

# Issues for the Prevention and Control of HCV Infection in the United States

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*"The findings and conclusions in this presentation are those of the authors and do not necessarily represent the views of the Centers for Disease Control and Prevention."*



# Outline

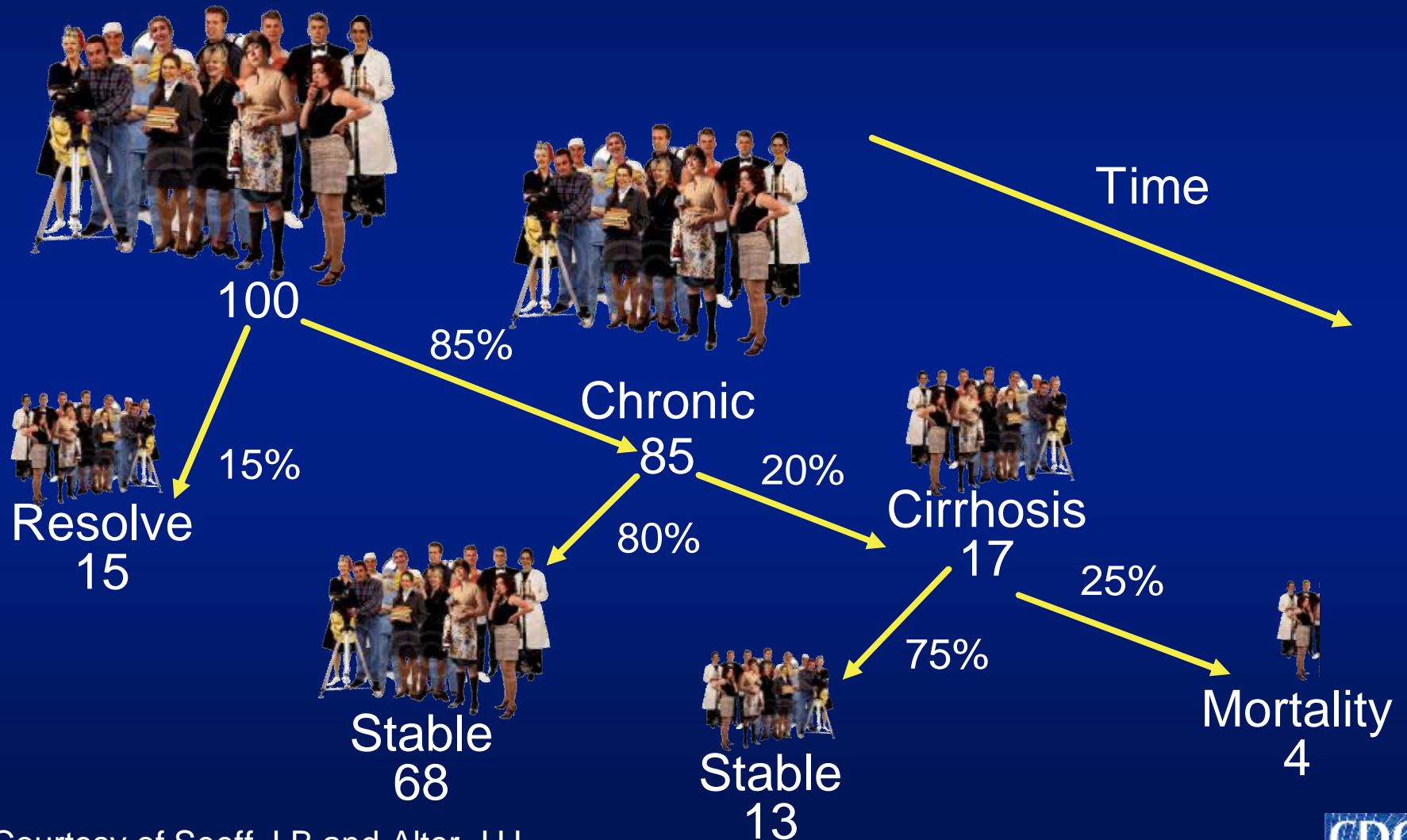
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- | Features of HCV infection
- | Epidemiology of HCV in the United States
  - Acute vs. chronic infections
  - Modes of transmission
- | National HCV prevention strategy
- | Outstanding issues

# Features of HCV Infection

- | Incubation period                      Average, 6–7 wk  
Range, 2–26 wk
- | Acute illness (jaundice)              Mild (20%–30%)
- | Persistent infection                    75%–85%
- | Chronic hepatitis                        70%
- | Immunity                                  No protective antibody  
response identified

# Risk of Fatal Outcome in Persons Who Develop HCV



Courtesy of Seeff, LB and Alter, HJ.



# Estimated HCV Burden United States, 2006

- | ~ 3,200 acute clinical cases
- | ~ 19,000 new infections
- | 3.2 million chronically infected persons
  - 30%-40% of HIV+ persons are coinfecting
- | 1.6% of U.S. residents ever infected
  - $\leq 50\%$  may be aware
- | 8,000 – 10,000 deaths per year

