

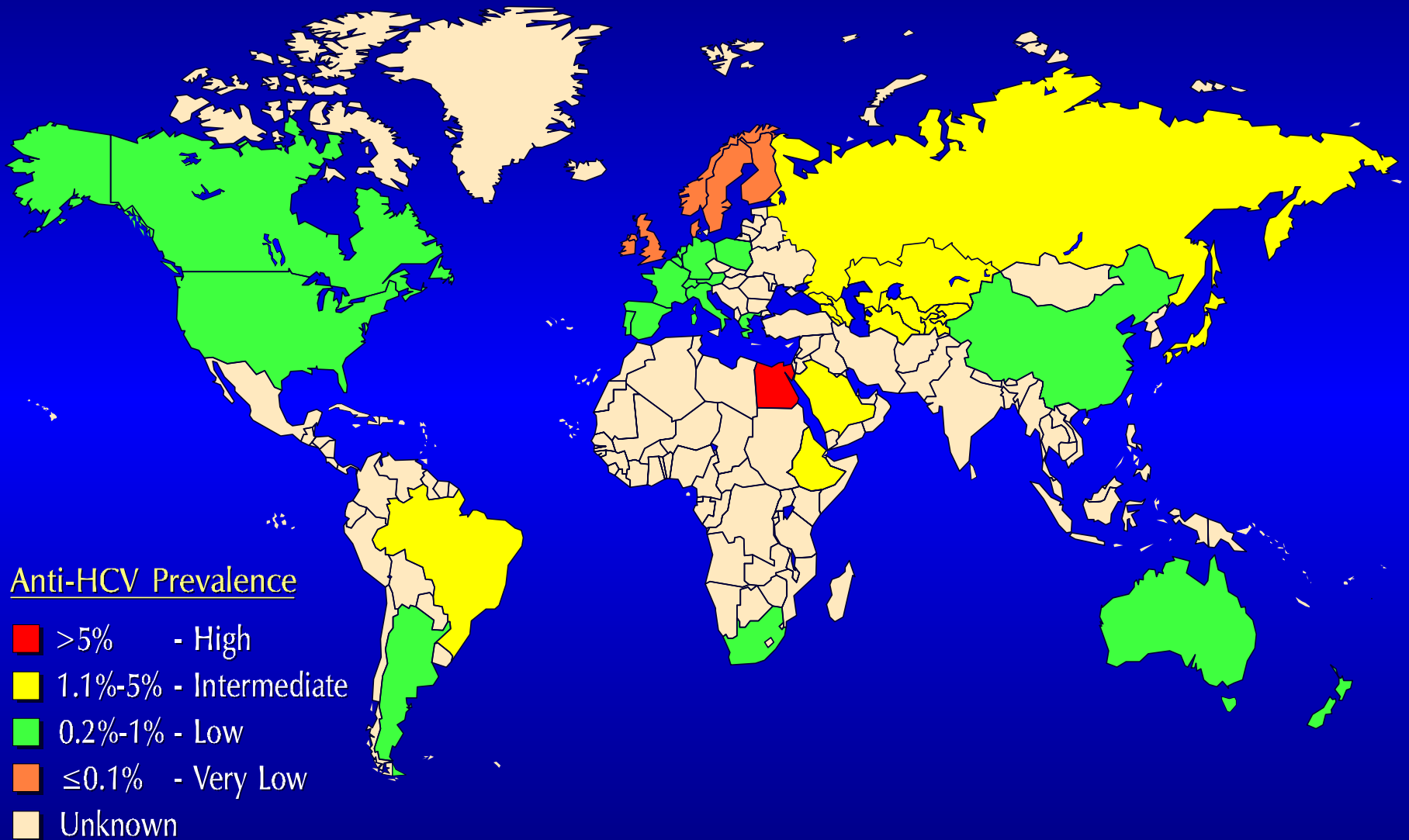
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# *Epidemiology of Hepatitis C*

*Pierre Jean Malè*

*Training in Reproductive Health Research  
Geneva 2006*

# Prevalence of HCV Infection Among Blood Donors\*



\* Anti-HCV prevalence by EIA-1 or EIA-2 with supplemental testing; based on data available in January, 1995.

