Hepatitis B and C Prevention Strategies, United States

1st International Meeting on Hepatitis Cure and Eradication
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Centers for Disease Control and Prevention
### Persons Living With Viral Hepatitis B and C, United States

<table>
<thead>
<tr>
<th>Virus</th>
<th>Prevalence</th>
<th>% Unaware of infection</th>
<th>Deaths (2006)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hepatitis B</td>
<td>800,000 – 1.4 million</td>
<td>~ 65%</td>
<td>3,000</td>
</tr>
<tr>
<td>Hepatitis C</td>
<td>3-4 million</td>
<td>50-75%</td>
<td>15,000</td>
</tr>
</tbody>
</table>
Mortality associated with Hepatitis B, Hepatitis C, and HIV United States, 1999–2010

United States Viral Hepatitis Action Plan, 2011 (updated 2014) : Priority Areas

- Educate providers and communities to reduce health disparities
- Improve testing, care and treatment
- Strengthen surveillance
- Eliminate transmission of vaccine-preventable hepatitis
- Reduce viral hepatitis caused by drug-use behaviors
- Protect patients and workers from healthcare-associated hepatitis
Overview of Hepatitis B Virus Prevention and Control

- **Vaccination**
  - All infants, beginning at birth
  - All children and adolescents (through age 18)
  - Adults in high-risk groups (e.g., STD, MSM, IDU, HIV-infected)

- **Reducing perinatal transmission**
  - Screening for HBsAg* in pregnancy and post exposure prophylaxis of newborn

- **Screening for infection**
  - High risk groups
  - Foreign-born persons from countries with prevalence ≥2%

- **Education and raising awareness**
- **Testing and linkage to care programs**

* Hepatitis B surface antigen
Hepatitis B Vaccine Policy and Rates of Acute Hepatitis B, United States, 1980–2011

![Graph showing the rate of acute hepatitis B cases per 100,000 population from 1980 to 2011.](image)

- **Universal maternal HBsAg testing 1988**
- **Infants of HBsAg-positive women, 1984**
- **High-risk groups, 1982**
- **All US infants, 1991**
- **Ages 0-18 years, 1999**
- **Birth dose, 2006**
- **Adults <60 years with Diabetes**

*Health care providers, MSM, IDU, hemodialysis patients, household & sexual partners of persons with chronic HBV, persons in certain institutional settings, e.g., inmates of long-term correctional facilities.*

Source: National Notifiable Disease Surveillance System (NNDSS)
Estimated Number of Births to HBsAg-Positive Pregnant Women
U.S., 1993-2009

U.S. Perinatal Hepatitis B Prevention Program

- Created in 1990 to assist in elimination of perinatal hepatitis B transmission
- Programs in 64 public health jurisdictions
  - 50 states, 6 cities, 8 territories and freely associated island nations
  - Fosters collaboration with healthcare providers, laboratories, hospitals, nursery staff, and families

http://www.cdc.gov/hepatitis/HBV/PerinatalXmtn.htm
Perinatal Hepatitis B Prevention

- **Screen all pregnant women**
  - First prenatal visit and retest at or prior to delivery if at risk
  - Link to care and treatment if infected

- **Post-exposure prophylaxis to newborn**
  - HBIG and single antigen Hepatitis B vaccine within 12 hours of birth
  - Timely completion of HBV vaccine series
  - Post-vaccination serologic testing 1-2 months after completion of vaccine series, *not* before 9 months of age
  - Revaccinate if not protected
    - HBsAg-negative and antibody to hepatitis B surface antigen (≥10mIU/mL)
Percentage of Infants of HBsAg*-Positive Mothers Completing Case Management, CDC Perinatal Program, 1993–2009

Data Source: National Center for Immunization and Respiratory Disease, CDC, as of 8/2013

* Hepatitis B surface Antigen.
**CDC and USPSTF* Recommendations for Hepatitis B Testing**

- **Populations with ≥2% prevalence**
  - Foreign born
  - US-born to parents born in high prevalence regions (≥8%)
  - Other: MSM, IDU, HIV + persons, household contacts or sexual partners of HBV+

- **Candidates for immunosuppression therapy**

- **Screening and treatment cost effective**
  - $29,230/QALY

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* US Preventive Services Task Force

Building Capacity in Hepatitis B Testing and Linkage to Care at 9 Sites Serving Persons at Risk*: 9/2012-9/2014, preliminary results**

