



2023 NCSCG
20TH ANNUAL
3 GI SYMPOSIUM



Elimination of HBV & HCV: Updates in Strategies and Endpoints

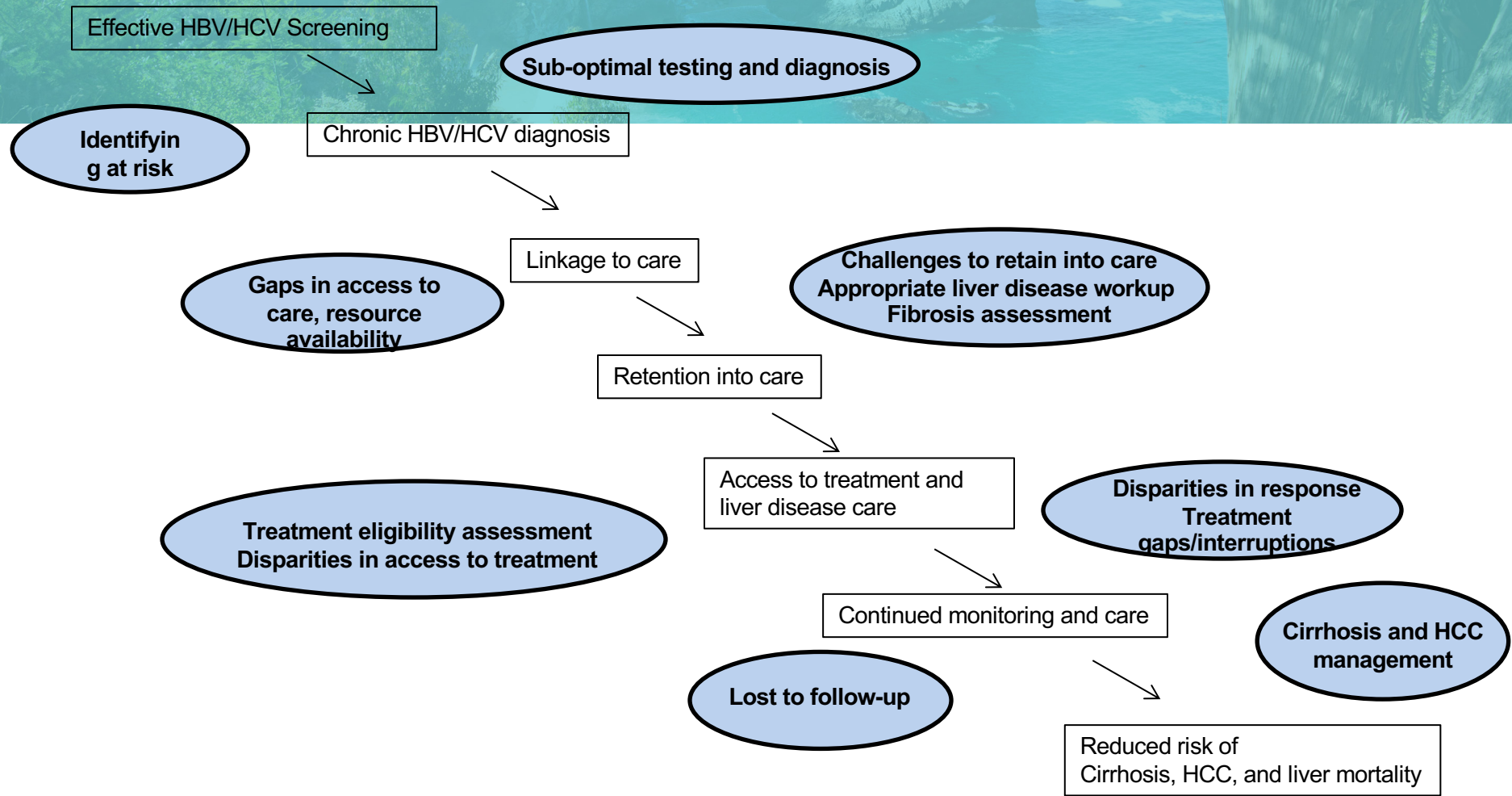
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Disclosures

- Received research funding (to my institution) from Gilead Sciences

Objectives

- Review recent updates in HBV and HCV epidemiology
- Understand the progress towards achieving viral hepatitis elimination with focus on U.S.
- Review challenges and potential strategies in achieving viral hepatitis elimination



HBV Cascade of Care – Global Estimates

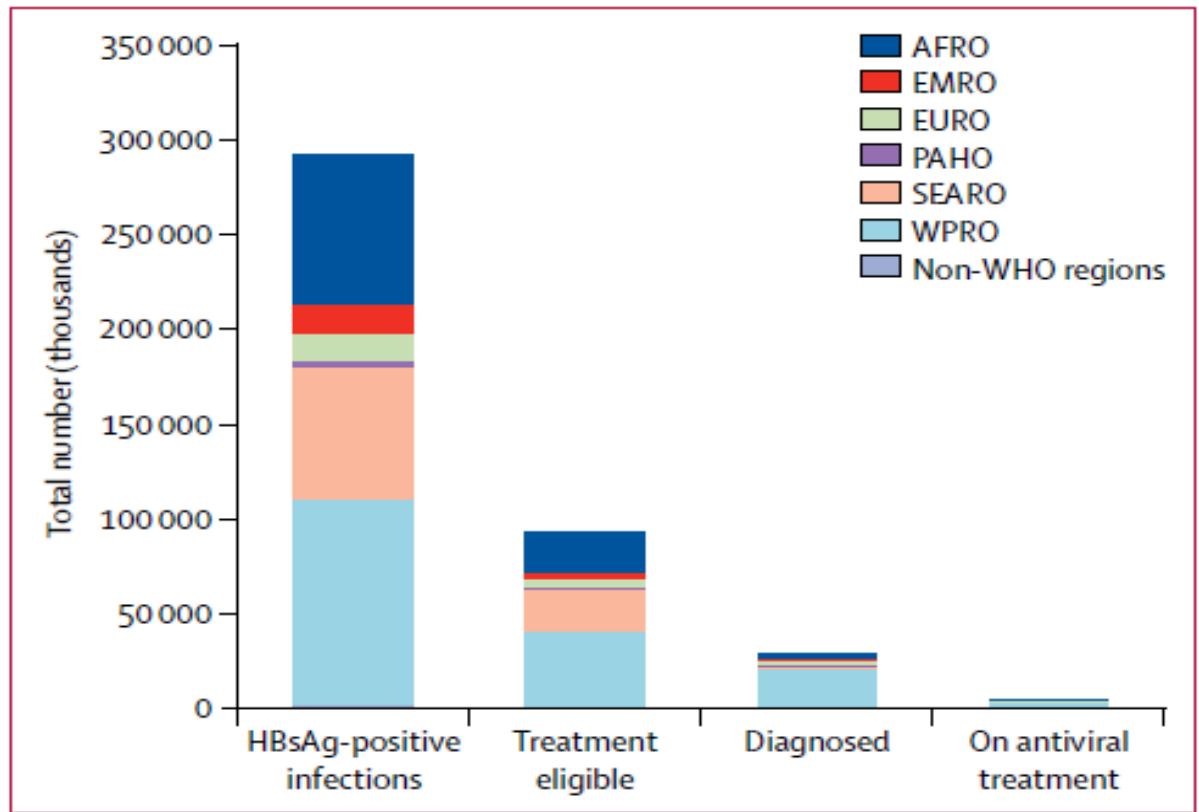


Figure 2: Global and regional hepatitis B virus cascade of care in 2016
AFRO=Regional Office for Africa. EMRO=Eastern Mediterranean Regional Office.
EURO=Regional Office for Europe. PAHO=Pan American Health Organization.
SEARO=South-East Asia Regional Office. WPRO=Western Pacific Regional Office.