# Hepatitis C Virus Infection

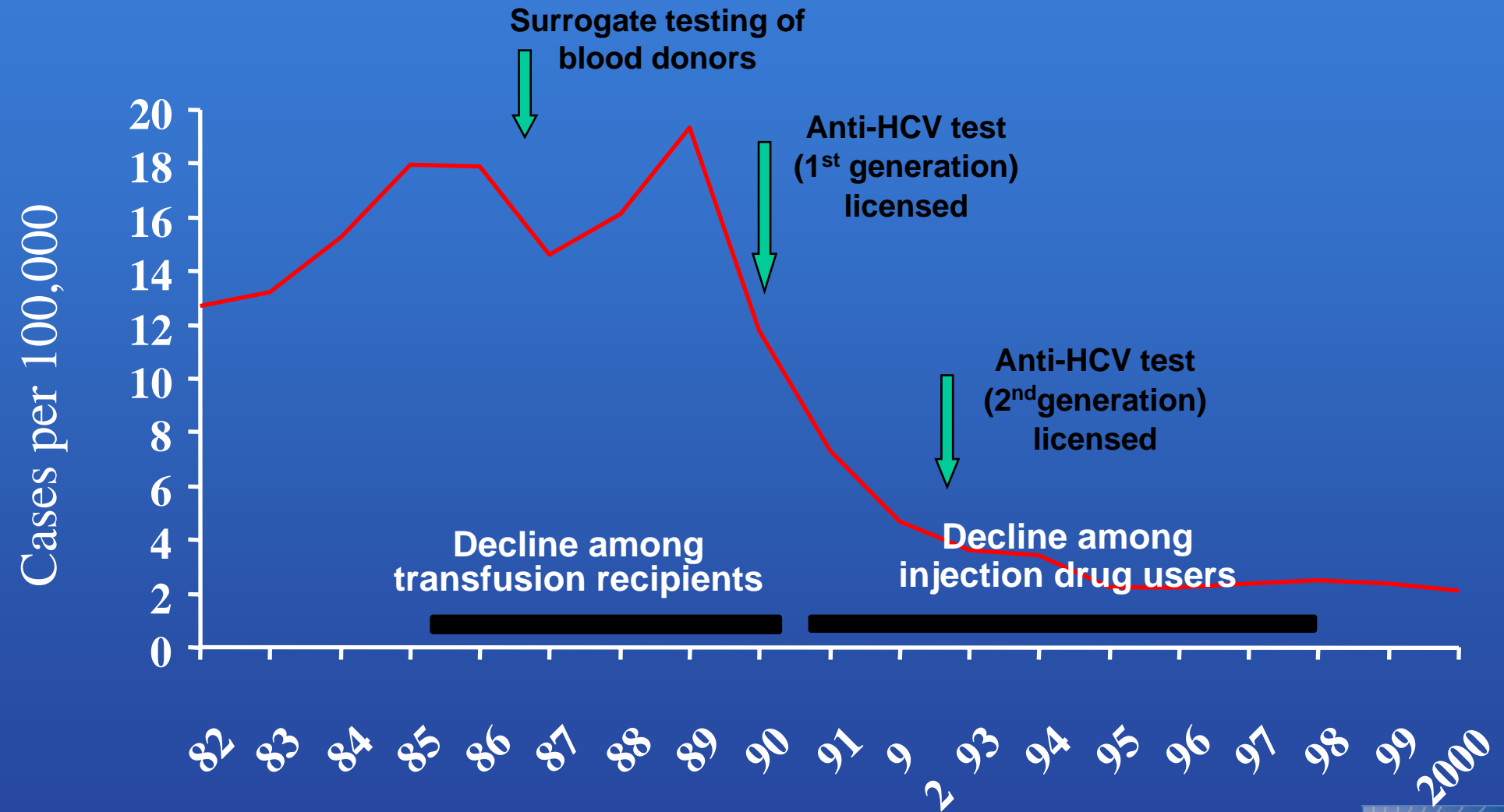
## Worldwide Disease Burden

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- 150 million have markers of HCV infection
- 85% have chronic HCV infection

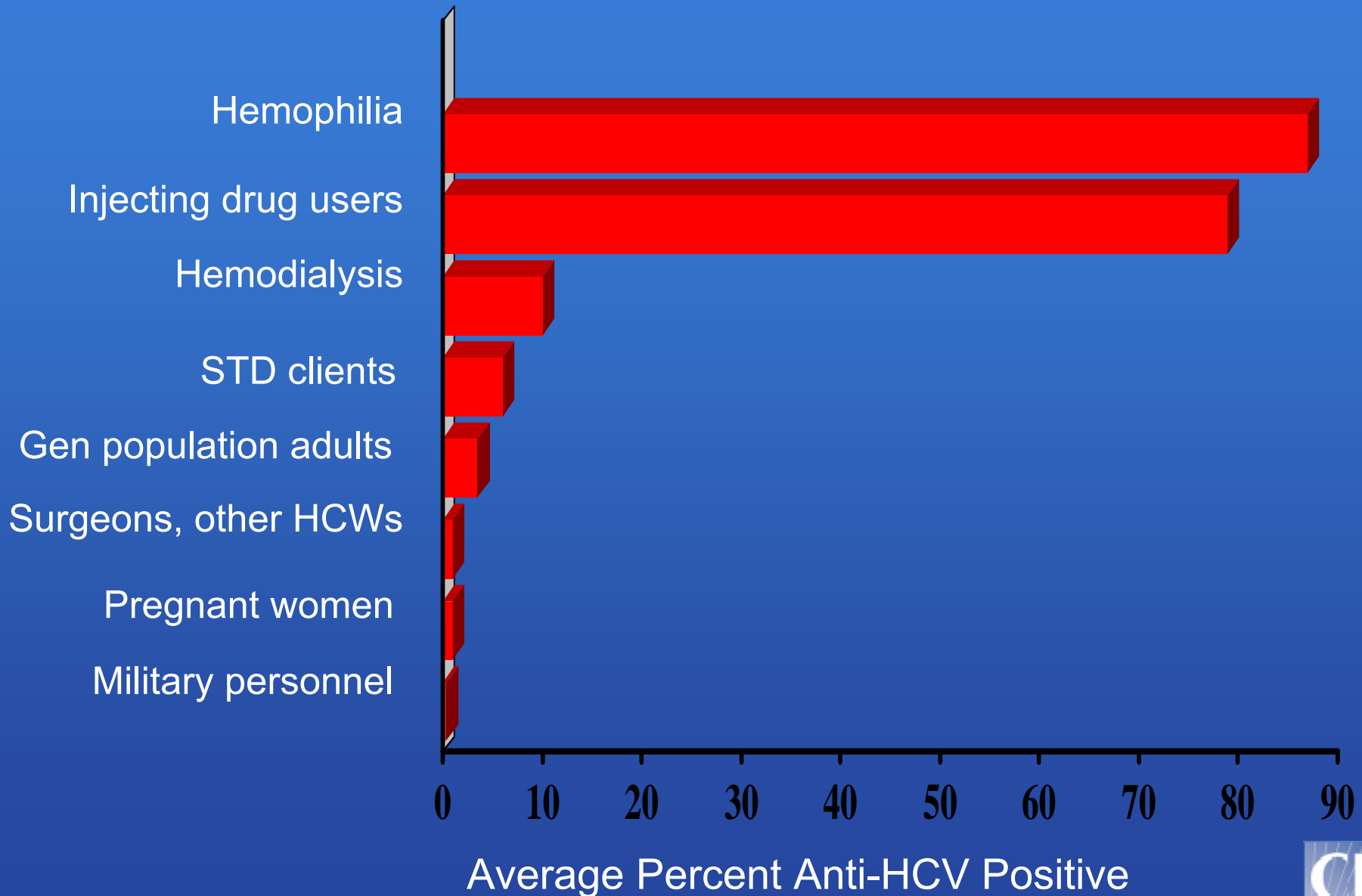
- Up to 20% will develop a cirrhosis over 20% years
- 20% of them will develop a liver cancer
- End-stage liver disease is the first indication to OLT
- Current treatment options may cure a minority of patients
- No vaccine available

