Hepatitis C

Prepared by
Division of Viral Hepatitis
Centers for Disease Control and Prevention

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### Features of Hepatitis C Virus Infection

<table>
<thead>
<tr>
<th>Feature</th>
<th>Details</th>
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<tbody>
<tr>
<td><strong>Incubation period</strong></td>
<td>Average 6-7 weeks, Range 2-26 weeks</td>
</tr>
<tr>
<td><strong>Acute illness (jaundice)</strong></td>
<td>Mild (≤20%)</td>
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<tr>
<td><strong>Case fatality rate</strong></td>
<td>Low</td>
</tr>
<tr>
<td><strong>Chronic infection</strong></td>
<td>60%-85%</td>
</tr>
<tr>
<td><strong>Chronic hepatitis</strong></td>
<td>10%-70% (most asx)</td>
</tr>
<tr>
<td><strong>Cirrhosis</strong></td>
<td>&lt;5%-20%</td>
</tr>
<tr>
<td><strong>Mortality from CLD</strong></td>
<td>1%-5%</td>
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Chronic Hepatitis C
Factors Promoting Progression or Severity

- Increased alcohol intake
- Age > 40 years at time of infection
- HIV co-infection
- Other
  - Male gender
  - Chronic HBV co-infection
Serologic Pattern of Acute HCV Infection with Recovery

- **anti-HCV**
- **Symptoms +/-**
- **HCV RNA**
- **ALT**

**Titer**

- **Time after Exposure**
- **Months**
- **Years**

- Normal
Serologic Pattern of Acute HCV Infection with Progression to Chronic Infection

- **Titer**
  - anti-HCV
  - Symptoms +/-
  - HCV RNA

- **ALT**

- **Time after Exposure**
  - Months
  - Years

- **Normal**
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
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<tbody>
<tr>
<td><strong>New infections per year 1985-89</strong></td>
<td>242,000</td>
</tr>
<tr>
<td><strong>2001</strong></td>
<td>25,000</td>
</tr>
<tr>
<td><strong>Deaths from acute liver failure</strong></td>
<td>Rare</td>
</tr>
<tr>
<td><strong>Persons ever infected (1.8%)</strong></td>
<td>3.9 million (3.1-4.8)*</td>
</tr>
<tr>
<td><strong>Persons with chronic infection</strong></td>
<td>2.7 million (2.4-3.0)*</td>
</tr>
<tr>
<td><strong>HCV-related chronic liver disease</strong></td>
<td>40% - 60%</td>
</tr>
<tr>
<td><strong>Deaths from chronic disease/year</strong></td>
<td>8,000-10,000</td>
</tr>
<tr>
<td><strong>95% Confidence Interval</strong></td>
<td></td>
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</tbody>
</table>
Estimated Incidence of Acute HCV Infection
United States, 1960-2001

CDC, unpublished data
Prevalence of HCV Infection by Age and Gender, United States, 1988-1994

Source: CDC, NHANES III, NEJM 1999
Exposures Known to Be Associated With HCV Infection in the United States

- Injecting drug use
- Transfusion, transplant from infected donor
- Occupational exposure to blood
  – Mostly needle sticks
- Iatrogenic (unsafe injections)
- Birth to HCV-infected mother
- Sex with infected partner
  – Multiple sex partners
Reported Cases of Acute Hepatitis C by Selected Risk Factors, United States, 1982-2001*

* 1982-1990 based on non-A, non-B hepatitis
Injecting Drug Use and HCV Transmission

- Highly efficient
  - Contamination of drug paraphernalia, not just needles and syringes
- Rapidly acquired after initiation
  - 30% prevalence after 3 years
  - >50% after 5 years
- Four times more common than HIV
Posttransfusion Hepatitis C

Donor Screening for HIV Risk Factors
- Anti-HIV
- ALT/Anti-HBc
- Anti-HCV
- Improved HCV Tests

All volunteer donors
- HBsAg

Adapted from HJ Alter and Tobler and Busch, Clin Chem 1997
Occupational Transmission of HCV

