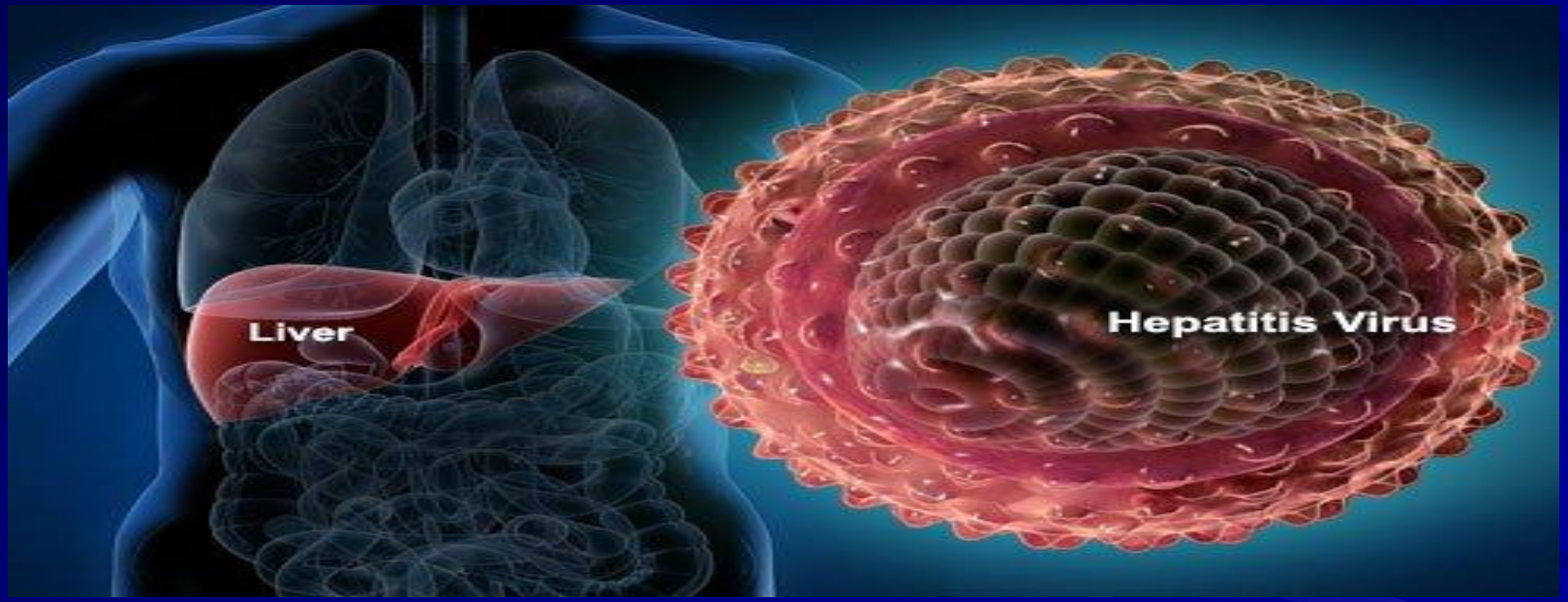
Epidemiology of Viral Hepatitis -2024



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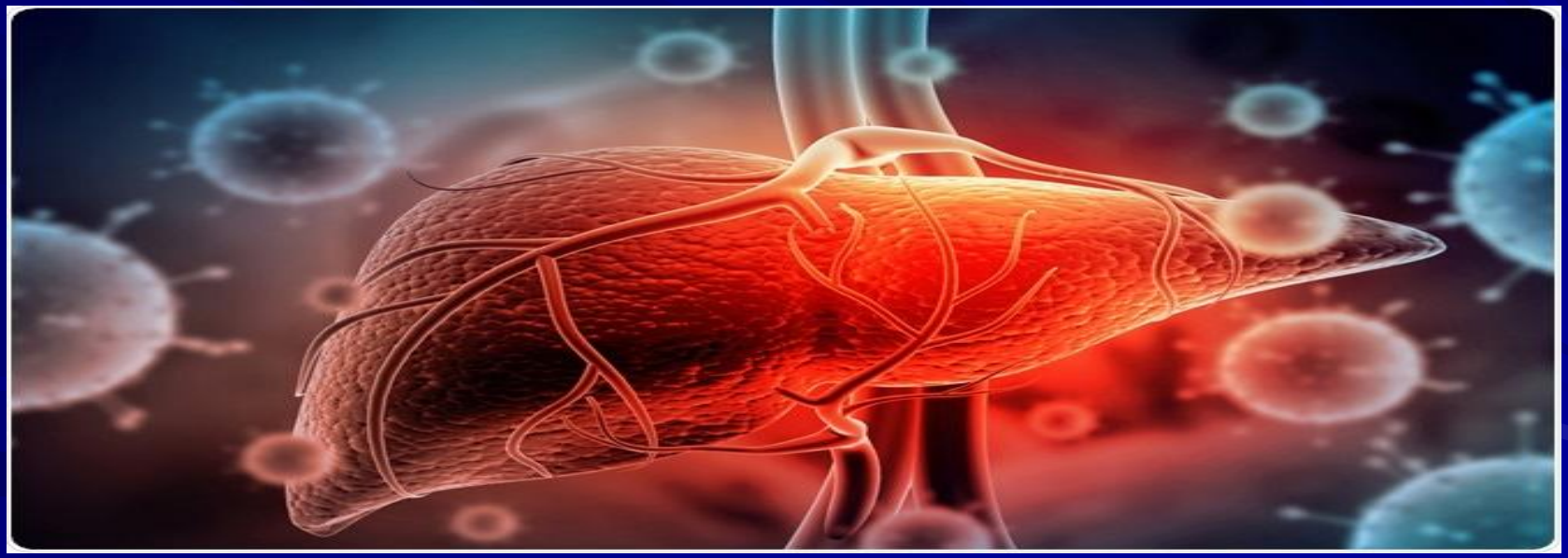
OBJECTIVES

- TO KNOW THE TYPES OF VIRAL HEPATITS
- DEFINE THE EPIDEMIOLOGY OF VIRAL HEPATITS
- HAVE IDEA ABOUT PREVENTION AND VACCINATIONS

Part 1

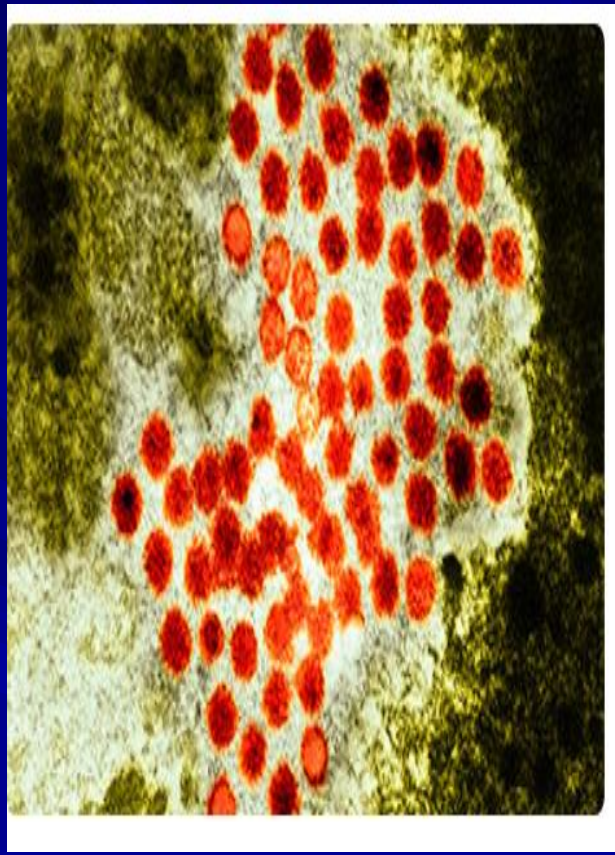
Hepatitis A

Hepatitis A (formerly known as "infectious" hepatitis or epidemic jaundice



Agent factors

- The causative agent, the hepatitis A virus, is an enterovirus (type 72) of the Picornaviridae family.
- Faecal shedding of the virus is at its highest during the later part of the incubation period and early acute phase of illness.
- Only one serotype is known.



