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Overview

• Hepatitis C virus (HCV) background
• Barriers to HCV care
• Solutions
• Surveillance, Screening, and Linkage-to-Care
• State-level HCV elimination efforts
• HCV elimination requirements
HEPATITIS C VIRUS

A brief background
Hepatitis C Virus (HCV)

Virus that infects the liver
Spread through infected blood
Substance users & baby boomers
Untreated can lead to liver failure and liver cancer

Kills more Americans each year than HIV + 60 other infectious diseases combined

17,253 HCV-related deaths in 2017
HCV progression is mostly asymptomatic over 20-30 years.
Populations most at risk for HCV

- Historically – Baby Boomers
- Currently – Patients who inject drugs (PWIDs)

Rates of reported acute hepatitis C, by age group
— United States, 2003–2018

Primarily younger PWIDs living in rural areas
HCV-Related Disparities Among African Americans

- **Disease prevalence among African Americans vs non-Hispanic White persons**
  - Twice as high as non-Hispanic whites
  - Less likely to spontaneously clear HCV infection
  - Higher risk of ESLD complications
  - Hepatocellular cancer rate 2x higher
  - Lower likelihood of getting on transplant list

- **Awareness of HCV infection and treatment among African Americans vs non-Hispanic White persons**
  - Less likely to be aware of HCV infection
  - Less likely to be referred and linked to specialty care
  - Less likely to receive HCV treatment
  - Less likely to be listed for transplant
  - Longer liver transplant wait lists
Highest HCV-Associated Death in Non-Hispanic AI/AN and Non-Hispanic Blacks

- CDC analysis of 2016-2017 Multiple Cause of Death (MCOD) and National Vital Statistics System data

- In 2017 there were 17,253 HCV-associated deaths among 325.7 million US residents and 2.8 million total deaths

- Age-adjusted HCV-associated death rate: 4.13/100,000 population (95% CI: 4.07-4.20)

- Racial disparity in HCV-associated deaths:
  - Ref: Non-Hispanic White 3.70 (3.63-3.78)
  - Highest: Non-Hispanic AI/AN 10.24 (9.04-11.44), Non-Hispanic Black 7.03 (6.79-7.28) and Hispanic (5.29 (5.09-5.51)
  - Lower: Non-Hispanic API 1.86 (1.67-2.05)

<table>
<thead>
<tr>
<th>Category</th>
<th>United States</th>
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<tbody>
<tr>
<td></td>
<td>Rate (95% CI)</td>
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<tr>
<td>Overall</td>
<td>4.13 (4.07-4.20)</td>
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<tr>
<td>Sex</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>6.12 (6.01-6.23)</td>
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<tr>
<td>Female</td>
<td>2.32 (2.26-2.39)</td>
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<tr>
<td>Race/ethnicity</td>
<td></td>
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<tr>
<td>Non-Hispanic White</td>
<td>3.70 (3.63-3.79)</td>
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<tr>
<td>Non-Hispanic Black</td>
<td>7.03 (6.79-3.79)</td>
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<tr>
<td>Hispanic</td>
<td>5.29 (5.09-5.51)</td>
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<tr>
<td>Non-Hispanic API</td>
<td>1.96 (1.67-2.05)</td>
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<tr>
<td>Non-Hispanic AIAN</td>
<td>10.24 (9.04-11.44)</td>
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<tr>
<td>Year of birth</td>
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<tr>
<td>Before 1945</td>
<td>6.52 (6.21-6.83)</td>
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<tr>
<td>1945-1965</td>
<td>16.90 (16.62-17.19)</td>
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<tr>
<td>After 1965</td>
<td>.91 (.87-.95)</td>
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</table>

Evolving HCV Treatment
It’s Come a Long Way

- SVR = sustained virologic response = undetectable virus
- SVR12 = SVR at ≥12 weeks after completion of HCV treatment
- SVR12 = HCV cure

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

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

Feld JJ et al. NEJM 2016; Foster G et al NEJM 2016
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

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.

HCV Elimination – Why now?

