VIRAL HEPATITIS B

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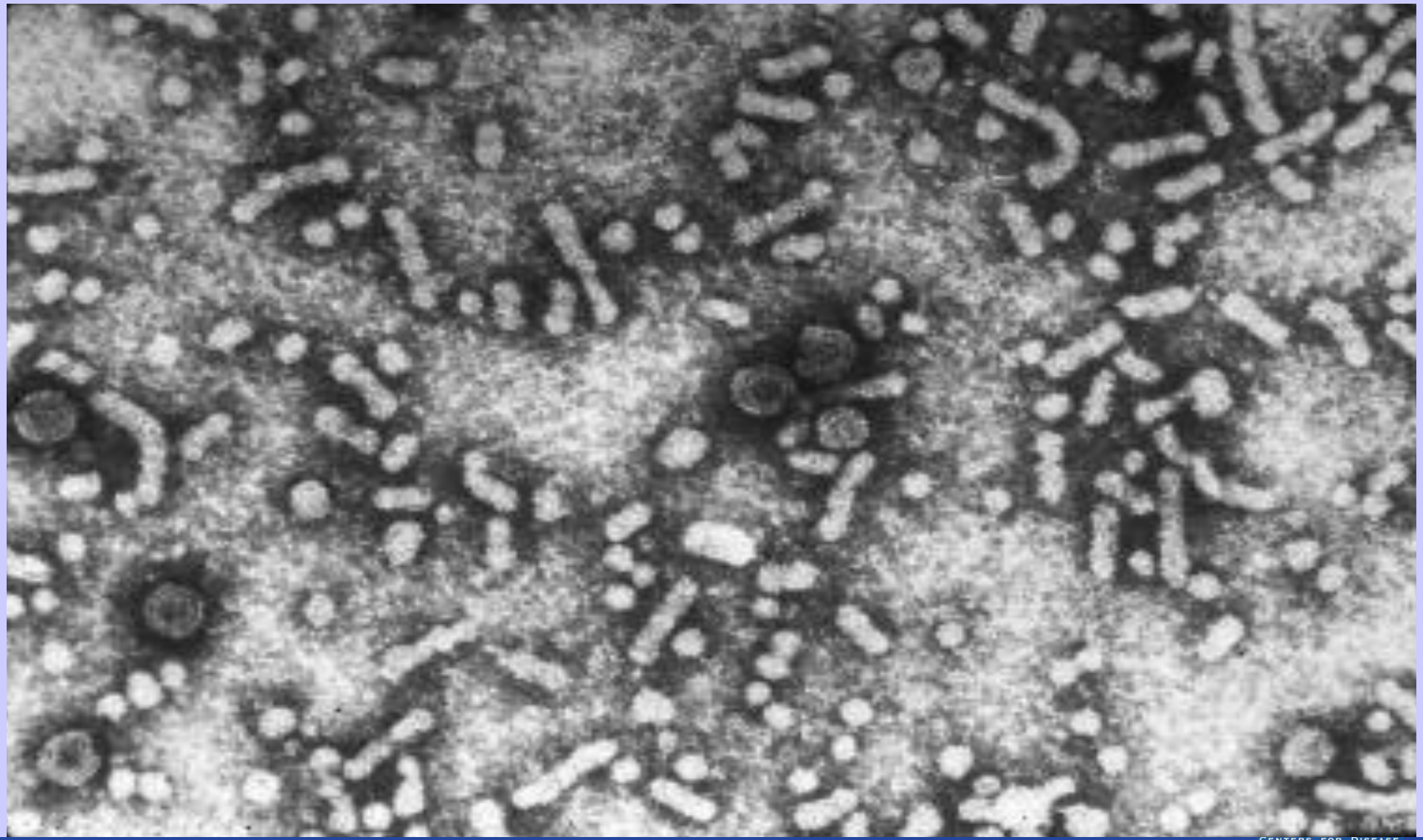
The hepatitis_ B virus is a DNA virus belonging to the Hepadnaviridae family of viruses.



VIRAL HEPATITIS TYPE B

Etiology:

Hepatitis B virus, HBV, Hepadnavirus, the so-called Dane particle with a core (formed by DNA, DNA polymerase, and a nucleocapsid protein with the hepatitis B core antigen (HBcAg) and a coat of hepatitis B surface antigen (HBsAg)). The whole virus is infectious with a diameter of 42 nm.

The source of infection

Two months in the ende of incubation period, the sick or carriers.

Route of transmission

Parenteral transmission - blood, blood products and inoculation of the infectious material are of principal significance in the transmission.

Professional risk to medical personnel (injury by needle - transmission in 7 - 30 %, contaminated instruments, blood transfusions - transmission in 90 %).

i.v. drug addicts - injury during tattooing, possibly other minute injuries of the skin and mucosa.