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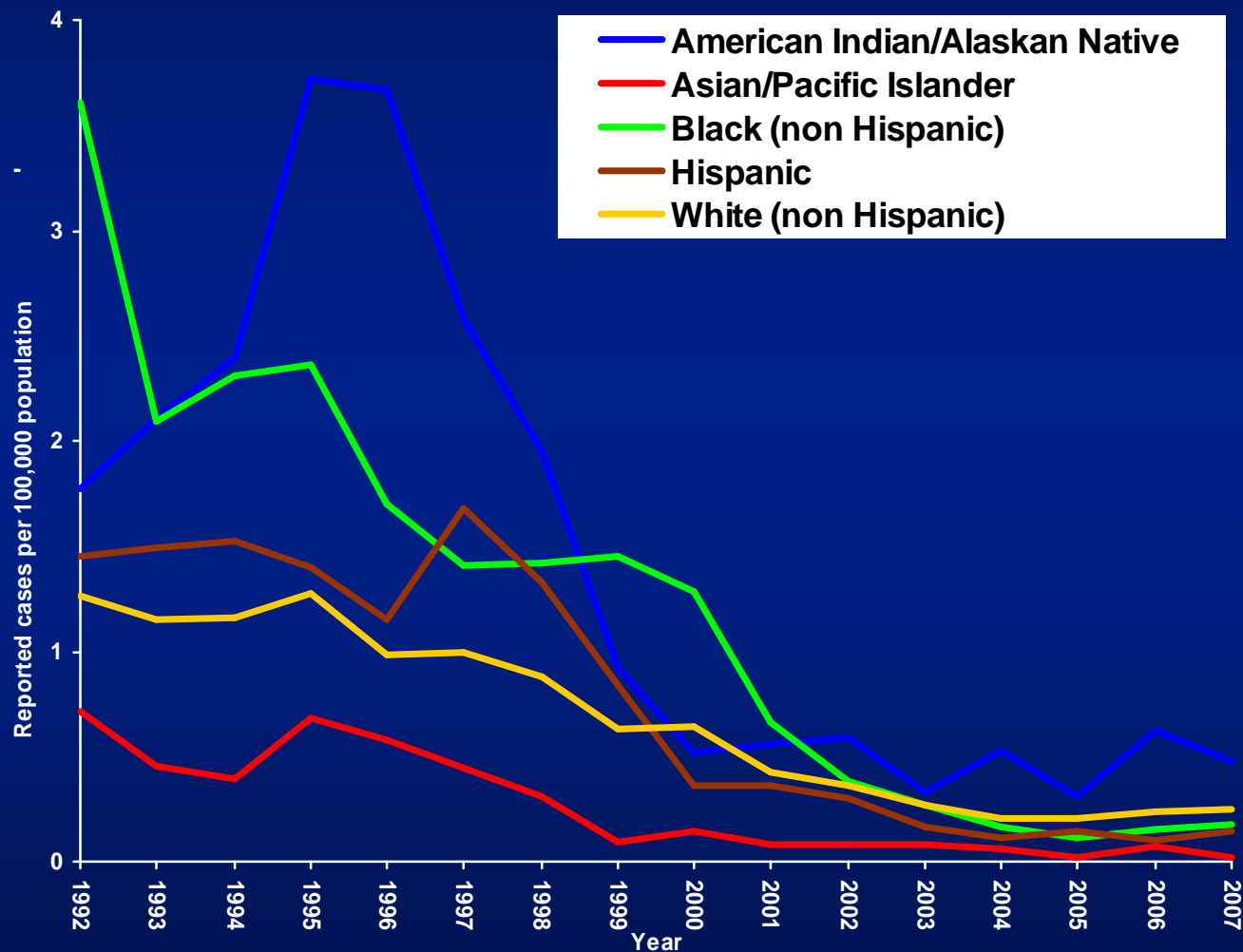
# Incidence of Acute Hepatitis C\*, United States, 1992-2007



\*Acute hepatitis C was reported as acute hepatitis Non-A Non B until 1995  
Source: Nationally Notifiable Disease Surveillance System