- Direct acting antivirals (DAAs)
- If done properly, HCV DAA’s have:
  - Near universal efficacy
  - Shortened duration of therapy
  - Minimal adverse events & impact on patient’s quality of life
- Can combine HCV treatment medications from different classes
  - Multiple targets to increase efficacy
  - Decrease risk of viral resistance
HHS and WHO

- HCV elimination by 2030

Only Connecticut, South Carolina, and Washington are on track to meet 2030 HCV elimination target.

HCV elimination requirements

• Remove policy barriers (e.g. prior authorizations)
• Improved provider education
• Patient advocacy, education, and outreach
• Innovative treatment models to engage traditionally underserved populations
• Coalition building of organizations most impacted by HCV (e.g. state health departments, department of corrections, Medicaid & third party payers)
• Subscription-based medication models
HCV Therapeutic Divide

**HCV Treatment**
- Near universal efficacy
- Minimal side effects
- Short treatment duration
- All-oral medication

**HCV Disease State**
- HCV infections continue to rise due to ongoing opioid epidemic
- Up to 50% unaware of HCV infection
- Shortage of treatment providers
BARRIERS TO CARE
HCV Off-Site Referral Model

Methadone Programs

HCV providers are limited at OTPs

Barriers to Care

Liver Clinic
Barriers to Off-Site Referral

Variety of real-world barriers prevent HCV treatment access

- Stigma associated with substance use
- Lack of knowledge about HCV
- Competing priorities
- Limited or no insurance

78% of hepatitis C virus (HCV) infected patients at addiction centers are willing to get treated [1]

Only ~5% of HCV+ patients with addiction get treatment

Barriers among providers

- Concerns over re-infection
- Patient adherence
- Difficult to treat
- Provider shortage

Provider perceived barrier and facilitator to HCV treatment initiation

Treatment Cost

• Historically a challenge but prices have come down in recent years
• Discriminator State Medicaid Restriction Grades (via Stateofhepc.org)
  - Mississippi, South Dakota, and Arkansas are only two states with grade below a C

Reference: https://stateofhepc.org/report/#find-your-state
OVERCOMING CHALLENGES TO HCV TREATMENT
Simultaneous treatment of HCV and OUD

• Improves patient retention
• Improves patient adherence
• HCV treatment can be integrated in OUD care

...studies have consistently found insufficient testing and poor rates of treatment after HCV diagnosis among PWID. Bottlenecks often originate from state-level policies on Medicaid reimbursement and HCV surveillance efforts.

A. Patients receiving opioid treatment at week 24 were significantly more likely to achieve SVR.

B. Significant decline in opioid-positive urine drug screens was seen in patients who started and were retained on opioid treatment.
HCV Facilitated Telemedicine Model

Bring the HCV provider to a familiar and comfortable environment for patients
Integrated HCV Telemedicine Model

OTP patient screened for HCV

HCV +

Patient evaluations with provider via telemedicine

HCV medication dispensed with patients existing methadone dose

Repeat until end of treatment

Patient and physician extender at OTP
Pilot Study results

• 45 patients enrolled at one clinic
• Onsite medication dispensing increases HCV medication adherence

93% cured of HCV via Telemedicine

95% recommend over in-person referral
Statewide HCV Elimination Network

- Patient-Centered Outcomes Research Institute (PCORI) funded a study to integrate HCV treatment into opioid treatment programs via telemedicine
- Project recruitment: March 2017-Feb 2020
  - >600 patients enrolled
- 12 sites across NYS, covering most metropolitan areas (6 upstate, 6 in NYC)
- Our integrated telemedicine model:
  - Removes time and place as obstacles from delivery of high-quality, cost-effective healthcare
  - Permits providers to treat patients statewide from the same location
Patient-Centered Telemedicine Framework

Human-Computer Interface
- Hardware/Software
- Broadband

Infrastructures
- Facilities
- Equipment

Sociotechnical Systems Model
- Comprehensive Dynamic Patient-Centered Telemedicine
- Clinical Content (Interoperability)
- Internal Organizational Features
- Measurement and Monitoring
- Workflow and Communication

External Regulations
- Federal/State
- Credentialing bodies

Social Determinants of Health

People
- Patients
- Clinic staff
- Other stakeholders

Research Gaps

Provider education and training

• Change provider misconceptions
  - Re-infection
  - Difficult to engage
  - Poor adherence
• Increase pool of available providers
  - Train PCPs
  - Advanced Practice Practitioners

In conclusion, despite the availability of effective all-oral DAA therapies, the rate of DAA prescribed treatment is much lower among patients with HCV SUD compared with patients with HCV without SUD.