By **sexual intercourse** in homosexuals, bisexuals, and prostitutes.

Vertical - perinatal transmission from mother to child when the mother is the virus carrier or the sick person. About 95 % of newborns infect intranatally and 5 % intrauterinely.

Susceptibility

General

Preventive measures:

VIRAL HEPATITIS TYPE B

Preventive measures:

Health education - **to emphasize the extent of risk**
Observance of epidemic measures in medical establishments.
Handling biological material and contaminated instruments, consistent disinfection and sterilization, application of single-use needles and syringes, use of closed hemodialysis systems, smoking and drinking in workplaces with biological material is forbidden.
Postexposure prophylaxis - passive and active immunization (newborns) **Examination of blood-donors** - exclusion of HBsAg carriers from blood donation
Designation and inspection of sanitary-epidemic measures in non-medical establishments (hair-dressing salons, barber shops, etc.)
Active immunization in persons with a high risk of infection (stated by public notice)

The disease occurs worldwide with a very high burden among an estimated 280 million carriers.

The symptoms can vary greatly and many of those infected with HBV never develop any symptoms at all.

Those who do get symptoms (30-50% of cases) usually suffer from tiredness, loss of appetite, abdominal discomfort, nausea, vomiting and fever.

The vast majority of healthy adults who get acute hepatitis B will recover with no liver damage in 4–12 weeks but the death rate can reach 2% in the elderly.

Chronic infection is most likely to develop in young babies.

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Hepatitis B – Clinical Features

- **Incubation period:** Average 60-90 days
Range 45-180 days
- **Clinical illness (jaundice):** <5 yrs, <10%
>5 yrs, 30%-50%
- **Acute case-fatality rate:** 0.5%-1%
- **Chronic infection:** <5 yrs, 30%-90%
>5 yrs, 2%-10%
- **Premature mortality from chronic liver disease:** 15%-25%

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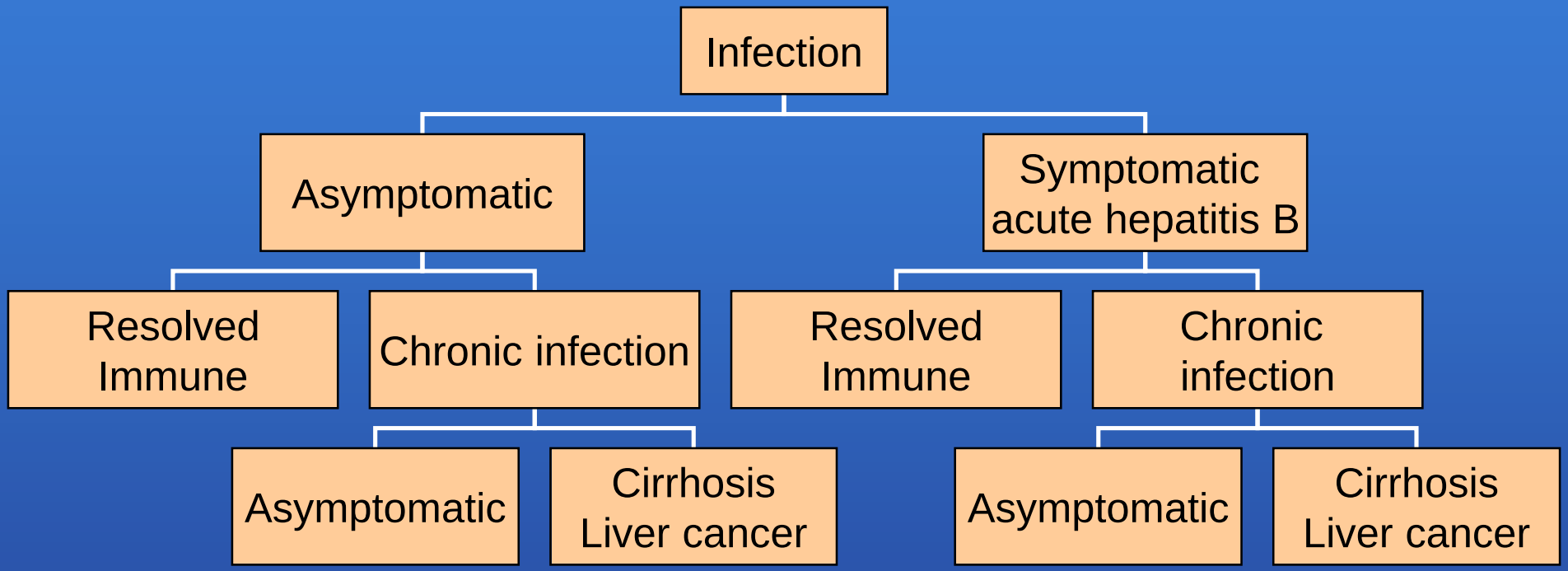
Outcome of HBV Infection



