Placing Nation on the Path Toward the Elimination of Hepatitis C

John W. Ward, M.D.
Division of Viral Hepatitis
Centers for Disease Control and Prevention
Establishing Public Health Policy

Institute of Medicine
Hepatitis and Liver Cancer: A National Strategy for Prevention and Control of Hepatitis B and C

A Comprehensive Plan for Viral Hepatitis Prevention, Care, and Treatment United States

World Health Assembly Resolution 63.18: Comprehensive Hepatitis Prevention and Control- 2010
United States Viral Hepatitis Action Plan 2014-2016

- 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
Reported Cases of Acute Viral Hepatitis – 2013
n=52,355
**Persons Living With HBV and HCV Infections - United States**

<table>
<thead>
<tr>
<th>Virus</th>
<th>Prevalence</th>
</tr>
</thead>
<tbody>
<tr>
<td>HBV</td>
<td>740,000 – 2.3 million</td>
</tr>
<tr>
<td>HCV</td>
<td>2.7 – 3.5 million</td>
</tr>
</tbody>
</table>

* National Vital Statistics System
Viral Hepatitis Mortality by Virus Type


N=21653
HCV Deaths and Deaths from Other Nationally Notifiable Infectious Diseases,* 2003-2013

* TB, HIV, Hepatitis B and 57 other infectious conditions reported to CDC

Advent of Curative HCV Therapies Have Increased Considerations for HCV Elimination
World Health Assembly Hepatitis Resolution (WHA67.6): a powerful tool for action

- Unanimously adopted with 49 countries speaking in favor
- Broad set of recommended actions including:
  - Support development of national viral hepatitis strategies
  - Enhance strategic information
  - Promote access to prevention and treatment services
  - **Assess feasibility of elimination of HBV and HCV**
Targets for Elimination of Hepatitis C

Programmatic Issues

- Potentially feasible targets would be:
  - 70% reduction in new infections by 2030.
  - 65% reduction in deaths by 2030
- Continued scaled-up of harm reduction to 50% of the PWID population and reduced risk of medical exposure of 75%.
- Treatment of 100% of patients with cirrhosis caused by HCV and 85% of non-cirrhotic chronic patients before they become cirrhotic.
- Investment in the order of $>7-14bn (assuming large price reductions in treatment).
Rationale for Elimination Targets
Lessons learned from HIV, TB, Other Programs

- **Global targets** trigger action (e.g. «3 by 5» target set for HIV in 2002) – price reductions, access has dramatically increased
- Important factors: **simplification**, public health approach
- A **strong civil society movement** was/is essential
- **Global solidarity** followed – establishment of the Global Fund; USG Programme (PEPFAR), UNITAID. Foundations
- Development of HIV programmes and **national action plans** in all countries
- **Global accountability**: countries report back to World Health Assembly
- Global strategies guide the «**what to do**»
**Twin Epidemics of HCV Transmission and Disease**

- HCV seroprevalence highest for persons born 1945-1965
- 5 fold higher prevalence than others (3.39%)
- 81% of all HCV infected adults
- 73% of HCV related deaths

Rising Number of New Acute HCV Cases related to injection drug use

![Graph showing the number of new acute HCV cases](image)
Benefits of HCV Curative Therapies

• 50%–74% reduction in all cause mortality

• 75% reduction in liver cancer

• 93% reduction in liver failure

• 93% reduction in liver–related mortality

van der Meer JAMA 2012, Morgan Ann Int Med 2012
HCV Deaths Averted with Birth Cohort Testing Using Different Treatments

PR = Pegylated Interferon plus Ribavirin for all genotypes, PRPI = PR plus a protease inhibitor for genotype 1, PR for genotypes 2/3; PRS/SR = pegylated interferon, ribaviron, and sofosbuvir for genotype 1, and sofosbuvir plus ribavirin for genotypes 2 and 3; SS/SR = Sofosbuvir and Simeprevir for genotype 1, and sofosbuvir and ribavirin for genotypes 2 and 3.
HCV Test, Care, and Cure Continuum

~ 3 million persons living with HCV

- All HCV infected: 50%
- anti-HCV tested: 38%
- HCV care: 23%
- HCV RNA: 11%
- Treated: 6%

