Protecting Adults Against Vaccine-Preventable Hepatitis (VPH)

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Vaccine-preventable hepatitis (VPH) includes hepatitis A and hepatitis B. Hepatitis C is not vaccine preventable.
SWIMSUITE 2007 | THE MUSIC ISSUE
Our Models Jam with Gnarls Barkley, Aerosmith, Kanye West, Kenny Chesney and Panic! At the Disco

Sports Illustrated

Yamila and Veronica Bust Out In 3-D

Look Who's In Elvis' Bed

Beyoncé
The Dreamgirl As You've Never Seen Her

The Best Rookies Ever

Body Painting That Rocks

[Image]
SORRY
TEMPORARILY CLOSED.
MANAGEMENT
Hepatitis A Outbreak Fall 2003

- 601 patients (October 1\textsuperscript{st} to December 1\textsuperscript{st})
  - 4 cases of fulminant liver failure (38-57)
    - 2 had underlying co-morbidities
  - 3 deaths (0.5%)
  - 124 hospitalized
- No workers identified as source of outbreak
- 98% Green Onions (Shipped Sept. 2003)
  - Salsa & 50 other dishes
  - Nucleic acid sequencing
  - Farmers
  - Water
Cases of Hepatitis A Associated with a Restaurant in Pennsylvania in 2003, According to Date of Onset

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Vaccine-Preventable Hepatitis (VPH)* – Basic Facts

- *VPH includes hepatitis A (HAV) and hepatitis B (HBV)
  - Hepatitis C (HCV) is not vaccine preventable\(^1\)
  - Both viruses can cause significant morbidity and mortality\(^2\)
  - HAV is one of the most common vaccine-preventable diseases in international travelers\(^3\)
  - HBV is the cause of up to 80% of hepatocellular carcinomas\(^2\)
  - HBV is second only to tobacco among known human carcinogens\(^2\)

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## Overview of Viral Hepatitis

<table>
<thead>
<tr>
<th>Type of Hepatitis</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D*</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Source</td>
<td>Feces</td>
<td>Blood/body fluids</td>
<td>Blood/body fluids</td>
<td>Blood/body fluids</td>
<td>Feces</td>
</tr>
<tr>
<td>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>No</td>
</tr>
<tr>
<td>Prevention</td>
<td>Pre/post-exposure immunization; ensure safe food and drinking water</td>
<td>Pre/post-exposure immunization; risk behavior modification</td>
<td>Blood donor screening; risk behavior modification</td>
<td>Pre/post-exposure immunization against HBV; risk behavior modification</td>
<td>Ensure safe food and drinking water</td>
</tr>
<tr>
<td>Vaccine?</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>?</td>
</tr>
</tbody>
</table>

*Dependent on hepatitis B virus (HBV) for replication. Vaccine against hepatitis B available.

CDC DATA: INCIDENCE OF HEPATITIS A
### Top 10 States With the Highest Hepatitis A Rates

#### THEN 1987-1997

<table>
<thead>
<tr>
<th>State</th>
<th>Avg. rate</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arizona</td>
<td>48</td>
<td>D.C. 14</td>
</tr>
<tr>
<td>Alaska</td>
<td>45</td>
<td>Georgia 12</td>
</tr>
<tr>
<td>Oregon</td>
<td>40</td>
<td>Arizona 8</td>
</tr>
<tr>
<td>New Mexico</td>
<td>40</td>
<td>Rhode Island 7</td>
</tr>
<tr>
<td>Utah</td>
<td>33</td>
<td>Connecticut 7</td>
</tr>
<tr>
<td>Washington</td>
<td>30</td>
<td>Kansas 7</td>
</tr>
<tr>
<td>Oklahoma</td>
<td>24</td>
<td>Maryland 6</td>
</tr>
<tr>
<td>South Dakota</td>
<td>24</td>
<td>Massachusetts 6</td>
</tr>
<tr>
<td>Idaho</td>
<td>21</td>
<td>Texas 6</td>
</tr>
<tr>
<td>Nevada</td>
<td>21</td>
<td>Florida 5</td>
</tr>
<tr>
<td>California</td>
<td>20</td>
<td>California 5</td>
</tr>
</tbody>
</table>