Results confirm prior studies that showed that patients with SUD who are treated for HCV can achieve similar adherence and SVR rates to patients without SUD.

System and Policy Changes

- Removal of prior authorizations
- No longer requiring liver damage or cirrhosis
- Promotion of public awareness about HCV screening
- Improvement of HCV surveillance by upgrading information technology infrastructure
- Expansion of HCV screening by partnering diverse healthcare organizations
- Implementation of harm reduction and prevention strategies via expansion of syringe service programs
Change in public perception and stigma

• OUD as a medical condition, not a moral or social failure

• “I am in a methadone program” vs “I’m on methadone”
  - Being in a program means you have a doctor overseeing your treatment (medical supervision)

• Stigma can come from:
  - Self
  - Society
  - Structural
Stigma as a barrier to HCV care

1. Patients in OTP rarely seek care outside the OTP due to stigma, competing priorities, and other barriers.
2. Integrated telemedicine brings HCV care into OTP, a community that legitimizes methadone treatment and promotes HCV treatment.
3. HCV treatment in OTP promotes patients overcoming HCV stigma and facilitates societal engagement.

Curing HCV permits patient to overcome stigma by increasing self-awareness and developing coping strategies.

Opioid Treatment Program
Patient with HCV

Opioid Treatment Program with Integrated Telemedicine
1. Legitimizes methadone treatment
2. Enables HCV education and treatment

Outside providers
PCP, HCV Provider

Societal engagement

STIGMA
Overcoming stigma through whole-patient care

Treating SUD and HCV within the OTP community enables patients to begin addressing stigma barriers

Sources of Stigma Barriers
• Self-stigma
• Societal stigma
• Structural stigma
Facilitated Telemedicine Promotes Confidence & Trust in Virtual Healthcare Delivery

Trust in Opioid Treatment Program

IMPROVING SURVEILLANCE, SCREENING, AND LINKAGE TO CARE
Screening vs. Surveillance

• Screening
  - At the level of the individual
  - Detection and diagnosis of asymptomatic conditions

• Surveillance
  - At the level of population
  - To detect and eliminate the underlying causes

• Relevance to HCV
  - Automated screening of high-risk populations
  - Surveillance to assess and confirm elimination efforts from a defined area
Surveillance

- HCV surveillance is critical to prevention and control strategies and ability to identify areas of high rates of infection
- Monitoring changes in acute disease incidence can be used to assess the effectiveness of prevention programs
- Current surveillance efforts are weak or unreliable due to:
  - Low screening and testing rates
  - Stigma
  - Asymptomatic nature of acute HCV
  - Most health departments unable to follow up on HCV+ reports
Changing Demographics

- Widespread shift in HCV mortality trends since 2013
  - Heterogeneity in HCV mortality at the county level
- Counties in the highest rate of HCV death among persons <40 are concentrated in areas with high rates of OUD and injection drug use

Figure 3.8. Number of newly reported* chronic hepatitis C virus infection cases†, by sex and age — United States, 2019

Source: CDC, National Notifiable Diseases Surveillance System.

* During 2019, cases of chronic hepatitis C were either not reportable by law, statute, or regulation; not reported; or otherwise unavailable to CDC from Arizona, Arkansas, California, Delaware, District of Columbia, Hawaii, Indiana, Kentucky, Mississippi, Nevada, North Carolina, Rhode Island, and Texas.