# Estimated Incidence of Acute Hepatitis C United States, 1982-2000



Source: Sentinel Counties

# HCV Prevalence by Selected Groups United States

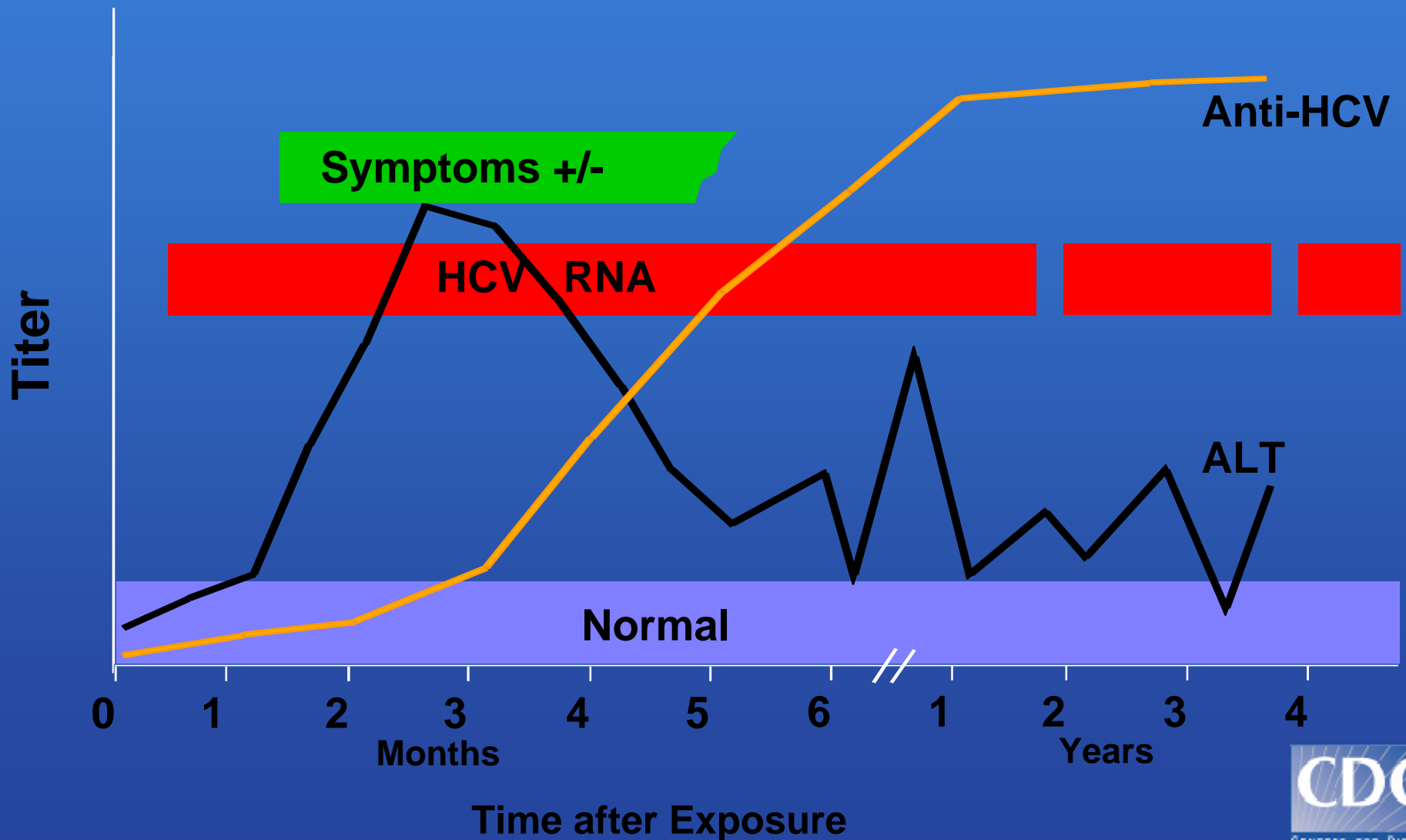


# Hepatitis C – Clinical Features

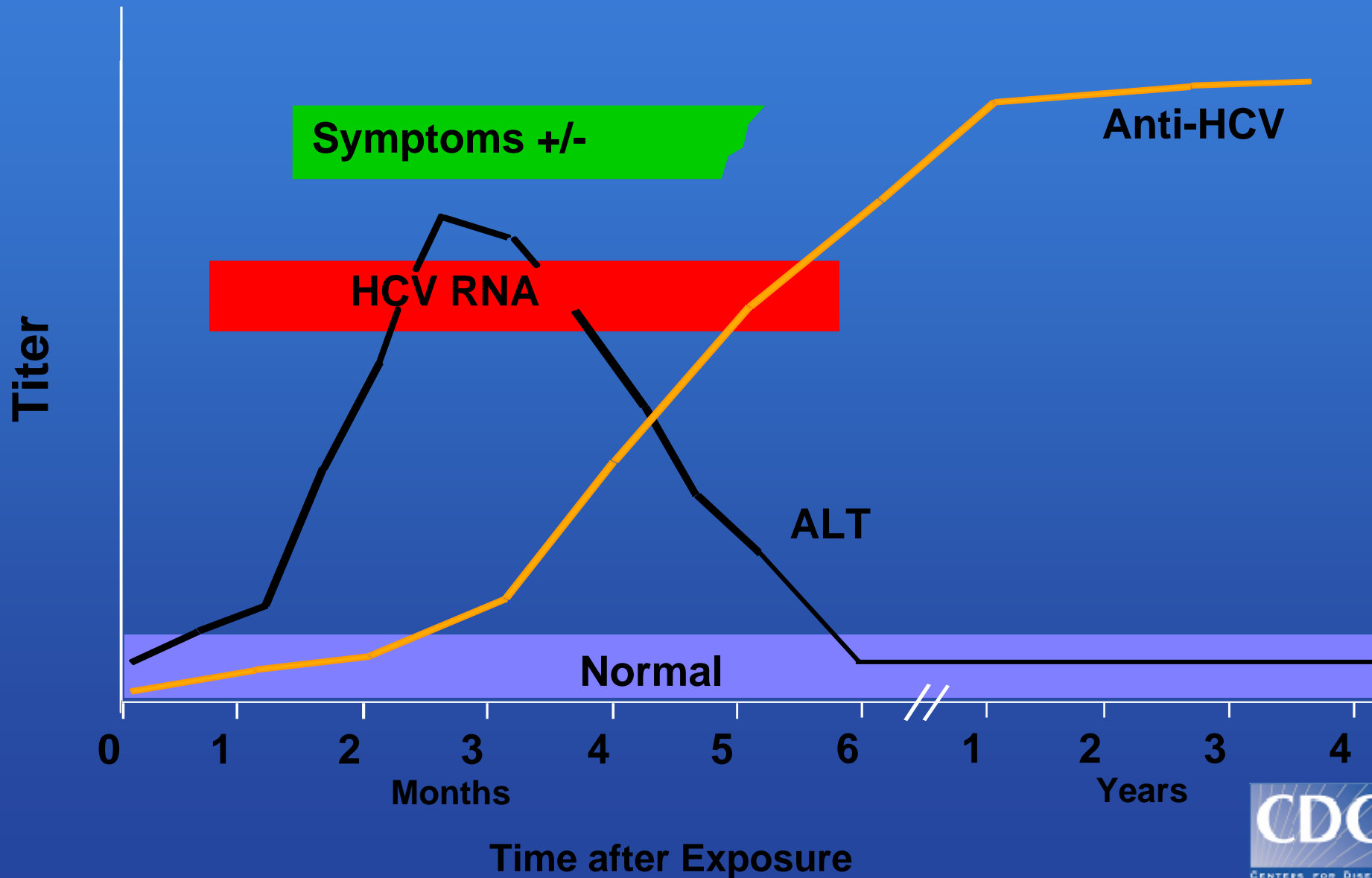
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- **Incubation period:** Average 6 - 7 wks  
Range 2 - 26 wks
- **Acute illness (jaundice)** Mild ( $\leq 20\%$ )
- **Case fatality rate** Low
- **Chronic infection** 60%-85%
- **Chronic hepatitis** 70%
- **Cirrhosis** 5%-20%
- **Mortality from CLD :** 3%

