Epidemiology of Hepatitis C: Impact On Minorities

10th Annual National Summit on Health Disparities

R Monina Klevens, DDS, MPH
Division of Viral Hepatitis
National Center for HIV/AIDS, Viral Hepatitis, STD & TB Prevention
4/22/13
Objectives

- Overview hepatitis C infection
- Epidemiology and disparities
  - Sources of data
- Prevention activities
Hepatitis C Virus

• Single-stranded RNA

• Genetic diversity
  – Six genotypes and >50 subtypes
  – Genotype 1a and 1b are most common in US
## Viral Hepatitis Overview

### Types of Viral Hepatitis

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Source of virus</td>
<td>feces</td>
<td>blood/ blood-derived body fluids</td>
<td>blood/ blood-derived body fluids</td>
<td>blood/ blood-derived body fluids</td>
<td>feces</td>
</tr>
<tr>
<td>Route of transmission</td>
<td>fecal-oral</td>
<td>percutaneous permucosal</td>
<td>percutaneous permucosal</td>
<td>percutaneous permucosal</td>
<td>fecal-oral</td>
</tr>
<tr>
<td>Chronic infection</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>not usually</td>
</tr>
<tr>
<td>Prevention</td>
<td>pre-exposure immunization</td>
<td>pre/post-exposure immunization</td>
<td>blood donor screening; risk behavior modification</td>
<td>pre/post-exposure immunization; risk behavior modification</td>
<td>ensure safe drinking water</td>
</tr>
</tbody>
</table>
Relative Transmission Efficiency of Bloodborne Viral Infections

<table>
<thead>
<tr>
<th></th>
<th>HBV</th>
<th>HCV</th>
<th>HIV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injection drug use</td>
<td>+++</td>
<td>++++</td>
<td>++</td>
</tr>
<tr>
<td>Sexual</td>
<td>+++</td>
<td>+</td>
<td>++</td>
</tr>
<tr>
<td>Perinatal</td>
<td>++++</td>
<td>+</td>
<td>++</td>
</tr>
<tr>
<td>Occupational</td>
<td>+++</td>
<td>+/-</td>
<td>+/-</td>
</tr>
</tbody>
</table>
Surveillance for Hepatitis C in the United States

• Acute disease
  – Symptoms and laboratory criteria
  – Source is NNDSS

• Chronic infection
  – Laboratory criteria alone
    • Antibody (past or current infection)
    • RNA (current infection)
  – New testing algorithm in May
  – Source is NHANES
Continuum of Hepatitis C Infection

- Anicteric (80%)
- Icteric (20%)

HCV infection

- Chronic infection (50-90%)

- Elevated ALT (75%)
  - Mild
  - Mod-severe

- Fulminant

- Normal ALT

- Cirrhosis → HCC

Acute hepatitis

Chronic infection

6 months → 10-30 years

Source: Marcellin J of Hepatol 1999;31:S9-16

Source: National Notifiable Diseases Surveillance System (NNDSS)
The National Health and Nutrition Examination Survey (NHANES)

- Collects data from a nationally representative sample of the US population
  - >5000 participants/year
- Excludes institutionalized persons
- Components: physical exam, interview, and specimen collection
- Laboratory testing for HCV at CDC
Prevalence (%) of Antibody to Hepatitis C Virus by Race/Ethnicity, 1999-2002

- NHWhite: 1.5\% (1.1, 1.9)  
- NHBlack: 3.0\% (2.4, 3.9)  
- Hispanic/Other: 1.3\% (0.8, 2.1)

4.1 M antibody positive  
3.2 M RNA positive

n=  
5,991 NHWhite  
3,530 NHBlack  
4,422 Hispanic/Other

Adjusted Relative Odds of Antibody to Hepatitis C Virus among Participants 20-59 Years of Age by Race/Ethnicity, 1999-2002