# Incidence of Acute Hepatitis C\* by Race and Ethnicity, United States, 1992-2007

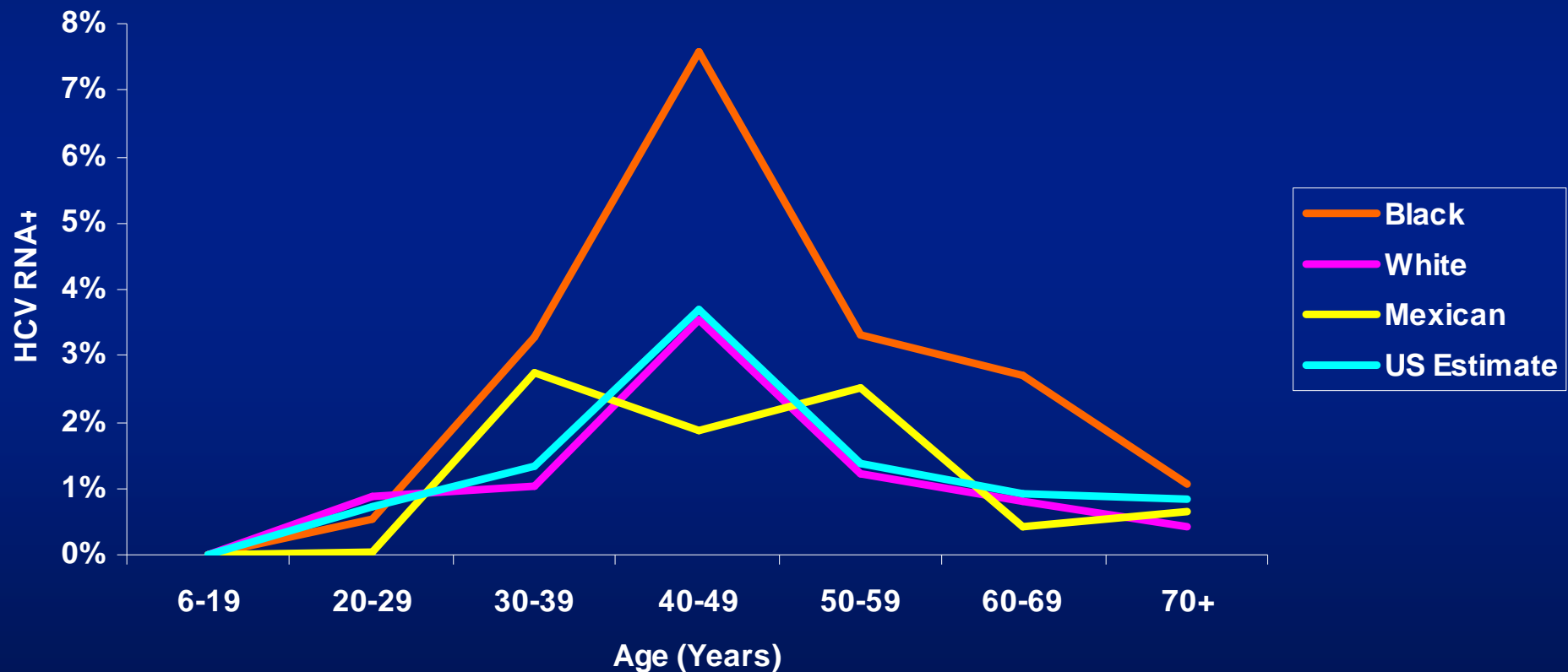


\*Acute hepatitis C was reported as acute hepatitis Non-A Non B until 1995  
Source: Nationally Notifiable Disease Surveillance System



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

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

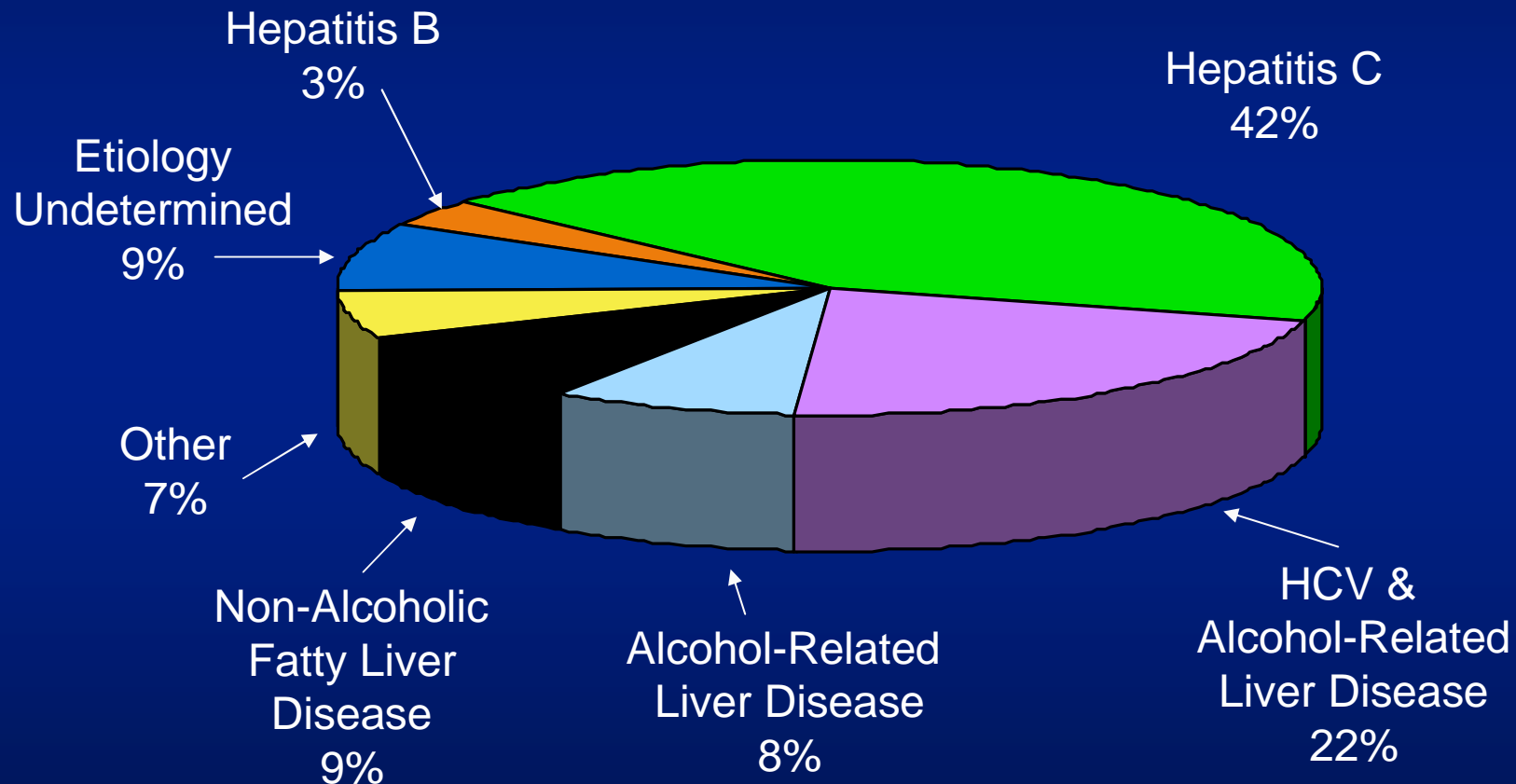


# NHANES: Limitations

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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

# Etiology of Chronic Liver Disease in Three Health Care Systems\*, 1999-2000



\*New Haven County CT, Multnomah County OR, Kaiser Permanente in Alameda County CA (n=2,353)  
Source: Bell, et al. Am J Gastroenterol. 2008 Nov;103(11):2727-36.