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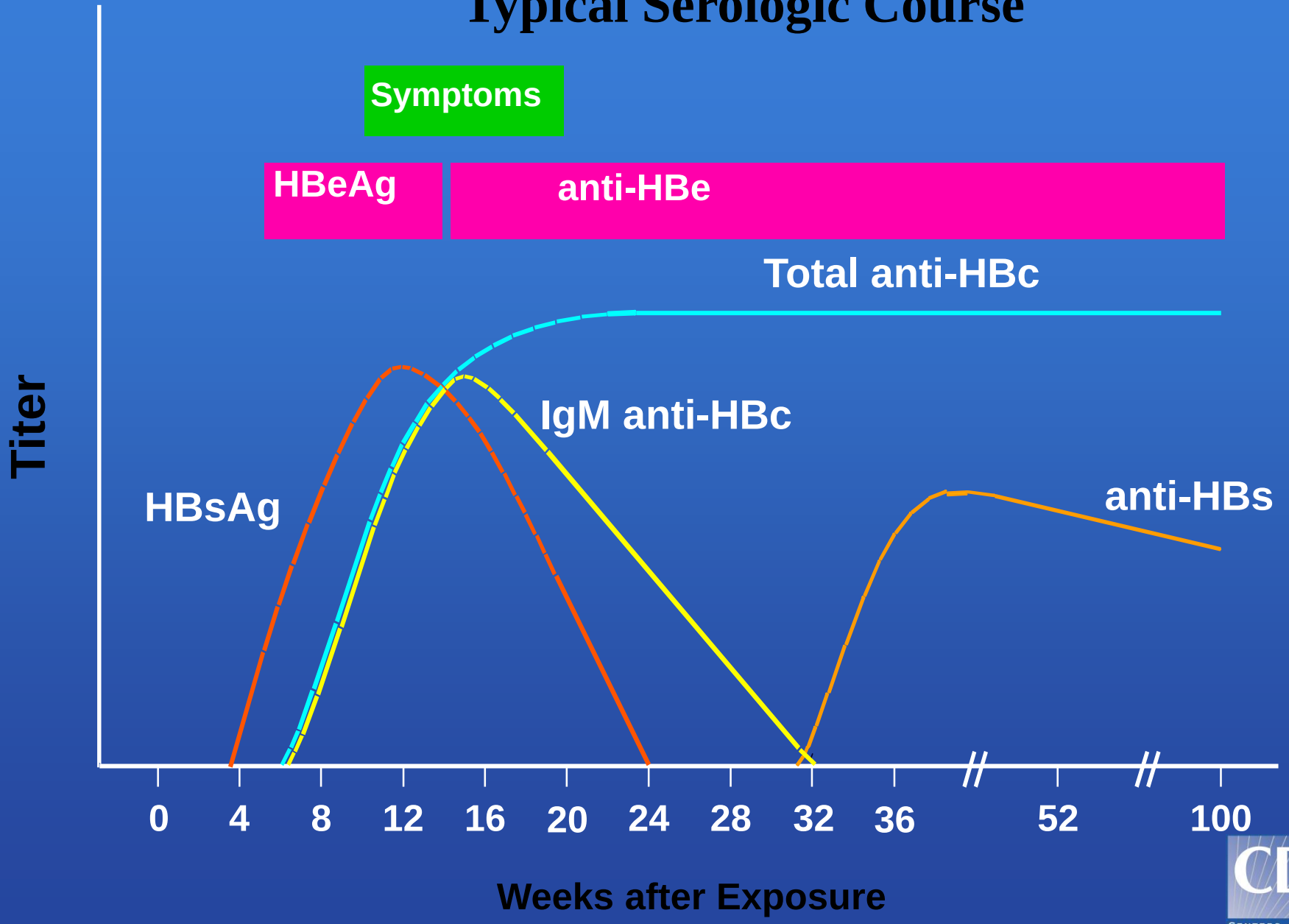
Acute Hepatitis B Virus Infection with Recovery