- **RESERVOIR OF INFECTION : The human cases. Asymptomatic (anicteric) infections are especially common in children.**
- **There is no evidence of a chronic carrier**

- PERIOD OF INFECTIVITY :
- The risk of transmitting HAV is greatest from 2 weeks before to 1 week after the onset of jaundice. infectivity falls rapidly with the onset of jaundice
- INFECTIVE MATERIAL : Mainly man's faeces. Blood, serum and other fluids are infective during the brief stage of viraemia.

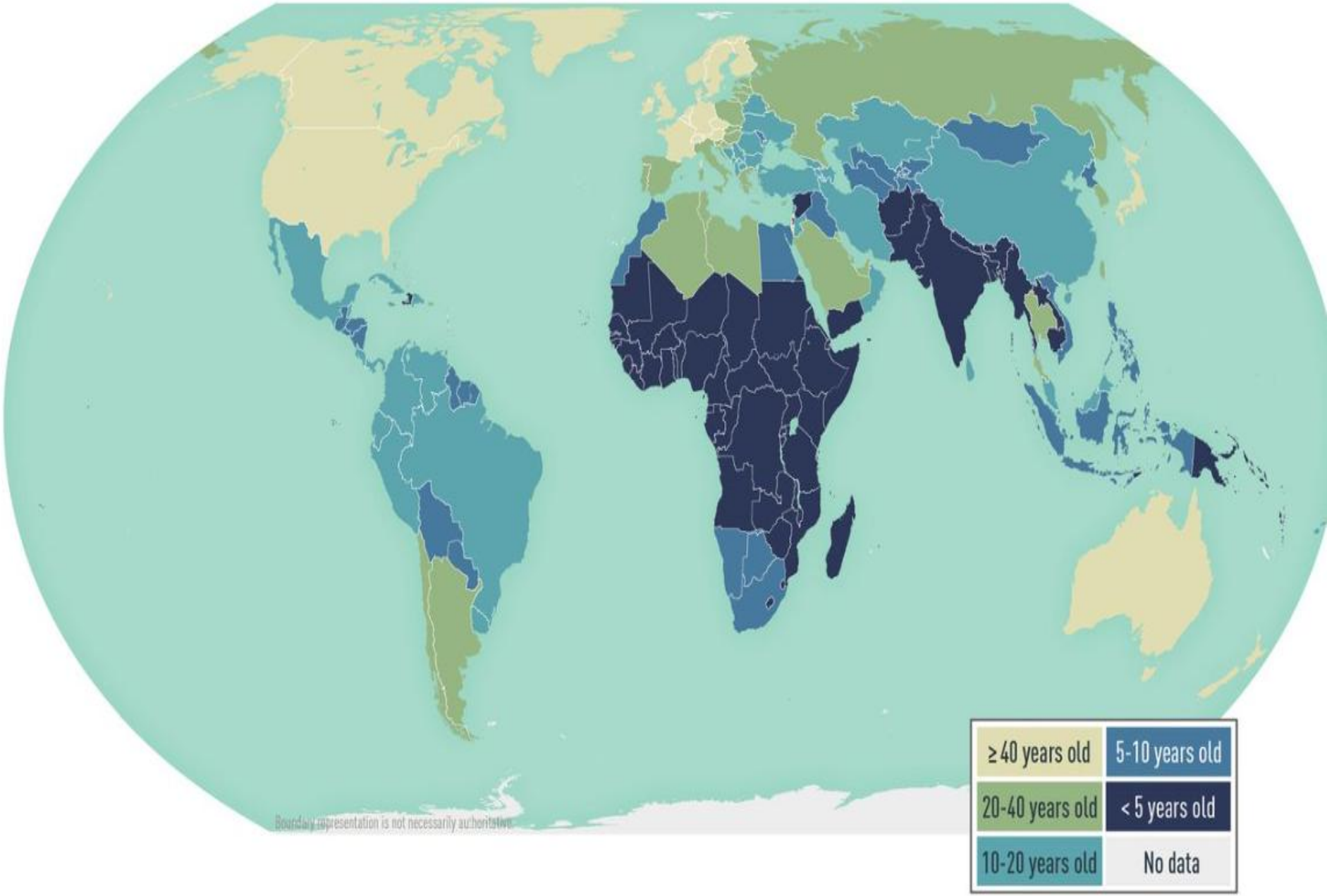
- There is little evidence for HAV transmission by urine or nasopharyngeal secretions .
- Haemodialysis plays no role in the spread of hepatitis A infections to either patients or the staff

