

Blood-borne viral infections

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Blood-borne viral infections

- Hepatitis B virus (HBV)
- Hepatitis C virus (HCV)
- Human immunodeficiency virus (HIV)
- Cytomegalovirus (CMV)
- Human herpesviruses types 6 and 7 (HHV-6, -7)
- Human T cell leukemia virus (HTLV)

Transient viremia

- West Nile virus
 - Fever and headache
 - Incubation period of 2-15 days
 - 20% of infected individuals develop symptoms
 - Severe disease 1/200 people

Risk of contracting infection

- Hepatitis B virus – relatively high
- Hepatitis C, HIV – low risk

Blood-borne viral infections

- Hepatitis B virus (HBV)
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- Human immunodeficiency virus (HIV)

Risks of procedures

- High risk
 - Uncontrolled bleeding or spattering of blood
 - Open surgery, procedures lasting more than 3 hours
- Low risk
 - Capillary oozing
 - Curettage and cautery, shave biopsy
- Very low risk
 - cryotherapy

Prevention measures – high risk procedures

- Gloves
- Water repellent gown
- Protective headwear
- Mask with visor
- Protective footwear

Protection – low risk procedures

- Gloves
- Protective eyewear

Body fluids

- High risk

- Blood
- Cerebrospinal fluid
- Pleural fluid
- Breast milk
- Amniotic fluid
- Vaginal secretions
- Unfixed body tissues
- Peritoneal fluid
- Pericardial fluid
- Synovial fluid
- Semen