#### NOW

<table>
<thead>
<tr>
<th>State</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rhode Island</td>
<td>7</td>
</tr>
<tr>
<td>Connecticut</td>
<td>7</td>
</tr>
<tr>
<td>Kansas</td>
<td>7</td>
</tr>
<tr>
<td>Maryland</td>
<td>6</td>
</tr>
<tr>
<td>Massachusetts</td>
<td>6</td>
</tr>
<tr>
<td>Texas</td>
<td>6</td>
</tr>
<tr>
<td>Florida</td>
<td>5</td>
</tr>
<tr>
<td>California</td>
<td>5</td>
</tr>
</tbody>
</table>

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**Note:** The table lists the states in order of highest to lowest hepatitis A rates. The images depict maps of the United States, highlighting the states with the highest rates.
<table>
<thead>
<tr>
<th></th>
<th>HAV</th>
<th>HBV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimated total infections*</td>
<td>42,000</td>
<td>51,000</td>
</tr>
<tr>
<td>Chronic infections</td>
<td>0</td>
<td>&gt;1 million</td>
</tr>
<tr>
<td>Chronic liver disease deaths/year</td>
<td>0</td>
<td>~5000</td>
</tr>
</tbody>
</table>

Note: These figures represent reported figures adjusted upward to account for estimated underreporting.


Vaccine-preventable hepatitis (VPH) includes hepatitis A and hepatitis B. Hepatitis C is not vaccine preventable.

CDC. Epidemiology and Prevention of Vaccine-Preventable Diseases. 10th ed. 2007.
7 out of 10 Americans born today will acquire at least one identifiable risk factor of Hepatitis A during their life

Epidemiologic Characteristics of Patients With Hepatitis A — US, 2005*

60% of those infected with hepatitis A have no identifiable risk factor

60% of those infected with hepatitis A have no identifiable risk factor

*Values total >100% because multiple risk factors could be reported for a single case.

Epidemiologic Characteristics of Patients With Hepatitis B — US, 2005*

More than 70% of newly acquired infections in 2005 were attributable to high-risk sexual activity or injection drug use.

*Values total >100% because multiple risk factors could be reported for a single case.

Clinical Characteristics of VPH

**HAV**
- Symptoms are age related
  - Asymptomatic in >70% of children <6 years
  - Symptomatic in >70% of older children and adults
- Illness generally lasts ≤2 months
  - Up to 6 months in 10%-15%
- High morbidity/low mortality
  - More severe complications possible in patients with CLD

**HBV**
- ~50% of acute infections in adults are asymptomatic
  - 1%-2% of acute infections progress to fulminant hepatitis
    - 63%-93% mortality rate
- 5% of all adult acute HBV infections progress to chronic infection
- Chronic infection accounts for most of the morbidity and mortality with HBV infection

CLD = chronic liver disease.
Vaccine-preventable hepatitis (VPH) includes hepatitis A and hepatitis B. Hepatitis C is not vaccine preventable.

CDC. *Epidemiology and Prevention of Vaccine-Preventable Diseases*. 10th ed. 2007.
VPH Is a Significant Public Health Concern

<table>
<thead>
<tr>
<th>HAV</th>
<th>HBV</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Acute disease associated with an average loss of 27 workdays(^1)</td>
<td>• HBV can be 100 times more infectious than HIV(^3)</td>
</tr>
<tr>
<td>• 11% to 22% of patients are hospitalized(^1)</td>
<td>• 25% with chronic infection die prematurely from liver cancer or cirrhosis(^1)</td>
</tr>
<tr>
<td>• Annual costs estimated at $489 million(^2) (1997 data)</td>
<td>• Each year &gt;5000 people die as a result of acute or chronic HBV infection(^1)</td>
</tr>
<tr>
<td></td>
<td>• 1 to 1.25 million chronic carriers in US(^1)</td>
</tr>
</tbody>
</table>

Vaccine-preventable hepatitis (VPH) includes hepatitis A and hepatitis B. Hepatitis C is not vaccine preventable.