Host factors

- AGE : more frequent among children than in adults. However
- People from all ages may be infected if susceptible.
- In young children, infections tend to be mild or subclinical
- The clinical severity increases with age.
- The ratio of anicteric to icteric cases
  - Adults is about 1 :3
  - Children, it may be as high as 12: 1

However, faecal excretion of HAV antigen and RNA persists longer in the young than in adults

Map 5-06 Estimated age at midpoint of population immunity (AMPI) to hepatitis A, by country



- SEX : Both sexes are equally susceptible.
- IMMUNITY: Immunity after attack probably lasts for life
- Second attacks have been reported in about 5 %.
- Most people in endemic areas acquire immunity through subclinical infection.
- The lgM antibody appears early in the illness and persists for over 90 days.
- IgG appears more slowly and persists for many years.

Environmental factors

- Cases may occur throughout the year.
- Poor sanitation and overcrowding favour the spread of infection, giving rise to water-borne and food-borne epidemics.

Modes of transmission

- ***FAECAL-ORAL ROUTE :*** **This is the major route of transmission.**
- **It may occur by direct (person-to-person) contact or indirectly by way of contaminated water, food or milk.**
- **Water-borne transmission, is not a major factor in developed countries, where food-borne outbreaks are becoming more frequent.**

- ***PARENTERAL ROUTE:*** **Hepatitis A is rarely, if ever, transmitted by the parenteral route (i.e., by blood and blood products or by skin penetration through contaminated needles).**
- **This may occur during the stage of viraemia.**
- **This mode of transmission is of minor importance as viraemic stage of infection occurs during prodromal phase and there is no carrier state.**

- ***SEXUAL TRANSMISSION:*** **As a sexually transmitted infection hepatitis A may occur mainly among homosexual men because of oral-anal contact .**
- **Food handlers are not at increased risk for hepatitis A because of their occupation, but are noteworthy because of their critical role in common-source food-borne HAV transmission.**
- **Health care personnel do not have an increased prevalence of HAV infection and nosocomial HAV transmission is rare.**
- **Children play an important role in HAV transmission as they generally have asymptomatic or unrecognized illness.**

Incubation period

- 10 to 50 days (usually 14-28 days}.
- The length of the incubation period is proportional to the dose of the virus ingested .

TABLE 1

Outcomes of infection with hepatitis A virus

Outcome	Children	Adults
Inapparent (sub-clinical) infection	80-95%	10-25%
Icteric disease	5-20%	75-90%
Complete recovery	>98%	>98%
Chronic disease	None	None
Mortality rate	0.1%	0.3-2.1%

Hepatitis A Prevention

- General prevention
  - –Water chlorination
  - –Boil water 20 minutes
  - –Wash hands
  - –Avoid contaminated food

Vaccines

Two types of hepatitis A vaccines .

- A-Formaldehyde inactivated hepatitis A vaccine are licensed for use in persons more than 12 months of age.
- The complete vaccination schedule consists of 2 dose administration into the deltoid muscle.
- The interval between the first (primary) dose and second (booster) dose is commonly 6-12 months;
- Following 2 doses of vaccine the protective efficacy is about 94 per cent.

- B-The live attenuated vaccine is administered as a single subcutaneous dose.
- Both inactivated and live attenuated hepatitis A vaccines are highly immunogenic and immunization will generate long-lasting, possibly life-long, protection against the disease in children and adults.

- HAV Immunoglobulin
  - Can prevent 85-95% infections if given within two weeks of exposure

  Indicated in:
  - Household and sexual contacts
  - Day care contacts
  - Prison contacts
  - Common source outbreaks

Hepatitis B

serum hepatitis

- Is an acute systemic infection with major pathology in the liver, caused by hepatitis B virus {HBV) and transmitted usually by the parenteral route.
- It is clinically characterized by a tendency to a long incubation period (4 weeks to 6 months) and a protracted illness with a variety of outcomes.
- Usually, it is an acute self-limiting infection, which may be either subclinical or symptomatic.