# Hepatitis C mortality, 1995-2004

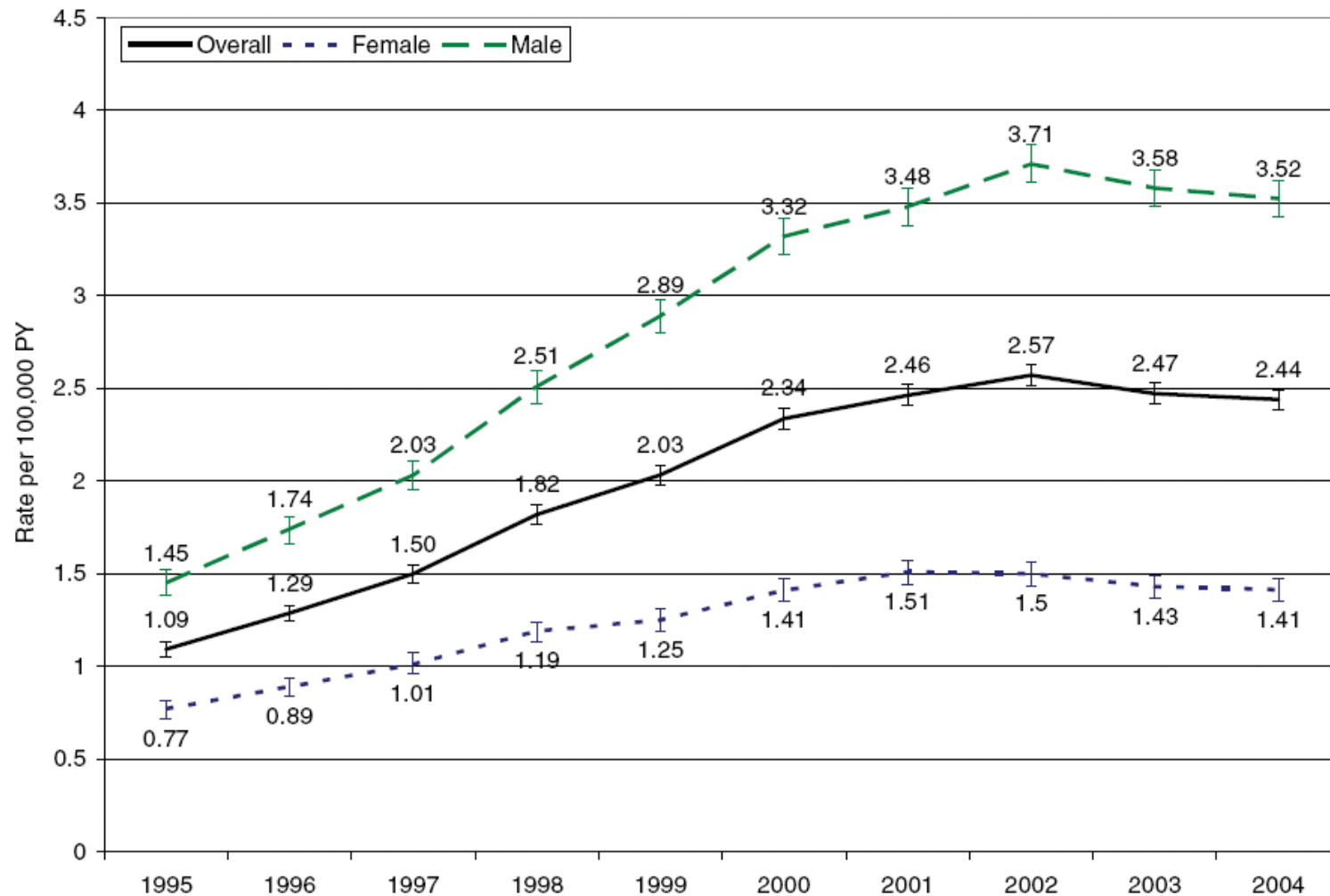


Fig. 1. Annual age-adjusted hepatitis C mortality rates and 95% confidence intervals by sex, United States, 1995-2004.

Source: Wise M et al. HEPATOLOGY 2008;47:1 128-1 135.