Adult Immunization
Recommendations for Hepatitis A
Adult Immunization Recommendations for Hepatitis A

- Medical indications
  - Persons with chronic liver disease (CLD)
  - Persons who receive clotting factor concentrates
- Behavioral indications
  - Men who have sex with men (MSM)
  - Illicit drug users
- Occupational indications
  - Persons working with HAV-infected primates or with HAV in a research laboratory setting
- Other indications
  - Persons traveling to or working in countries that have high or intermediate endemicity of hepatitis A
  - Any person who would like to obtain immunity

Adult Immunization Recommendations for Hepatitis B

- Medical indications
  - Persons with end-stage renal disease (including hemodialysis patients)
  - Persons seeking evaluation or treatment for a sexually transmitted disease
  - Persons with HIV infection
  - Persons with chronic liver disease
  - Persons receiving clotting factor concentrates

- Occupational indications
  - Healthcare workers and public safety workers who are exposed to blood or body fluids

Adult Immunization Recommendations for Hepatitis B (continued)

- Behavioral indications
  - Sexually active persons who are not in a long-term, mutually monogamous relationship
  - Current or recent injection-drug users
  - MSM
- Other indications
  - Household contacts and sex partners of persons with chronic HBV infection
  - Clients and staff of institutions for persons with developmental disabilities
  - All clients of sexually transmitted disease clinics
  - International travelers to countries with high or intermediate prevalence of chronic HBV infection
  - Any person seeking protection from HBV infection

Adult Immunization Recommendations for Hepatitis B (continued)

- Settings in which hepatitis B vaccination is recommended for all adults
  - STD treatment facilities
  - HIV testing and treatment facilities
  - Facilities providing drug-abuse treatment and prevention services
  - Healthcare settings providing services for injection-drug users or MSM
  - Correctional facilities
  - End-stage renal disease programs and facilities for chronic hemodialysis patients
  - Institutions and nonresidential daycare facilities for persons with developmental disabilities

Supporting Evidence for Recommendations: Illegal (Injection and Noninjection) Drug Users
Prevalence of Substance Dependence—US, 2005

- 22.2 million Americans 12 years of age or older, or 9.1% of the population, were classified with past year substance dependence or abuse
- 1.1 million of these persons received treatment in a specialty facility

The Substance Use—Hepatitis A Connection

- Hepatitis A and illegal drug use (injection and noninjection)
  - Cross-sectional surveys demonstrate that illegal drug users have a higher prevalence of anti-HAV than the general population\(^1\)
  - Transmission among illegal drug users probably occurs through both percutaneous and fecal-oral routes\(^1\)
- Outbreaks of hepatitis A have been reported with increasing frequency in the last 2 decades among injection and non-injection drug users in Australia, Europe, and North America\(^1\)
  - Outbreaks frequently involve users of injected and non-injected methamphetamine, accounting for up to 48% of reported cases\(^1\)

The Substance Use—Hepatitis B Connection

- Injection drug users (IDUs) are at increased risk of contracting HBV\(^1\)
  - HBV is transmitted efficiently through blood exposure
  - Sharing syringes, needles, and other drug preparation equipment increases the risk of transmission
- In 2005, 5% and 17% of new HAV and HBV infections, respectively, occurred among IDUs\(^2\)
- Within 5 years of beginning injection drugs, 50% to 70% of IDUs will become infected with hepatitis B\(^1\)

Hepatitis C

- IDU currently the major risk factor for Hepatitis C
- 2005 Data from the CDC shows 60% of new Hepatitis C cases occur from IDU
- 15%- 30% of all prisoners in the US are infected
The New Epidemic

- Methamphetamine
- One of leading risk factors for HIV
- MSM
- Increasing heterosexual use
- Why?
Supporting Evidence for Recommendations: Chronic Liver Disease (CLD)
Most Common Etiologies of CLD or Hepatic Cirrhosis

- Alcohol 60%-70%
- Chronic viral hepatitis (B or C) 10%
- Biliary obstruction 5%-10%
- Hemochromatosis 5%-10%
- NAFLD 10%
- Other causes, including ~5%

1º or 2º biliary cirrhosis

NAFLD = non-alcoholic fatty liver disease.
Risk of Fulminant Hepatitis Following HAV Infection in Patients With CLD

- 595 Italian patients (mean age 29.1 years) with chronic HBV (n = 163) or HCV (n = 432) infection were prospectively monitored for 7 years.
- At analysis, 27 patients had acquired HAV, 17 of whom had chronic HCV.
  - 7 out of the 17 developed fulminant liver failure.
- None of the HAV cases in HBV group progressed to liver failure.