<table>
<thead>
<tr>
<th>Goals</th>
<th>Achieved</th>
<th>%Achieved</th>
</tr>
</thead>
<tbody>
<tr>
<td>Persons tested for HBsAg</td>
<td>17,000</td>
<td>14,694</td>
</tr>
<tr>
<td>Persons tested HBsAg+</td>
<td></td>
<td>802 (5%)</td>
</tr>
<tr>
<td>Persons received results</td>
<td>85%</td>
<td>691</td>
</tr>
<tr>
<td>Persons referred to care, treatment, and preventive services</td>
<td>75%</td>
<td>635</td>
</tr>
<tr>
<td>Persons attended first medical appointment</td>
<td></td>
<td>406</td>
</tr>
</tbody>
</table>

* Foreign-born person from intermediate/high endemic areas; **Receipt of data ongoing
Community-Based Hepatitis B Programs
10/2014–9/2016

- Goal: To improve the capacity of healthcare providers to identify and link foreign-born individuals with chronic hepatitis B to care

<table>
<thead>
<tr>
<th>Number of awards</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eligibility</td>
<td>Established coalition of public health, academic centers, and primary care providers (PCP)</td>
</tr>
<tr>
<td>One year award amount</td>
<td>$300,000</td>
</tr>
<tr>
<td>Project period</td>
<td>2 years</td>
</tr>
<tr>
<td>Total project period funding</td>
<td>$1.8 million</td>
</tr>
</tbody>
</table>
Hepatitis C Virus: Prevention and Control

Primary Prevention (prevent infection)
- Screen blood supply
- Ensure safe therapeutic injection practices
- Practice universal precautions in medical practices
- Counsel infected person to reduce transmission risk behavior
- Reduce illicit drug use and ensure safety (e.g., needle exchange)

Secondary prevention (prevent disease)
- Test to detect active infection
- Counsel to avoid alcohol intake
- Vaccinate for hepatitis A and B
- Treat with antivirals

Adapted from Thomas D. Nature Medicine July 2013 : (19) 850-859
Impact of Prevention Measures on Hepatitis C Virus (HCV) Infection in United States

- Discovery of HCV: 1989
- Anti-HCV test licensed: 1992
- Indirect blood screening for HCV and HIV prevention measures: 1986
- Needle stick Safety and Prevention Act: 2001
- 22,000 new acute HCV cases reported in 2012

Recent Increases in HCV Infection

- **Between 2007 and 2012**
  - 50% increase in case reporting
  - 200% increase in 17 states

- **Risk factors**
  - ~70% persons who inject drugs
  - Previous oral prescription narcotic use
  - Equally male to female
  - Young, ages 18 to 29 years
  - White
  - Rural and suburban

Broader HCV Testing Recommendation in 2012
One time Test for Persons Born 1945 –1965

- Birth cohort represent
  - 81% of adult chronic infections
  - 73% HCV deaths

- Prevalence ~6 times higher (3.29% vs 0.55% other ages)

- No reported risk factors: 44%

- Benefit of treatment, with SVR reducing
  - Liver cancer risk: 70%
  - All-cause mortality: 50%

References:
USPSTF* and CDC Recommendations for HCV Testing

- One time screening test for persons born 1945-1965 without ascertainment of risk (USPSTF Grade B)

- **Major risk**
  - Past or present injection drug use

- **Other risks**
  - Received blood/organs prior to June 1992
  - Received blood products made prior to 1987
  - Ever on chronic hemodialysis
  - Infants born to HCV infected mothers
  - Intranasal drug use
  - Unregulated tattoo
  - History of incarceration

- **Medical**
  - Persistently elevated ALT
  - HIV

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## Health Impact of Birth Cohort Recommendations

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Birth Cohort Testing with Therapy</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>PegIFN-Riba + Telaprevir</td>
</tr>
<tr>
<td>Additional identified cases</td>
<td>809,000</td>
</tr>
<tr>
<td>Cirrhosis cases averted</td>
<td>203,000</td>
</tr>
<tr>
<td>Decompensated cirrhosis cases averted</td>
<td>74,000</td>
</tr>
<tr>
<td>Hepatocellular carcinoma cases averted</td>
<td>47,000</td>
</tr>
<tr>
<td>Transplants averted</td>
<td>15,000</td>
</tr>
<tr>
<td>Deaths from hepatitis C virus averted</td>
<td>121,000</td>
</tr>
<tr>
<td>Medical costs averted</td>
<td>$2.5B</td>
</tr>
<tr>
<td>Cost/QALY gained</td>
<td>$35,700</td>
</tr>
</tbody>
</table>