- In approximately 5 to 15 per cent of cases fails to resolve, and the affected individuals then become persistent carriers of the virus.
- Persistent HBV infection may cause progressive liver disease including chronic active hepatitis and hepatocellular carcinoma.
- There is also evidence of a close association between hepatitis Band primary liver cancer .
- Hepatitis B virus can form a dangerous alliance with delta virus and produce a new form of virulent hepatitis .

Host factors

AGE :

- The outcomes of HBV infection are age-dependent.
- Acute hepatits B occurs in approximately 1 per cent of perinatal, 10 per cent of early childhood (1-5 years of age), and 30 per cent of late (> 5 years age) HBV infections. Mortality from fulminant hepatitis B is approximately 70 per cent.
- The development of chronic HBV infection is inversely related to age and occurs in approximately 80-90 per cent of persons infected perinatally, in 30 per cent infected in early childhood (less than 6 years of age) and in 5 per cent infected after 6 years of age .

HIGH-RISK GROUPS

- The annual incidence of HBV infection in surgeons is estimated to be 50 times greater than that in the general population and is more than twice that of other physicians.
- Other high-risk groups comprise recipients of blood transfusions, health care and laboratory personnel,homosexuals, prostitutes, percutaneous drug abusers,infants of HBV carrier mothers, recipients of solid organ transplants and patients who are immunocompromised.

Agent factors

- AGENT:

Hepatitis B virus was discovered by Blumberg in 1963.

RESERVOIR OF INFECTION

- Man is the only reservoir of infection which can be spread either from **carriers** or from **cases.**
- The continued survival of infection is due to the large number of individuals who are carriers of the virus.
- The persistent carrier state has been defined as the presence of HBsAg (with or without HBeAg) for more than 6 months.

PERIOD OF COMMUNICABILITY

- The virus is present in the blood during the incubation period (for a month before jaundice) and acute phase of the disease.
- Period of communicability is usually several months {occasionally years in chronic carriers) or until disappearance of HBsAg and appearance of surface antibody.

Modes of transmission

Parenteral route

Essentially a blood-borne infection.

- Infected blood and blood products through transfusions, dialysis, contaminated syringes and needles, pricks of skin, handling of infected blood, accidental inoculation.
- Accidental percutaneous inoculations .

INFECTIVE MATERIAL

- Contaminated blood is the main source of infection, although the virus has been found in body secretions such as saliva, vaginal secretions and semen of infected persons

Perinatal transmission

- HBV carrier mothers to their babies appears to be an important factor for the high prevalence of HBV infection .
- Children born to mothers who are HBeAg-positive become chronically infected.
- Infection of the baby is usually anicteric and is recognized by the appearance of surface antigen between 60-120 days after birth .

Sexual transmission

Incubation period

- 30 to 180 days. Lower doses of the virus result often in longer incubation period. The average incubation period is about 75 days .

Hepatitis B vaccine

- The recombinant hepatitis B vaccine was introduced in 1986 and has gradually replaced the plasma-derived hepatitis B vaccine.
- The active substance in recombinant hepatitis B vaccine is HBsAg.