Immunogenicity of HAV Vaccine in Decompensated Cirrhotic Patients

More Severe Complications Can Occur When HCV Patients Are Coinfected With HBV

- 92 consecutive patients with HCV seen in Hadassah Medical Center Liver Unit (Jerusalem)
- HBV coinfection observed in 66%
- Coinfection associated with more complications
  - Bleeding esophageal varices
  - Hepatic encephalopathy
  - Spontaneous bacterial peritonitis
  - Hepatocellular carcinoma

Supporting Evidence for Recommendations: Sexually Active Individuals
VPH Can Be Sexually Transmitted

- ~67.5 million people are infected with an STD\(^1\)
  - Up to 1.2 million people living with HIV/AIDS\(^2\)
- HAV and HBV can be transmitted through sexual exposure
  - 56% of newly acquired HBV infections can be attributed to sexual contact (10% from sex with an HBV-infected individual, 14% from MSM, 32% from >1 sex partner)\(^3\)
  - ~14% of HAV infections are attributable to personal contact with an infected individual (ie, household, heterosexual, or MSM)\(^3\)

MSM = men who have sex with men.
Vaccine-preventable hepatitis (VPH) includes hepatitis A and hepatitis B. Hepatitis C is not vaccine preventable.

Considerations for Sexually Active Individuals

- Vaccination is one of the most effective means of preventing sexual transmission of HAV and HBV\(^1\)
- Condoms do not protect against all modes of HAV transmission\(^1\)
- 36% of reported HBV-infected patients have had prior treatment for STDs\(^2\)
- In a study from 1992, nearly 13% of women and nearly 20% of men treated for an STD returned within 9 months with a new infection\(^3\)

HIV
Risks to the Liver in HIV

Other Infections

HCV
HBV
HAV

Immune Reconstitution

Nucleoside and Nucleotide Analogues
Protease Inhibitors

Diabetes
Dyslipidemia

EtOH/IVDU
HCV Treatment
NNRTI

Adaptation—Slide courtesy of R. Berggren, MD.
HIV and Liver Disease Often Coexist

- Risk factors associated with viral hepatitis are often the same as those for HIV
- Chronic HBV infection occurs in 10%-15% of HIV-infected persons\(^1\)
- Up to 30% of HIV-infected persons are coinfected with HCV\(^2\)
- 45% of hospitalized HIV patient deaths are caused by end-stage liver disease\(^3\)

Liver Disease Is a Major Cause of Death in the HAART Era

Deaths Caused by ESLD Among Persons With HIV *

*ESLD = end-stage liver disease.
### Immunogenicity of HAV Vaccine in HIV+ Individuals vs Healthy Controls

<table>
<thead>
<tr>
<th>Stage of Infection</th>
<th>HIV-Infected</th>
<th>Healthy Controls</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>Response* (%)</td>
</tr>
<tr>
<td>All stages</td>
<td>49</td>
<td>46 (93.9)</td>
</tr>
<tr>
<td>CD4 &gt;300</td>
<td>26</td>
<td>26 (100)</td>
</tr>
<tr>
<td>CD4 &lt;300</td>
<td>23</td>
<td>20 (87.0)</td>
</tr>
</tbody>
</table>

*Response rate (%) measured 1 month after 2nd Hep A dose

Financial Impact of High Risk Patient Populations and Hepatitis A & B
Effect of Hepatitis A or Hepatitis B Infection on Cost of Care in Patients With Preexisting Conditions

- Multi-state Medicaid claims database
- Study population
  - Medicaid recipients ≥18 years old
  - 2 unique claims within calendar year with an ICD-9 code specific for Hepatitis A or B and
    - Human immunodeficiency virus (HIV)
    - Sexually transmitted disease (STD)
    - Chronic liver disease (CLD)
  - Controls matched by disease state, age, race, and clinical severity score