Typical Serologic Course



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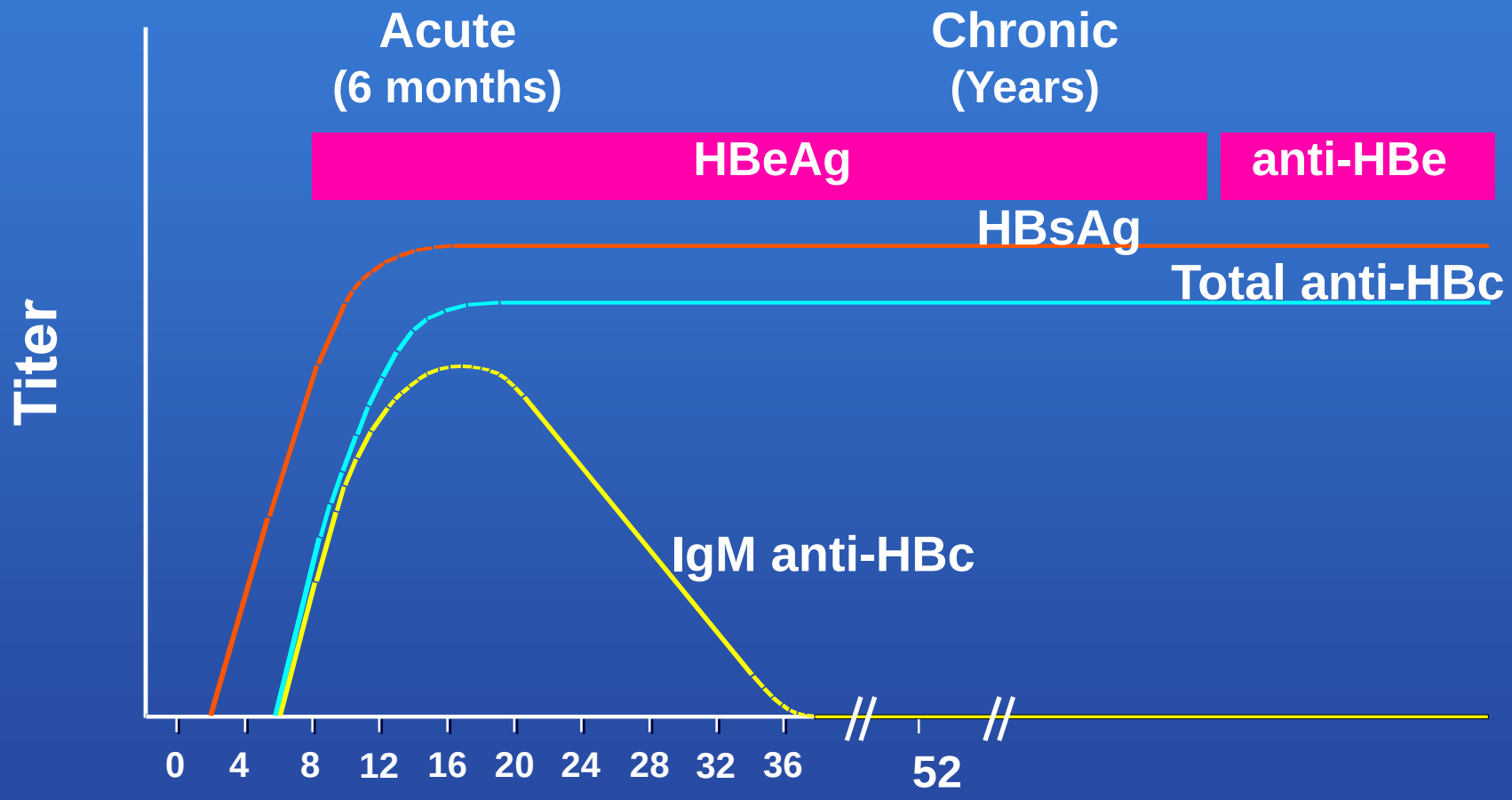
Progression to Chronic Hepatitis B Virus Infection

Typical Serologic Course



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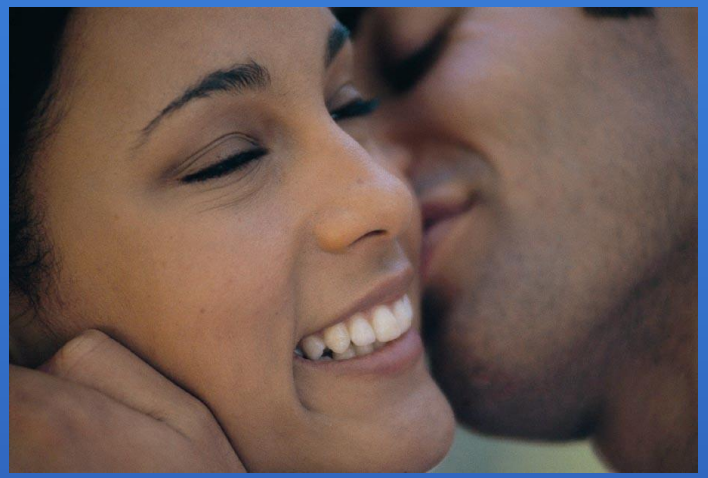
HBV Modes of Transmission



- Sexual
- Parenteral
- Perinatal

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Concentration of HBV in Various Body Fluids

High	Moderate	Low/Not Detectable
blood	semen	urine
serum	vaginal fluid	feces
wound exudates	saliva	sweat
		tears
		breast milk

