

# Identification and management of persons with chronic viral hepatitis in the United States

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# The Burden of Chronic Hepatitis B and Hepatitis C in the U.S.

- Persons living with chronic infection- ~ 4.5 M
  - Chronic HBV 800,00-1.4 million
  - Chronic HCV 3.2 million
- Chronic viral hepatitis associated deaths – 10,000-14,000
  - Chronic HBV 2,000-4,000 per yr
  - Chronic HCV 8,000-10,000 per year
- HIV infected: 9% HBV; 25% HCV
- Cause of most chronic liver disease in US

# Burden of Hepatitis B Virus Infection in the U.S.

No. of Acute Clinical Cases Reported <sup>a</sup>

Estimated No. of Acute Clinical Cases <sup>b</sup>

Estimated No. of New Infections <sup>b</sup> (current)

Percent Ever Infected <sup>c</sup>

Number of Persons Living with Chronic Infection <sup>d</sup>

Annual Number of Chronic Liver Disease Deaths associated with Viral Hepatitis <sup>e</sup>

Hepatitis B					
2007	2006	2005	2004	2003	2002
4,519	4,758	5,494	6,212	7,526	8,064
13,000	13,000	15,000	17,000	21,000	23,000
43,000	46,000	53,000	60,000	73,000	79,000

4.3% - 5.6%

800,000 - 1.4 million persons

3,000

# Prevalence of hepatitis B virus (HBV) infection, by risk population

Population	Chronically infected with HBV*	Ever infected with HBV**
	%	%
General U.S. population	0.3 (95% CI : 0.2–0.4)	4.8% (95% CI: 4.2%-5.5%)
HIV-positive persons	4 – 17	24 – 76
Injection-drug users	3 – 6	20 – 70
Men who have sex with men	1 – 3	10 – 40
Sexual contacts of HBsAg+ persons	3.5 – 9	25 – 59
Household contacts of HBsAg+ persons	3 – 20	15 – 60

\*HBsAg+; \*\*Total anti-HBc+

# Burden of Hepatitis C Virus Infection in the U.S.

No. of Acute Clinical Cases Reported <sup>a</sup>  
 Estimated No. of Acute Clinical Cases <sup>b</sup>  
 Estimated No. of New Infections <sup>b</sup> (current)

Hepatitis C					
2007	2006	2005	2004	2003	2002
849	802	694	758	891	1,223
2,800	3,200	3,400	4,200	4,500	4,800
17,000	19,000	21,000	26,000	28,000	29,000

Percent Ever Infected <sup>c</sup>  
 Number of Persons Living with Chronic Infection <sup>d</sup>  
 Annual Number of Chronic Liver Disease Deaths associated with Viral Hepatitis <sup>e</sup>

1.3% - 1.9%
2.7–3.9 million persons
12,000

# Data Sources for HBV and HCV Incidence and Prevalence Estimates in the U.S.

## **a. Number of Acute Clinical Cases Reported:**

For hepatitis A, hepatitis B, and hepatitis C/non-A, non-B hepatitis, the number of cases reported to the National Notifiable Disease Surveillance System (NNDSS).

## **b. Estimated Number of Acute Clinical Cases and New Infections:**

Incidence estimates for hepatitis A and hepatitis B are derived from catalytic modeling of seroprevalence data from the Third National Health and Nutrition Examination Survey (NHANES III) applied to cases reported to the Nationally Notifiable Disease Surveillance System (NNDSS). Incidence estimates for hepatitis C are derived by adjusting rates from the Sentinel Counties Study of Viral Hepatitis (1982–2006) and Emerging Infection Program (2007) for underreporting and asymptomatic infection.

## **c. Percent Ever Infected:**

Seroprevalence estimates for HAV, HBV and HCV come from the National Health and Nutrition Examination Survey **HAV:** Bell BP, Kruszon-Moran D, Shapiro CN et al. Hepatitis A virus infection in the United States: serologic results from the Third National Health and Nutrition Examination Survey. *Vaccine* 23(2005):5798-5806. **HBV:** McQuillan GM, et al. Prevalence of hepatitis B virus infection in the United States: The National Health and Nutrition and Examination Surveys, 1976 through 1994. *AJPH* 1999; 89(1):14-18. **HCV:** Armstrong GL et al. The prevalence of hepatitis C virus infection in the United States, 1999 through 2002. *Ann Int Med* 2006;144:705-14.