Data From Health Research Insights, Inc..
## Financial Implications: HAV or HBV Infection Superimposed on Existing Disease: 2004

Multistate Medicaid claims database

<table>
<thead>
<tr>
<th>Risk Cohort (N)</th>
<th>With</th>
<th>Mean Increase In Cost per Recipient*</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIV (16,285)</td>
<td>HAV</td>
<td>$1041.93</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>HBV</td>
<td>$1602.55</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>STD (242,223)</td>
<td>HAV</td>
<td>$1591.56</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>HBV</td>
<td>$3414.25</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>CLD (138,417)</td>
<td>HAV</td>
<td>$5056.80</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>HBV</td>
<td>$(300.91)</td>
<td>0.17</td>
</tr>
</tbody>
</table>

*Compared to individuals matched by gender, age, race, and disease state without HAV or HBV infection.
Financial Implications: HAV or HBV Infection Superimposed on Existing Disease: 2004

<table>
<thead>
<tr>
<th>Mean Increase in Cost per Recipient*</th>
<th>HAV</th>
<th>HBV</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIV</td>
<td>$1,000</td>
<td>$0</td>
</tr>
<tr>
<td>STD</td>
<td>$2,000</td>
<td>$3,000</td>
</tr>
<tr>
<td>CLD</td>
<td>$6,000</td>
<td>$0</td>
</tr>
</tbody>
</table>

*Compared to individuals matched by gender, age, race, and disease state without HAV or HBV infection.

$P<0.001$ for all except CLD with HBV
The Importance of Hepatitis Prevention in Corrections
Drug Use

- 1 in 4 inmates report a history of injection drug use\(^1\)
- In 2000, 21% of state prisoners and 59% of federal prisoners were incarcerated for drug offenses\(^2\)
- In 1997 inmate surveys, 83% of state prisoners and 73% of federal prisoners reported past drug use, and 57% of state prisoners and 45% of federal prisoners reported using drugs in the month before their offense\(^2\)
- Injection-drug use during incarceration has been reported by 3%–28% of adult inmates\(^2\)

High-Risk Sexual Behavior

- Men who have sex with men and inmates who engage in high-risk sexual activity are at increased risk for HAV and/or HBV
  - Conservative estimates find 2–30% of inmates have sex while incarcerated
  - Outbreaks of syphilis and hepatitis B among inmates reflect sexual activity in correctional facilities
  - Hep A & B are STD’s by definition
  - Higher incidence of HIV in this population

Other Risk Factors in Corrections Setting

- Percutaneous exposures have the potential to transfer infectious blood and transmit blood-borne pathogens\(^1\)
  - Tattoos, bites and abrasions are common in correctional facilities and may expose inmates and staff to HAV & HBV
- Environmental and behavioral factors common in the inmate population increase the risk for HAV:
  - Close proximity (and sharing) of toilet and drinking facilities\(^2,3\)
  - Fecal contamination through “rectal” smuggling of items into prisons\(^1\)
  - General over-crowding and poor sanitation\(^3\)
  - Smoking and sharing cigarettes (62% of inmates smoke)\(^4\)
  - Smoking and sharing marijuana\(^2\)

Hepatitis A

- During January 2001-July 2002, 403 hepatitis A cases were reported in Polk County, Florida
- 48% were drug users and of these, 80% were recently in jail.

Vong S - Vaccine - 11-JAN-2005; 23(8): 1021-8
HCV: Disease Overview

- ~2.7 million persons infected nationwide
- Majority of cases occur in adults ≥ 25 years old
- Injecting drug use is the most commonly identified risk factor for infection
- Conservative estimates of prevalence of 15-30% of incarcerated population
- No vaccine for the prevention of HCV

Hepatitis A/B Prevention in Corrections Makes Medical Sense

- Inmates have a high prevalence of risk factors associated with viral hepatitis transmission, including drug use, high-risk sexual activity, and percutaneous exposures.
- Incarcerated populations are able to access healthcare—often for the first time.
  - Infectious diseases, including AIDS, STDs, TB, and viral hepatitis, are more prevalent among correctional inmates than the general population.
Hepatitis Prevention in Corrections is Cost-Effective