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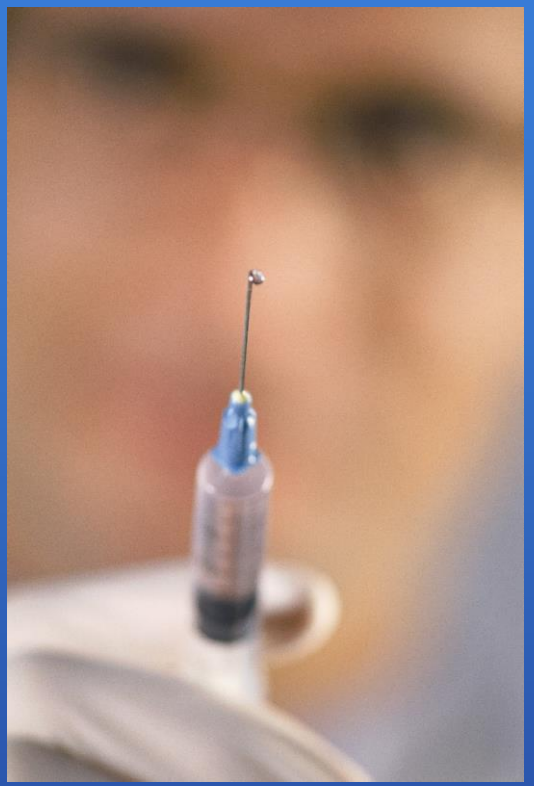
Elimination of HBV Transmission, United States

Strategy

- **Prevent perinatal HBV transmission**
- **Routine vaccination of all infants**
- **Vaccination of children in high-risk groups**
- **Vaccination of adolescents**

  all children up through age 18
- **Vaccination of adults in high-risk groups**



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Hepatitis B Vaccine

- Licensed in 1982; currently recombinant (in US)
- 3 dose series, typical schedule 0, 1-2, 4-6 months - no maximum time between doses (no need to repeat missed doses or restart)
- 2 dose series (adult dose) licensed by FDA for 11-15 year olds (Merck)
- Protection ~30-50% dose 1; 75% - 2; 96% - 3; lower in older, immunosuppressive illnesses (e.g., HIV, chronic liver diseases, diabetes), obese, smokers

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Hepatitis B Vaccination
ACIP Recommendations

- Routine infant
- Ages 11-15 “catch up”, and through age 18(VFC eligible)
- Over 18 – high risk
  - **Occupational risk (HCWs)**
  - **Hemodyalisis patients**
  - **All STD clinic clients**
  - **Multiple sex partners or prior STD**
  - **Inmates in Correctional settings**
  - **MSM**
  - **IDU**
  - **Institution for developmental disability**
- Pre-vaccination testing – if cost effective
- Post-vaccination testing – 1-2 months after last shot, if establishing response critical (HCW)

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VIRAL HEPATITIS C

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VIRAL HEPATITIS TYPE C

Etiology: Hepatitis C virus is a RNA-virus measuring 50 nm. It is classed into a separate genus, Hepacavirus of the Flaviviridae family.

The source of infection — Long-term in viremia (in the ende IP), chronic infections.

Route of transmission — Parenteral transmission. Sporadically, vertical and sexual transmissions were reported carrier or the sick person.

Susceptibility — Susceptibility is general.

Preventive measures:
The same as for HBV, exclusive immunization.

Features of Hepatitis C Virus Infection

Incubation period		Average 6-7 weeks Range 2-26 weeks
Acute illness (jaundice)		Mild (≤20%)
Case fatality rate		Low
Chronic infection	Age-related	60%-85%
Chronic hepatitis asx)	Age-related	10%-70% (most
Cirrhosis		<5%-20%
Mortality from CLD		1%-5%

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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

