VIRAL HEPATITIS B

mkolar@med.muni.cz EPI; Autumn 2019

CDC
Centers for Disease Control and Prevention

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:

HEPATITIS B (Hepatitis B virus) – Case definition

Clinical Criteria

- Not relevant for surveillance purposes

Laboratory Criteria

- Positive results of at least one or more of the following tests or combination of tests:
- — IgM hepatitis B core antibody (anti-HBc IgM)
- — Hepatitis B surface antigen (HBsAg)
- — Hepatitis B e antigen (HBeAg)
- — Hepatitis B nucleic acid (HBV-DNA)

Epidemiological Criteria

- Not relevant for surveillance purposes

Case Classification

- A. **Possible case** NA
- B. **Probable case** NA
- C. **Confirmed case**

CDC
Centers for Disease Control and Prevention

VIRAL HEPATITIS TYPE B

Preventive measures:

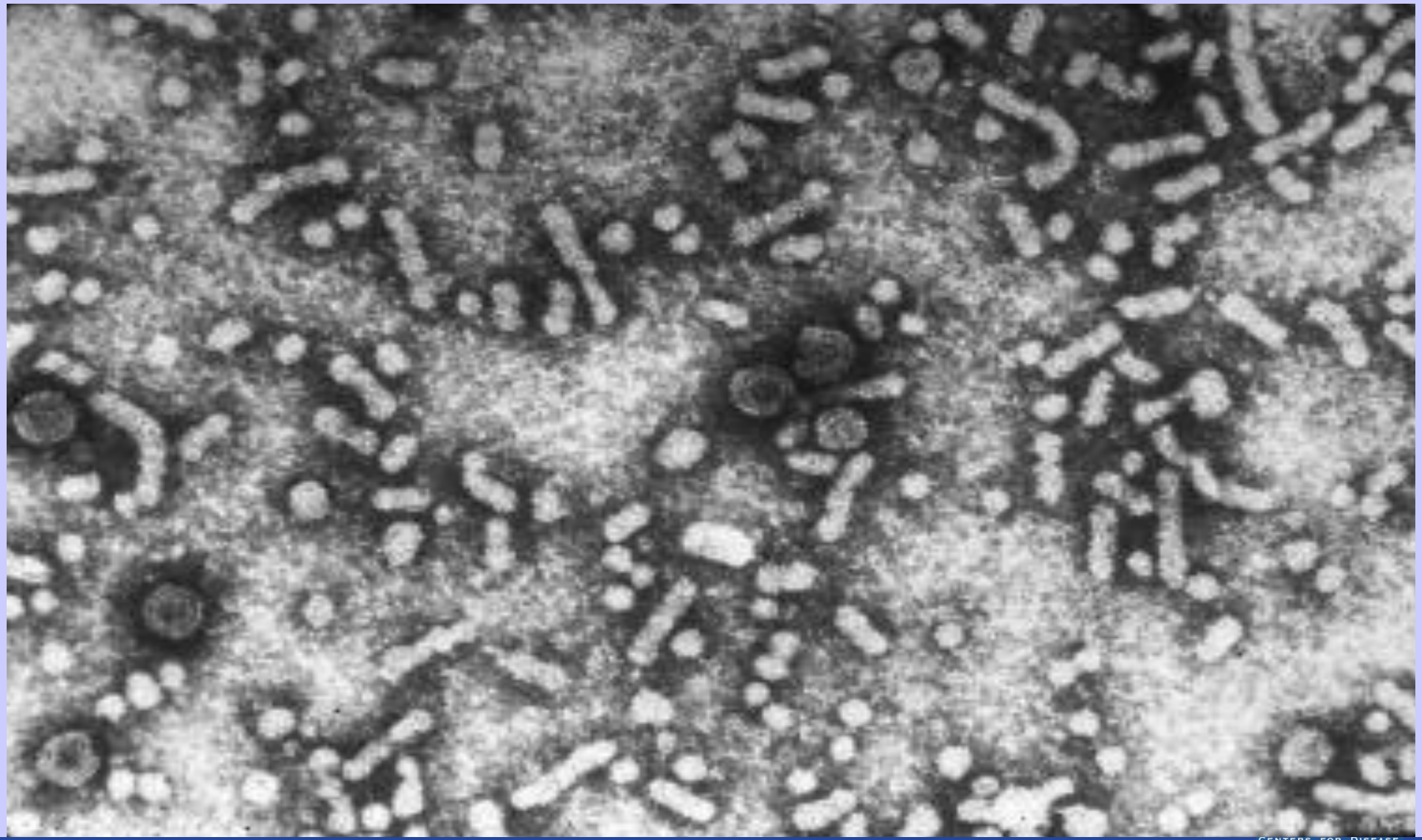
Health education - **to emphasize the extent of risk**
Observance of epidemic measures in medical establishments.
Handling biological material and contaminated instruments, consistent disinfection and sterilization, application of single-use needles and syringes, use of closed hemodialysis systems, smoking 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.