# Outline

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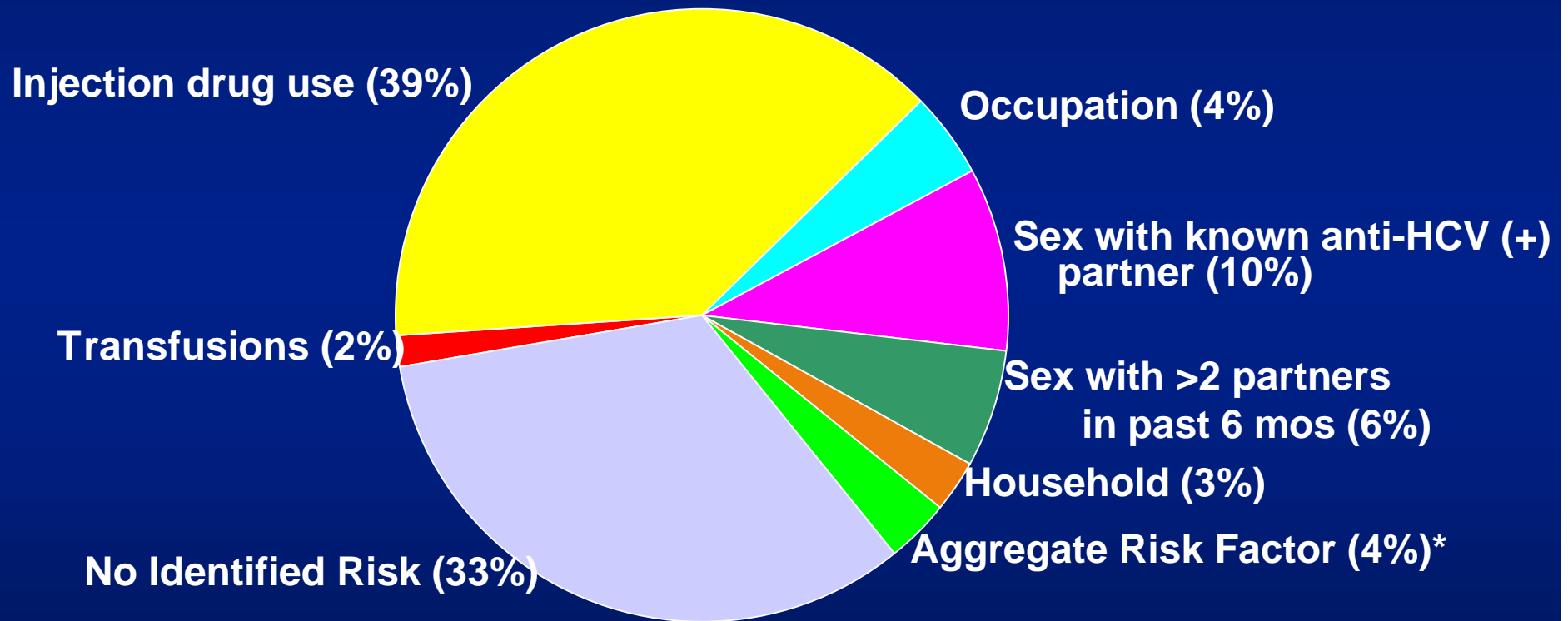
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# Modes of transmission

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- | In the United States, injection drug use is the predominant mode of transmission
- | Unsafe therapeutic injections may account for up to 40% of all HCV infections worldwide

# Reported Risk Factors for Acute Hepatitis C, United States, 2001-2004

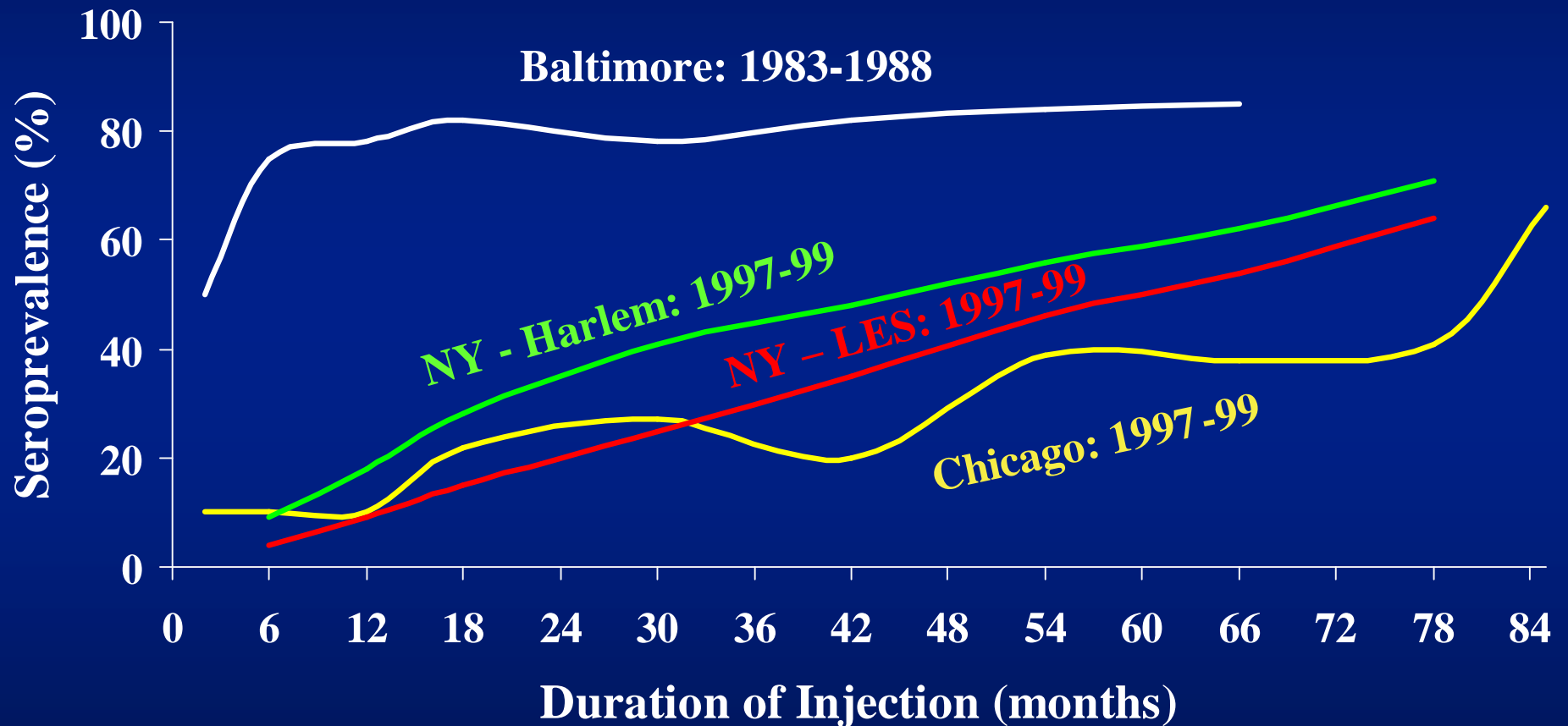


\*Aggregate risk factor = Case shown a list of risk factors and admits to one, but does not specify which one