HCV Testing
Implementation Strategies

- Education (Hepatitis web study.org)
- Care models (e.g., telemedicine)
- Clinical decision tools
- Performance measures (CDC/AMA)
- HCV Test and Cure Programs (public health-provider coalitions)
Philadelphia HCV Testing and Care Coordination

16% of 4514 tested

65% of anti-HCV+

89%

87%

79%

Anti-HCV+  HCV RNA+  Informed of HCV RNA+  Specialist referral  Seen by specialist

MMWR, May 2015
Medicaid Reimbursement Criteria - HCV Therapy

- Minimum fibrosis score
- Prescription by specialist

Some states have few specialists; some states require biopsies for fibrosis scoring

Canary L, Ann Int Med, in press
Epidemics of HCV Transmission

- 29,000 new HCV infections in 2013
- 150% increase since 2010

Regional Drug Injection Trends Among Persons <30 years old in KY, TN, VA, WV
HCV prevalence rate*, persons born after 1965 2011

*persons with detectable HCV RNA in q1 2011 per 1,000 persons served by Quest during same period

**data not shown for those states with less than 5% of population served by Quest in 2011
HCV prevalence rate*, persons born after 1965, 2015

*persons with detectable HCV RNA in q1 2015 per 1,000 persons served by Quest during same period

**data not shown for those states with less than 5% of population served by Quest in 2015
Multi-Component Interventions for HCV Prevention

A combination of *readily-available* and *low threshold* OAT (with methadone and/or buprenorphine) and SEPs have been shown to:

- Reduce syringe sharing
- Lower injecting risk
- Reduce incidence of HIV and HCV
  - Up to 80% in UK
  - Three fold - New York

OAT: Opioid Agonist Treatment
SEP: Syringe Exchange Programs
Antiviral Therapy Might Be Used to Reduce HCV Prevalence Among Injecting Drug Users

- Annually treating 10 HCV infections per 1000 IDU and achieve SVR of 62.5%
- Projected to result in a relative decrease in HCV prevalence over 10 years of 31%, 13%, or 7% for prevalences of 20%, 40%, or 60%, respectively
- Can the HIV model of “Treatment as Prevention” be applied to HCV?
Essential Goals to Eliminate HCV

- Prevent sequelae of advancing liver disease in those already infected
  - Baby Boomers, born 1945 - 1965
  - Many don’t know they are infected

- Prevent new or “incident” infections
  - Persons who inject drugs
  - Unsafe healthcare practices
  - Sexual exposures in immunocompromised individuals
HCV Elimination Model for the United States

- Elimination requires preventing transmission of incident infections, and curing chronic HCV infections
  - *Reach, test, treat, cure and prevent every case*

- Determine feasibility of eliminating HCV in the US by modeling different elimination strategies

- Compare cost-effectiveness of multiple HCV elimination strategies

- Model will serve as a guide to develop a comprehensive strategy for eliminating HCV in the US
Georgia as a Site to Model HCV Elimination

- ~4 million persons
- High burden of HCV - 5-7%
- Relatively small in-migration
- Mixed infection risks - healthcare, IDU
- Capacity - modest, good record in HIV prevention
- Motivated government and population
HCV Elimination in Cherokee Nation

- Small population (314,000) in defined 14 county area
- 95% receive care in CN Health Service
- High prevalence- anti-HCV 6.0% (2013); 5160 current HCV infections
- Nascent test, care, and cure programs
- Tribal leadership commitment to HCV elimination
- Coalition of public health, clinical care, and academic medicine
- Kick-off October 30, 2015
Hepatitis B
Hepatitis B Virus: Prevention and Control U.S. Measures

- **Vaccination**
  - All infants, preferably beginning at birth (72% coverage achieved)
  - All children and adolescents (through age 18)
    - Hepatitis B vaccine series (92% coverage achieved)
  - Adults in high-risk* groups
    - 35% coverage in adults aged 19-49
    - 65% coverage in healthcare workers

- **Screening for infection**
  - Screening all pregnant women for infection (>90% achieved)
  - Foreign-born persons from countries with prevalence ≥2%
  - High risk groups*

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

*High risk groups: STD, MSM, IDU, HCV/HIV-infected
Vaccine-based Strategy to Eliminate HBV Transmission in U.S.

