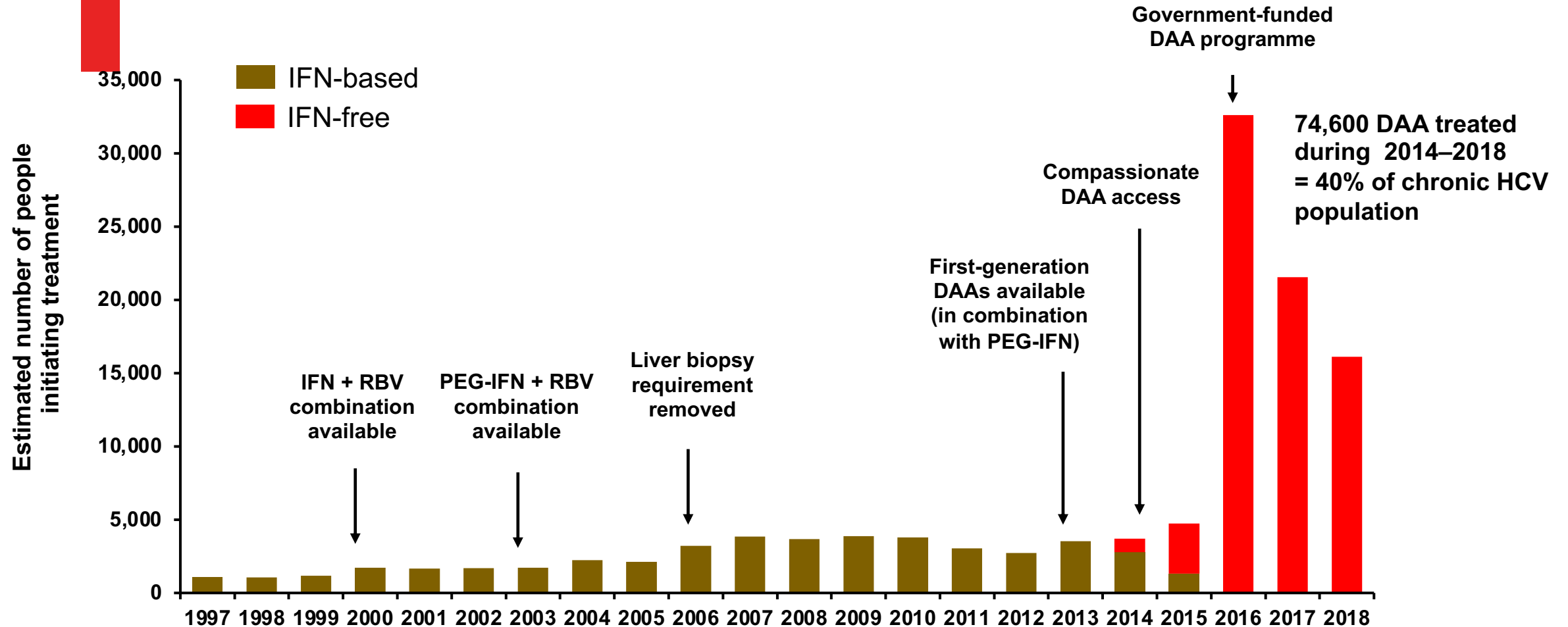


By Tina Rosenberg

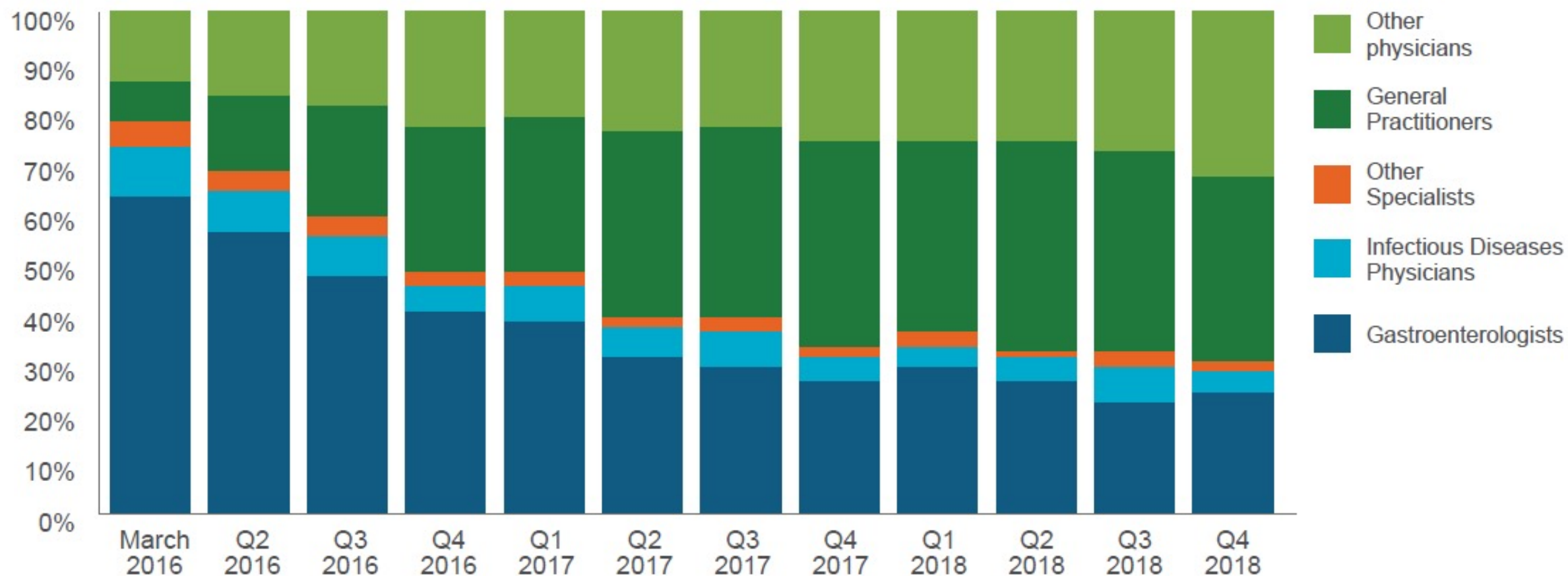
Ms. Rosenberg is a co-founder of the [Solutions Journalism Network](#), which supports rigorous reporting about responses to social problems.