Infant Hepatitis B Vaccine Schedules

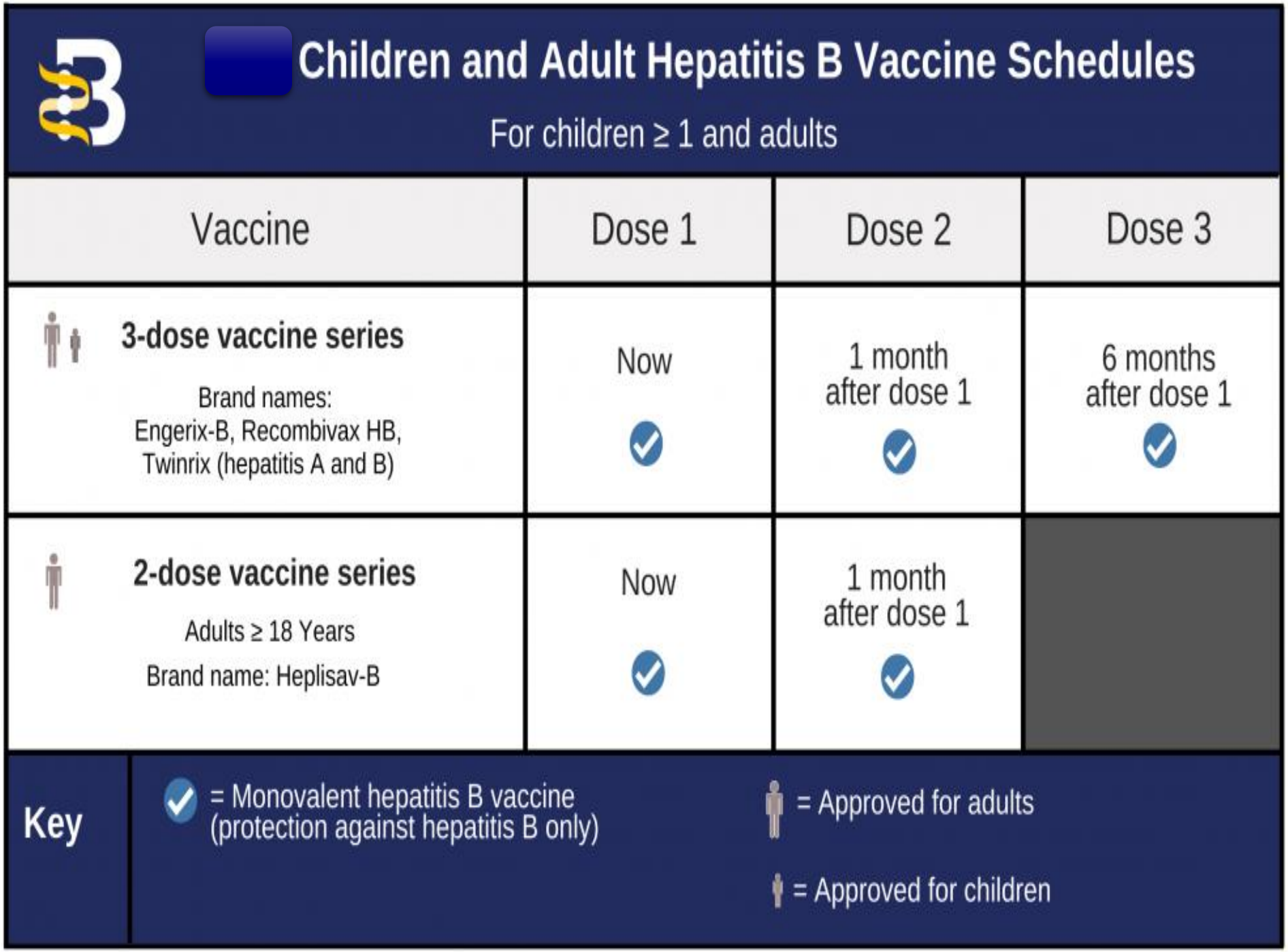
For infants < 1 year of age

Vaccine	Dose 1 "Birth Dose"	Dose 2	Dose 3	Dose 4
3-dose vaccine series Brand names: Engerix-B, Recombivax HB	Within 24 hours of birth	1 month after dose 1	6 months after dose 1	
4-dose combination vaccine series (pentavalent or hexavalent) Brand names: Vaxelis, Pediarix	Within 24 hours of birth (Hepatitis B vaccine)	6 weeks of age (Combination vaccine)	14 weeks of age (Combination vaccine)	6 months of age (Combination vaccine)