- Universal infant vaccination (1991)
- Catch-up vaccination
  - adolescents 11-12 years (1995)
  - all persons <19 years (1999)
  - Adults at risk for HBV (1982)
- Universal birth dose (2005)
- Universal vaccination in settings serving adults at high risk (2006)
- Adults with diabetes (2012)
Outcomes of Infants Born to HBsAg+ Women – United States 2008-2013

- Total: 89%
- Foreign born: 95%
- HepB <12 hrs. 95%
- HBIG <12 hrs. 96%
- HBsAg+ infants 1%

17,951 mother–infant pairs; 11,335 with data for HBIG/HepB status; 100 HBsAg+ infants

S Schillie, Pediatrics 2015
900 infants each year develop chronic HBV
Testing omissions, failures
100-150 infants at risk of HBV-related mortality

To reduce vaccine failures
  – Improve birth dose coverage
  – Perinatal management
  – Consider additions
    • eAg/ HBV DNA testing for HBsAg+ mothers
    • Anti-viral prophylaxis

Elimination of the Risk for Pediatric HBV Transmission
Hepatitis B Vaccination Coverage 2012-2014

0-3 days | 19-35 months | 13-17 yrs. | Health care providers | 19+yrs. | Diabetes | Chronic liver disease

MMWR 2015 / 64(04);95-102; MMWR August 29, 2014 / 63(34);741-748  CDC. Gov/vaccines
http://www.cdc.gov/vaccines/imz-managers/coverage/index.html
Benefits of HBV Testing, Care and Treatment: Lower Risk of Liver Cancer

• US cohort observed for 5 years
  – 50% reduction in liver cancer risk with HBV therapy (median 45 mos.)
  – 83% reduction for persons with viral load >20,000 IU/mL
• Studies in Asian countries
  – 56%-78% reduction in risk
  – Benefit for patients with and without cirrhosis
• Greatest benefit with nucleoside/nucleotide analog treatment

Most New Reports of HBV in the United States Are Among the Foreign Born

Global Burden of HBV Disease

Prevalence of hepatitis B infection, adults 19-49 years, 2005

HBsAg+ Persons Reported by Place of Birth, 1990-2005
Community-Based Hepatitis B Testing and Linkage to Care

- Test populations with ≥ 2% prevalence
  - Foreign born (e.g. Asia, Africa)
  - MSM, IDU
  - Cost -$750–3,752 per case
    - versus diabetes: $4,064
- $36,088 per QALY for screen and treat

- Impact
  - Interventions to reduce mortality
  - Decrease transmission

Implementation Research
HBV Testing and Linkage to Care
Nine Community Sites, 2012–2014
23,144 tested, 1,317 (5.7%) HBsAg-positive

- Received Results: 90%
- Post-Test Counseling: 85%
- Referred to Medical Care: 83%
- Attended First Medical Appointment: 46%

CDC, 2015, unpublished
Proposal for Institute of Medicine

A National Strategy for the

Elimination of Hepatitis C and Hepatitis B
Phase I (September 1, 2015 – April 1, 2016)
- Determine whether elimination goals for hepatitis B and hepatitis C are feasible
- Identify possible critical success factors

Phase II (if exercised, ten months from second task order initiation - target start date is April 1, 2016)
- Prepare a consensus report that would propose feasible disease incidence and mortality elimination goal(s) to be reached by 2030
- Specify a plan of action to achieve the goals
Propose feasible elimination goals for Hepatitis C and Hepatitis B

- Mortality
- Incidence
- Elimination goals can be a reduction to zero or below a certain number or rate reached by a certain date (e.g., 2030)
- Based on assessment of key considerations –
  - Epidemiology - transmission, burden of disease
  - Current and potential (modelings) of effectiveness of interventions
  - Capacity of service delivery
Institute of Medicine
A National Strategy for the Elimination of Hepatitis B and C
Draft Charge for Phase II

- Specify a plan of action to achieve elimination goals
  - Key intervention – testing, treatment, harm reduction
  - Roles of key stakeholders (e.g., public health, clinical care, substance abuse, correctional health services)
  - Address barriers (e.g. policy issues, capacity, costs, equity)
  - Identify prevention research or technology development needs
Setting HBV and HCV Elimination Targets

Rationale

• Mobilize partners
• Improve prioritization
• Drive innovation
• Increase interest in capacity building
• Provide measures of progress and accountability
IT TOOK US 25 YEARS TO BRING HIM TO HIS KNEES... NOW LET'S FINISH HIM OFF!...