- Inefficient by occupational exposures
- Average incidence 1.8% following needle stick from HCV-positive source
  - Associated with hollow-bore needles
- Case reports of transmission from blood splash to eye; one from exposure to non-intact skin
- Prevalence 1-2% among health care workers
  - Lower than adults in the general population
  - 10 times lower than for HBV infection
HCV Related to Health Care Procedures
United States

- Recognized primarily in context of outbreaks
  - Chronic hemodialysis
  - Hospital inpatient setting
  - Private practice setting
  - Home therapy
- Unsafe injection practices
  - Reuse of syringes and needles
  - Contaminated multiple dose medication vials
HCW to Patient Transmission of HCV

- **Rare**
  - In U.S., none related to performing invasive procedures
- **Most appear related to HCW substance abuse**
  - Reuse of needles or sharing narcotics used for self-injection
- **No restrictions routinely recommended for HCV-infected HCWs**
Perinatal Transmission of HCV

- Transmission only from women HCV-RNA positive at delivery
  - Average rate of infection 6%
  - Higher (17%) if woman co-infected with HIV
  - Role of viral titer unclear

- No association with
  - Delivery method
  - Breastfeeding

- Infected infants do well
  - Severe hepatitis is rare
Sexual Transmission of HCV

• **Case-control, cross sectional studies**
  – Infected partner, multiple partners, early sex, non-use of condoms, other STDs, sex with trauma, BUT
  – MSM no higher risk than heterosexuals

• **Partner studies**
  – Low prevalence (1.5%) among long-term partners
    • infections might be due to common percutaneous exposures (e.g., drug use), BUT
  – Male to female transmission more efficient
    • more indicative of sexual transmission
Sexual Transmission of HCV

- Occurs, but efficiency is low
  - Rare between long-term steady partners
  - Factors that facilitate transmission between partners unknown (e.g., viral titer)

- Accounts for 15-20% of acute and chronic infections in the United States
  - Sex is a common behavior
  - Large chronic reservoir provides multiple opportunities for exposure to potentially infectious partners
Household Transmission of HCV

- Rare but not absent
- Could occur through percutaneous/mucosal exposures to blood
  - Contaminated equipment used for home therapies
    - IV therapy, injections
  - Theoretically through sharing of contaminated personal articles (razors, toothbrushes)
Other Potential Exposures to Blood

- No or insufficient data showing increased risk
  - intranasal cocaine use, tattooing, body piercing, acupuncture, military service

- No associations in acute case-control or population-based studies

- Cross-sectional studies in highly selected groups with inconsistent results
  - Temporal relationship between exposure and infection usually unknown
  - Biologically plausible, but association or causal relationship not established
Sources of Infection for Persons With Hepatitis C

- Injecting drug use 60%
- Sexual 15%
- Transfusion 10% (before screening)
- Occupational 4%
- Other 1%*
- Unknown 10%

* Nosocomial; iatrogenic; perinatal

Source: Centers for Disease Control and Prevention
Reduce or Eliminate Risks for Acquiring HCV Infection

- Screen and test donors
- Virus inactivation of plasma-derived products
- Risk-reduction counseling and services
  - Obtain history of high-risk drug and sex behaviors
  - Provide information on minimizing risky behavior, including referral to other services
  - Vaccinate against hepatitis A and/or hepatitis B
- Safe injection and infection control practices

MMWR 1998;47 (No. RR-19)
Reduce Risks for Disease Progression and Further Transmission

- Identify persons at risk for HCV and test to determine infection status
  - Routinely identify at risk persons through history, record review

- Provide HCV-positive persons
  - Medical evaluation and management
  - Counseling
    - Prevent further liver damage
    - Prevent transmission to others

MMWR 1998;47 (No. RR-19)
HCV Testing Routinely Recommended

*Based on increased risk for infection*
- Ever injected illegal drugs
- Received clotting factors made before 1987
- Received blood/organs before July 1992
- Ever on chronic hemodialysis
- Evidence of liver disease