Know More Hepatitis Campaign Strategies

- News/Media Advocacy
- Digital Media
- Broadcast (Radio/TV Public Service Advertising)
- Social Media
- Partnership Engagement
- Professional Education
- Opinion Leader Outreach
Educating Communities

Airport Diorama

Highway Billboard
Treatment as Prevention Strategy to reduce HCV Prevalence

Martin NK et al. Hepatology 2013
Cure and Prevention (CaP): Models for Persons Who Inject Drugs (PWID)

- Model under development to estimate the impact of targeted treatment on incidence and prevalence associated with prevention strategies*
  - Targeted treatment to active injectors within social networks
  - Assess reductions in morbidity & mortality and reinfection rates

- Use existing datasets to model case-studies for U.S. settings
  - Rural versus urban
  - New treatment and associated costs

- Develop estimates of cost, and cost-effectiveness to achieve desired health outcomes

* Includes concurrent evidence-based interventions needles exchange and opioid agonist treatment
Building Capacity in Hepatitis C Testing and Linkage to Care at 22 Sites Serving Persons at Risk*: 9/2012–9/2014, preliminary results*

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<th>Goals</th>
<th>Achieved</th>
<th>%Achieved</th>
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<tr>
<td>Persons tested for HCV Antibody and HCV RNA</td>
<td>47,400</td>
<td>43,768</td>
<td>92%</td>
</tr>
<tr>
<td>Persons tested anti-HCV +</td>
<td>5,796 (13%)</td>
<td>Range 3-51%</td>
<td></td>
</tr>
<tr>
<td>Persons received RNA test</td>
<td>85%</td>
<td>3,557</td>
<td>61%</td>
</tr>
<tr>
<td>Persons received RNA results</td>
<td>85%</td>
<td>2,189</td>
<td>83%</td>
</tr>
<tr>
<td>Persons referred to care, treatment, and preventive services</td>
<td>75%</td>
<td>2,078</td>
<td>79%</td>
</tr>
<tr>
<td>Persons began treatment</td>
<td>15%</td>
<td>70</td>
<td>3%</td>
</tr>
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*Receipt of data ongoing
Community-based Programs to Test and Cure Hepatitis C: 9/2014 – 9/2018

- **Goal**: develop package of services to improve healthcare capacity to test and cure

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<td><strong>Eligibility</strong></td>
<td>Established coalition of public health, academic centers, and primary care</td>
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<tr>
<td><strong>Average one year award amount</strong></td>
<td>$1.5 million</td>
</tr>
<tr>
<td><strong>Project period</strong></td>
<td>4 years</td>
</tr>
<tr>
<td><strong>Total project period funding</strong></td>
<td>$20 million</td>
</tr>
</tbody>
</table>
Community-based Programs to Test and Cure Hepatitis C: Outcomes

- **Initial targets**
  - An annual increase in testing, diagnosis, and cure by of ≥ 50%, with at least
    - 10,000 persons tested
    - 2000 persons diagnosed
    - 2500 cured

- **Targets to be revisited during project period**
Community-based Programs to Test and Cure Hepatitis C: Package of Services

- Identify and educate target population
- Incorporate HCV testing among in primary care practices
- Implement regular consultation of primary care provider with HCV specialists
- Case management
- Monitor outcome and community impact via data system
- Leverage Affordable Care Act: insurance enrollment, free testing, and improve quality of care through use of EMR
American Medical Association Performance Measures Updated (2013)

- **Screening**
  - One-time screening: patients at risk (injection drug use ever, blood transfused prior to 1992, or born during 1945–1965)
  - Annual HCV screening: patients who are active injection Drug Users

- **Care and treatment**
  - Referral to treatment for patients identified with HCV Infection
  - Sustained Virologic Response (SVR)
  - Confirmation of Hepatitis C viremia
  - Hepatitis C RNA and genotype testing before initiating treatment
  - HCV RNA testing between 4-12 weeks after treatment start
  - Discontinuation of antiviral therapy if inadequate response

- **Additional performance measures on prevention (vaccination, alcohol consumption counseling, HCC screening)**
Viral Hepatitis Prevention in the United States

- Improve primary prevention: reduce transmission
- Strengthen the continuum of HBV and HCV testing, care, and treatment
- Enhance surveillance to detect and interrupt transmission
- Build evidence base for policy development and to guide interventions