March 5, 2019

# HCV treatment uptake in Australia: 1997–2018



# Increasing proportion of non-specialist treatment



# Hepatitis C prescription utilization in Louisiana Medicaid

Number of direct-acting antiviral prescriptions in Louisiana Medicaid per year

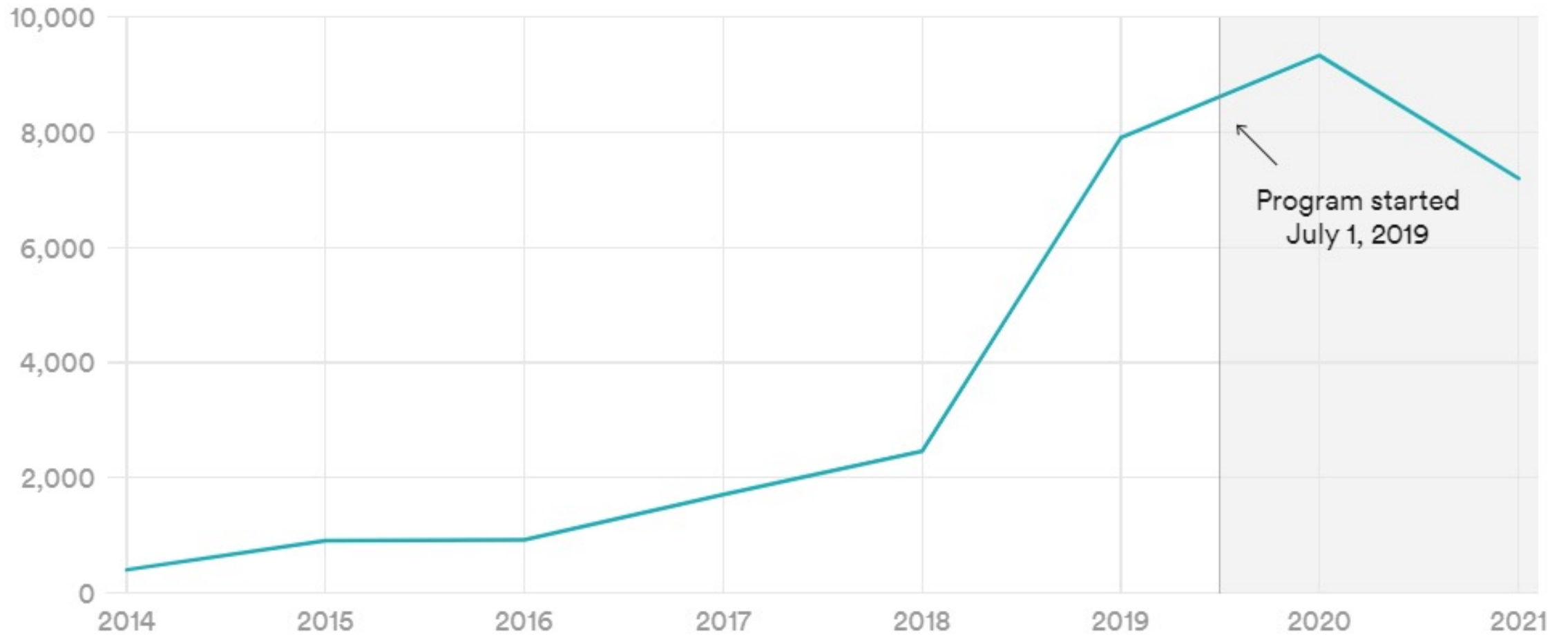


Chart: J. Emory Parker/STAT

<https://www.statnews.com/2022/09/13/louisiana-washington-hep-c-investigation/>