† Only confirmed, newly reported, chronic hepatitis C cases are included. For the complete case definition, see https://ndc.services.cdc.gov/conditions/hepatitis-c-chronic/.
Surveillance Needs

Figure 3.1. Number of reported acute hepatitis C virus infection cases and estimated infections* — United States, 2012–2019

Source: CDC, National Notifiable Diseases Surveillance System.
### Seroprevalence of HCV in Selected Countries With Significant Emigration*

<table>
<thead>
<tr>
<th>Country</th>
<th>Predominant Genotype (%)</th>
<th>Prevalence, %</th>
<th>Total Cases (Thousands)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Afghanistan</td>
<td>3 (62.0)</td>
<td>0.5</td>
<td>181</td>
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<tr>
<td>Algeria</td>
<td>1 (87.6)</td>
<td>1.0</td>
<td>388</td>
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<tr>
<td>Brazil</td>
<td>1 (66.4)</td>
<td>0.9</td>
<td>1787</td>
</tr>
<tr>
<td>China</td>
<td>1 (58.0)</td>
<td>0.7</td>
<td>9795</td>
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<tr>
<td>Egypt</td>
<td>4 (90.0)</td>
<td>6.3</td>
<td>5625</td>
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<tr>
<td>Estonia</td>
<td>1 (72.7)</td>
<td>1.4</td>
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<tr>
<td>Gabon</td>
<td>4 (92)</td>
<td>7.0</td>
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<tr>
<td>India</td>
<td>3 (64.1)</td>
<td>0.5</td>
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<table>
<thead>
<tr>
<th>Country</th>
<th>Predominant Genotype (%)</th>
<th>Prevalence, %</th>
<th>Total Cases (Thousands)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iraq</td>
<td>4 (52.9)</td>
<td>0.2</td>
<td>85</td>
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<tr>
<td>South Korea</td>
<td>1 (48.4)</td>
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<td>Libya</td>
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<tr>
<td>Pakistan</td>
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<td>3.8</td>
<td>7172</td>
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<td>Romania</td>
<td>1 (98.0)</td>
<td>2.5</td>
<td>547</td>
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<tr>
<td>Slovakia</td>
<td>1 (89.9)</td>
<td>0.6</td>
<td>33</td>
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<tr>
<td>Syria</td>
<td>4 (59.0)</td>
<td>3.0</td>
<td>554</td>
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<tr>
<td>Thailand</td>
<td>3 (47.8)</td>
<td>0.7</td>
<td>463</td>
</tr>
</tbody>
</table>

*Russia and Russian immigrants as well!

Screening and Linkage-to-care

- HCV screening needs to occur at least annually in locations with high-risk patient populations
  - Opioid treatment programs
  - Syringe service programs
  - Emergency department

- Dried blood spot as alternative to blood draw
  - For patients who are difficult blood draws

- Development of point-of-care diagnostics
  - HCV antibody and RNA

- Innovative screening locations
  - Community screening in neighborhoods
  - Mobile screening with ability to travel to high-risk areas.
  - Linkage with other types of services for social determinants of health
Treatment Locations

- Bring treatment to location where patients feel comfortable
- HCV treatment can be integrated into OTPs
- HCV treatment can also be offered at SSPs
- Mobile telemedicine
STATE-LEVEL HCV ELIMINATION ACTIVITIES
Louisiana

- 2018, $35 million USD spent on HCV treatment covered <3% of state Medicaid or prisoners with HCV
- Subscription-based model focused on Medicaid and incarcerated patients
  - Louisiana ranked #1 in 2019 for number of incarcerated individuals
  - Partnered with its DOC to implement a five-year plan to screen as many incarcerated individuals as possible.
  - As of June 2021, 8934 inmates were screened for HCV at six of eight Louisiana DOC facilities. Among them, 11% to 15% were HCV-infected and 1060 persons initiated HCV treatment.
- Removed liver damage and sobriety restrictions
Washington State

- Subscription-based model focused on Medicaid and PWIDs
- No significant changes in HCV prescriptions
- Reasons for limited impact:
  - Had already removed liver damage and sobriety requirements
  - #8 on Commonwealth Fund 2020 Scorecard on State Health Systems Performance
  - Took a broad approach without focusing on specific, high-risk populations
  - COVID-19 pandemic
Figure 1. Trends in Hepatitis C Virus Prescription Fills in Treated States and Synthetic Controls
Michigan

Michigan Department of Health and Human Services launches We Treat Hep C Campaign aimed at providing timely screening and treatment of Hepatitis C