CDC
Centers for Disease Control and Prevention

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



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.

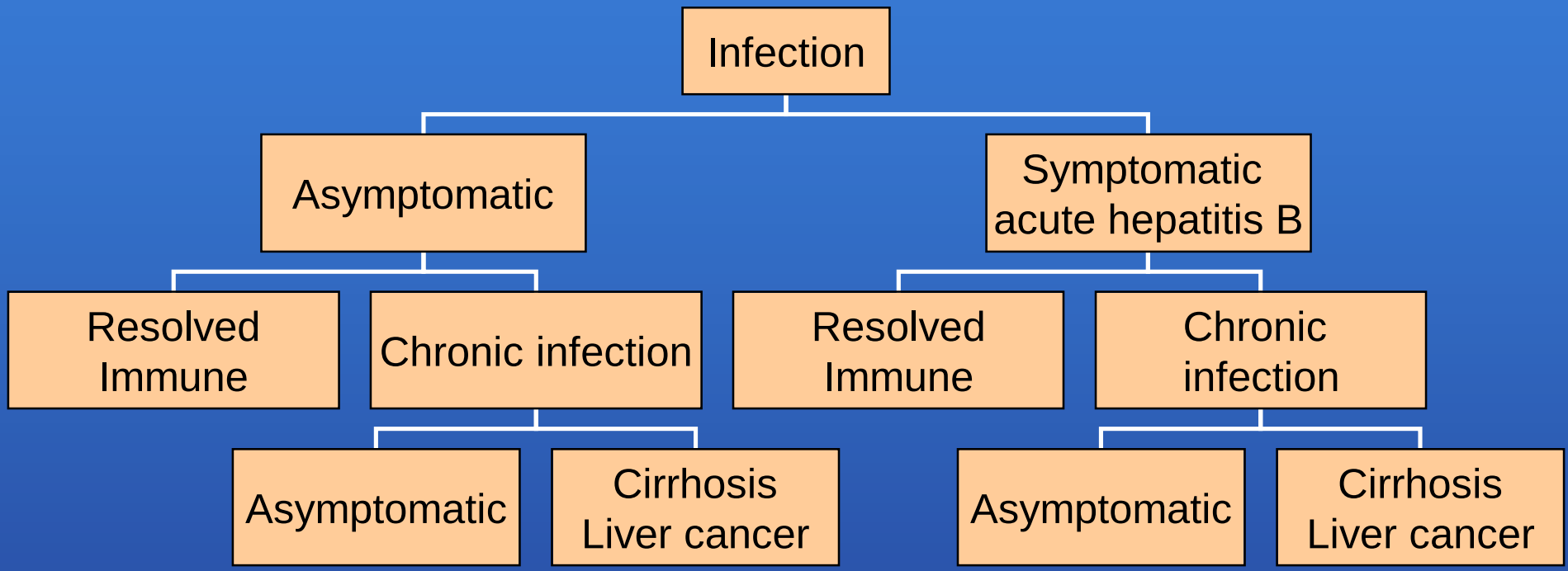
CDC
Centers for Disease Control and Prevention