HBV Epidemiology and Disease Prevalence

HBV Infections (2016) †
291,992,185
(3.9%)



Diagnosed
10%



Treated
5%



Annual Deaths
864,863



Deaths per minute
2



Birth Dose
46%

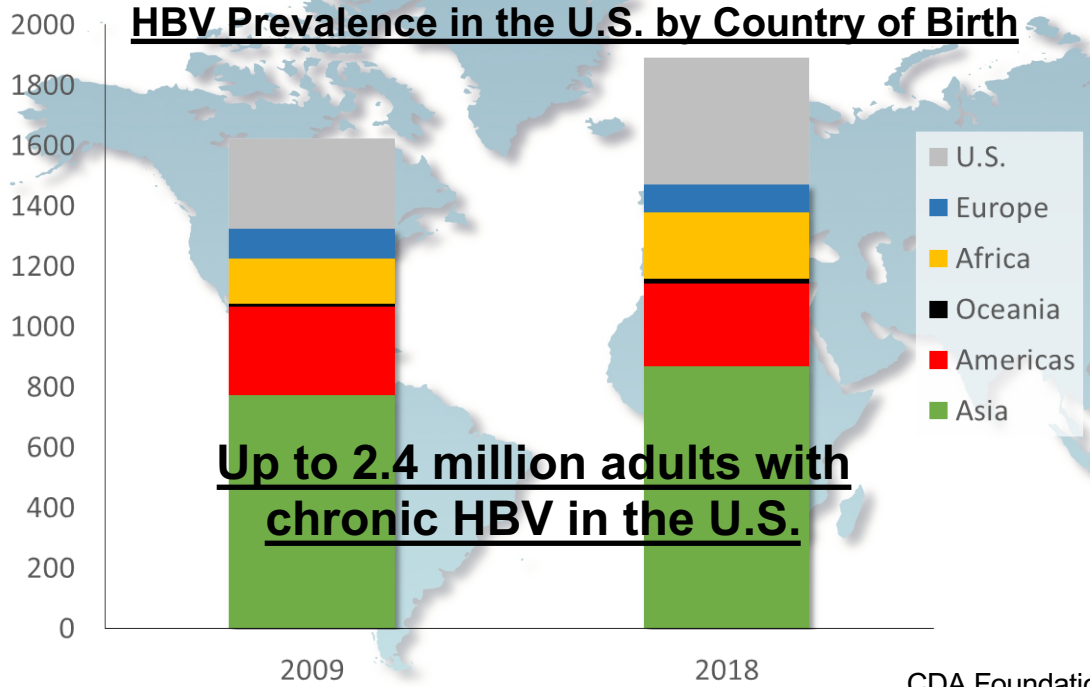


3+ Dose
87%

WHO GOALS by 2030
90% diagnosed
80% treated
65% reduction in mortality

~270 million (2020 estimates)
Less new infections – vaccination
Increased mortality of aging HBV population









HBV Epidemiology – United States



United States

Population: 331,002,651 | 2020 Adult Population: 257,509,854 | World Bank Classification: High income

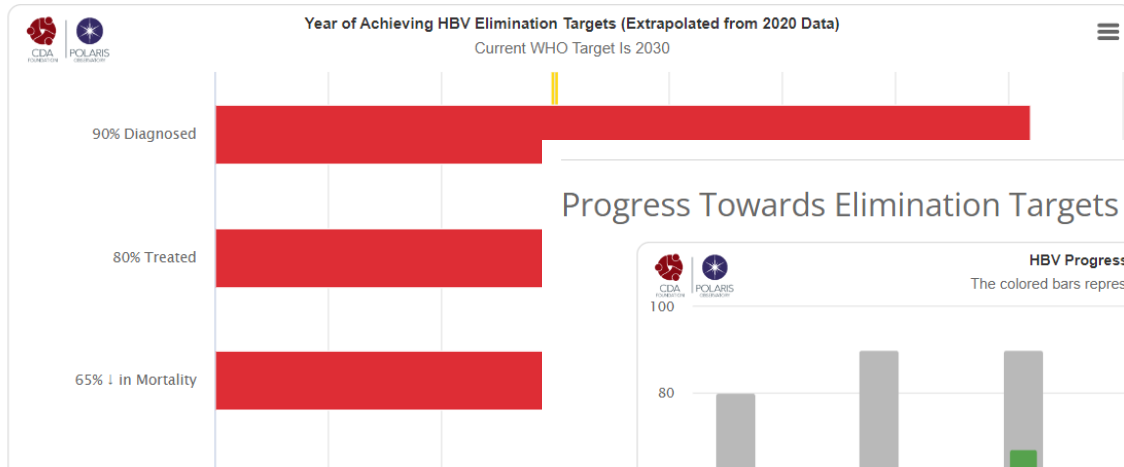
Polaris Estimate | HBV Status: Verified

			
Diagnosed 35%	Treated 31%	Annual Deaths 3,100	Deaths per day 8
			
Birth Dose 64%	3+ Dose 93%	HBIG 50%	Tx Pregnant Women 20%

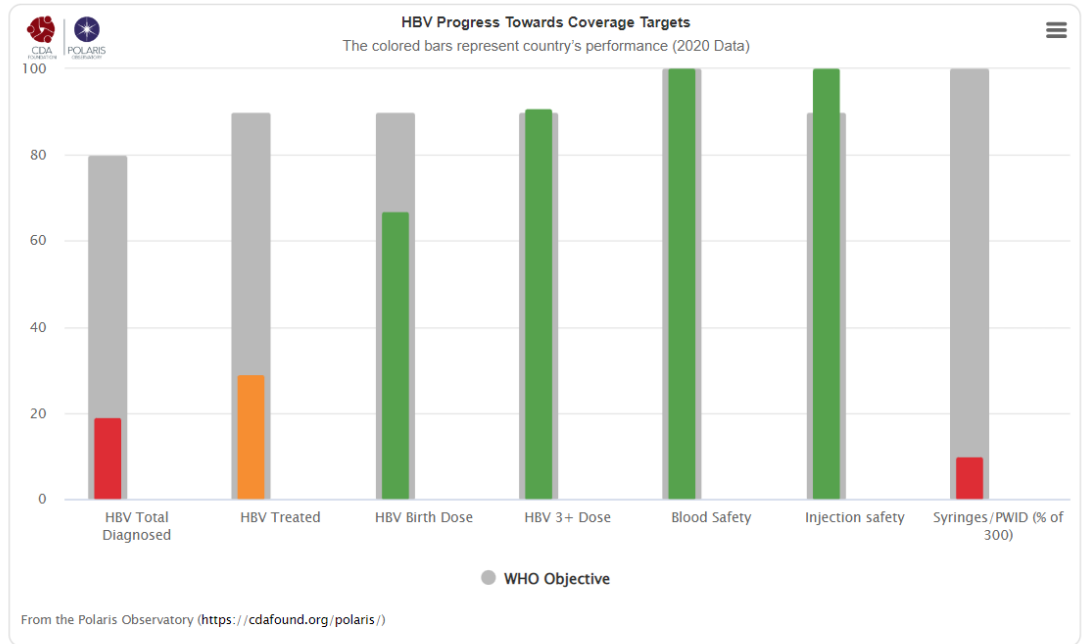
Year of Achieving Elimination Targets (Extrapolated from 2020 Data)

Current WHO Target Is 2030

Year of Achieving All Relative Goals for HBV > Year 2051



Progress Towards Elimination Targets (2020 Data)