## **d. Number of Persons Living with Chronic Infection:**

**HBV:** CDC. Recommendations for identification and public health management of persons with chronic hepatitis B virus infection. *MMWR* 2008;57(No. RR-8). **HCV:** Armstrong GL et al. The prevalence of hepatitis C virus infection in the United States, 1999 through 2002. *Ann Int Med* 2006;144:705-14.

## **e. Annual Number of Chronic Liver Disease Deaths associated with Viral Hepatitis:**

**HBV:** Vogt TM et al. Hepatitis B mortality in the United States, 1990–2004. Paper presented at 45th Annual Meeting of the Infectious Disease Society of America; October 4–7, 2007; San Diego, CA. and Manos MM et al. Limitations of conventionally derived chronic liver disease mortality rates: results of a comprehensive assessment. *Hepatology* 2008;47:1150-7. **HCV:** Wise M et al. Changing trends in hepatitis C-related mortality in the United States, 1995–2004. *Hepatology* 2008;47:1–8.

# Purposes of chronic HBV Screening:

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## Primary prevention

- Prevent nosocomial HBV transmission
- Manage exposures to HBV infected persons

## Secondary prevention

Reduce risks for chronic liver disease in infected persons by providing medical management and antiviral treatment

## Recommendations based on:

- Prevalence in population
- Serious outcomes from undetected infection

# Low levels of Self-Awareness of Chronic HBV Infection

- *As many as 2/3 of chronically-infected Asian Americans knew their status in several studies*



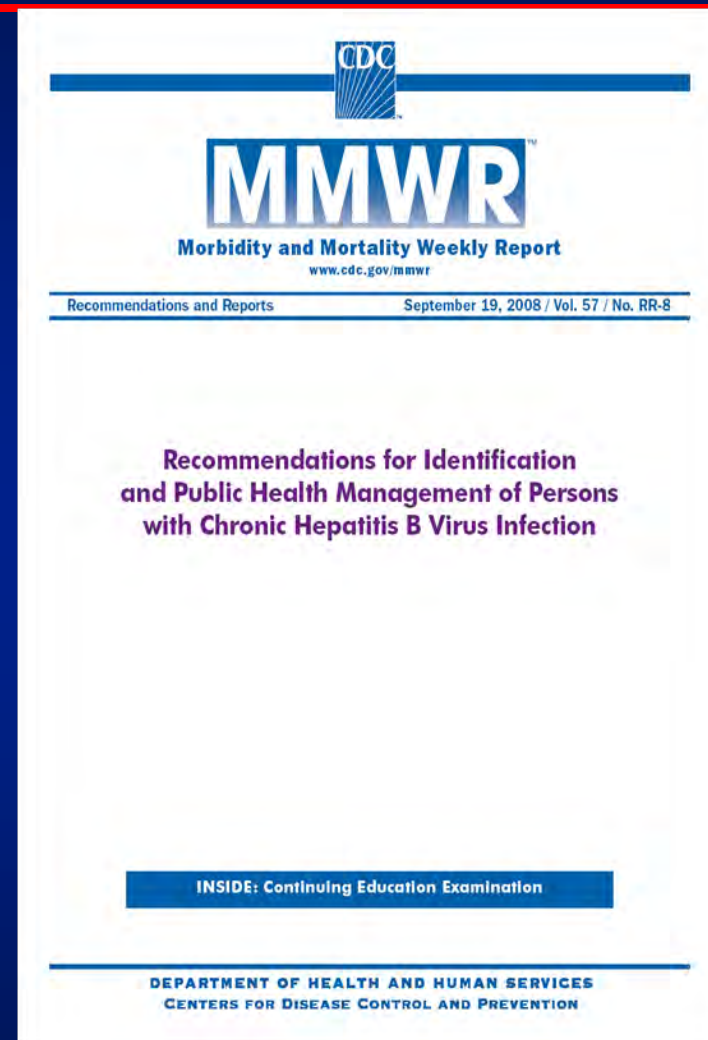
# Improve Screening and Care for Chronic Hepatitis C