# Serologic Pattern of Acute HCV Infection With Progression to Chronic Infection



# Pattern of Acute HCV Infection with Recovery





# Chronic Hepatitis C Factors Promoting Progression or Severity

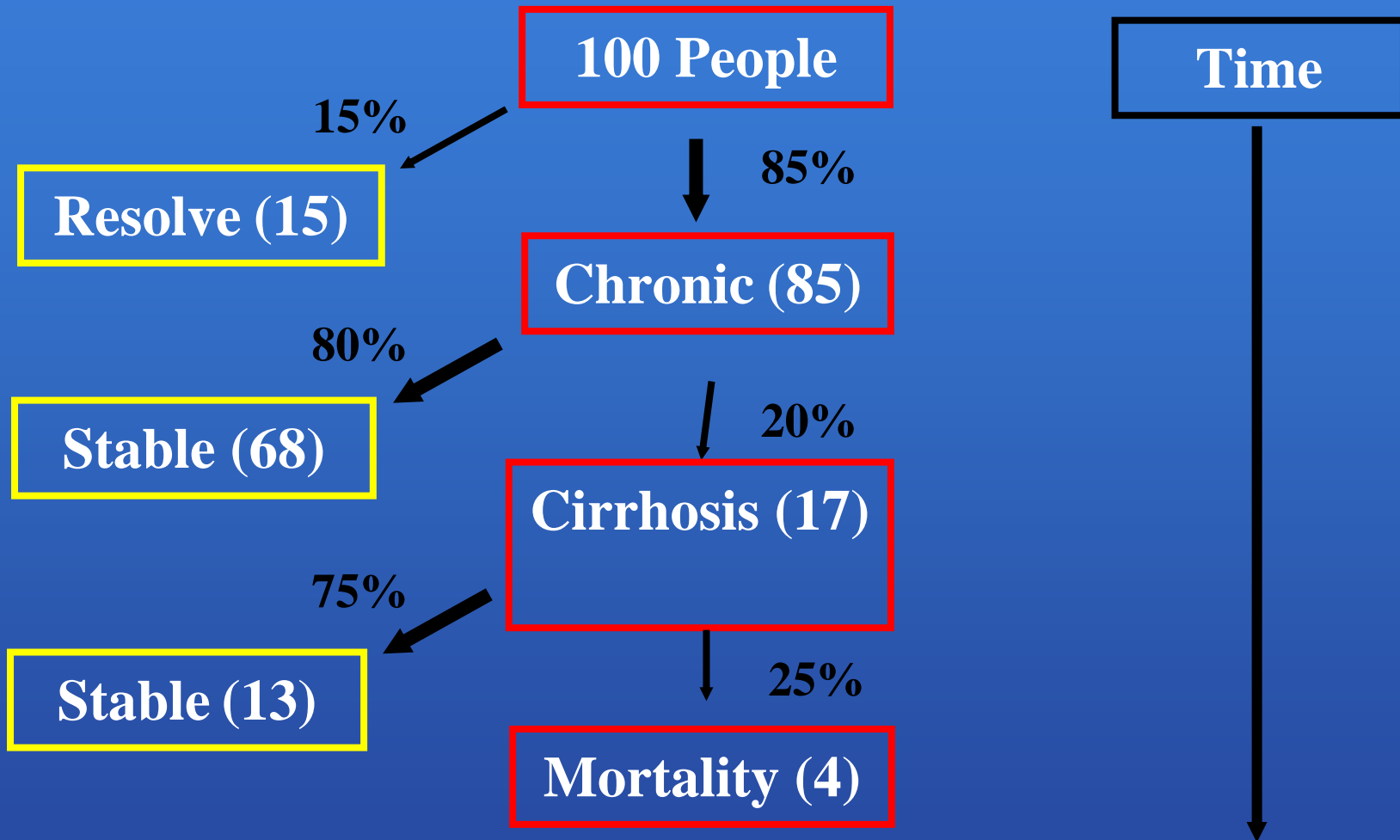
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- Increased alcohol intake
- Age > 40 years at time of infection
- HIV co-infection
- Other
  - Male gender
  - Chronic HBV co-infection