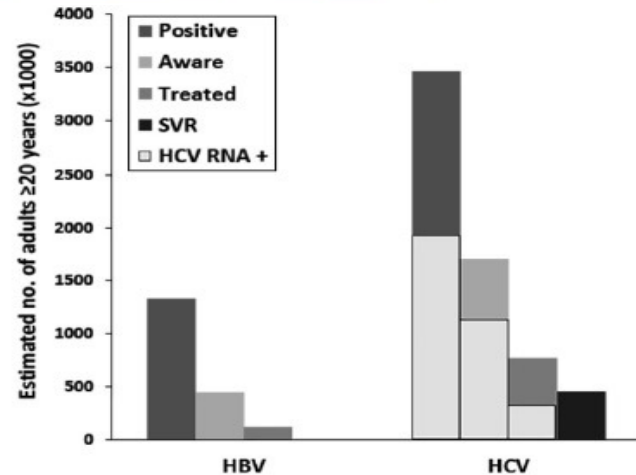
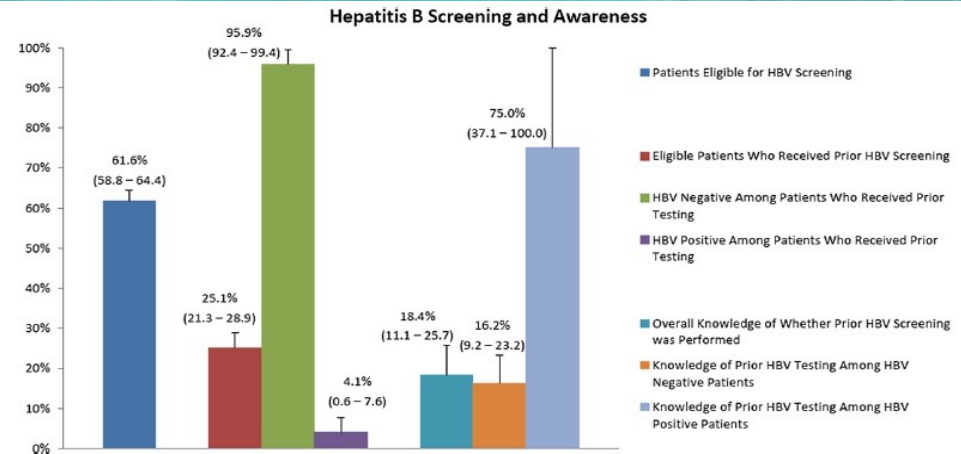


HBV Testing and Timely Diagnosis Remain Sub-optimal

- Data from the Racial and Ethnic Approaches to Community Health across the U.S. (REACH U.S. Cohort) that included ~54,000 ethnic minority individuals across 17 states observed **39.2% tested for HBV**.
- Among 93,000 adults of API ethnicity in the Kaiser Permanente Hawaii health system, **28.3% were tested for HBV**.
- Ogawa et al utilized Truven MarketScan and NHANES data and observed that among the 511,000 commercially insured US adults with chronic HBV, **only 18.6% were diagnosed**.

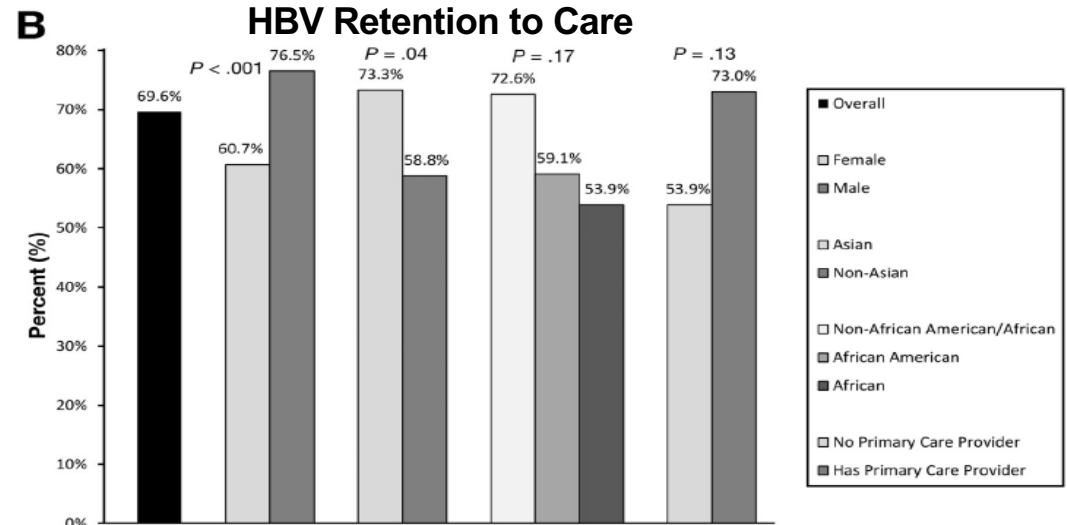
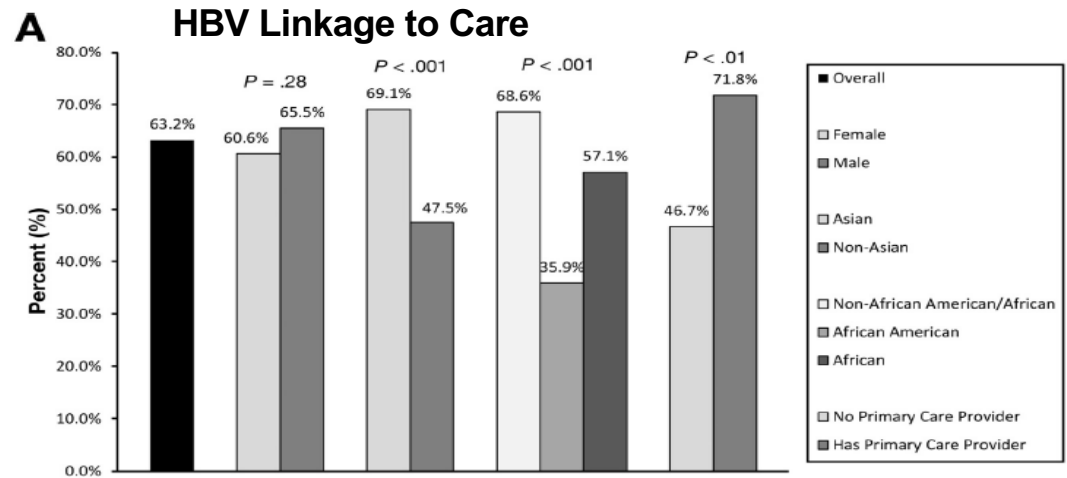
Lack of Awareness and Understanding Contributes to Sub-Optimal Engagement

- Pilot prospective study of 1,125 patients undergoing elective outpatient GI endoscopy to identify opportunities to educate and screen patients for HBV and HCV.
- Overall, 61.6% were eligible for HBV screening, among whom 25.1% received prior testing. **Only 18.5% were aware of prior testing, and 75% of chronic HBV patients were aware.**
- NHANES data from 2013-2016.
- Among HBV patients, **32% were aware of HBV infection.**
- Among those aware, **28% reported HBV treatment.**
- Lower socioeconomic factors (e.g., education level) were associated with less awareness of HBV infection