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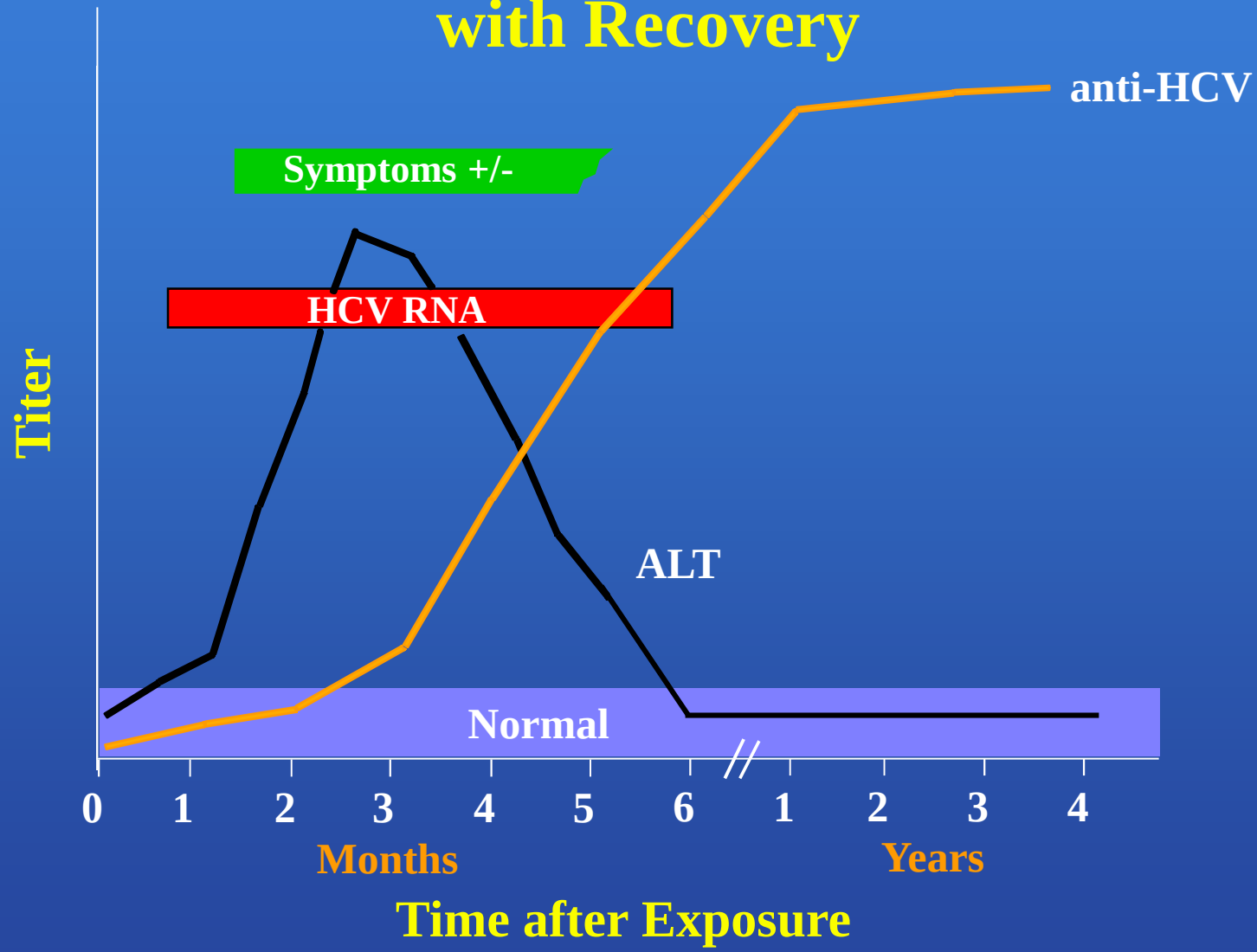
Serologic Pattern of Acute HCV Infection with Recovery