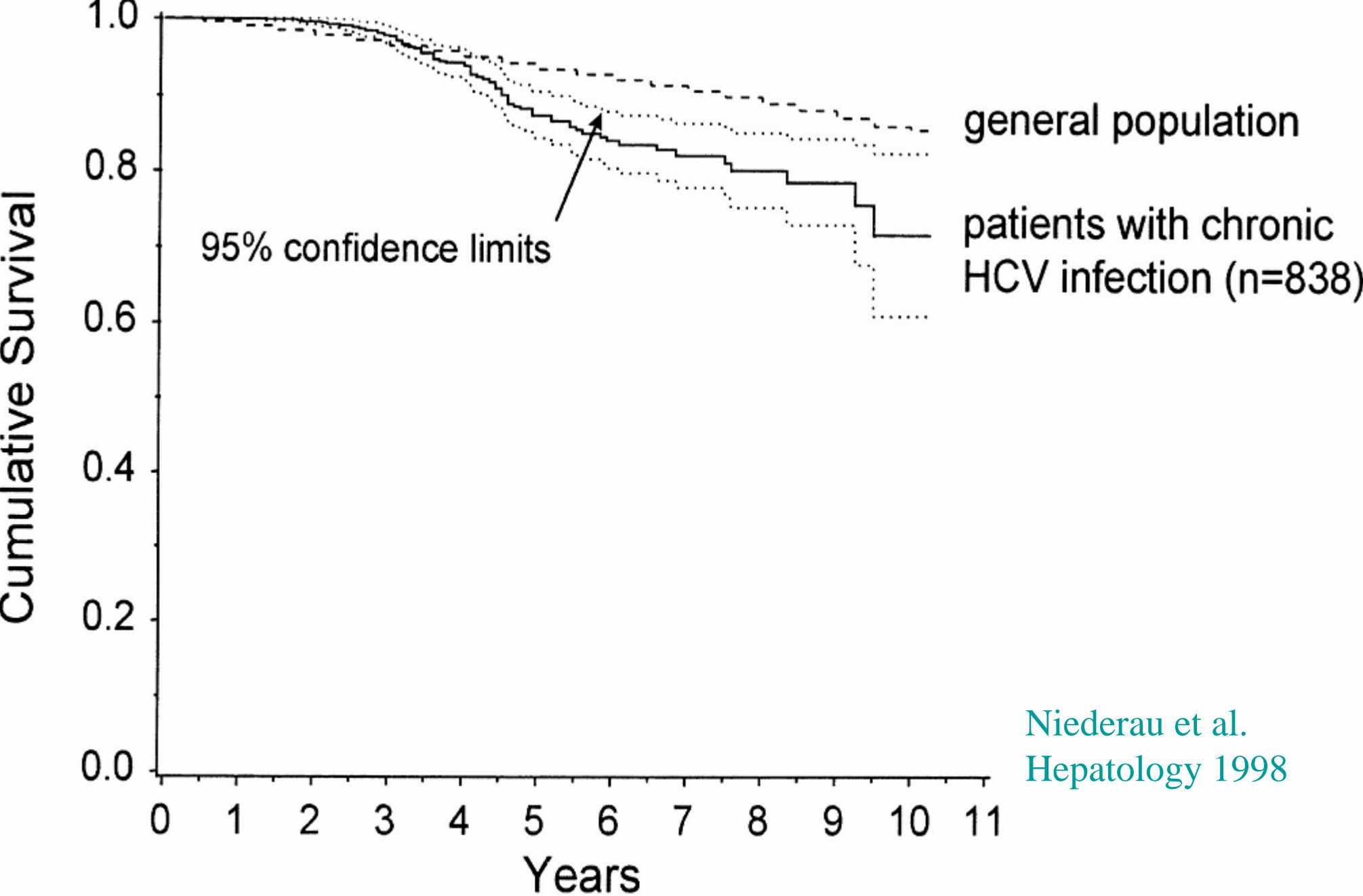
# *Factors affecting fibrogenesis **and** response to therapy in HCV infection*

Factor	Affects fibrogenesis	Affects treatment response
Age	Yes	Yes
Sex	Yes	Yes
Genotype	Unclear	Yes
Viral load	No	Yes
Alcohol abuse	Yes	Yes
HIV coinfection	Yes	Yes
HBV coinfection	Yes	Unclear
Overweight	Yes	Yes
Steatosis	Yes	Yes
Insulin resistance	Yes	Yes