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- **Improve screening strategies**
  - **Evaluate rapid HCV tests**
    - Increase receipt of results and interventions
    - Integrate with HIV testing
  - **Study alternatives to risk-based HCV screening**
    - Age based or birth cohort screening
- **Gather data on health care access and outcome**
- **Build model prevention and referral programs**

# Recommendations for Identification and Management of Persons with Chronic HBV Infection

- **Testing recommendations**
- **Management guidance**
- **Infrastructure needs**



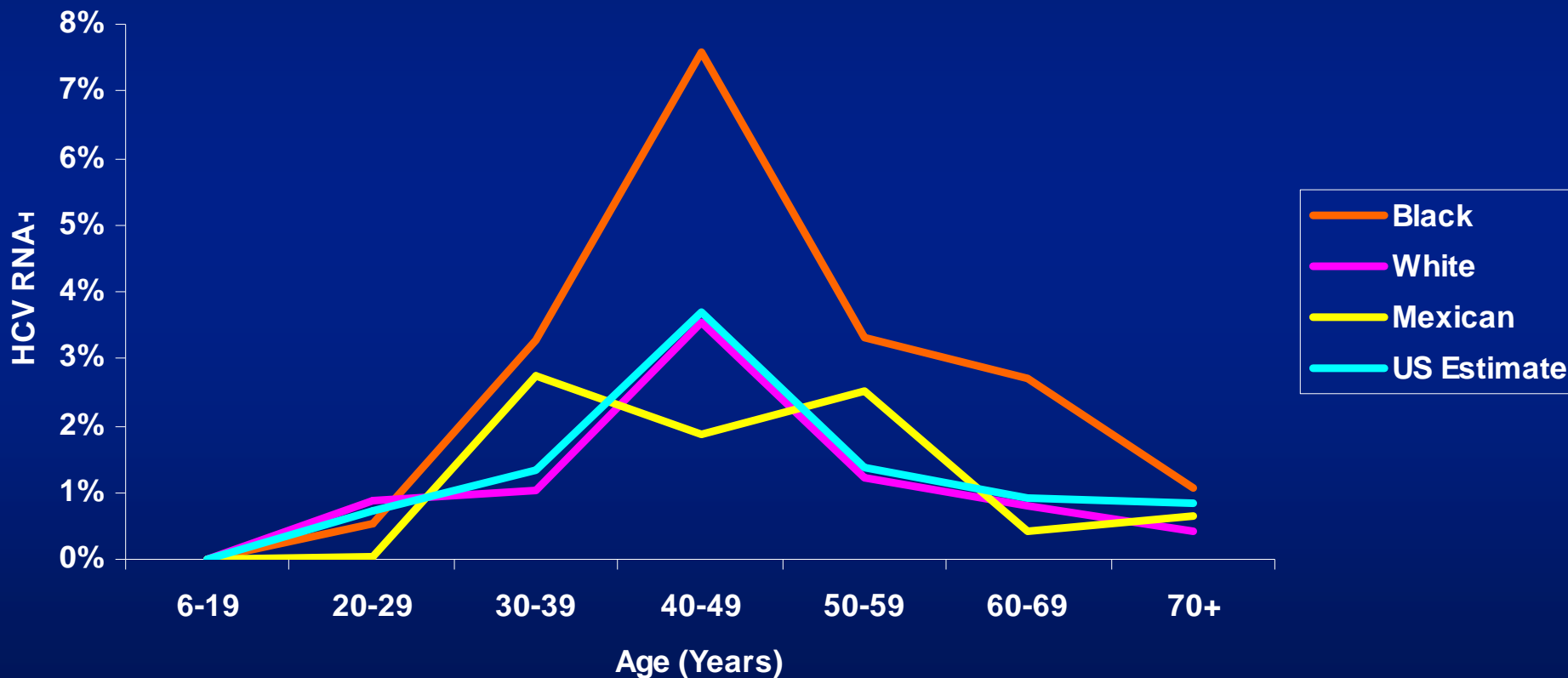
# Chronic Viral Hepatitis and Health Disparities