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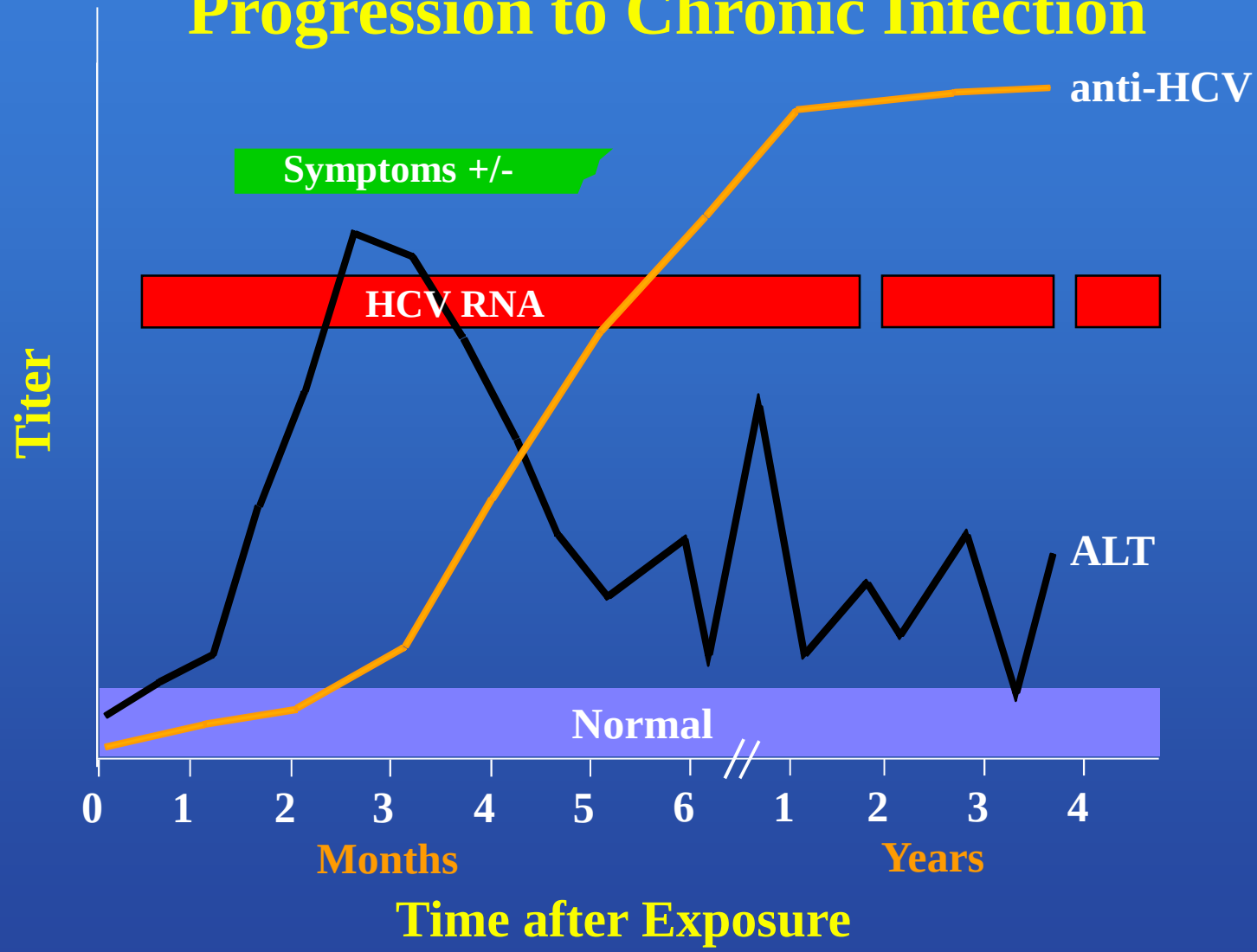
Serologic Pattern of Acute HCV Infection with Progression to Chronic Infection



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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

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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

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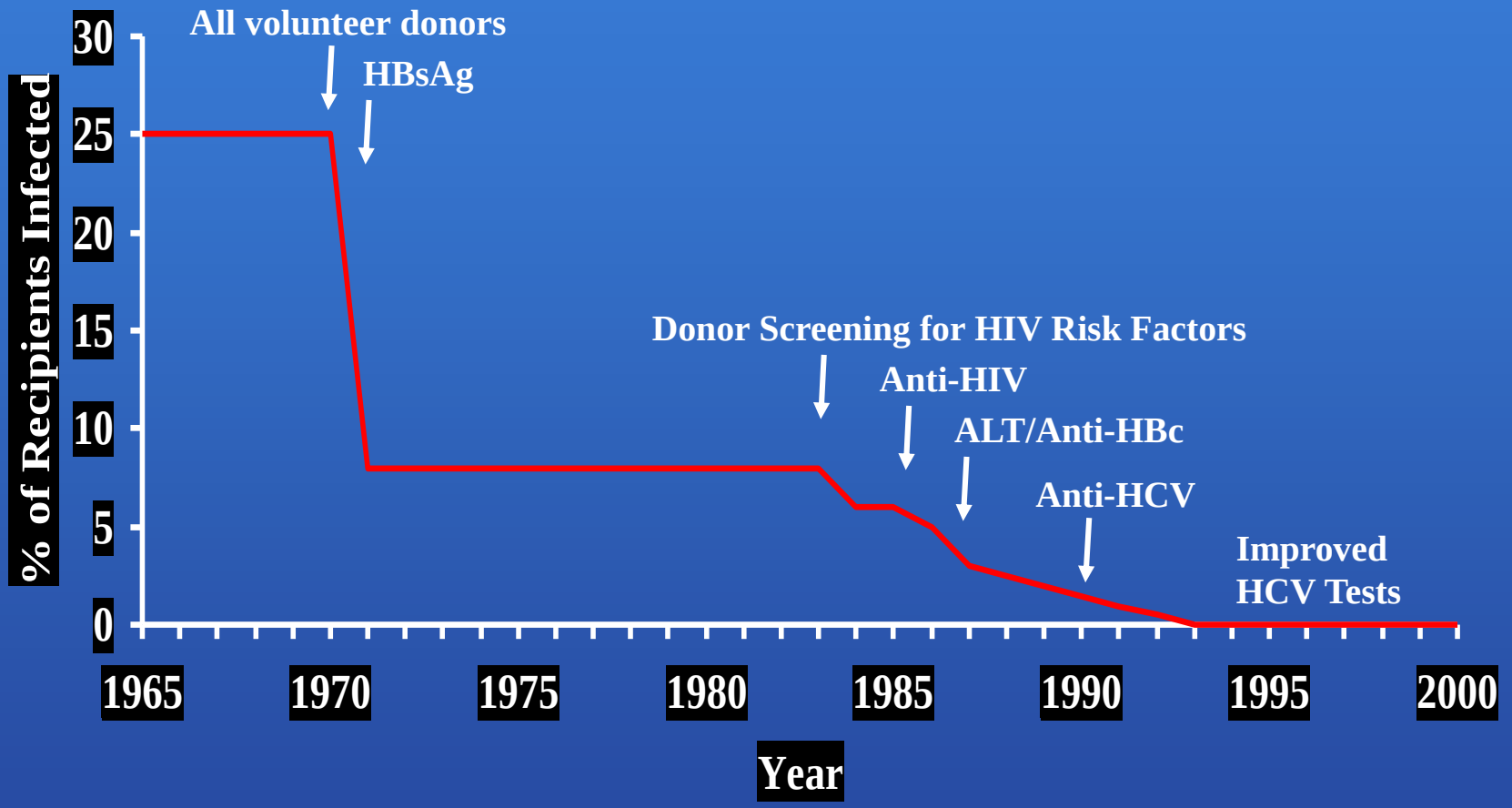
Posttransfusion Hepatitis C