Low Rates of Linkage to Care After HBV Diagnosis Among Safety-Net Populations

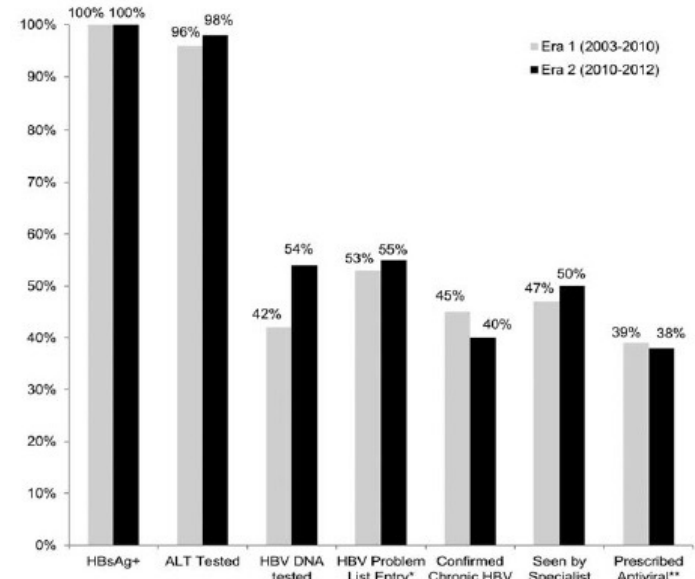
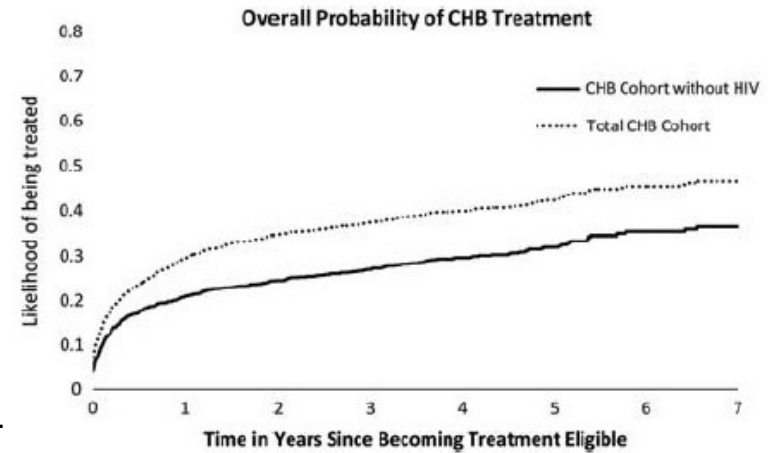
- Retrospective cohort study of adults with chronic HBV at a single center safety-net health system from 2009 to 2017
- Total of 454 chronic HBV patients were included (54.2% men, 72.7% Asian, 14.4% African American, 6.3% African)
- Linkage to care = initial visit with HBV provider after HBV diagnosis
- Retention to care = two additional visits with HBV provider after initial linkage to care



Disparities in HBV Treatment

- From 2010 to 2018, 5,157 chronic HBV patients were identified (54.7% male, 35.5% non-Hispanic white, 34.6% African American, 22.3% Asian, 7.7% Hispanic).
- Among treatment eligible, **48.4% were treated** (37.3% in non-HIV).
- Lower treatment rates in women vs. men (OR 0.40, 95% CI 0.33-0.49) and lower treatment with older age.
- Asians and African Americans significantly more likely to be treated
- Non-English patients more likely than English patients to be treated

- VA national data of chronic HBV patients from 1999 to 2013
- 21,419 patients with HBV identified (94% male, 52% white, 41% African American, 7% API, 5% HIV co-infection)
- Overall, 44% had HBV DNA testing, and of those with confirmed chronic HBV, **< 40% received antiviral therapy.**



HCV Epidemiology and Disease Prevalence



United States

2020 Total Population: 335,942,003 | 2020 Adult Population: 260,590,365
| World Bank Classification High income

HCV Status: *Polaris Estimate*

HCV Infections (2020)†
2,494,000
<1%



Diagnosed

39%



Annual Treated

6%



Annual Deaths

12,423



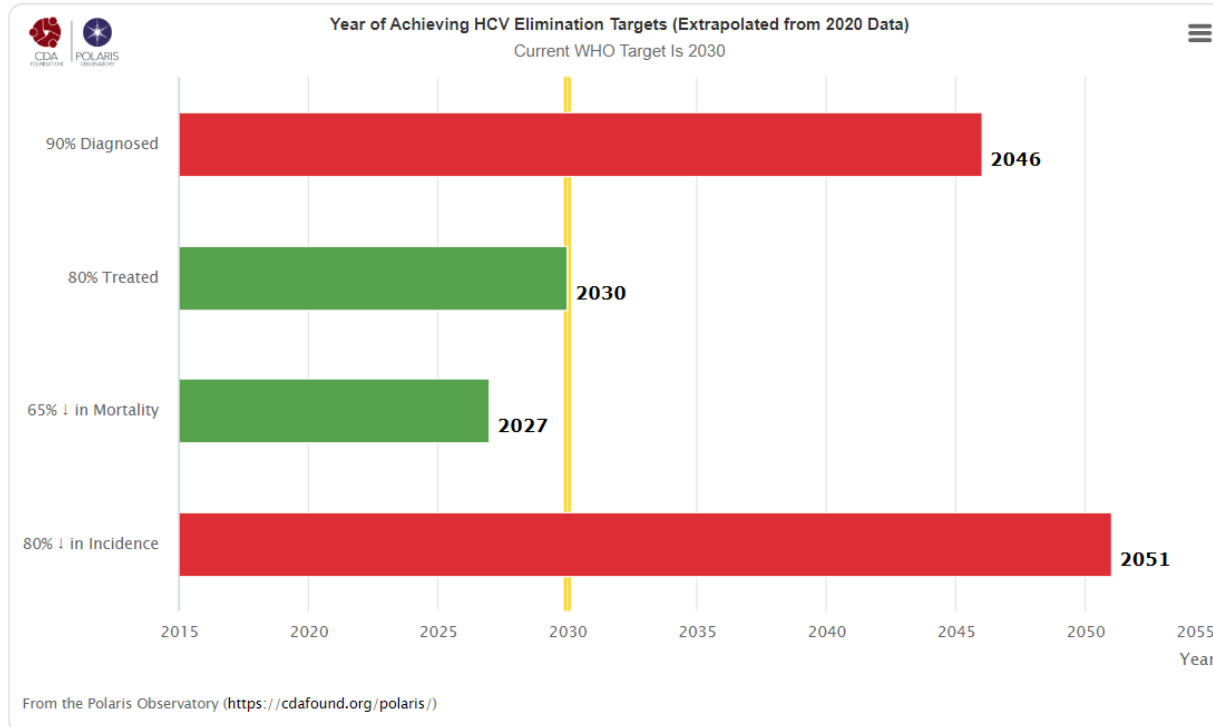
Deaths per hour

1

Year of Achieving Elimination Targets (Extrapolated from 2020 Data)