- Low risk

- Urine
- Feces
- Saliva
- Sputum
- Tears
- Sweat
- Vomit

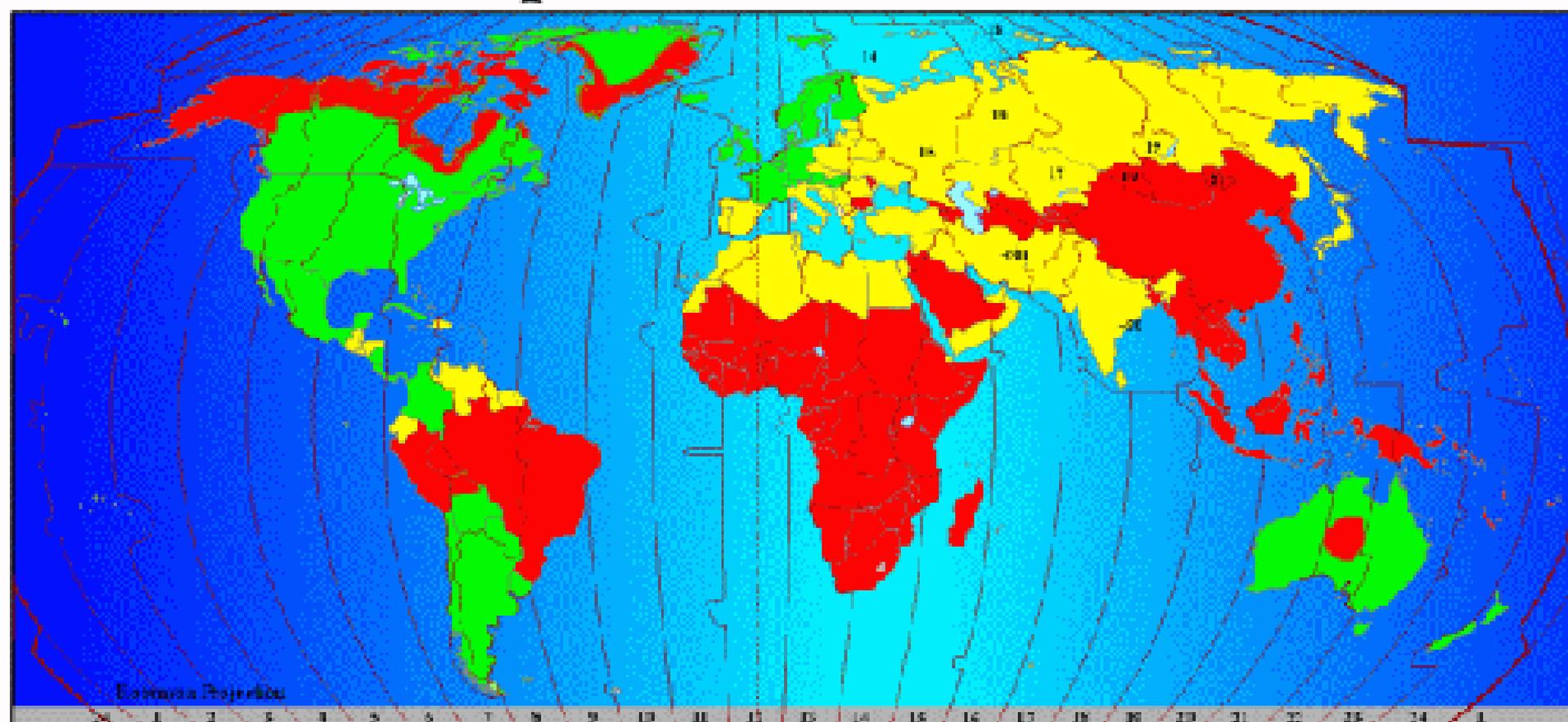
Hepatitis B virus

- Causes a spectrum of liver diseases
 - Acute hepatitis
 - Chronic hepatitis
 - Cirrhosis
 - Hepatocellular carcinoma

Hepatitis B virus

- Major cause of acute and chronic hepatitis
- ~300,000 new infections/year
- 350 deaths
- Can cause liver cirrhosis and liver cancer

Global Distribution of Chronic Hepatitis B Infection



■ >8% - High ■ 2% - 7% ■ <2% - Low