- Adding HAV vaccination to existing HBV vaccination is cost-effective for inmates, particularly in areas of high HAV endemicity
  - Substituting HAV/HBV vaccine for HBV vaccine in inmate populations is within the standard cost-effectiveness range for areas of low to medium HAV incidence and actually saves money in high prevalence areas
  - HAV/HBV vaccine would prevent 466 HAV infections, 60 hospitalizations, 1.6 premature deaths, and the loss of 28 life-years in highly endemic areas

Hepatitis Prevention in Corrections Benefits Society

• The Viral Hepatitis “Cycle”
  • Inmates can acquire and transmit viral hepatitis as they move between communities and correctional facilities\(^1\)

• More than 8 million inmates rejoin their communities each year\(^1\)

• Over half of inmates return to prison within 3 years of their release\(^2\)

Pregnancy
Hepatitis A in Pregnancy

- Increased Risk
  - Placental abruption
  - Premature delivery
- If mother acutely ill during delivery, child should receive immune globulin
Hepatitis B In Pregnancy

- The frequency of acute hepatitis B in pregnancy is 1 to 2 per 1,000
- Chronic Hep B: 5 to 15 per 1,000
- May result in:
  - severe maternal disease
  - fetal loss
  - chronic infection in the neonate.
HEP C

• In the OB Population 1-3% incidence
• Risk factors
  • Transfusion
  • IVDA
  • Sexual transmission
• 75% are asymptomatic
• 50% progress to hepatic dysfunction
• Of the above group 20% develop cirrhosis
• Perinatal transmission rates may be up to 40%
Vaccine-preventable hepatitis (VPH) includes hepatitis A and hepatitis B. Hepatitis C is not vaccine preventable.

Migration and Hepatitis A & B

- Americans travel internationally to Mexico more than any other country
- Families who live along the United States-Mexico border and travel back and forth frequently have been recognized as being at high risk for Hepatitis A
- 54% of the migrant population is from Mexico/Central America = 20 million individuals
- Majority of migrants have never been vaccinated against Hepatitis A or B
- CDC estimates between 1994-2003, 450,000 immigrants admitted to the USA had Hepatitis B

*Role of Immigrants and Migrants in Emerging Infectious Diseases*
Supporting Evidence for Recommendations: International Travelers
International Travelers Are at Risk for Exposure to VPH

The risk of exposure to hepatitis A virus (HAV) and hepatitis B virus (HBV) depends on:

1. Destination
2. Activities
3. Duration of travel

Vaccine-preventable hepatitis (VPH) includes hepatitis A and hepatitis B. Hepatitis C is not vaccine preventable.

VPH Risk Depends on Activities Undertaken During Travel

HAV:
- Fecal-oral transmission
  - Ingesting contaminated food or water
  - Ingesting contaminated water while swimming
- *Travelers to endemic regions are at risk for exposure to HAV*

HBV:
- Body fluid transmission
- Travelers to endemic regions may be at risk based on:
  - *Behavior*
    - Unprotected sex with local residents
    - Tattoos, piercings, IDU
  - *Medical/dental care*
    - Accidents or unexpected medical or dental care

IDU = Injectable drug use.
Vaccine-preventable hepatitis (VPH) includes hepatitis A and hepatitis B. Hepatitis C is not vaccine preventable.
Sex and Travel (Matteelli A, CID 2001)

- 66% of Australian travelers planned on having sex in Thailand
- 25% of Swedish female rail travelers had sex with unknown partner
- 19% of London travelers had sex with a new partner(s) on a recent trip  
  • 64% did not regularly use a condom
- 41% of Norwegian travelers had casual sex while abroad  
  • Infrequent condom use
UPDATES ON HEPATITIS A & B VACCINES
Hepatitis A Vaccine in the Last Decade

- In 2004, approximately two-thirds of reported hepatitis A cases occurred in states without childhood vaccination recommendations.
- In 2006, the ACIP, AAP, & AAFP made Hepatitis A a recommended vaccine
- ACIP “elimination of indigenous spread of hepatitis A is an attainable objective”.