- Chronic HBV
  - Asian/Pacific Islanders
    - 1 in 12 living with chronic HBV
    - Leading cause of cancer death
  - 40,000 cases per year among new entrants to US
- Chronic HCV
  - Most infections among persons born 1940-1965
  - Mortality twice that of whites for blacks, Hispanics, Native Americans



# Prevalence of HCV RNA by Age and Race, United States NHANES, 1999-2002

Estimated U.S. prevalence: 1.6% (3.2 million)



# NHANES: Limitations

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- Excludes incarcerated and homeless persons
  - Including incarcerated persons would increase the estimate of infected persons to 3.5 million
- Cross-sectional design prevents determination of sources of infection for individuals
- Possible under-reporting of injection drug use

# CDC Recommendations for Identification and Management of Persons with Chronic HBV Infection (2008)

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## New

- persons born in geographic regions with HBsAg prevalence of  $\geq 2\%$
- US born persons not vaccinated as infants whose parents were born in geographic regions with HBsAg prevalence of  $\geq 8\%$
- injection-drug users
- men who have sex with men
- persons with elevated ALT/AST of unknown etiology
- persons with selected medical conditions who require immunosuppressive therapy

## Continuing

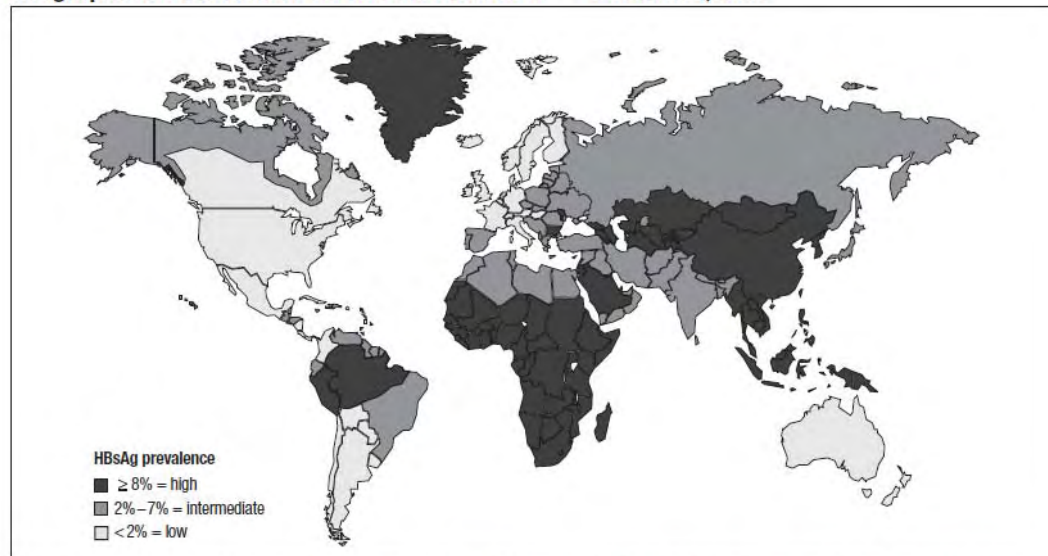
- pregnant women
- infants born to HBsAg-positive mothers
- household contacts and sex partners of HBV-infected persons
- persons who are the source of blood or body fluid exposures that might warrant postexposure prophylaxis
- persons infected with HIV

## Recommendations for Routine Testing and Follow-up for Chronic Hepatitis B Virus (HBV) Infection

Population	Recommendation	
	Testing	Vaccination/Follow-up
Persons born in regions of high and intermediate HBV endemicity (HBsAg prevalence $\geq 2\%$ )	Test for HBsAg, regardless of vaccination status in their country of origin, including <ul style="list-style-type: none"> <li>– immigrants</li> <li>– refugees</li> <li>– asylum seekers</li> <li>– internationally adopted children</li> </ul>	If HBsAg-positive, refer for medical management. If negative, assess for on-going risk for hepatitis B and vaccinate if indicated.
US born persons not vaccinated as infants whose parents were born in regions with high HBV endemicity ( $\geq 8\%$ )	Test for HBsAg regardless of maternal HBsAg status if not vaccinated as infants in the United States.	If HBsAg-positive, refer for medical management. If negative, assess for on-going risk for hepatitis B and vaccinate if indicated.