# Natural History of HCV Infection

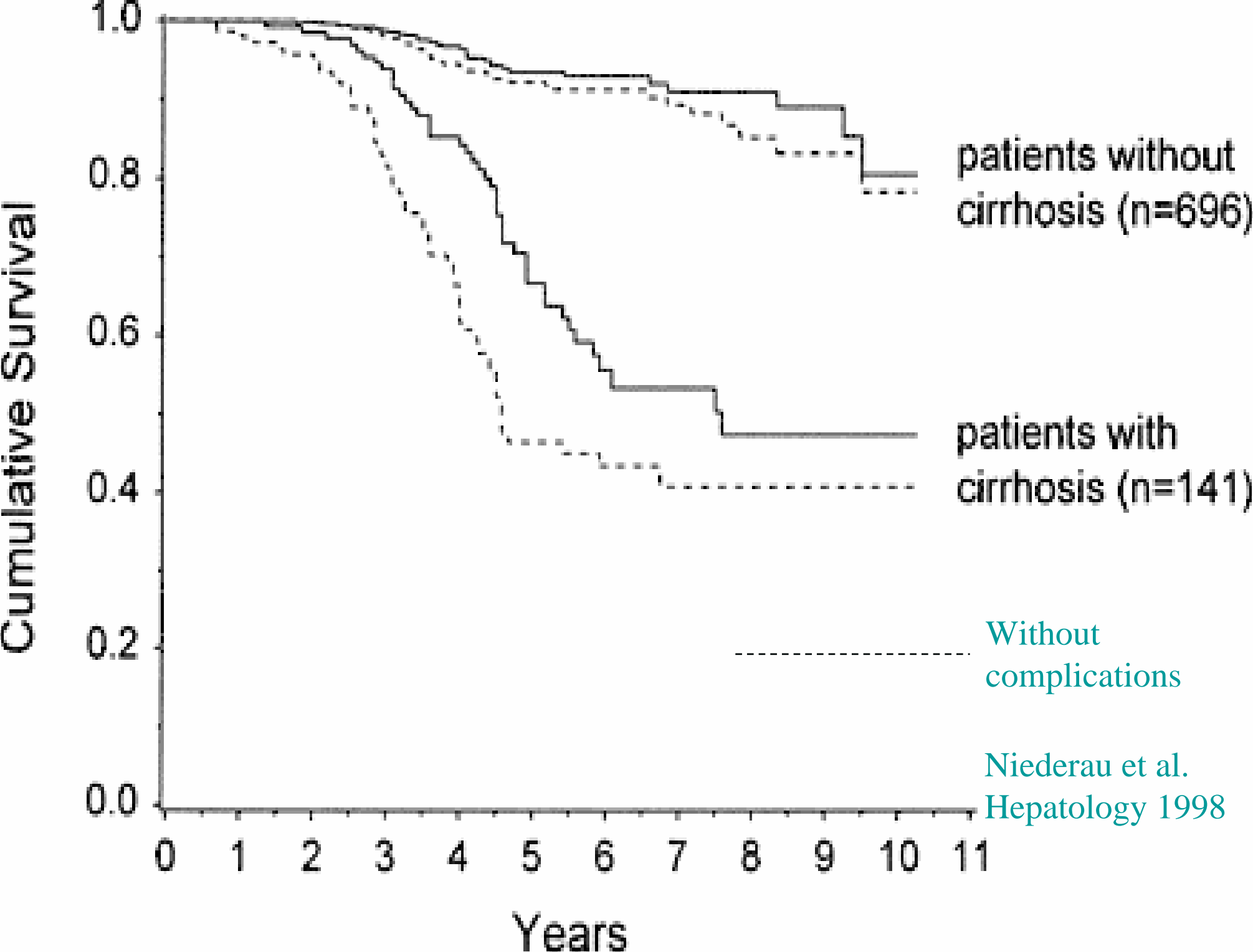


Leading Indication for Liver Transplant



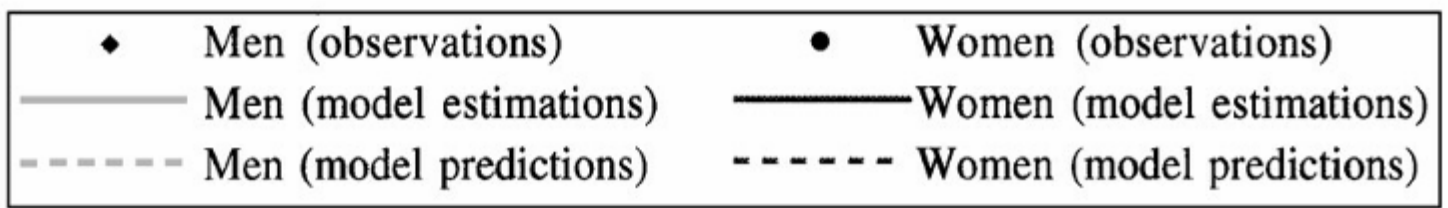
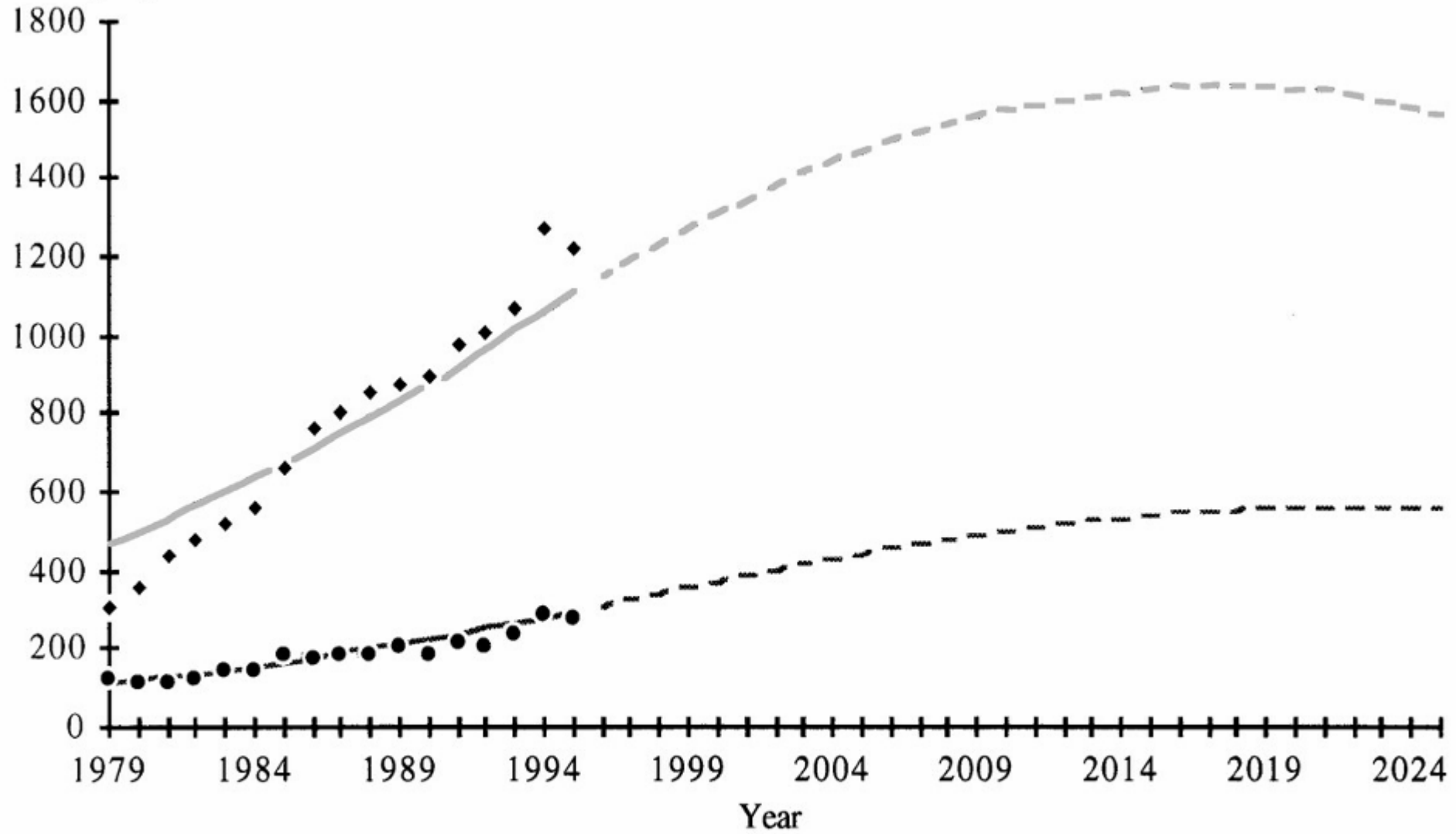
Number of patients under observation