Intermediate

Hepatitis B

- Outcome of infection varies with host and virus
- Infiltrates of inflammatory cells – hepatocellular death
- In acute infection, pathology is mild to moderate
- One virion may be sufficient to initiate infection

Predicted outcome – hepatitis B virus infection

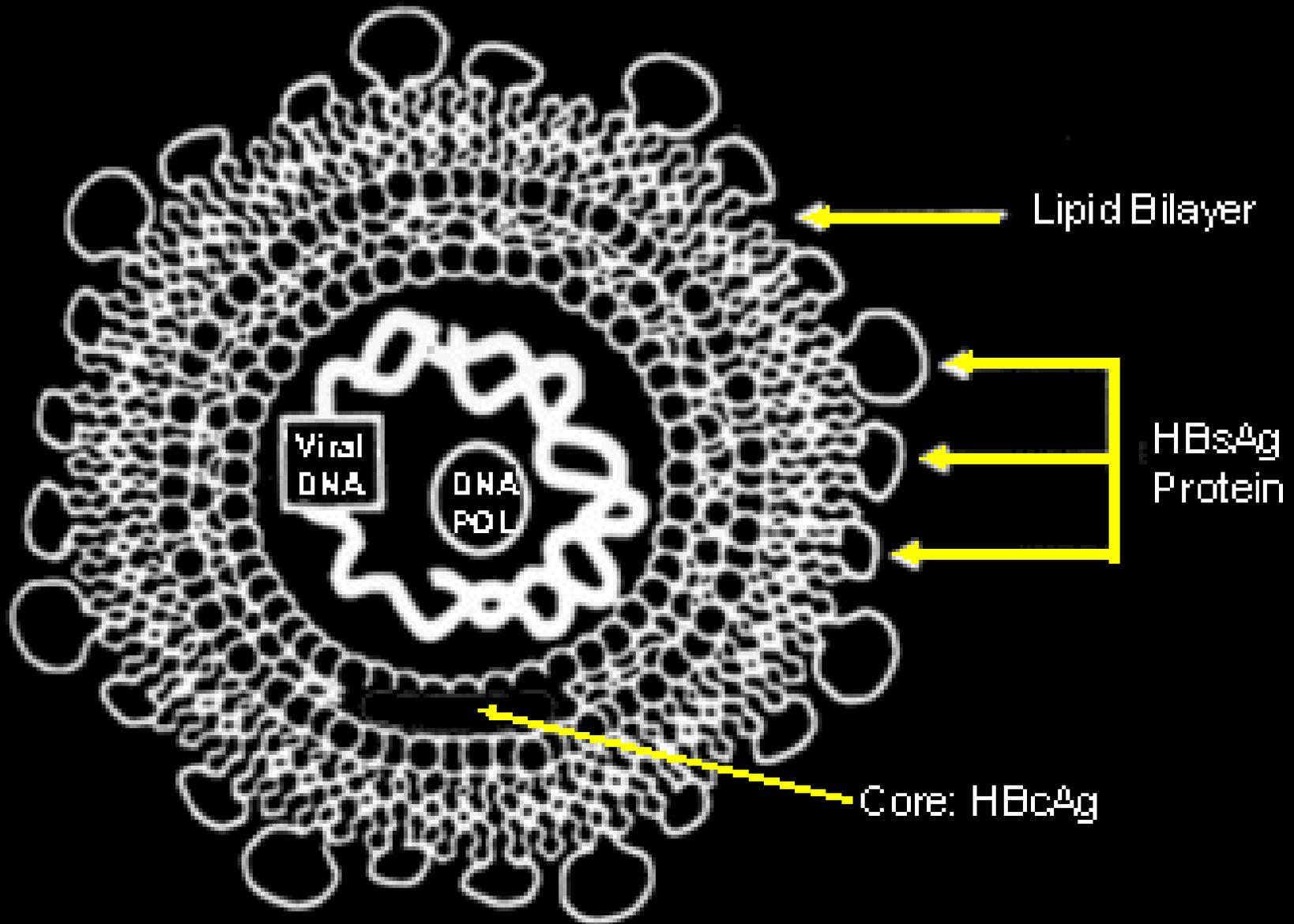
- Subclinical disease 65-80%
- Icteric disease 20-35
- Complete recovery 95-98
- Chronic disease 2-10
- Mortality rate (icteric cases) 0.5-1.5%