- Promote universal HCV testing for all adults
- Mavyret available to all Medicaid and Healthy Michigan Plan beneficiaries
- Removal of prior authorization
- Development of HCV trainings for clinicians
- Establish clinical consulting line for peer-to-peer clinical advice
Other state activities

- States in planning stages of an elimination program
  - Hawaii, Pennsylvania, Michigan, New York
- States who have conducted stakeholder meetings in past three years
  - Alaska, Arizona, Florida, Minnesota, Utah, Virginia
- States who list elimination projects but have no publicly available plan
  - Indiana, Kentucky, North Carolina, New Jersey, Tennessee, West Virginia, Wisconsin

Year of achieving HCV elimination by state

Themes from State elimination plans

I. Promotion of public awareness about HCV screening via outreach campaigns, focus groups and community involvement
   - To formulate best practices for patient engagement, communication strategies, and service delivery

II. Improvement of HCV surveillance by upgrading information technology infrastructure, automating reporting and review, and developing an HCV task force to manage the volume of cases.

III. Expansion of HCV screening by partnering with primary care providers, Medicaid, OTPs, syringe services programs (SSPs), and departments of corrections (DOC) to standardize routine screening at priority sites.

IV. Implementation of harm reduction and prevention strategies via expansion of SSPs and OTPs, including continuity of care for opioid use disorder among those discharged from DOC facilities.
INTERNATIONAL HCV ELIMINATION EFFORTS
Egypt

- 2018 Egypt Ministry of Health HCV elimination project
- Screened 80% of residents (50 million) in 7 months
- 92% of those HCV+ started treatment
- $130.00 USD – Final cost to identify and cure HCV
**Australia**

- One of the first countries to use subscription drug pricing model

- Plan included:
  - Added DAAs to national reimbursement list
  - Remove treatment restrictions
  - Permitted general practitioners to prescribe

- Reduced patient cost from $77,219 USD to $31.89 USD

- 2016-2019 – 82,280 Australians initiated DAA treatment
  - 2015 – 11.1% treatment uptake among HCV+ patients
  - 2019 – 64.2% treatment uptake among HCV+ patients
  - 93% overall cure rate

---

On track to achieve 80% HCV treatment coverage and 90% incidence reduction by 2030

HCV ELIMINATION REQUIREMENTS
Public-Private Partnerships

• Payer coalitions
  - Collective power of agencies who are already paying for HCV treatment

• Subscription-based treatment models
  - Need to include support for outreach, education, and screening

Subscription-based payment model implementation in Louisiana was associated with an increase 534.5% Washington did not experience a significant change in prescription fills

Education and Outreach

• Increased public awareness
  - Stigma remains a major barrier for patients and providers
• Provider education
• Patient education
• Targeting locations with high concentration of at-risk patients:
  - Supervised injection facilities
  - Detoxification centers
  - Emergency departments
  - Homeless shelters
Surveillance and Screening efforts

• Surveillance to identify regions in need
• Automated screening of high-risk populations
• On-site HCV services integrated into clinics with high-risk patients
• Harm reduction and syringe service programs
• System for responding to surveillance data to identify regions with a mismatch between HCV disease burden and HCV screening and treatment activities.
• Screening in high-risk venues identifies considerable numbers of HCV-infected individuals and such strategic efforts are critical in resource-limited jurisdictions.

In addition to reducing the risk of infection, harm-reduction programs can promote regular testing, facilitate linkage to care, and provide access to active PWID who are not often reached in traditional settings.

Change in Social Perspective

• Emphasize whole-patient care
  - De-silo substance abuse treatment from co-morbid conditions such as HCV and HIV
  - Pair OUC and HCV care
  - Utilize peer advocates who have lived, shared experiences
Nationwide HCV elimination is possible

- **Policy**
  - DAA’s make it medically possible yet policies, stigma, and education remain barriers
  - Subscription-based models can greatly expand treatment access

- **Education**
  - Patients, community, and provider with content appropriately targeted.

- **Stigma**
  - Need to drive national recognition of addiction as a disease state, not moral or personal failure

- **Data**
  - Innovative tools and technology, such as telemedicine, can help to bridge healthcare gaps
  - Support for screening and surveillance is continuously needed to identify areas in need
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