838 799 708 566 420 274 164 106 71 35 7 0



**A**

HCC deaths  
attributable to HCV  
per year

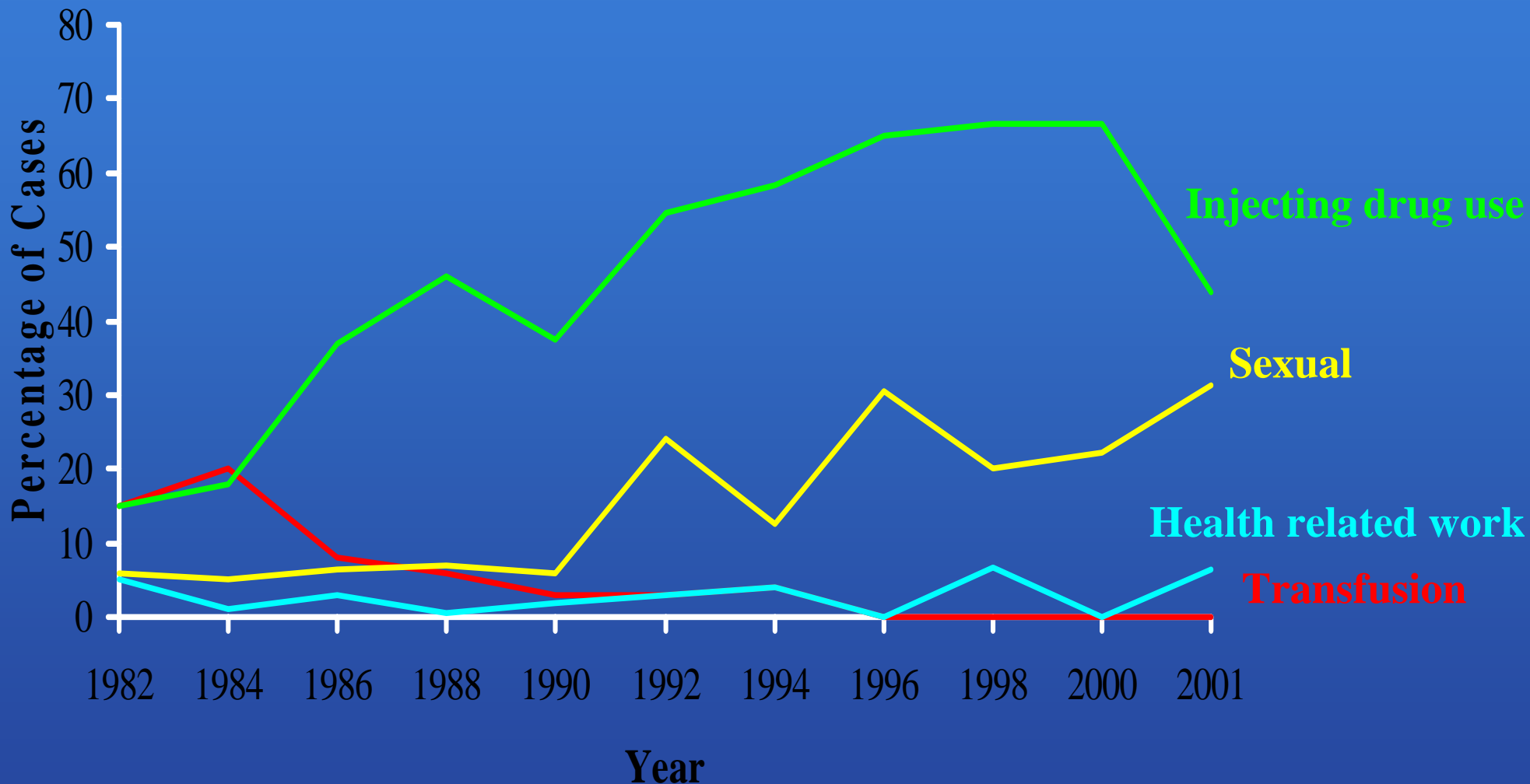


# Risk Factors Associated with Transmission of HCV

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- **Illegal injection drug use**
- **Transfusion or transplant from infected donor**
- **Occupational exposure to blood**
  - Mostly needle sticks
- **Iatrogenic (unsafe injections)**
- **Birth to HCV-infected mother**
- **Sexual/household exposure to anti-HCV positive contact**
- **Multiple sex partners**

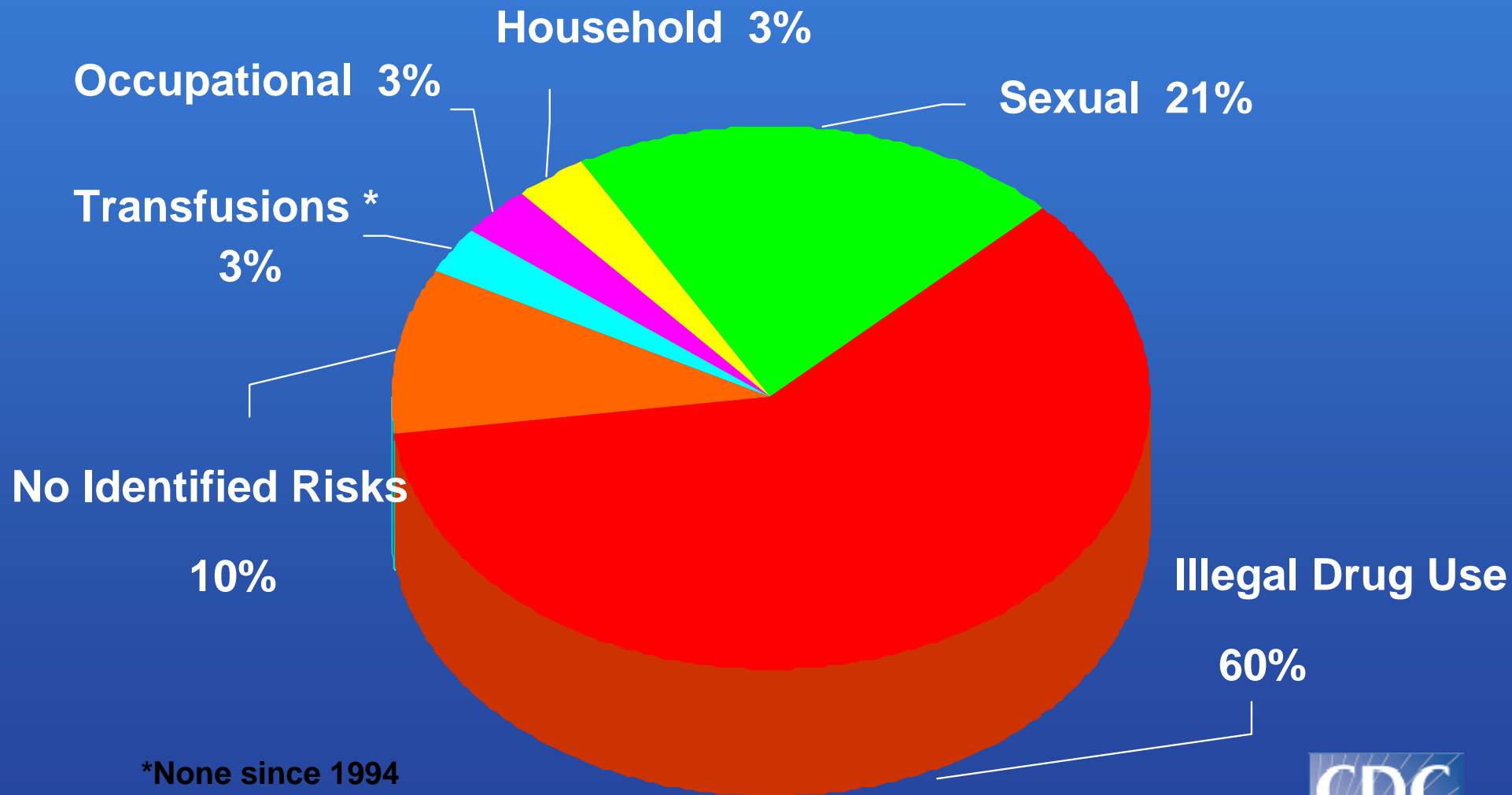
# Reported Cases of Acute Hepatitis C by Selected Risk Factors, United States, 1982-2001\*