# Hepatitis C prescription utilization in Washington Medicaid

Number of direct-acting antiviral prescriptions in Washington Medicaid per year

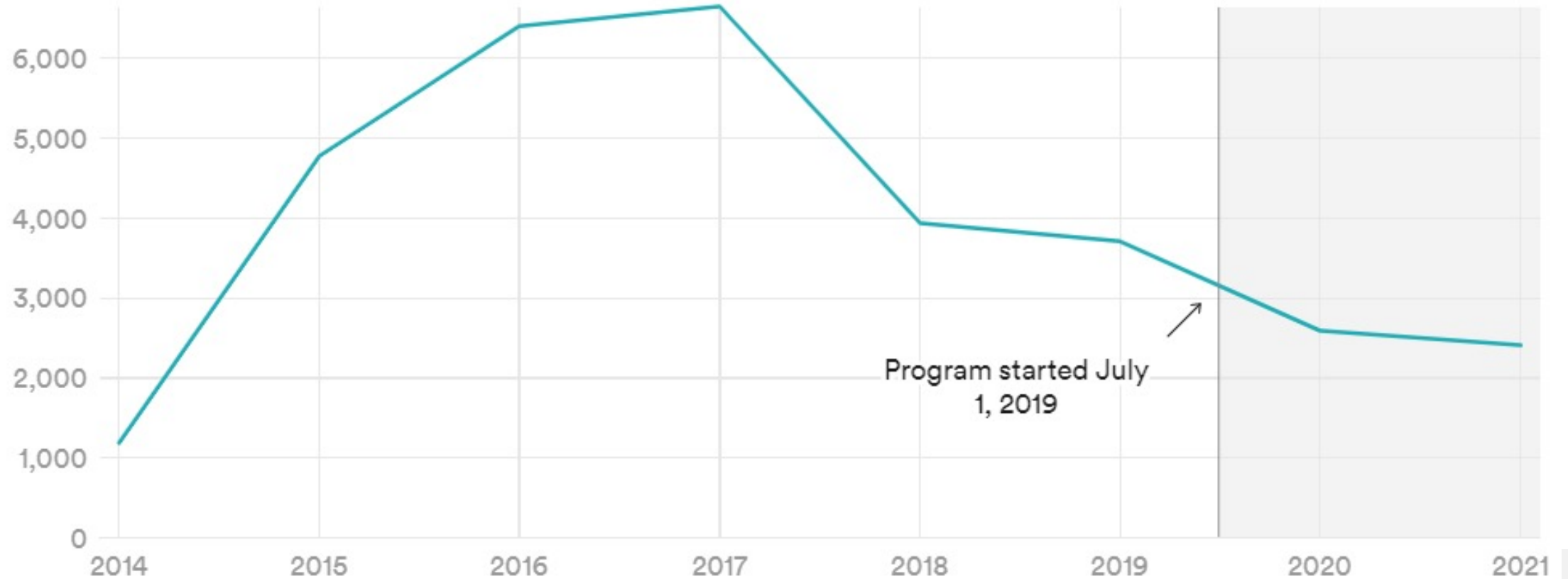


Chart: J. Emory Parker/STAT

# Components of Federal Elimination Plan

---

## **Point-Of-Care (POC) diagnostic tests**

- Enable hepatitis C **single-visit “test and treat” programs** to enhance cascade of care
- Obtain FDA approval of fingerstick test already in use in Australia and Europe