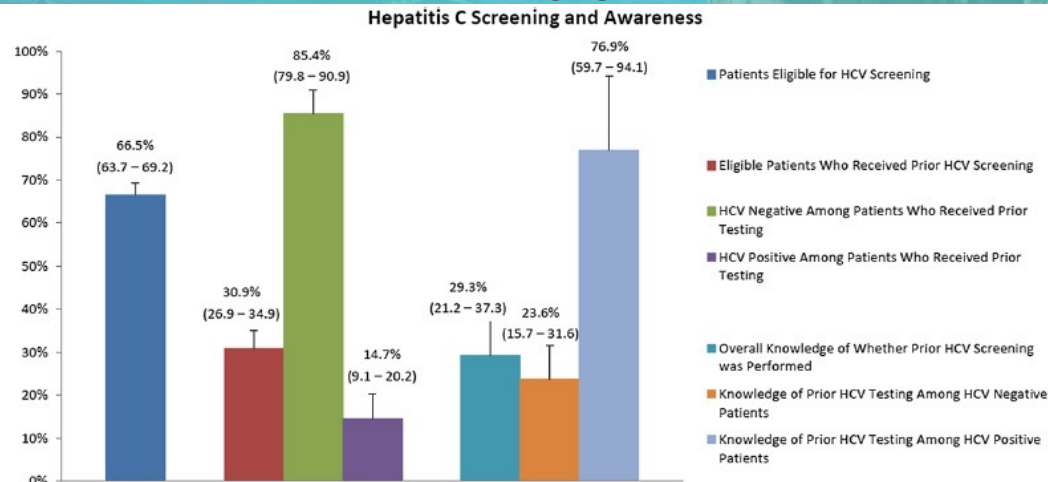
Current WHO Target Is 2030

Year of Achieving All Relative Goals for HCV > Year 2051

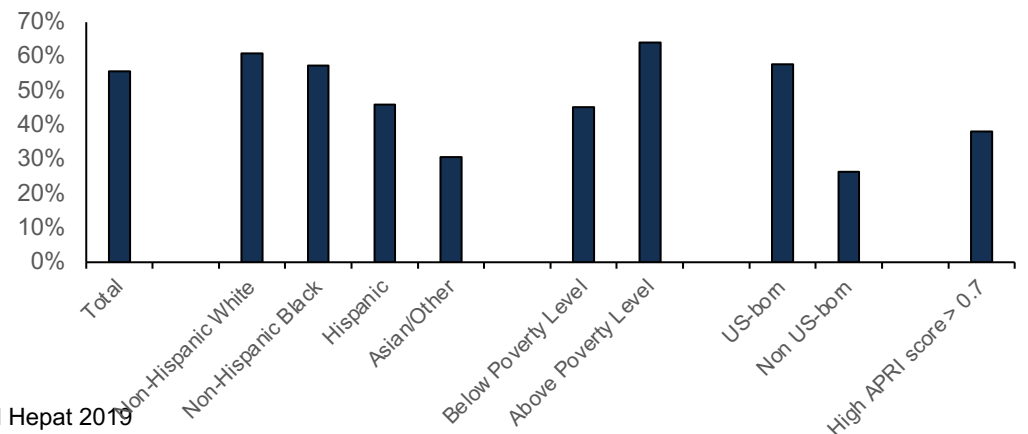


Lack of Awareness and Understanding Contributes to Sub-Optimal Engagement

- Pilot prospective study of 1,125 patients undergoing elective outpatient GI endoscopy to identify opportunities to educate and screen patients for HBV and HCV.
- Overall, 66.5% were eligible for HCV screening, among whom **30.9% received prior testing**. Only 29.3% were aware of prior testing, and **76.5% of HCV positive patients were aware**.
- NHANES data from 2013-2016 to evaluate awareness of HBV or HCV infection.
- Overall, 56% of patients with HCV were aware of their infection.
- Lower awareness among non-white ethnic minorities
- Lower awareness among non-US born and lower income households.
- Alarming, **only 38% of HCV patients at risk for significant fibrosis were aware of their infection**.

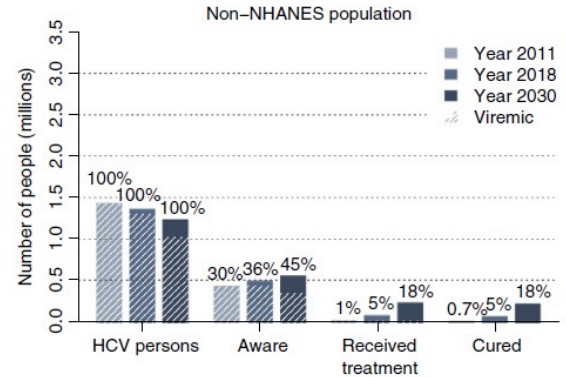
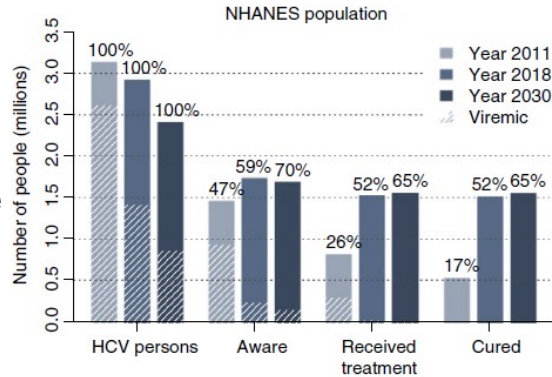
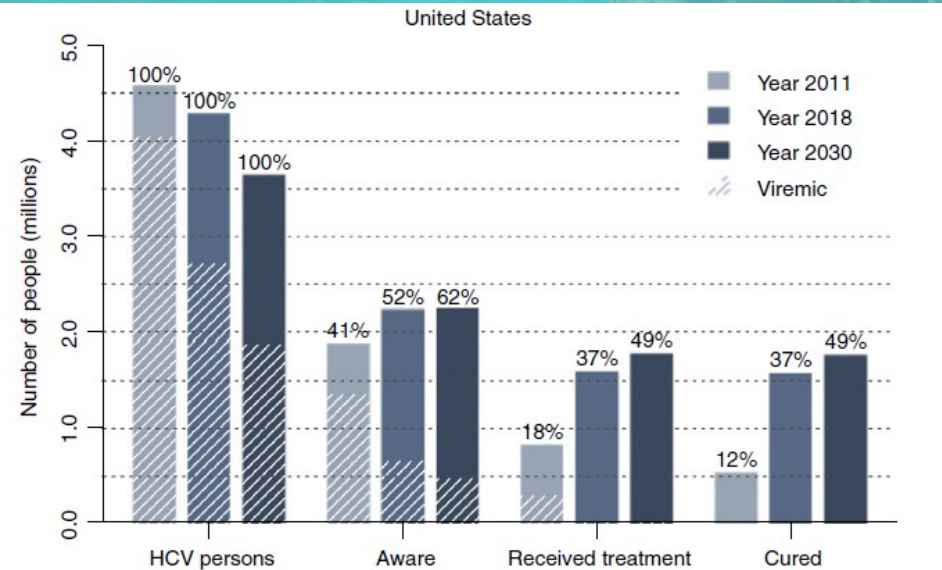


HCV Awareness - NHANES



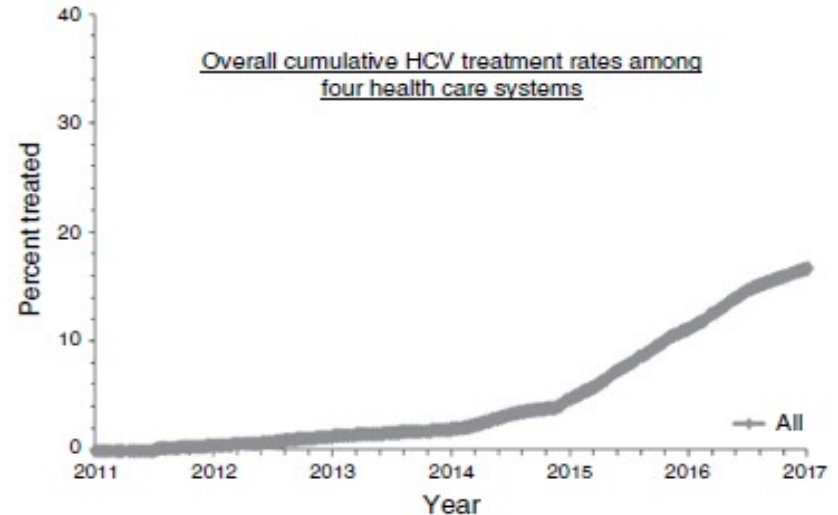
Lack of Awareness and Understanding Contributes to Sub-Optimal Engagement

- Simulated mathematic model of impact of DAAs on HCV cascade of care using NHANES data as well as non-NHANES specific populations (incarcerated, homeless, active-duty military, nursing home, immigrants).
- Modeled changes after 2011 policy updates, DAA era, and 2030 based on status quo
- By 2030, improvements realized, but major gaps in the HCV cascade of care persist
- High-risk non-NHANES populations experience disproportionately greater gaps in progressing to treatment and cure