*Based on need for exposure management*
- Healthcare, emergency, public safety workers after needle stick/mucosal exposures to HCV-positive blood
- Children born to HCV-positive women
Postexposure Management for HCV

- IG, antivirals not recommended for prophylaxis
- Follow-up after needlesticks, sharps, or mucosal exposures to HCV-positive blood
  - Test source for anti-HCV
  - Test worker if source anti-HCV positive
    - Anti-HCV and ALT at baseline and 4-6 months later
    - For earlier diagnosis, HCV RNA at 4-6 weeks
  - Confirm all anti-HCV results with RIBA
- Refer infected worker to specialist for medical evaluation and management
Routine HCV Testing Not Recommended (Unless Risk Factor Identified)

- Health-care, emergency medical, and public safety workers
- Pregnant women
- Household (non-sexual) contacts of HCV-positive persons
- General population
Routine HCV Testing of Uncertain Need

Not confirmed as risk factor/prevalence low or unknown

- Recipients of transplanted tissue
- Intranasal cocaine or other non-injecting illegal drug users
- History of tattooing, body piercing

Confirmed risk factor but prevalence of infection low

- History of STDs or multiple sex partners
- Long-term steady sex partners of HCV-positive persons
HCV Infection Testing Algorithm for Diagnosis of Asymptomatic Persons

Screening Test for Anti-HCV

Positive

RIBA for Anti-HCV

Negative

NAT for HCV RNA

Indeterminate

Additional Laboratory Evaluation (e.g. PCR, ALT)

Medical Evaluation

Negative PCR, Normal ALT

Positive PCR, Abnormal ALT

STOP

Source: MMWR 1998;47 (No. RR 19)
Medical Evaluation and Management for Chronic HCV Infection

- Assess for biochemical evidence of CLD
- Assess for severity of disease and possible treatment, according to current practice guidelines
  - 40-50% sustained response to antiviral combination therapy (peg interferon, ribavirin)
  - Vaccinate against hepatitis A
- Counsel to reduce further harm to liver
  - Limit or abstain from alcohol
HCV Counseling

- Prevent transmission to others
  - Direct exposure to blood
  - Perinatal exposure
  - Sexual exposure

- Refer to support group
Preventing HCV Transmission to Others

Avoid Direct Exposure to Blood

- Do not donate blood, body organs, other tissue or semen
- Do not share items that might have blood on them
  - personal care (e.g., razor, toothbrush)
  - home therapy (e.g., needles)
- Cover cuts and sores on the skin
Persons Using Illegal Drugs

- Provide risk reduction counseling, education
  - Stop using and injecting
  - Refer to substance abuse treatment program
  - If continuing to inject
    - Never reuse or share syringes, needles, or drug preparation equipment
    - Vaccinate against hepatitis B and hepatitis A
    - Refer to community-based risk reduction programs
Mother-to-Infant Transmission of HCV

- Postexposure prophylaxis not available
- No need to avoid pregnancy or breastfeeding
  - Consider bottle feeding if nipples cracked/bleeding
- No need to determine mode of delivery based on HCV infection status
- Test infants born to HCV-positive women
  - >15-18 months old
  - Consider testing any children born since woman became infected
  - Evaluate infected children for CLD
Persons with One Long-Term Steady Sex Partner

- **Do not need to change their sexual practices**
- **Should discuss with their partner**
  - Risk (low but not absent) of sexual transmission
  - Counseling and testing of partner should be individualized
    - May provide couple with reassurance
    - Some couples might decide to use barrier precautions to lower limited risk further
Persons with High-Risk Sexual Behaviors

- At risk for sexually transmitted diseases, e.g., HIV, HBV, gonorrhea, chlamydia, etc.
- Reduce risk
  - Limit number of partners
  - Use latex condoms
  - Get vaccinated against hepatitis B
  - MSMs also get vaccinated against hepatitis A
HCV Counseling

Other Transmission Issues

- HCV not spread by kissing, hugging, sneezing, coughing, food or water, sharing eating utensils or drinking glasses, or casual contact

- Do not exclude from work, school, play, child-care or other settings based on HCV infection status