Placing Nation on the Path Toward the Elimination of Hepatitis C

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A National Strategy for the

Elimination of Hepatitis C and Hepatitis B
Why now...?

- **World Health Assembly requested** (May 2014)
  - May 2014- Requested WHO examine the feasibility of strategies for the elimination of hepatitis B and hepatitis C and setting global targets
  - May 2016- WHO will present Global Elimination Goals for HBV and HCV to WHA

- **United Nations cites HepB vaccine as “best buy” for cancer prevention**

- **Sustainable Development Goals**
  - “End the epidemics of AIDS, TB, malaria and .. and combat hepatitis,”

- **Growing movement around hepatitis**
  - Health models demonstrate feasibility of large reductions in HCV
  - National and regional HCV elimination demonstration projects
  - Concerns over in equities in access to proven interventions
The Evolution of HCV Therapy from Interferon to Curative All Oral Antiviral Agents

Hepatitis B and Hepatitis B Meet Indicators for Elimination

- **Biologic**
  - Availability of effective interventions - e.g., vaccines, tests, therapies
  - Availability of effective diagnostic tools
  - Human are required for the agent’s life cycle

- **Economic – feasible (i.e. cost–effective)**

- **Adequate infrastructure – public health, clinical**

- **Social /political will**
  - Recognized as important public health issue
  - Technically feasible
  - Goals are accompanied by national plans
  - Plans for advocacy and partnerships

From Dowdle WR, *The Principles of Disease Elimination and Eradication*, MMWR 1999: 48(SU01);23-7
Burden of Hepatitis B and Hepatitis C in the United States

- **Hepatitis B**
  - ~25% of HsAg+ at risk for HBV related mortality
  - 740,000-2.3 M persons who are HBsAg+
  - Incidence increased in 2013

- **Hepatitis C**
  - ~20%-40% risk of HCV-related mortality
  - 2.7-3.5 M persons living with HCV
  - Increases in incidence and mortality

- **Disparities in health outcomes and access to preventive services**
Incidence
Vaccine-based Strategy to Eliminate HBV Transmission in U.S.

Comprehensive elimination plan – published 1991

• Universal HBsAg screening of pregnant women (1988)
• 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)
• Vaccination in settings serving high risk adults (2006)
• Universal vaccination of adults with diabetes (2012)

CDC/mmwr.gov

*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)
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
Discovery of HCV and Impact on HCV Incidence in US

1986 Indirect blood screening for HCV

Anti-HCV test licensed 1992

Needle stick Safety and Prevention Act 2001

Discovery of HCV 1989

HIV Prevention

Year

29,000 cases of incident HCV infection reported in 2013

Epidemics of HCV Transmission

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

Suryaorasad AG, et al. CID 2014, CDC MMWR 2010, CDC MMWR 2011, CDC MMWR 2015
Benefits of 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
- Models indicate “Cure and Prevention” strategies can lower prevalence and incidence of transmission

OAT: Opioid Agonist Treatment
SEP: Syringe Exchange Programs
Antiviral Therapy Can Improve Prevention of HCV 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

- Is a “Cure and Prevention” model feasible for HCV?
Burden of Disease and Mortality
Most New Reports of HBV in the United States Are Among the Foreign Born

Global Burden of HBV Disease

HBsAg+ Persons Reported by Place of Birth, 1990-2005

740,000-2.3 million chronic HBV infections
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

Benefits of HBV Testing, Care and Treatment: Lower Risk of Liver Cancer

• US cohort observed for 5 years
  – 50% decline in liver cancer 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
• New therapies in development

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
A Population at Increasing Risk for HCV Related Morbidity and Mortality

HCV seroprevalence highest for persons born 1945-1965

- 5 fold higher prevalence than others adults
- 81% of all HCV infected adults
- 73% of HCV related deaths

DCC-decompensated cirrhosis; HCC- hepatocellular carcinoma
HCV Deaths and Deaths from Other Nationally Notifiable Infectious Diseases,* 2003-2013

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

CDC and USPSTF Updated Recommendations for HCV Testing

• One time screening test for persons born 1945-1965

• 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 (annual testing)

HCV Deaths Averted with Birth Cohort Testing Using Different Treatments

$32,000-$35,000 per QALY

PR = Pegylated Interferon plus Ribavirin for all genotypes, PRPI; PR = PR plus a protease inhibitor for genotype 1, PR for genotypes 2/3; PRS/SR = pegylated interferon, ribavirin, 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.

Rein D, CID 2015
HCV Test, Care, and Cure Continuum

~ 3 million persons living with HCV

- All HCV infected: 100%
- anti-HCV tested: 50%
- HCV care: 38%
- HCV RNA: 23%
- Treated: 11%
- SVR: 6%

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 HIV prevention
- Motivated government
- Target: 90% diagnosed/95% treated/95% cured of HCV by 2020
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%; 5000 HCV+ persons
- Nascent test, care, and cure programs
- Tribal leadership commitment to HCV elimination
- Coalition of public health, clinical care, academic medicine
- Kick-off October 30, 2015
- Goals 85% Diagnosed/85% Cured of HCV by 2020
WHO Proposed Targets for HBV and HCV Elimination

- Global targets for eliminating Hepatitis B and Hepatitis C as public health concerns by 2030
  - 60% reduction in HBV incidence
  - 70% reduction in HCV incidence
  - 60% reduction in mortality for both HBV and HCV
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
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
• Build capacity
• Provide measures of progress and accountability
It took us 25 years to bring him to his knees... now let's finish him off...
Definitions

- *Elimination of disease*: Reduction to zero of the incidence of a specified disease in a defined geographical area as a result of deliberate efforts; continued intervention measures are required.

- *Elimination of infections*: Reduction to zero of the incidence of infection caused by a specific agent in a defined geographical area as a result of deliberate efforts; continued measures to prevent re-establishment of transmission are required.

- Elimination rather than Eradication- highlights regional rather than global milestones and need for sustained prevention activities.
Examples of Infection and Disease Elimination Goals

- **TB**
  - < 10 new TB cases/ million by 2035.
  - < 1 new TB case /million by 2050

- **HIV** - "AIDS free generation" - eliminating new HIV infections among children and keeping their mothers alive. (≤50 pediatric HIV infections per 100,000 live births)

- **Malaria** - "Malaria free world" by 2015
  - Reduce global malaria deaths from 2000 levels by 75%
  - Reduce global malaria cases from 2000 levels by 75%

- **Measles** – no indigenous transmission persisting for >1 year in an geographic area

- **Polio** - no wild poliovirus transmission in the past three years

- **Neonatal tetanus elimination**- < 1 case/ 1000 live births by 2015

- **Congenital syphilis** - <0.5 cases per 1000 live births by 2015

- **Leprosy**- <1 prevalence case per 10,000 population by 2016.

- **Lymphatic filariasis**- < 1% antigen prevalence in Aedes areas by 2016

- **HBV infections** - <1% HB infection in 5 year-olds by 2017 (control)

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