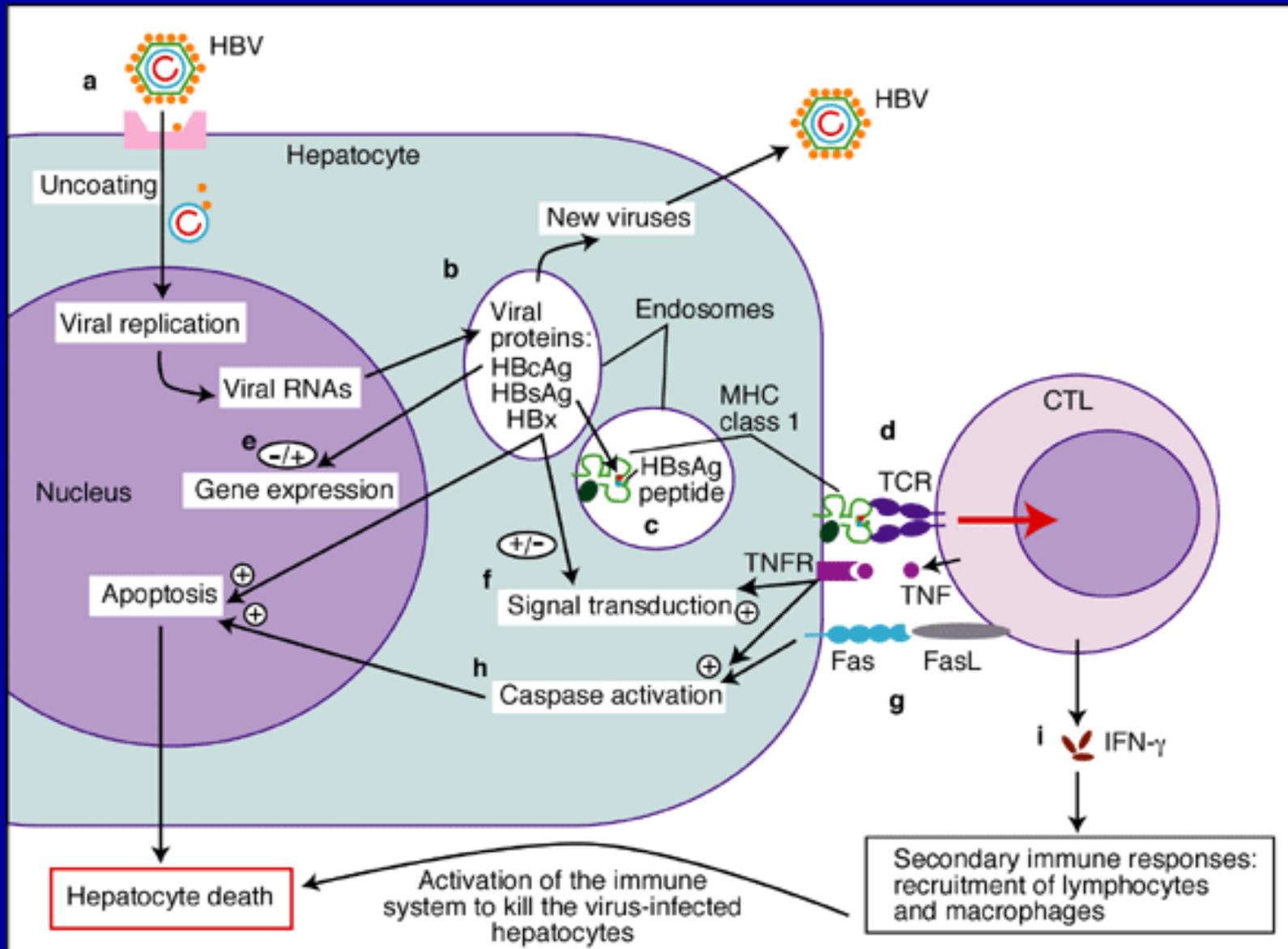
Prevention of HBV

- Vaccination
 - 98-100% of vaccinees develop antibody to HBs
- Post-exposure prophylaxis
 - HBIG, vaccination

Hepatitis B virus

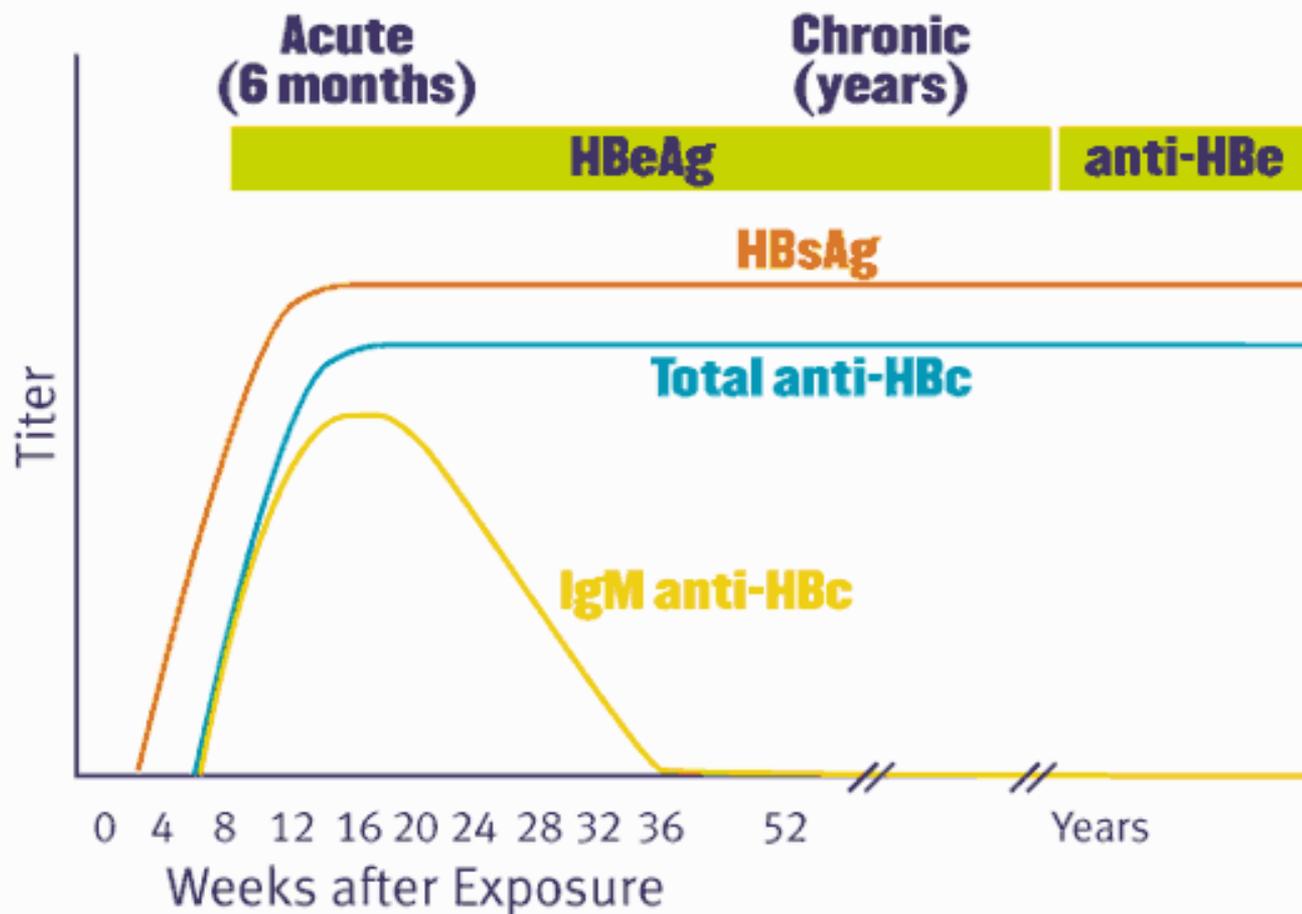
- Enveloped virus, partially ds DNA genome
- Uses reverse transcriptase