Continues on back

### Geographic Distribution of Chronic HBV Infection — Worldwide, 2006\*



\* For multiple countries, estimates of prevalence of hepatitis B surface antigen (HBsAg), a marker of chronic HBV infection, are based on limited data and might not reflect current prevalence in countries that have implemented childhood hepatitis B vaccination. In addition, HBsAg prevalence might vary within countries by subpopulation and locality.

Source: CDC. Travellers' Health: Yellow Book. <http://www.cdc.gov/travel/yellowbookch4-HepB.aspx>.

## Routine Testing and Follow-up for Chronic HBV Infection (continued)

Population	Recommendation	
	Testing	Vaccination/Follow-up
Injection-drug users	Test for HBsAg, as well as for anti-HBc or anti-HBs to identify susceptible persons.	First vaccine dose should be given at the same visit as testing. Susceptible persons should complete a 3-dose hepatitis B vaccine series to prevent infection from ongoing exposure.
Men who have sex with men	Test for HBsAg, as well as for anti-HBc or anti-HBs to identify susceptible persons.	First vaccine dose should be given at the same visit as testing. Susceptible persons should complete a 3-dose hepatitis B vaccine series to prevent infection from ongoing exposure.
Persons needing immunosuppressive therapy, including chemotherapy, immunosuppression related to organ transplantation, and immunosuppression for rheumatologic or gastroenterologic disorders	Test for all markers of HBV infection (HBsAg, anti-HBc, and anti-HBs).	Treat persons who are HBsAg-positive. Monitor closely persons who are anti-HBc positive for signs of liver disease.
Persons with elevated ALT/AST of unknown etiology	Test for HBsAg along with other appropriate medical evaluation.	Follow-up as indicated.
Donors of blood, plasma, organs, tissues, or semen	Test for HBsAg, anti-HBc, and HBV-DNA as required.	
Hemodialysis patients	Test for all markers of HBV infection (HBsAg, anti-HBc, and anti-HBs). Test vaccine nonresponders monthly for HBsAg. HBsAg-positive hemodialysis patients should be cohorted.	Vaccinate against hepatitis B to prevent transmission and revaccinate when serum anti-HBs titer falls below 10mIU/mL.
All pregnant women	Test for HBsAg during each pregnancy, preferably in the first trimester. Test at the time of admission for delivery if prenatal HBsAg test result is not available or if mother was at risk for infection during pregnancy.	If HBsAg-positive, refer for medical management. To prevent perinatal transmission, infants of HBsAg-positive mothers and unknown HBsAg status mothers should receive vaccination and postexposure immunoprophylaxis in accordance with recommendations and within 12 hours of delivery.
Infants born to HBsAg-positive mothers	Test for HBsAg and anti-HBs 1–2 mos after completion of at least 3 doses of a licensed hepatitis B vaccine series (i.e., at age 9–18 months, generally at the next well-child visit to assess effectiveness of postexposure immunoprophylaxis). Testing should not be performed before age 9 months or within 1 month of the most recent vaccine dose.	Vaccinate in accordance with recommendations.
Household, needle-sharing, or sex contacts of persons known to be HBsAg positive	Test for HBsAg, as well as anti-HBc or anti-HBs to identify susceptible persons.	First vaccine dose should be given at the same visit as testing. Susceptible persons should complete a 3-dose hepatitis B vaccine series to prevent transmission from ongoing exposure.
Persons who are the sources of blood or body fluids resulting in an exposure (e.g., needlestick, sexual assault) that might require postexposure prophylaxis	Test source for HBsAg.	Vaccinate healthcare and public safety workers with reasonably anticipated occupational exposures to blood or infectious body fluids. Provide postexposure prophylaxis to exposed person if needed.
HIV-positive persons	Test for HBsAg, as well as for anti-HBc or anti-HBs to identify susceptible persons.	Vaccinate susceptible persons against hepatitis B to prevent transmission.