Source: Sentinel Counties Study of Acute Viral Hepatitis, CDC



# Risk of HCV Infection Among Injection Drug Users



Garfein RS *Am J Public Health* 1996; 86:655; Thorpe LE *JID* 2000;182:1588-94; Diaz T *Am J Public Health* 2001; 91(1): 23-30.



# HIV prevention strategies not as effective for HCV prevention

- | Young IDUs do not seem to change behaviors when HCV test result is known<sup>1,2</sup>
- | Intensive counseling may decrease risk behaviors, but not HCV incidence in HCV–negative injectors (18.4/100 py)<sup>3</sup>
- | Intensive counseling may decrease risk behaviors in HCV–positive injectors<sup>4</sup>

Sources: 1. Ompad et al, *Clin Infect Dis* 2002; 35:783-8, 2. Hagan H et al. *Public Health Rep* 2006;121:710-9, 3. Garfein RS et al. *AIDS* 2007;21:1923-1932, 4. Latka MH et al. *AJPH* 2007;98:853-86



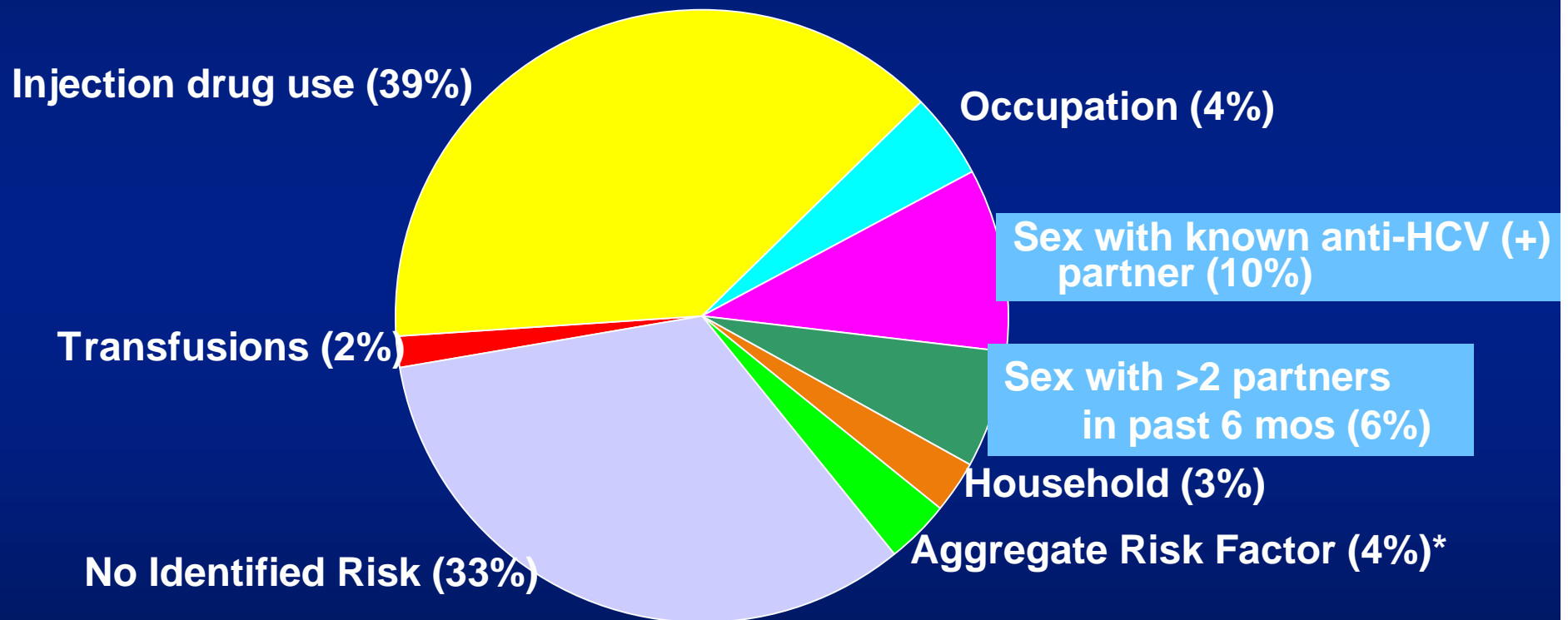
# HCV reduced with presence of prevention programs

- | HCV prevalence is 38% among <2-year injectors, however, interval to HCV infection has increased<sup>1</sup>
- | Early studies in Tacoma suggested reduced risk of HBV/HCV in NSEP users<sup>2</sup>
- | Prevalence among NYC IDU declined from 90% to 63% between 1990 to 2001<sup>3</sup>

Sources: 1. Hagan H et al. Am J Epidemiol 2008;168:1099-1109, 2. Hagan et al, Am J Public Health 1995; 85:1531-7, 3. DesJarlais D et al. AIDS 2005;19(Suppl 3):S20-5