Public Health Impact of Universal Hepatitis A Vaccine

• In 1999, Israel began a universal immunization program aimed at vaccinating all 18-month-old children
• First-dose immunization rate of approximately 90%
• Second-dose immunization rate of approximately 85%
• 98% reduction in disease in children 1 to 4 years of age
• 95% reduction in hepatitis A disease in all age groups including adults

Update: Prevention of Hepatitis A After Exposure to Hepatitis A Virus and in International Travelers. Updated Recommendations of the Advisory Committee on Immunization Practices (ACIP)

In 1995, highly effective inactivated hepatitis A vaccines were first licensed in the United States for preexposure prophylaxis against hepatitis A virus (HAV) among persons aged ≥2 years. In 2005, vaccine manufacturers received Food and Drug Administration approval for use of the vaccines in children aged 12–23 months (1).

The Advisory Committee on Immunization Practices (ACIP) issued recommendations for preexposure use of hepatitis A vaccine in 1996, 1999, and 2006 (1). Currently, ACIP recommends hepatitis A vaccination of all children at age 12–23 months, catch-up vaccination of older children in selected areas, and vaccination of persons at increased risk for hepatitis A (e.g., travelers to endemic areas, users of illicit drugs, or men who have sex with men) (2).

For decades, immune globulin (IG) has been recommended for prophylaxis after exposure to HAV (2). IG also has been recommended in addition to hepatitis A vaccine for preexposure prophylaxis for travelers to countries with high or intermediate hepatitis A endemicity who are scheduled to depart <4 weeks after receiving the initial vaccine dose. This report details updated recommendations, made by ACIP in June 2007, for prevention of hepatitis A after exposure to HAV and in departing international travelers (Box) and incorporates existing ACIP recommendations for prevention of hepatitis A (1).

Rationale and Methods for Updated Recommendations

When administered within 2 weeks of last exposure, IG is 80%–90% effective in preventing clinical hepatitis A. Despite previously available limited data suggesting that hepatitis A vaccine might be efficacious when administered after exposure (2), in the absence of an appropriately designed clinical trial comparing the postexposure efficacy of vaccine with that of IG, ACIP continued to recommend IG exclusively for postexposure use (1). Hepatitis A vaccine, if recommended for other reasons, could be given at the same time. ACIP was prompted to revisit these recommendations when findings became
HEPATITIS B VACCINE
TWINRIX Accelerated Schedule: A Controlled Trial

- 496 subjects from Belgium, the Czech Republic, Norway, and the United States
- Randomized
- Follow-up on Day 7, 14, 21-30, 37 and Month 3, 12, 13

**Group 1 (N=250)**
TWINRIX: Day 0, 7, 21-30, Month 12

**Group 2 (N=246)**
- Engerix-B® [Hepatitis B Vaccine (Recombinant)]: Day 0, Month 1, 2, and 12
- Havrix® (Hepatitis A Vaccine, Inactivated): Day 0, Month 12

Important safety information is provided at the end of this presentation. See accompanying complete prescribing information for TWINRIX, HAVRIX, and ENGERIX-B. Connor et al. *J Travel Med.* 2007;14:9-15.
Anti-HAV Seroconversion Following Vaccination

*S*<0.001.

Important safety information is provided at the end of this presentation. See accompanying complete prescribing information for TWINRIX, HAVRIX, and ENGERIX-B. Connor et al. *J Travel Med.* 2007;14:9-15.
Anti-HBs Seroprotection Following Vaccination

~20% absolute difference in seroprotection at Day 37*

*P<0.001.