Adapted from: Centers for Disease Control and Prevention. Recommendations for Identification and Public Health Management of Persons with Chronic Hepatitis B Virus Infection. MMWR 2008; 57 (No. RR-8).



# Recommendations for Identification and Management of Persons with Chronic HBV Infection

- **Testing recommendations**
- **Management guidance**
  - Patient counseling
  - Contact management
  - Referral for care and treatment
- **Infrastructure needs**
  - Community outreach
  - State/local prevention programs
  - Care capacity



# Public health management of HBsAg-positive persons

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- **Development of testing programs and networks**
- **Contact management**
- **Patient education**
- **Medical management of chronic hepatitis B**
- **Development of surveillance registries of persons with chronic HBV infection**

# Future Directions: implementation and monitoring recommendations

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- **Resources for testing/screening programs**
- **Resources for contact management**
- **Provider and patient education**
- **Improving Linkages to Care**
- **Development of surveillance and registries of persons with chronic HBV infection**

# In the United States, 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

## National Hepatitis C Prevention Strategy

2001



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# National HCV Prevention Strategy (2001)

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- Prevent HCV infection
- Detect and control chronic liver disease
- Evaluate effectiveness of activities
- Conduct surveillance and research to advance hepatitis C prevention and control

# Prevention of HCV infection

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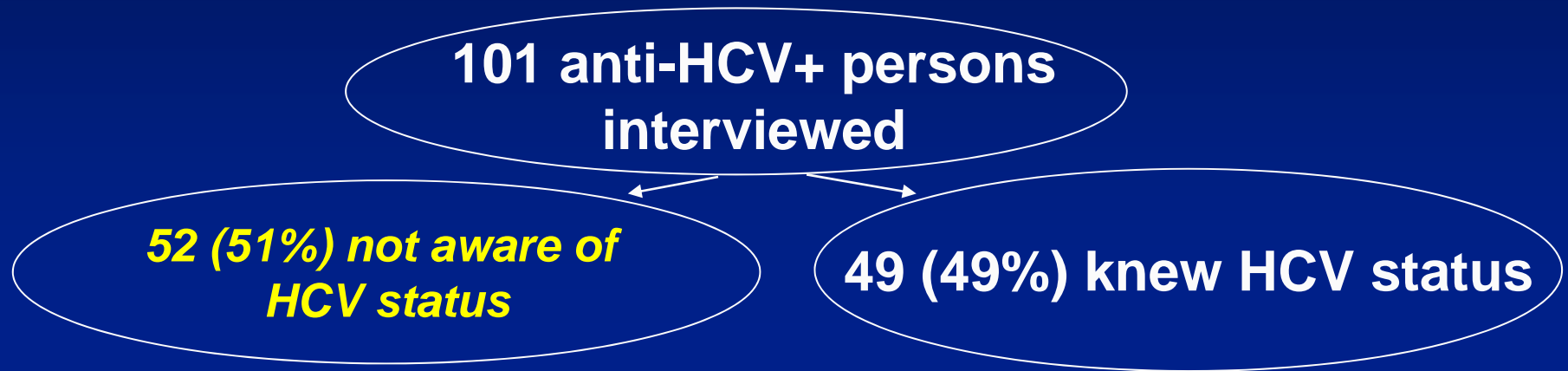
## Primary = Prevent HCV Transmission

- High risk activities – IDU, high risk sex
- Nosocomial, occupational, transfusions and transplant