Disparities in HCV Treatment Across Multi-Center Safety-Net Study

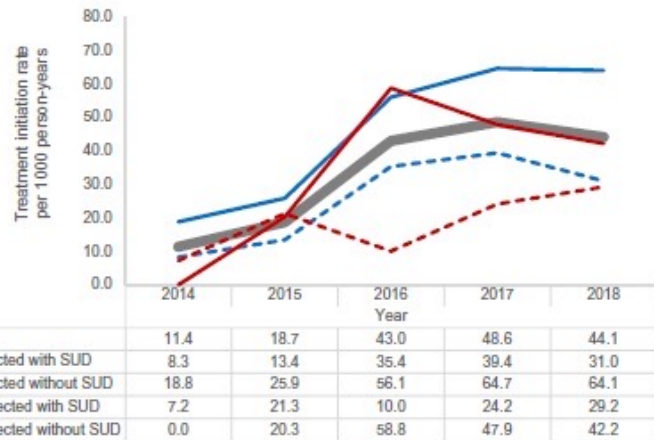
- Retrospective cohort study of 4 safety-net health system to evaluate disparities in access to HBV or HCV treatment
- From 2011 to 2017, 29,544 chronic HCV patients were identified (60.5% male, 55.9% white, 38.4% African American, 8.8% Hispanic) and **overall cumulative treatment was 16.9%**.
- Compared to non-Hispanic whites, significantly **lower odds of treatment in Hispanics** (OR 0.48, 95% CI 0.39-0.60).
- Compared to commercially insured patients, **significantly lower odds of treatment in patients with Medicaid** (OR 0.21, 95% CI 0.20-0.24) or none/indigent care (OR 0.19, 95% CI 0.15-0.21).



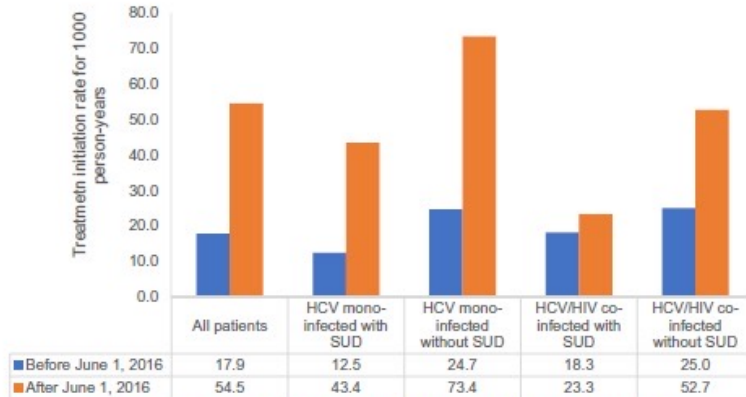
	Year						
	2011	2012	2013	2014	2015	2016	2017
Treatment rate (%)	0.5	1.4	2.0	4.8	11.1	16.4	16.9



- Retrospective study of Florida Medicaid claims data from 2013-2018.
- Among 14,063 newly diagnosed chronic HCV patients, DAA treatment increased following removal of fibrosis stage restriction in 2018, but **only 8% received DAA overall**.
- Co-infection with HIV or concurrent substance use disorder was associated with **47-59% less likely to receive HCV DAA**.
- Compared to non-Hispanic whites, African Americans also **30% less likely to receive HCV treatment**.

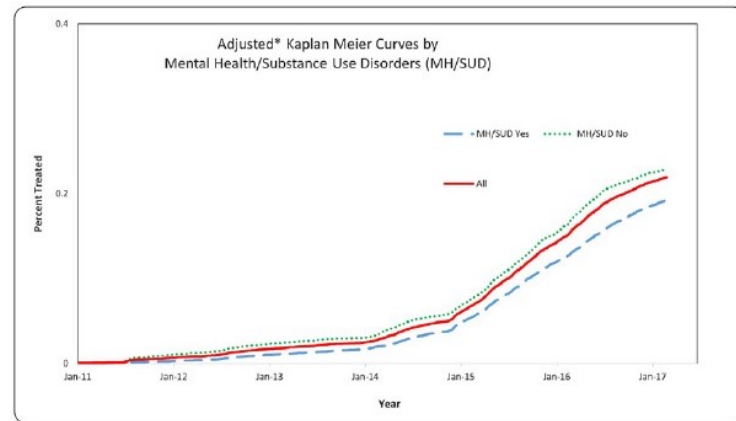


HCV: hepatitis C virus, SUD: substance use disorders, HIV: human immunodeficiency virus
 * Cochran-Armitage test was used to test trends (P<0.001).



DAA: direct-acting antiviral, HCV: hepatitis C virus, SUD: substance use disorders, HIV: human immunodeficiency virus
 Chi-square tests were used to compare treatment initiation rates before and after June 1, 2016. (all groups had significant increases within each group (P<0.01) except those with HCV/HIV with SUD (P=0.08).

- Multi-center safety-net cohort of 29,544 chronic HCV patients from 2011-2017
 - HCV treatment increased from 3.5% to 21.7% post DAA
 - Concurrent **mental health or substance use disorders** were associated with significantly lower odds of receiving HCV treatment (aOR 0.63, 95% CI 0.55-0.71)



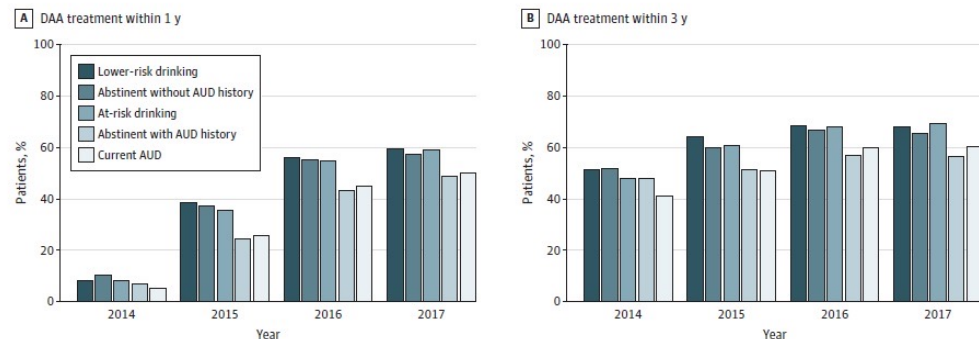
Cumulative treatment risk (%) across 7-year study: January 2011 - February 2017							
MH/SUD	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
No	1.0	2.3	3.0	6.6	14.6	21.1	21.6
Yes	0.2	0.8	1.3	3.6	8.6	13.2	13.6
All	0.5	1.4	2.0	4.8	11.1	16.4	16.9

*Adjusted for age, gender, race/ethnicity, insurance status, cirrhosis

- National VA data of ~134,000 chronic HCV patients from 2014-2020

– Increasing rates of treatment over time, but patients with **past or present history of alcohol use disorder** (based on AUDIT-C) were ~25% less likely to be treated (HR 0.75, 95% CI 0.70-0.81) compared to lower risk drinking behavior

Figure. Percentage of Patients With Hepatitis C Virus Within Veterans Health Administration Birth Cohort Receiving Direct-Acting Antiviral (DAA) Treatment Within 1 and 3 Years by Alcohol Use Category and Index Year



Timely Viral Hepatitis Screening is the First Step

- Low rates of screening and delays in viral hepatitis diagnosis persist
- This contributes to continued disease progression, liver-related morbidity and mortality
- Effective screening programs are key first step to timely diagnosis, followed by downstream linkage to care and treatment

What are current challenges with implementing effective viral hepatitis screening?