\* 1982-1990 based on non-A, non-B hepatitis



# Sentinel Counties Study of Acute Viral Hepatitis Reported Risk Factors for Acute Hepatitis C, 1991 – 2000



\*None since 1994

# Concentration of HCV in various body fluids

High

blood  
(incl. menstrual)  
serum  
wound exudates

Moderate

saliva  
urine

Low

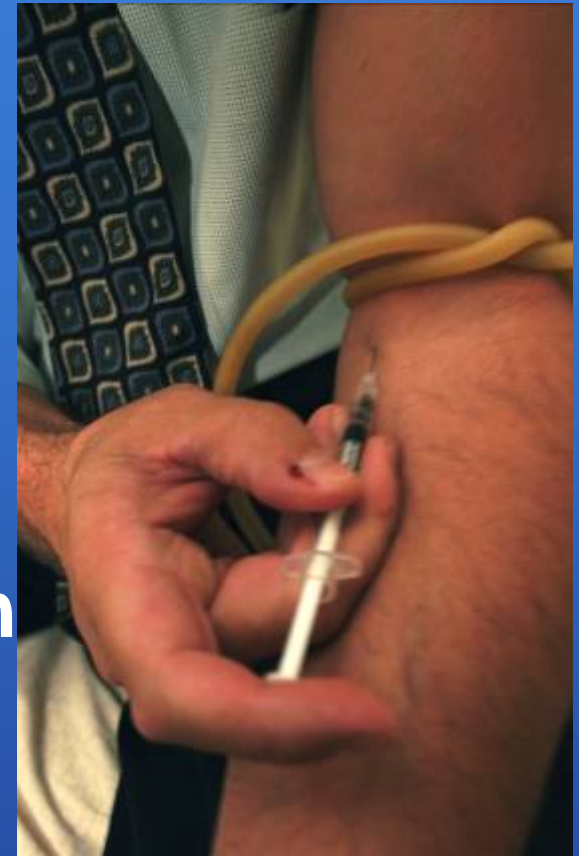
Not detectable

feces  
semen  
breastmilk  
tears  
amniotic fluid

# Injecting Drug Use and HCV Transmission

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- **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**



# Sexual Transmission of HCV

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- **Occurs, but efficiency is low**
  - Rare between long-term steady partners (1.5-3%)
  - MSM 3% (1-18% in selected STD clinic settings) – same as heterosexuals
  - 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

# Sexual Transmission of HCV

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## 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

# Perinatal Transmission of HCV

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- **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**
- **Infected infants do well**
  - Severe hepatitis is rare



# Mother-to-Infant Transmission of HCV

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- **Post-exposure 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**
  - Consider testing any children born since woman became infected
  - Evaluate infected children for CLD

# Household Transmission of HCV

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





# Transmission From Health Care Procedures

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- **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

# Patient to HCW Transmission of HCV

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- **Inefficient by occupational exposures**
- **Average incidence 1.8% following needlesticks from HCV-infected source**
  - Associated with hollow-bore needles
- **Case reports of transmission from blood splash to eye.**
- **Prevalence among health care workers 1-2%**
  - Lower than adults in the general population
  - 10 times lower than for HBV infection

# Reduce or Eliminate Risks for Acquiring HCV Infection

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- **Screening and testing donors of blood, organs, and tissues**
- **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
- **Infection control practices**
- **Blood and body fluid precautions**

# Preventing HCV Transmission to Others

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## Avoid Direct Exposure to Blood

- **Anti-HCV positive individuals should 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**
- **Studies suggest that HCV can survive on environmental surfaces at room temperature for at least 16 hours but not longer than 4 days**

# HCV Testing Routinely Recommended (Based on Risk for Infection)

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- **Persons who ever injected illegal drugs**
- **Persons with selected medical conditions**
  - received clotting factor concentrates produced before 1987
  - ever on chronic hemodialysis
  - evidence of liver disease
- **Prior recipients of transfusion/organs**
  - before July 1992
  - notified that donor later tested positive

# HCV Testing Routinely Recommended (Based on Recognized Exposure)

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- Healthcare, emergency medical, and public safety workers after needle sticks, sharps, or mucosal exposures to HCV-positive blood



- Children born to HCV-positive women

# **Routine HCV Testing Not Recommended (Unless Risk Factor Identified)**

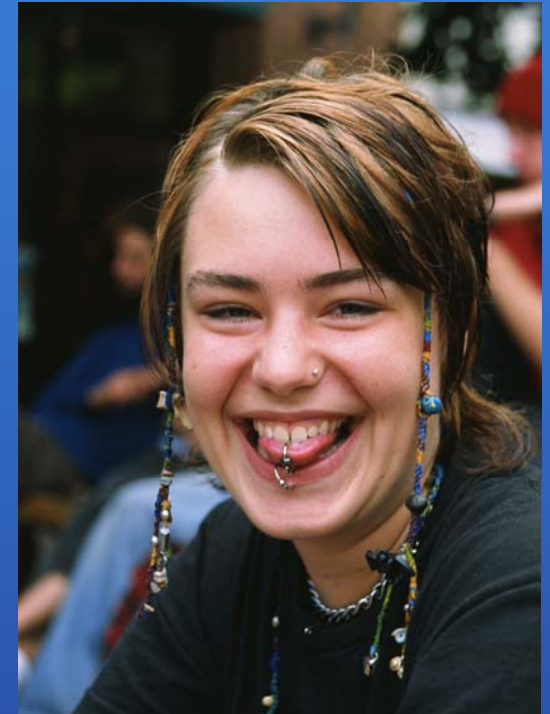
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- **Health-care, emergency medical, and public safety workers**
- **Pregnant women**
- **Household (non-sexual) contacts of HCV-positive persons**
- **General population**

# Routine HCV Testing of Uncertain Need

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- Recipients of transplanted tissue
- Intranasal cocaine or other non-injecting illegal drug users
- History of tattooing, body piercing
- History of STDs or multiple sex partners
- Long-term steady sex partners of HCV-positive persons





# Post-exposure Prophylaxis for Hepatitis C Issues and Considerations for Recommendations

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- **No protective antibody response identified**
- **Prior studies of IG use to prevent post-transfusion hepatitis may not be relevant**
- **IG prepared from high anti-HCV titer plasma did not prevent infection in chimpanzees**

# Public Health Service Guidelines for Anti-HCV-Positive Persons

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## Anti-HCV-positive persons should:

- Be considered potentially infectious
- Keep cuts and skin lesions covered
- Be informed of the potential for sexual transmission
- Be informed of the potential for perinatal transmission
  - no evidence to advise against pregnancy or breastfeeding



## Anti-HCV-positive persons should not:

- Donate blood, organs, tissue, or semen
- Share household articles (e.g., toothbrushes, razors)