## **Provide broad access to curative hepatitis C medications**

- **National subscription “Netflix” model**
- Fixed sum for drug access negotiated by the US Government
- Drugs then provided for free to Medicaid, uninsured, incarcerated, opioid treatment programs, Native American reservations

## **Empower health care delivery**

- **Expand screening settings for high-risk populations**, including prisons
- Employ innovative telehealth methods, mobile units
- Expand number of community health workers
- Re-energize vaccine research

“

Open your eyes, look within.

—  
BOB MARLEY

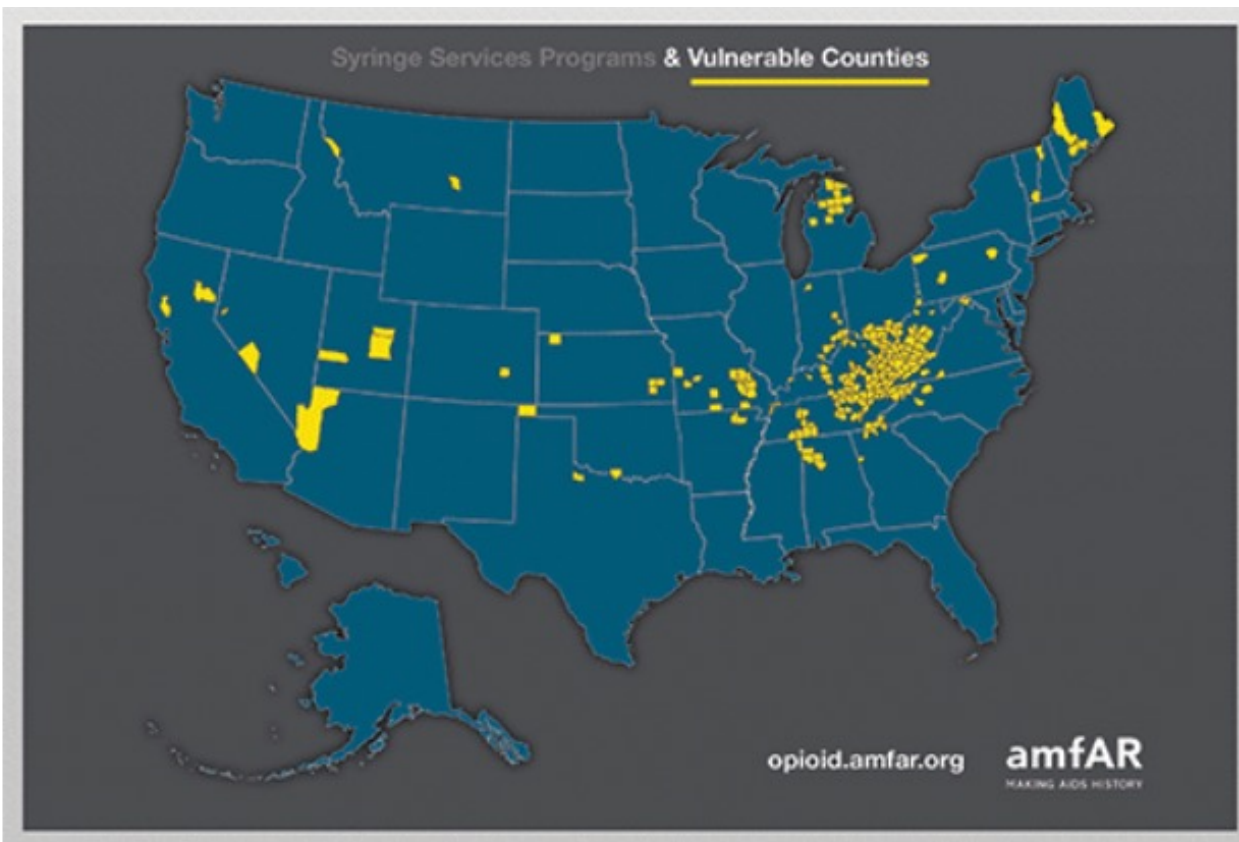
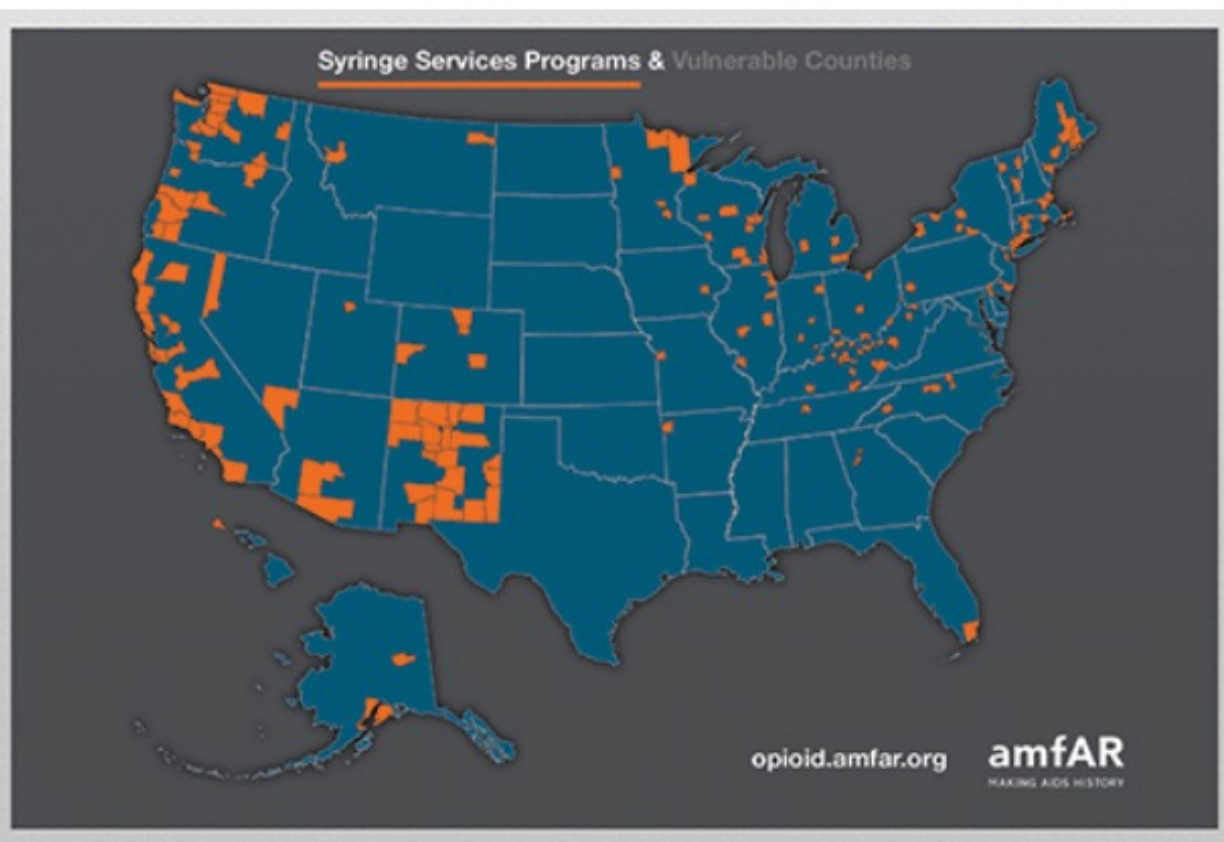
**INTEGRATED  
MODELS OF  
HCV TESTING  
AND  
TREATMENT  
ARE NEEDED**

# Thoughtful Implementation is Key

---

- Timing
  - 1<sup>st</sup> develop the healthcare infrastructure to test and treat
  - Integrated models: bring the cure to the patient
    - FQHCs, Prisons and Jails, SUD treatment, Syringe Service Programs
      - De-Silo reimbursement for sustainable models
    - Funding is needed
      - Clinical champions- protected time
      - Programmatic staff
      - Resources for patient support
      - Meals, transportation, safe storage of medication
  - Once the health care infrastructure is built, THEN, subscribe to Netflix
- Harm reduction is key to prevent reinfection
- Technical Assistance for integrating testing and linkage to care workflows