Virus-specific cytotoxic T lymphocyte (CTL) responses, and roles of proteins of hepatitis B virus

Progression to Chronic Hepatitis B Virus Infection, Typical Serologic Course



Source: Centers for Disease Control and Prevention

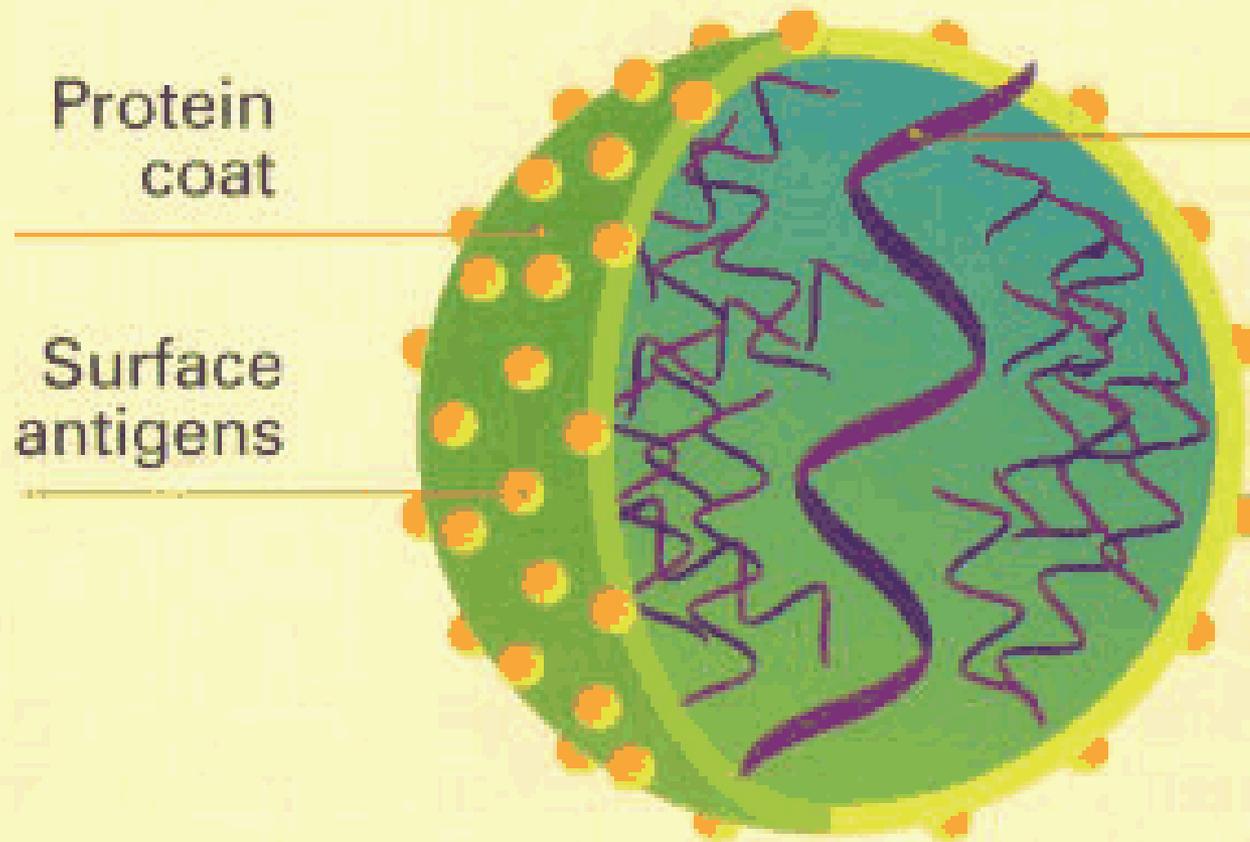
Hepatitis D

- Only seen with Hepatitis B virus infection

Hepatitis C

- Majority newly acquired infections – asymptomatic
- Risk factor – injectable drug abuse
- Acute infection is mild
- Chronic infection occurs in 80% of cases
- 1.8% of general population – evidence of infection