# Reported Risk Factors for Acute Hepatitis C, United States, 2001-2004



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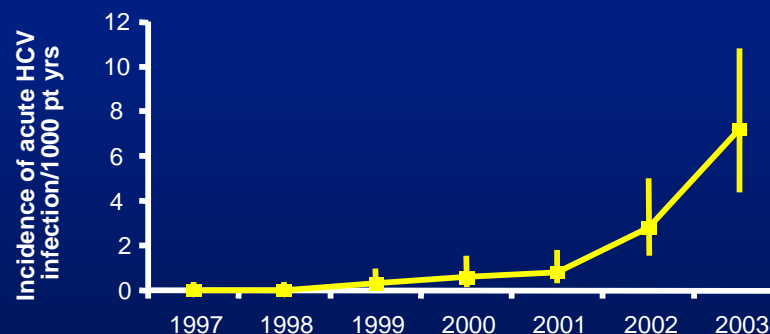
Source: Sentinel Counties Study of Acute Viral Hepatitis, CDC



# Sexual transmission of HCV

- | HCV infection associated with
  - infected partners, >20 partners, early sex, non-use of condoms, other STDs, sex with trauma
- | No transmissions between 1,163 heterosexual couples followed 8,932 py<sup>1,2,3</sup>
- | Case series of HIV-infected MSM indicate sexual transmission is occurring among them<sup>4,5,6</sup>

**Increasing acute HCV infections among HIV+ MSM in London and South England<sup>7</sup>**



Sources: 1. Marincovich B et al. *Sex Transm Infect* 2003; 70:160-2; 2. Tahan V et al. *Am J Gastroenterol* 2005; 100:821-4; 3. Vandelli C et al. *Am J Gastroenterol* 2004; 99: 855-9. 4. Rauch A et al. *Clin Infect Dis* 2005; 41:395-402. 5. Danta M, Brown D, Bhagani S, et al. Recent epidemic of acute hepatitis C virus in HIV-positive men who have sex with men linked to high-risk sexual behaviors. *AIDS* 2007; 21:983-91. 6. Van de Laar TJW et al. *J Infect Dis* 2007; 196:230-8. 7. Browne RE, et al. 2nd IAS 2003; Abstract 972



# Other Potential Exposures to Blood

- | Insufficient data to characterize risk from intranasal cocaine use, tattooing, body piercing, acupuncture, military service
- | Limited number of studies showing associations that cannot be generalized
  - May be limited to certain settings and account for small fraction of cases  
(e.g., prisons, unregulated practitioners, populations with certain cultural practices)
- | No associations in acute case-control or population-based studies

# Non-hospital healthcare associated HCV transmission in the US

- I 24 healthcare-associated HCV infection outbreaks in past 10 years; 17/24 in non-hospital healthcare settings
  - outpatient medical or surgical clinics (n=11)
  - chronic hemodialysis centers (n=6)
- I > 270 new HCV infections identified
  - Is this the tip of the iceberg?
- I >60,000 persons recommended for screening
- I Infection control breaches by healthcare personnel:
  - Unsafe injection practices
  - Hemodialysis center protocols not observed

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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

# Primary prevention activities

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- | IDU counseling messages:
  - Stop using drugs
  - Use new paraphernalia each use
- | Partner with HIV prevention to leverage efforts
- | Assure effective infection control in health care settings

# HIV/HCV prevention in syringe exchange programs --- United States, 2005

**TABLE 2. Number and percentage of syringe exchange programs (SEPs),\* by selected supplies and services provided — United States, 2005**

Supplies and services	No.	(%)
<b>Prevention supplies</b>		
Male condoms	115	(97)
Female condoms	98	(83)
Alcohol pads	117	(99)
Bleach	82	(69)
<b>On-site medical screenings and services</b>		
HIV counseling and testing	96	(81)
Hepatitis C counseling and testing	66	(56)
Hepatitis B counseling and testing	44	(37)
Hepatitis A counseling and testing	28	(24)
Hepatitis B vaccination	46	(39)
Hepatitis A vaccination	43	(37)
Sexually transmitted disease (STD) screening	57	(49)
Tuberculosis screening	33	(28)
On-site medical care	34	(29)
<b>Referrals</b>		
Substance-abuse treatment	102	(86)
<b>Education</b>		
HIV/AIDS prevention	116	(98)
Hepatitis A, B, and C prevention	114	(97)
Safer injection practice	113	(96)
Vein care	110	(93)
STD prevention	110	(93)
Abscess prevention	107	(91)
Male condom use	112	(95)
Female condom use	97	(82)

\* N = 118.

Source: *MMWR* November 9, 2007 / 56(44);1164-1167



# Detect and control chronic liver disease

- I Identify HCV-infected persons through targeted testing
  - Evaluate targeting strategies
  - Determine the feasibility and effectiveness of alternative testing strategies
  - Partner with HIV programs
  - May change with development of rapid anti-HCV assay

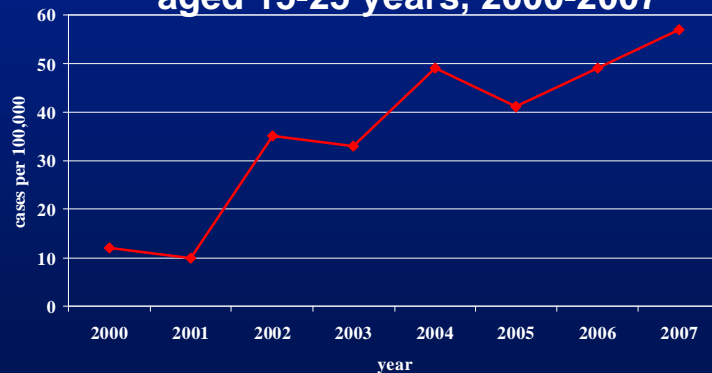
# Reasons to detect and control chronic liver disease