Important safety information is provided at the end of this presentation.
See accompanying complete prescribing information for TWINRIX, HAVRIX, and ENGERIX-B.
## TWINRIX Accelerated Dosing Delivers a Sustained Immune Response

<table>
<thead>
<tr>
<th>Timepoint</th>
<th>TWINRIX</th>
<th>Monovalent</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>HAV Seroconversion</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Day 37</td>
<td>98.5%</td>
<td>98.6%</td>
</tr>
<tr>
<td>Month 3</td>
<td>100%</td>
<td>95.6%</td>
</tr>
<tr>
<td>Month 12</td>
<td>96.9%</td>
<td>86.9%</td>
</tr>
<tr>
<td>Month 13</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td><strong>HBV Seroprotection</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Day 37</td>
<td>63.2%</td>
<td>43.5%</td>
</tr>
<tr>
<td>Month 3</td>
<td>83.2%</td>
<td>76.7%</td>
</tr>
<tr>
<td>Month 12</td>
<td>82.1%</td>
<td>77.8%</td>
</tr>
<tr>
<td>Month 13</td>
<td>96.4%</td>
<td>93.4%</td>
</tr>
</tbody>
</table>

A prospective, open-label, randomized comparative study of 496 healthy adults. TWINRIX (Day 0, 7, 21–30 followed by booster dose Month 12) versus hepatitis A vaccine [Havrix® (Hepatitis A Vaccine, Inactivated)] (Day 0, Month 12) and hepatitis B vaccine (Engerix-B® [Hepatitis B Vaccine (Recombinant)]) (Day 0, Month 1, 2, 12).

Important safety information is provided at the end of this presentation. See accompanying complete prescribing information for TWINRIX, HAVRIX, and ENGERIX-B. Connor et al. *J Travel Med.* 2007;14:9-15.
TWINRIX Accelerated Dosing Offers Protection Against Hepatitis A and Hepatitis B

NEW ACCELERATED SCHEDULE:

3 doses given within 3 weeks followed by a booster dose at 12 months

Choose the course of protection that fits your patient’s needs


Important safety information is provided at the end of this presentation. See accompanying complete prescribing information for TWINRIX.
The safety of TWINRIX administered via the accelerated schedule was similar to that with the standard TWINRIX schedule and with the separate component vaccines (eg, HAVRIX and ENGERIX-B).

Important safety information is provided at the end of this presentation. See accompanying complete prescribing information for TWINRIX, HAVRIX, and ENGERIX-B.
Important Safety Information for TWINRIX

TWINRIX is contraindicated in people with hypersensitivity to any component of the vaccine, including yeast and neomycin.

In clinical trials with TWINRIX, the most common solicited adverse events were:

- Soreness at the injection site
- Headache
- Redness at the injection site
- Fatigue

They were mild and self-limiting and did not last more than 48 hours.

As with any vaccine, rare adverse events may occur. (See Adverse Reactions section of the Prescribing Information for TWINRIX for other potential side effects.)

As with any vaccine, TWINRIX may not protect 100% of individuals receiving the vaccine.

As with any vaccine, if administered to immunosuppressed persons, including individuals receiving immunosuppressive therapy, the expected immune response may not be obtained.

See accompanying complete prescribing information for TWINRIX.
Indication and Important Safety Information for HAVRIX

• HAVRIX is indicated for active immunization of persons ≥12 months of age against disease caused by hepatitis A virus (HAV).

• In clinical trials, the most common solicited adverse events were injection-site soreness and headache. Greater incidences of general adverse events were observed in subjects who received HAVRIX at the same time as Hib conjugate and DTaP vaccines. As with any vaccine, rare adverse events may occur. (See Adverse Reactions section of the Prescribing Information for HAVRIX for potential side effects.) HAVRIX is contraindicated in people with hypersensitivity to any component of the vaccine, including neomycin.

See accompanying complete prescribing information for HAVRIX.
Indication and Important Safety Information for ENGERIX-B

- ENGERIX-B is indicated for immunization against infection caused by all known subtypes of hepatitis B virus. As hepatitis D (caused by the delta virus) does not occur in the absence of hepatitis B infection, it can be expected that hepatitis D will also be prevented by ENGERIX-B vaccination.

- ENGERIX-B is generally well tolerated. In clinical trials, the most common solicited adverse events were injection-site soreness and fatigue. As with any vaccine, rare adverse events may occur. (See Adverse Reactions section of the Prescribing Information for ENGERIX-B for other potential side effects.) ENGERIX-B is contraindicated in people with hypersensitivity to any component of the vaccine, including yeast.

See accompanying complete prescribing information for ENGERIX-B.