C VIRUS



Protein
coat

Surface
antigens

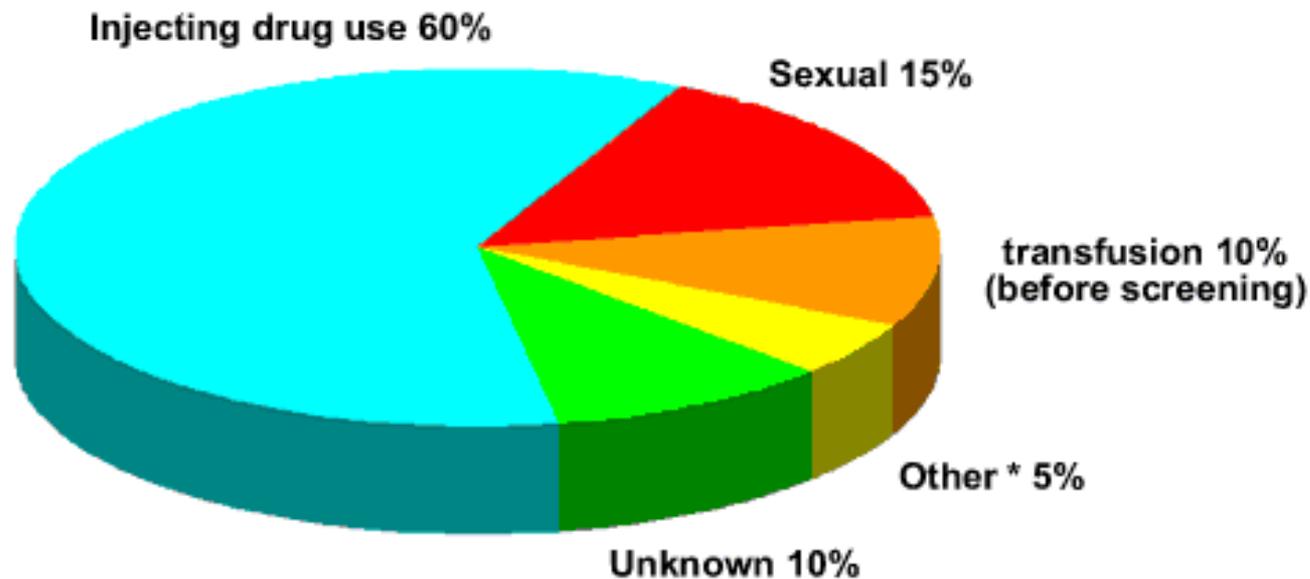
RNA
viral genes

a single
strand
of genetic
material

Hepatitis C virus

- Transmission through parenteral routes
- Viral replication in the liver
 - 5-19% of hepatocytes are positive for HCV RNA
- Triad of steatosis, bile duct damage, and lymphoid follicles
- Most infections become chronic