- I Medical management
  - Evaluate for chronic liver disease
  - Treatment if indicated
  - Substance abuse treatment (alcohol, drugs) if appropriate
  - Immunization (HBV, HAV, influenza, pneumonia)
- I Counsel to prevent disease transmission
  - Household contacts
  - Sexual contacts
  - Drug use contacts

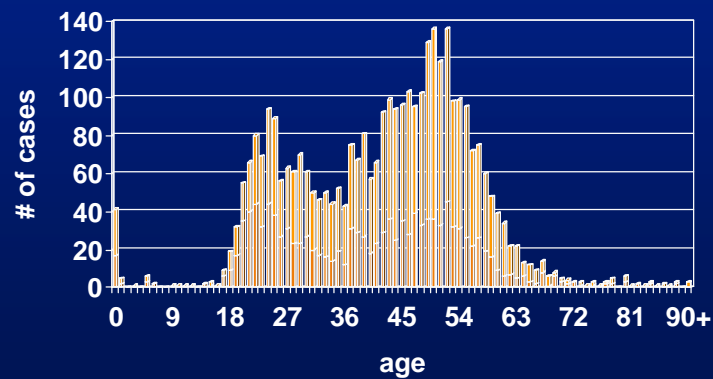
# Conduct surveillance and research to advance HCV prevention and control

- I Enhanced surveillance with algorithms for investigation enabled detection of a cluster of new HCV infections among persons <30 years of age in New York State<sup>1</sup>
- I Through effective surveillance from 2000 to 2007, Massachusetts detected rates of newly diagnosed reported HCV infection in 15 to 25 year-olds in Massachusetts increasing from 12 to 57 per 100,000 population<sup>2</sup>

Rate of confirmed hepatitis C among persons aged 15-25 years, 2000-2007



Confirmed chronic HCV by age, 2007



Sources: 1. MMWR 2008;57(19), 2. Unpublished data, MA DOH



# Challenges for surveillance of acute hepatitis C in the United States

- I National acute hepatitis C surveillance directs prevention efforts, however:
  - 80% of new infections are asymptomatic
  - Laboratory-based reporting requires integration of multiple reports for an individual
  - Diagnostic assays to distinguish acute from chronic HCV infection are lacking; cases reported from laboratories are often chronic infections
  - Reported cases lack data on race (20%) and risk (30%)

# Challenges for surveillance of chronic hepatitis C

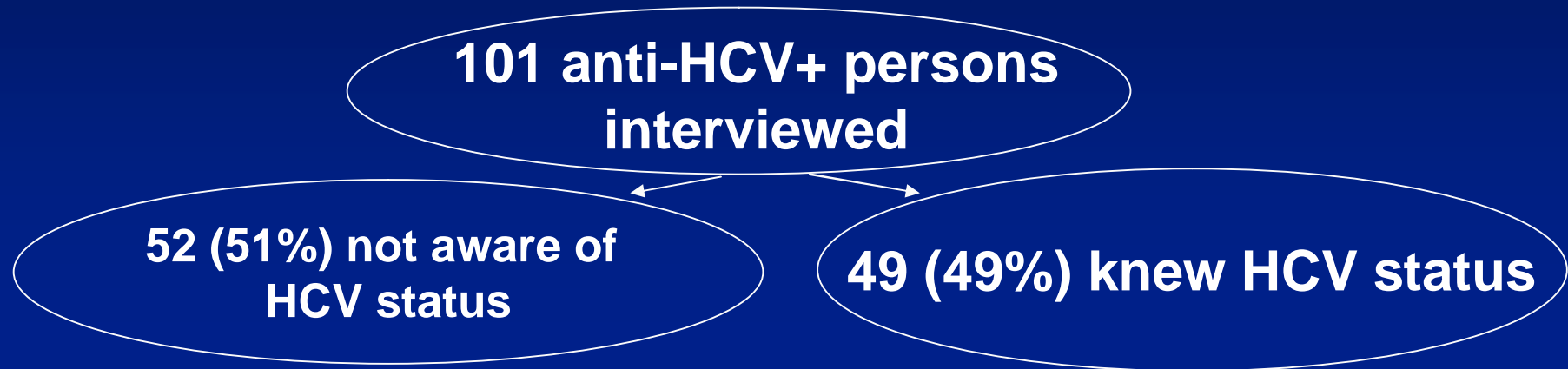
- I Surveillance for chronic HCV infection is complex:
  - Reported by 36 states
  - Comprised >99% of all reported hepatitis C cases in 2006
  - Difficult to identify newly reported cases
  - Laboratory-based reporting requires integration of numerous reports
  - Reported cases lack data on race (60%) and risk (~100%)
  - Limited by lack of funding

# Evaluate effectiveness of activities

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- I National surveillance shows decrease in acute hepatitis C, with recent plateau
  - How can we continue to decrease incidence?
- I Unknown percentage of infected persons are tested and access care
  - No federally-funded HCV testing program
  - No federal HCV treatment infrastructure

# 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



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# Outstanding issues

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- | 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?

# Discussion

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<http://www.cdc.gov/hepatitis>