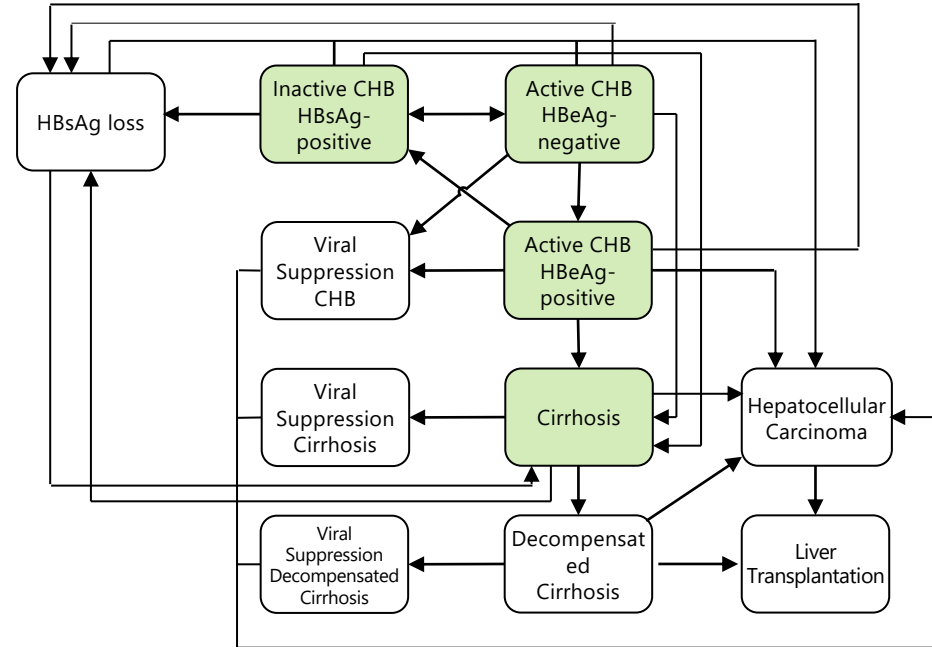
- Complexity of risk-based testing assessment – not any more
- Stigmatization
- Engaging individuals into care for testing and follow-up care
- Knowledge and awareness at both patient and provider level
- Health system or public health infrastructure to implement effective screening programs
- Health policy support (e.g. AB 789 California)

In Support of One-Time Universal HBV Screening

- Reduce barriers and stigma associated with HBV testing
- Simplify testing approach and learn from failures of risk-based testing (e.g. evolution of HCV screening)
- Timely diagnosis to facilitate linkage to care and treatment
- HBV testing should be linked with HBV vaccination – better align vaccination to those who would benefit and minimize false reassurance
- Recent data demonstrating cost-effectiveness of this approach

Cost-Effectiveness of One-Time Universal HBV Screening among U.S. Adults

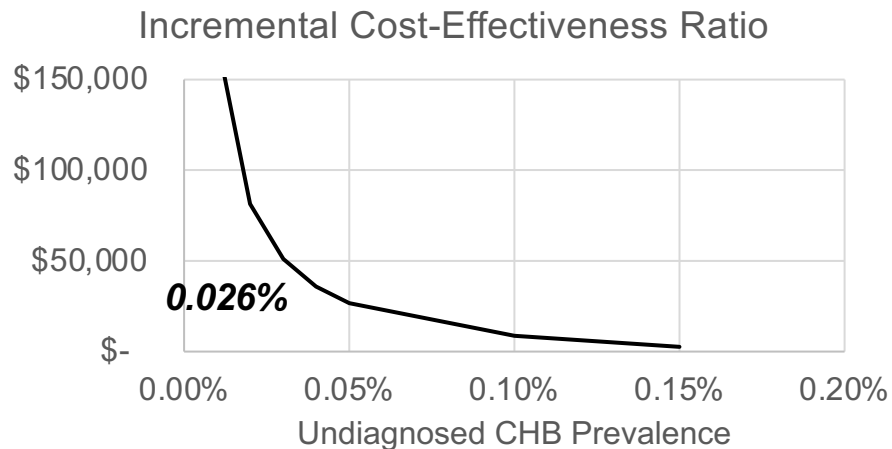
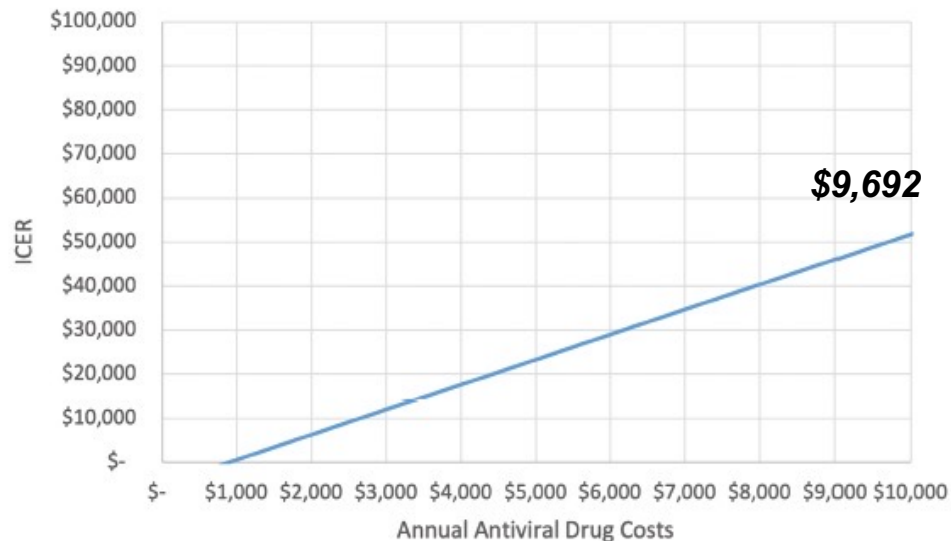
- Markov model was developed to calculate the costs, population health impact, and cost-effectiveness of one-time universal screening and CHB monitoring and treatment compared with current practice.
- Thresholds for cost-saving or cost-effectiveness based on a willingness to pay of \$50,000/quality-adjusted life-year.
- The analysis assumed testing would be performed during routine healthcare visits and that generic tenofovir or entecavir would be utilized for treatment.





Compared to current practice, one-time universal screening would lead to:

- 7.4 fewer cases of cirrhosis
- 3.3 fewer cases of decompensated cirrhosis
- 5.5 fewer cases of HCC
- 1.9 fewer HBV-related liver transplantations
- 10.3 fewer HBV-related deaths
- Cost savings of \$262,857
- Gain of 135 QALY per 100,000 adults 18-69 years
- Overall **23,000 deaths averted and over \$556 million in cost-savings**, which would be even higher if chronic HBV prevalence is significantly greater than NHANES estimates



Updated HBV Screening and Testing Recommendations – CDC, March 10, 2023

- HBV screening at least once during lifetime for adults aged ≥ 18 years
- Triple panel testing: HBsAg, anti-HBs, total anti-HBc
- Rationale for new recommendations:
 - Simplifying implementation of screening to improve diagnosis
 - Risk-based testing has failed and has been a barrier to timely diagnosis
 - Assessment of risk is complex and risks stigmatizing individuals
 - Early diagnosis and treatment reduces morbidity and mortality and reduces transmission
 - Cost-effective
 - Readily available inexpensive testing
 - Identify individuals at risk of reactivation and appropriate for linking to HBV vaccination

Universal Hepatitis B Vaccination in Adults Aged 19–59 Years:
Updated Recommendations of the Advisory Committee on
Immunization Practices — United States, 2022

Weekly / April 1, 2022 / 71(13);477–483

Please note: This report has been corrected.