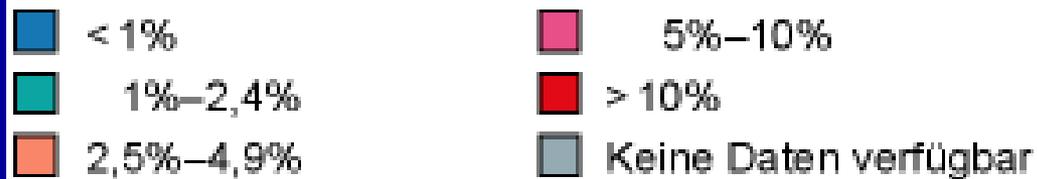
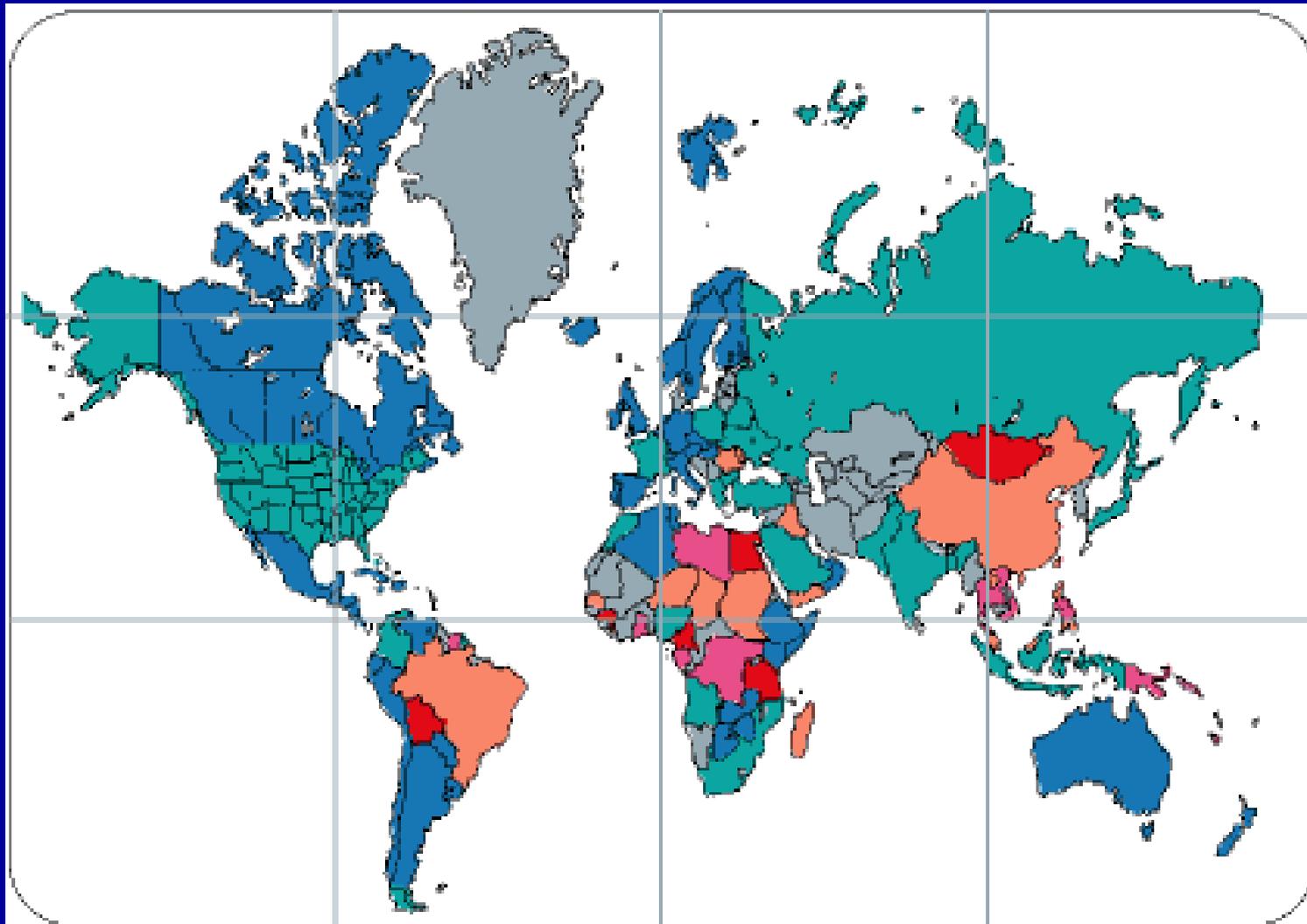
Sources of Infection for Persons with Hepatitis C



*Nosocomial: Health-care work; Perinatal

Source: Centers for Disease Control and Prevention

Hepatitis C virus



HIV

- Causative agent of AIDS
- Reported prevalence in ED – 0.15-7.8%

Nosocomial infection

- Infection of patients by health care workers

Best Practices

- Immunization to hepatitis B virus
- Prevention/control measures
- Patient testing

General prevention

- Good hygiene
- Wear gloves, cover existing wounds
- Indirect sharp transfer
- Appropriate disposal of sharps
- Disinfect surfaces

Post-exposure prophylaxis

- Wash off splashes with soap and water
- Encourage bleeding if skin was broken
- Wash out splashes in eyes with eye wash or tap water
- Record source of injury and report incident

Decisions about prophylaxis

- Source of contamination
- Extent of injury and type of sharp
- Likelihood of virus infection in the source case
- Vaccination history of injured party
- Establish risk – blood samples from patient and injured party