## Secondary = Reduce Risk of Chronic Liver Disease

- Identify those at risk, test, counsel, medical management

# NHANES follow-up survey, 2001-2002



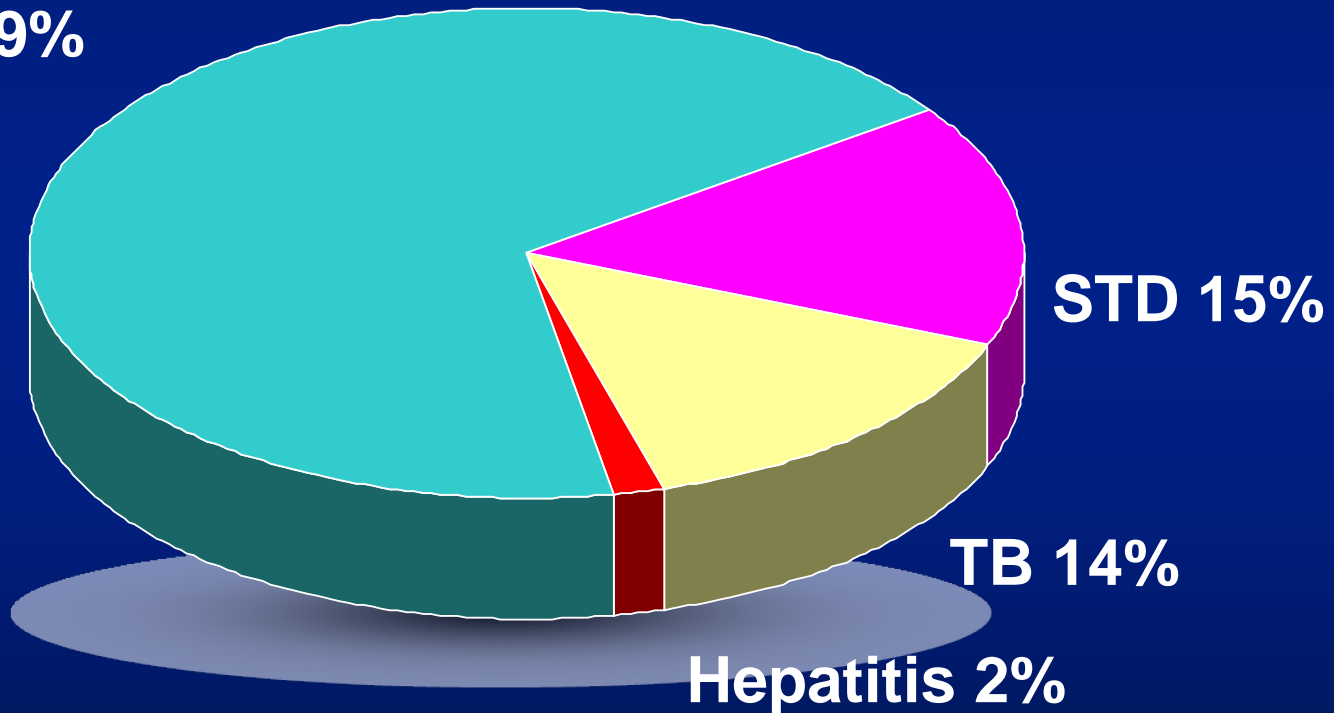
Reasons for previous testing (n=46) for anti-HCV included:

- 21 (46%) routine physical/blood test
- 6 (13%) blood donation
- 5 (11%) evaluation of symptoms of viral hepatitis
- 3 ( 7%) had an identified risk factor for HCV

# FY 2008 Domestic Enacted Funds

**Total: \$1 billion**

**Domestic HIV  
69%**





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# Outstanding issues

- How can incidence of HCV infection be reduced among IDU?
- How can non-hospital health care-related transmission be eliminated?
- What more can be learned about sexual transmission of HCV?
- How can we improve surveillance for both acute and chronic hepatitis C?
- ***How can we most effectively identify HCV-infected persons?***
- Once identified, how can HCV-infected persons access care, as treatment improves?

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# Treatment strategies

CDC does not issue treatment guidelines

## AASLD PRACTICE GUIDELINES

- Chronic Hepatitis B: 2009
- Chronic Hepatitis C: 2009
- Major Health Services Issue: Linkage to Care