# Harm Reduction is Critical to HCV Elimination



<https://www.coalitionforsyringeaccess.org/>

# C Change: Technical Assistance to support HCV Elimination



**HEALTH FEDERATION**  
OF PHILADELPHIA

The keystone of community health since 1983



# Re-energize Vaccine Research

- An HCV vaccine is helpful to support HCV elimination goals
- HCV Controlled Human Infection Model (CHIM) likely required to accelerate vaccine development – no other models

**Chimpanzee:**  
Only reliable model of human HCV



**Mice or Human-liver chimeric mice**



- Immunocompetent mice **not permissive to human HCV**
- Chimeric humanized mice **immunocompromised**

**Rat hepatitis virus**



- Not permissive to human HCV
- Even if vaccine strategy developed in this model → **human trials would require human infections**
- **Initial vaccine efforts not predictive of results in humans**



# HCV Controlled Human Infection Model (CHIM)

---

- Utilized in other infectious diseases
- Healthy adult volunteers immunized with a promising vaccine candidate or placebo and then exposed to a well-characterized strain of HCV to assess efficacy
- Although acute HCV infection is typically benign, study participants who develop clinically concerning findings or chronic viremia could be rapidly treated to prevent long-term morbidity
- The potential benefits of CHIM
  - Promising HCV vaccine candidates could carefully and expeditiously be identified
  - Rapidly advanced for further testing in high-risk populations if deemed necessary
  - Minimize the tremendous cost and practical challenges associated with conducting studies in people who inject drugs,
  - Bottlenecks of HCV vaccine development would be effectively sidestepped

# Re-energize Vaccine Research

---

- Page/Cox vaccine study (NIH)- Phase II clinical efficacy trial
  - 6 years (+ planning) with 550 participants (people who inject drugs)
  - Immunogenic and safe
  - No effect on acute or chronic infection
  - **Repeating for every vaccine candidate impractical**
- No clear evidence of long-term risk to transient HCV infection
- Treatment extremely effective with no failures to salvage treatment of acute HCV
- Current protocol to establish standardized CHIM inoculum to be used for all future CHIM globally using acutely infected recipient
- Use of acute donor will minimize inoculum size
- Step-wise increase in duration of infection from 12 to 24 weeks
- Risk mitigation strategies at all steps with clear futility criteria

# Design: Multi-Staged Approach

---

- Establishment of Inoculum
  - Generate an acute inoculum to be used for future CHIM
  - 1 to 4 genotypes – genotypes 1 and 3 +/- others
- Sentinel cohorts
  - Reliable infection - viremia
  - Acute, non-severe hepatitis
  - Reliable (universal) cure with DAAs
- Spontaneous Clearance cohorts
  - Clarify spontaneous clearance rate for each inoculum
- Vaccine Cohorts
  - Vaccinated prior to infection
  - Matched to spontaneous clearance cohort on: sex, race, IFNL4 genotype

# Clinical Infectious Diseases Supplement on HCV CHIM

**Key ethical considerations for HCV CHIM** - Charles Weijer, Annette Rid (NIH) et al

**Choosing the inoculum: virological considerations for HCV CHIM** - Jake Liang (NIH) et al

**Clinical trial design for HCV CHIM** - Jordan Feld, David Thomas (JHU) et al.

**Immunological monitoring in HCV CHIM** - Naglaa Shoukry, et al

**Who would volunteer to be infected: Participant perspective for HCV CHIM** - Jake Eberts (1DaySooner) et al

**Outcome of treatment for acute HCV with direct-acting antivirals** - Marianne Martinello (UNSW), Gail Matthews (UNSW)

**What is the risk of HCC with transient HCV infection or successfully treated chronic HCV infection without cirrhosis?** - Christine Hsu (NIH), David Kaplan (U Penn)

**HCV CHIM vs standard vaccine development for HCV: A value and cost comparison?** - Alyssa Billinski (Brown)

CID 2023:77 (Suppl 3)

Slide credit: Jordan Feld MD, Toronto Centre for Liver Disease

# Yes, the US can be HCV free!

---

Integrated  
Models of Care  
are Key to bring  
cure to patients

A Cohesive  
Federal  
Strategy is  
needed

Remove all  
barriers to  
prescribing  
DAAs

Harm  
Reduction!

A vaccine has  
potential to  
support  
elimination

Ample financial support is needed including reimbursement  
in behavioral health and harm reduction settings