Mark K. Weng, MD¹; Mona Doshani, MD¹; Mohammed A. Khan, PhD¹; Sharon Frey, MD²; Kevin Ault, MD³; Kelly L. Moore, MD⁴; Eric W. Hall, PhD⁵; Rebecca L. Morgan, PhD⁶; Doug Campos-Outcalt, MD⁷; Carolyn Wester, MD¹; Noele P. Nelson, MD, PhD¹ ([View author affiliations](#))

Challenges to Effective Implementation of Universal HBV Screening

- Lack of healthcare resource and infrastructure – many chronic HBV individuals live in underserved communities with disparities in access to care
- How to expand access to HBV testing?
 - Testing in non-traditional settings (e.g. lessons learned from HCV)
 - Testing by other providers (e.g. pharmacists, nursing)
- What is the role of public health departments in testing, tracking, facilitating linkage to care and treatment?
- Must ensure infrastructure to facilitate effective linkage of care for identified chronic HBV patients as well as linkage to vaccination for test negative
- What can we learn from COVID pandemic infrastructure and protocols for testing, tracking, and implementing vaccinations?

Barriers to Viral Hepatitis Screening and Linkage to Care

Patient-Level Issues

- Lack of access to regular healthcare services
- Competing healthcare priorities (e.g., substance abuse, mental illness)
- Stability factors (e.g., housing, employment)
- Other factors: (asymptomatic, unaware of consequences, fears of treatment, stigma)

Provider-Level Issues

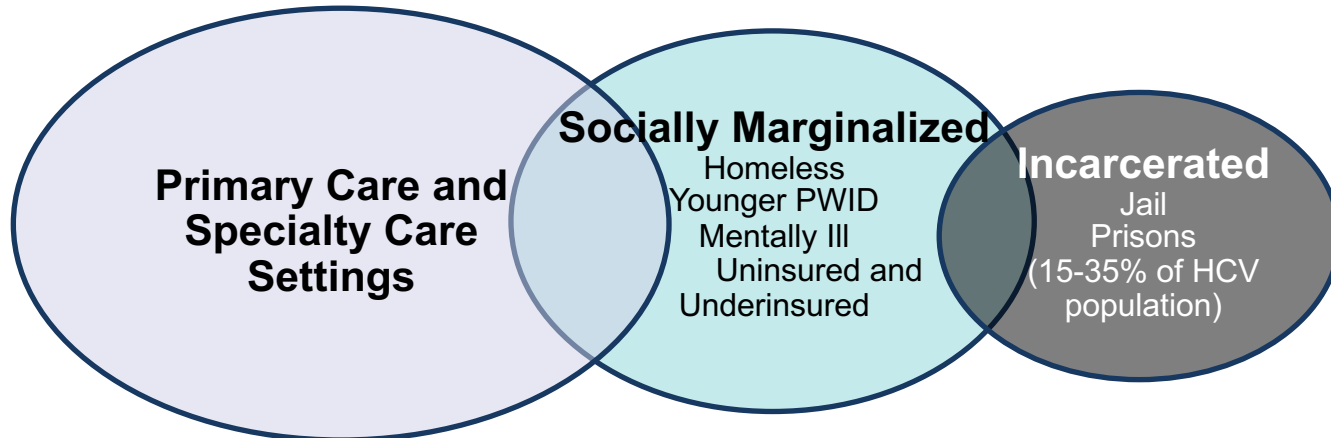
- Limited number of treaters in certain areas
- Limited knowledge about viral hepatitis and current treatment options
- Lack of prioritization/willingness to treat HBV/HCV
- Misperception candidates for treatment (e.g., substance abuse, risk for re-infection)

Healthcare System Issues

- Multi-step process for testing, diagnosis, linkage to care
- Need for support services (case managers, navigators, social workers)
- Limited accessibility of HBV/HCV care locations (distance, time to appointment)
- Multi-step referral pathway and segregated service delivery

Potential Strategies– Screening in Non-Traditional Settings

- Effective implementation will need to expand testing beyond primary care settings
 - Underserved populations with limited access to healthcare
 - Disadvantaged populations not engaged into healthcare settings
- Some of the highest risk individuals (particularly for HCV) are socially marginalized populations
- Screening needs to be incorporated into routine care across all spectrums of healthcare access and settings



Learning from the Success of Implementing Screening in Non-Traditional Settings for HCV

Location	Services
ED (Emergency Department)	<ul style="list-style-type: none"> ▪ Serve as safety net for low income and under/uninsured population ▪ High rates of ED utilization among population of undiagnosed HCV
FQHC (Federally Qualified Health Centers)	<ul style="list-style-type: none"> ▪ High risk population ▪ In conjunction with Project-ECHO, shown to achieve high SVR rates ▪ Opportunity to diagnose and treat in same location
Needle Exchange Programs	<ul style="list-style-type: none"> ▪ Harm reduction services are opportunities for testing, referral and in some cases treatment for younger population
Psychiatric Facilities	<ul style="list-style-type: none"> ▪ Active opioid detoxification programs shown to have high prevalence of younger undiagnosed HCV (>40%) ▪ Population is younger (<35y) suburban heroin users
OBOT Programs (Office-based opioid therapy programs)	<ul style="list-style-type: none"> ▪ Patients treated with buprenorphine in an outpatient setting shown to have high prevalence of undiagnosed HCV (>40%) ▪ Tends to be older (>30y) population with government insurance

Potential Strategies– Increasing Patient Awareness and Engagement

Use of Patient Reminders

- Minimal interventions such as reminder calls and text messages are low-cost interventions that can increase rates of linkage to care

Patient Education and Outreach

- Direct to consumer education and PR outreach to emphasize new guidelines and importance of screening and early diagnosis
- Education to correct misperceptions (“look fine, feel fine”, side effects)
- Address stigma of viral hepatitis
- Patient knowledge increases engagement which improves screening, linkage to care and treatment

Potential Strategies – Targeting Provider Factors

Increase PCP awareness of HBV/HCV and treatments

- Educate on long-term risks of HBV/HCV and treatment options
- Emphasize importance of screening, diagnosis, timely treatment
- Identifying local champions

Increase use of electronic medical records

- Implementation of EMR prompts and best practice alerts to flag patients for screening
- Automated clinical decision support tools and care management pathways

Potential Approaches for Effective Implementation

- Leverage integration into electronic health records
- Eliminate financial barriers associated with testing
- Engage stakeholders to work together – patients, providers, health systems, payers, public health departments
- Leverage existing infrastructure and care models that have worked – HCV, COVID, HIV, TB
- Incorporate HBV testing and vaccination into quality metrics
- Simplify treatment and make it more accessible

Multi-factorial Barriers to Effective Viral Hepatitis Care and Elimination

Patient Factors

- Medical literacy and education/awareness
- Socioeconomic factors
- Age, sex, race/ethnicity
- Primary language
- Substance use
- Health insurance
- Access to care
- Stigma

Provider Factors

- Knowledge and up to date with guidelines
- Attitudes & bias
- Experience with patients with viral hepatitis and chronic liver disease
- Perception of barriers to screening and treatment
- Competing demands

Timely and Appropriate Viral Hepatitis Care

Health System Factors

- Availability of providers
- Infrastructure and resources to support screening implantation and linkage to care
- Location of services
- Type of practice setting

Payors

Patient Advocate Groups

Public Health Departments

Medical Societies

Take Home Points

- We are not on track to meet WHO viral hepatitis elimination goals for viral hepatitis in the U.S.
- Improvements in HCV have been achieved but many remain undiagnosed and untreated. Novel interventions are needed to improve cascade of care - \$11 billion over 5 years in proposed budget
- Recent updates in HBV guidance – universal screening and near-universal vaccination will improve timely diagnosis and treatment. More resources and collaboration are needed to implement this guidance, while ensuring successful linkage to care and treatment.
- More work to be done – outreach, advocacy, education, research, implementation



Thank you

- Northern California Society for Clinical Gastroenterology
- NCSCG GI Symposium Organizing Committee

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