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%

CDC
Centers for Disease Control and Prevention

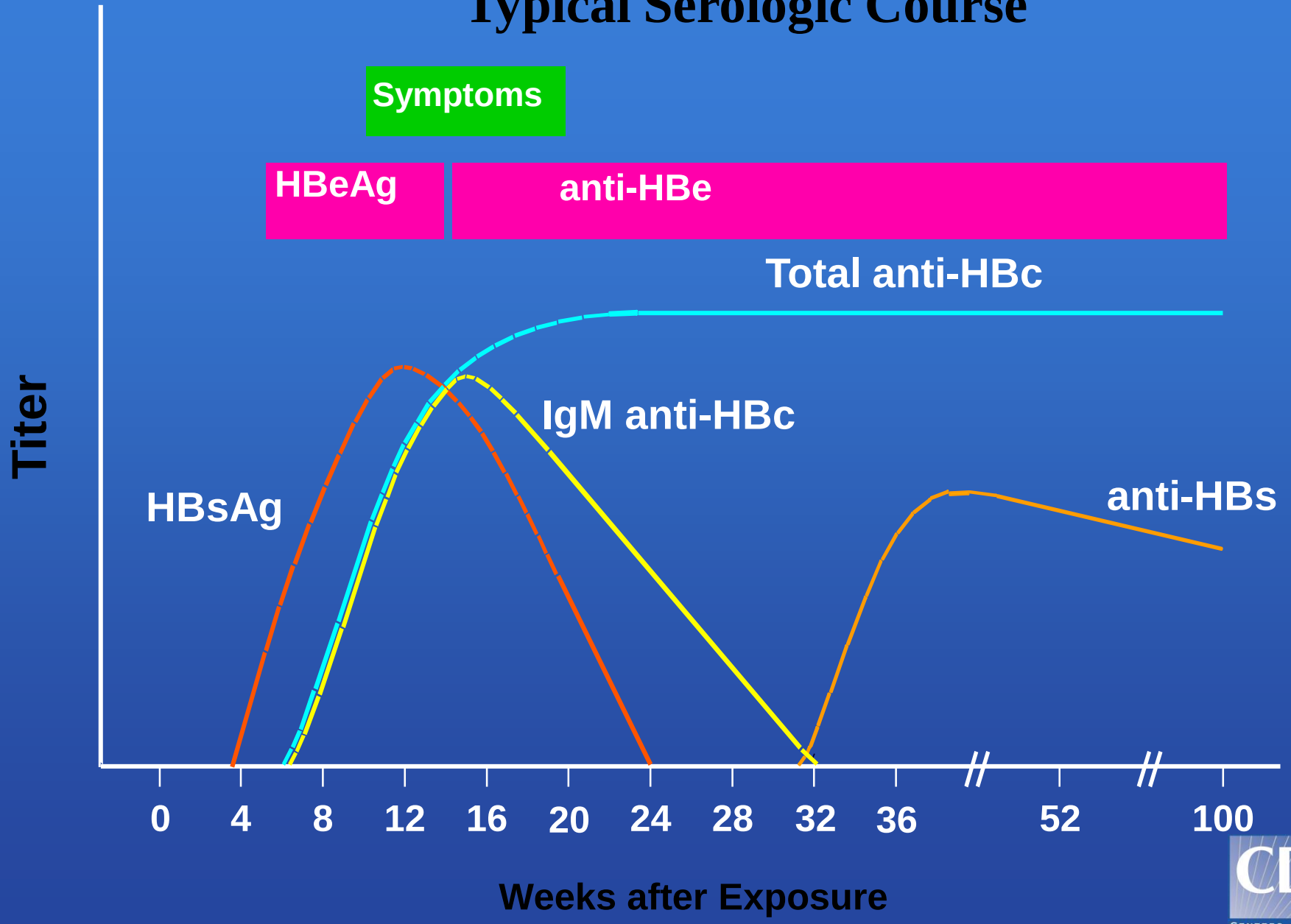
Outcome of HBV Infection



CDC
Centers for Disease Control and Prevention

Acute Hepatitis B Virus Infection with Recovery

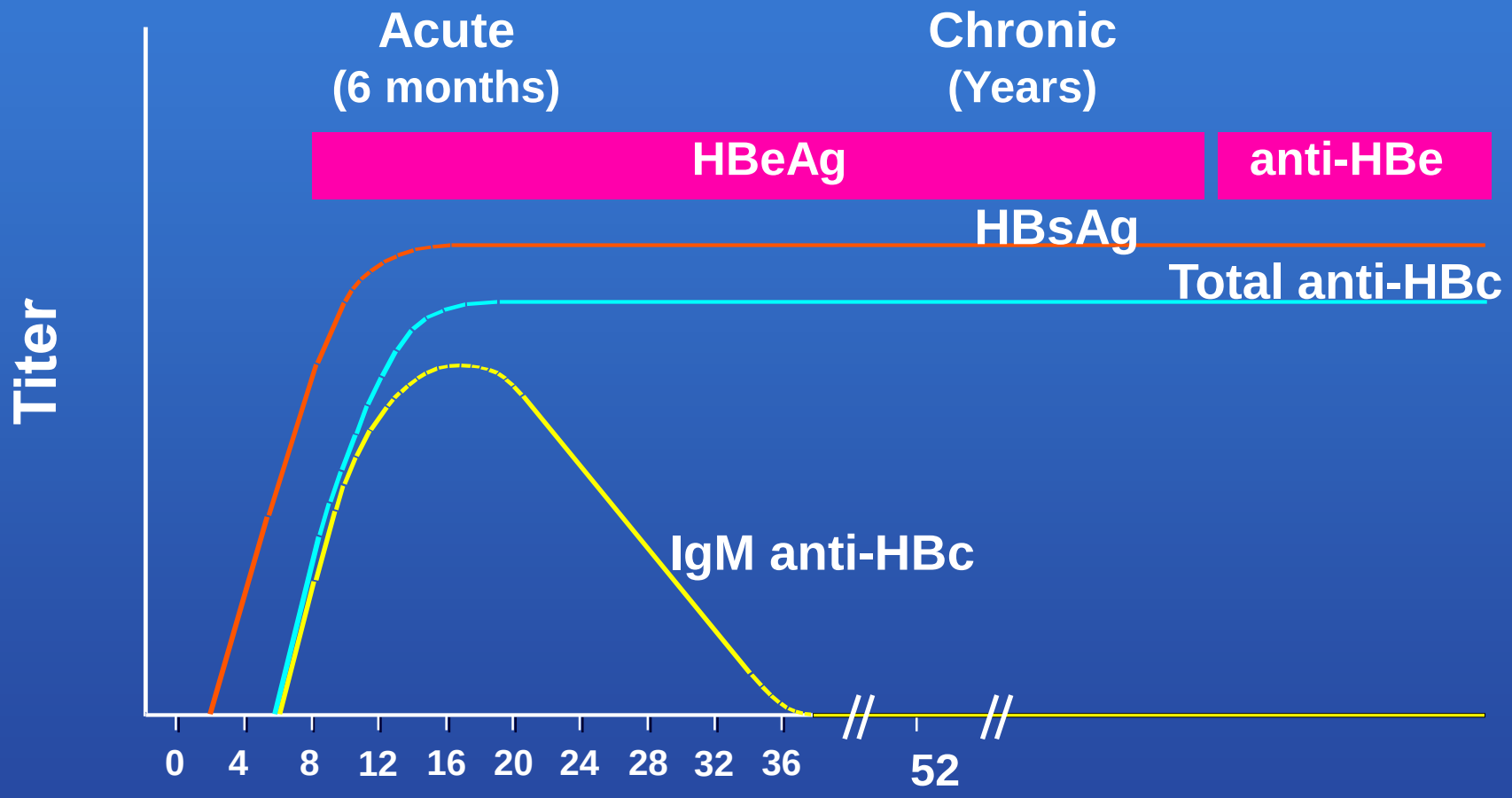
Typical Serologic Course



CDC
Centers for Disease Control and Prevention

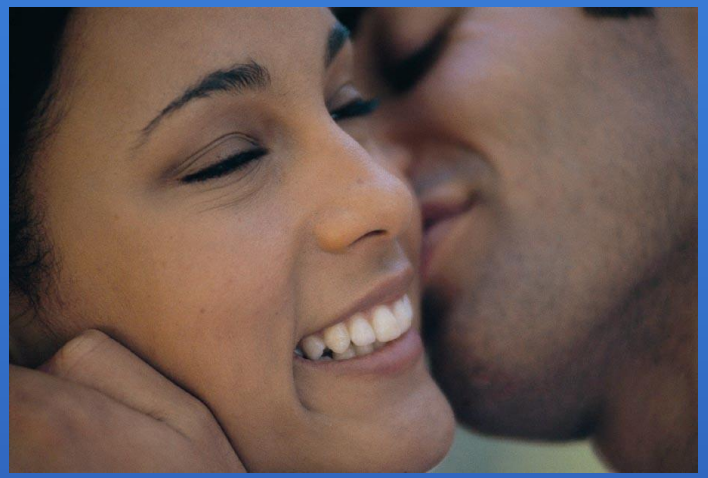
Progression to Chronic Hepatitis B Virus Infection

Typical Serologic Course



CDC
Centers for Disease Control and Prevention