Prevalence of Hepatitis C Antibody by Age Group

Forecast Model of Hepatitis C Related Morbidity and Mortality in the US*


**Decomp Cirrhosis**

**Deaths**

**Hepatocel CA**

**Number**

0 5000 10000 15000 20000 25000 30000 35000 40000


**Division of Viral Hepatitis**

Mortality Associated With Hepatitis B, Hepatitis C, and HIV
United States, 1999 – 2008*

## Number of Deaths in the United States with Hepatitis C* by Race or Ethnicity

*As underlying or contributing cause


<table>
<thead>
<tr>
<th>Race/ethnicity</th>
<th>Number (%) of deaths</th>
<th>Crude Odds Ratio compared to non HCV deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>White non-Hispanic</td>
<td>9544</td>
<td>1.0 (reference)</td>
</tr>
<tr>
<td>Black, non-Hispanic</td>
<td>2638</td>
<td>1.9 (1.8, 2.0)</td>
</tr>
<tr>
<td>Hispanic</td>
<td>2245</td>
<td>3.4 (3.2, 3.5)</td>
</tr>
<tr>
<td>Asian or Pacific Islander</td>
<td>376</td>
<td>1.8 (1.8, 2.0)</td>
</tr>
<tr>
<td>American Indian or Alaskan Native</td>
<td>192</td>
<td>3.0 (2.6, 3.5)</td>
</tr>
<tr>
<td>Other</td>
<td>59</td>
<td>2.5 (1.9, 3.2)</td>
</tr>
</tbody>
</table>
Distribution of US Liver Transplants by Indication, 2010

N = 6,133

- Hepatitis B
- Hepatitis C
- Hepatocell CA
- Alcoholic liver disease
- Nonalcohol liver disease
- Other

Klevens et al. IDSA 2011 abstract #1194; data from UNOS and HRSA
Awareness of Hepatitis C and Infection Status Before NHANES Notification Letter, 2001-2008

Ever heard of hepatitis C

Unaware of infection

NHWhite n=87
NHBlack n=47
Hispanic/Other n=36

2012 CDC Screening Recommendations

- Adults born 1945-1965
  - one-time testing for HCV
  - strong recommendation, moderate quality of evidence

- All persons HCV infected
  - brief alcohol screening
  - intervention as appropriate
  - referral as appropriate
  - strong recommendation, moderate quality of evidence
Progress with HCV therapies

### Health Impact of Birth Cohort Recommendations

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Birth Cohort Testing with Therapy</th>
</tr>
</thead>
<tbody>
<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>

Comprehensive Approach to Hepatitis C Prevention, Care, and Treatment

- Revise policies to expand access to testing, care and treatment services
- Build capacity to deliver preventive and care services
- Reaching marginalized populations
- Monitor outcomes
Data Needed to Monitor Implementation and Impact of 2011 Recommendations

HCV infection
- Risk behavior
  - Population-based Surveys*
  - At risk groups
- Incidence
  - Acute disease reporting
  - Modes of transmission
  - Serologic surveys

Chronic disease
- Prevalence, morbidity, healthcare utilization
  - HCV case reporting
- Population-based surveys
  - Services and providers
  - Outcomes of care and treatment
  - Drug resistance

Death
- Mortality
  - Vital statistics
CDC Projects to Build Capacity for HCV Testing and Linkage to Care

- 10 settings for persons who inject drugs - 18,000 tests
  - Street outreach, drug treatment, primary care

- 16 primary care settings – 34,000 tests
  - Community health centers, STD/HIV, ED, medical centers

- 2 settings to replicate Project ECHO
  - Telemedicine approach to improving health care
Summary

• The US has a large burden of HCV infection
  – Many infected persons are undiagnosed

• Testing and linkage to care need to improve
  – Therapies have evolved

• Collaborations are essential among public health, clinical care providers, laboratories and payers to improve HCV testing, care and treatment
Thank you.
http://www.cdc.gov/hepatitis
Distribution of Persons with HIV and HCV Co-infection in Three US Sites, 2009

Speers et al. Public Health Reports 2011;126:344-348