Adapted from HJ Alter and Tobler and Busch, Clin Chem 1997

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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

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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

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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

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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

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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

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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

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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)

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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

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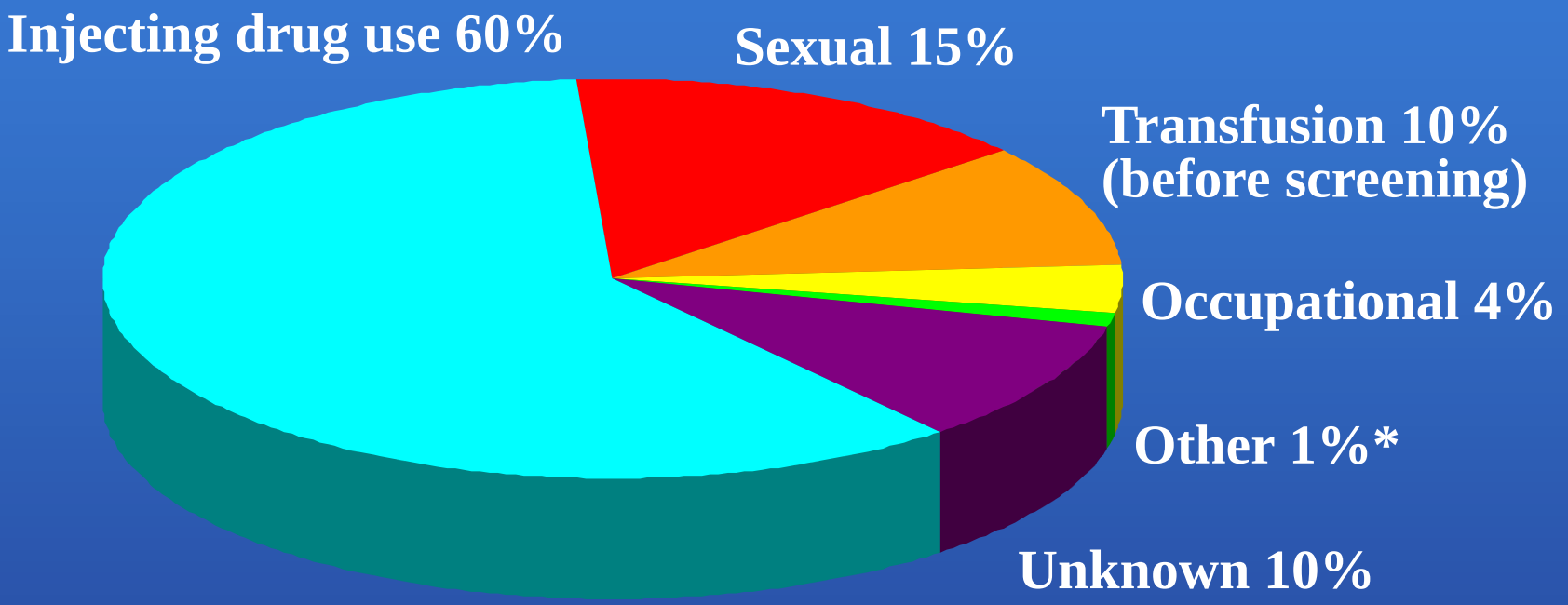
Sources of Infection for Persons With Hepatitis C



* Nosocomial; iatrogenic; perinatal

Source: Centers for Disease Control and Prevention

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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)

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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)

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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

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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

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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

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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

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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

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Sexual Transmission of HCV

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

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Sexual Transmission of HCV

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

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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