HBV Modes of Transmission



- Sexual
- Parenteral
- Perinatal

CDC
Centers for Disease Control and Prevention

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

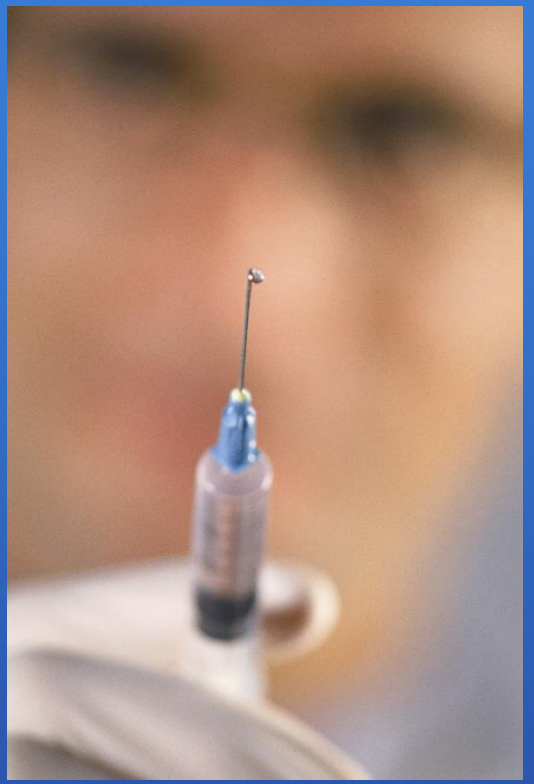
CDC
Centers for Disease Control and Prevention

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**



CDC
Centers for Disease Control and Prevention

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

CDC
Centers for Disease Control and Prevention

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)

CDC
Centers for Disease Control and Prevention