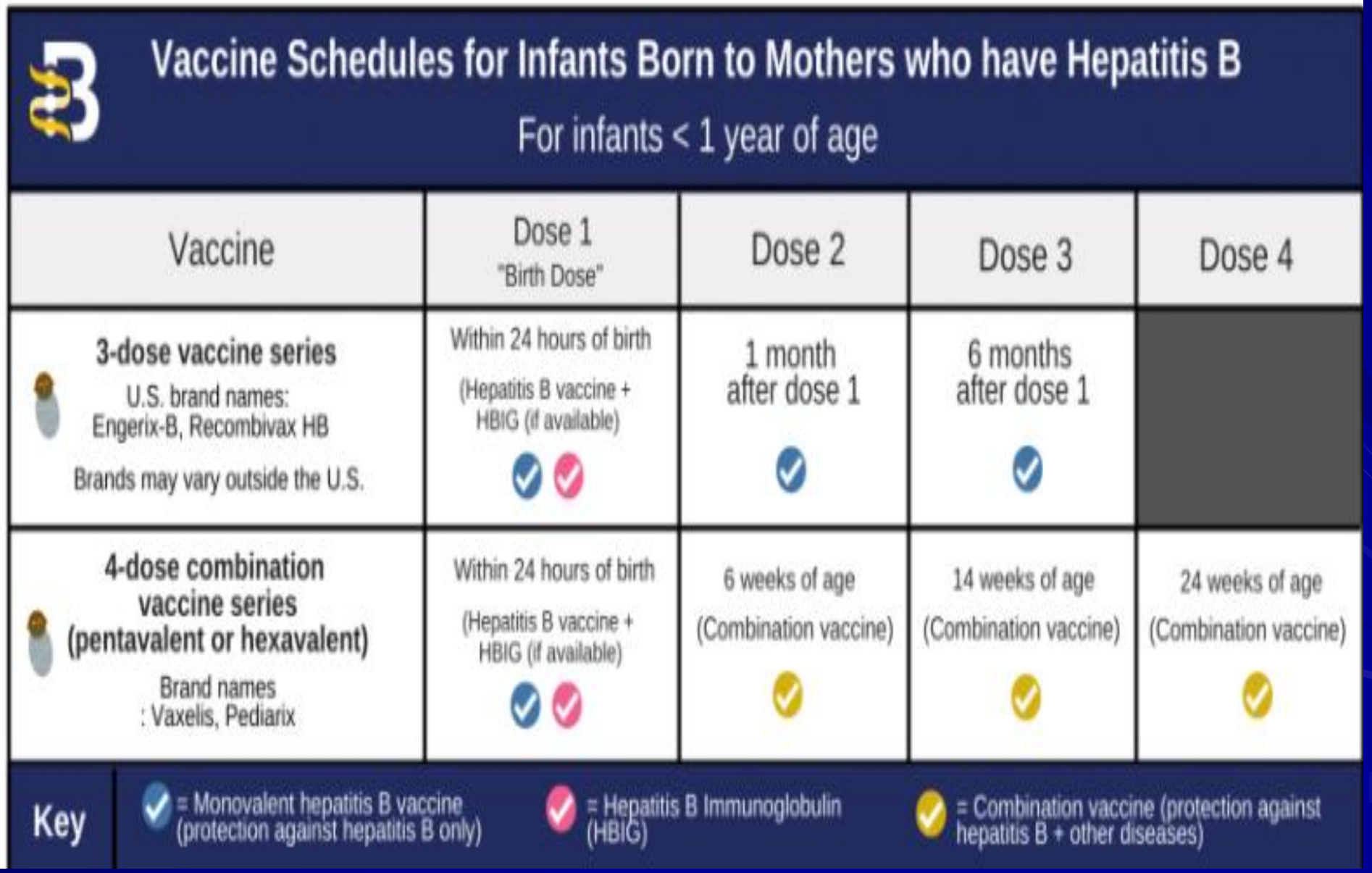
Key

= Monovalent hepatitis B vaccine (protection against hepatitis B only)

= Combination vaccine (protection against hepatitis B + other diseases)


Children and Adult Hepatitis B Vaccine Schedules
For children ≥ 1 and adults
Vaccine
Dose 1
Dose 2
Dose 3
3-dose vaccine series
Brand names:
Engerix-B, Recombivax HB,
Twinrix (hepatitis A and B)
Now
1 month
after dose 1
6 months
after dose 1
2-dose vaccine series
Adults ≥ 18 Years
Brand name: Heplisav-B
Now
1 month
after dose 1
Key
= Monovalent hepatitis B vaccine
(protection against hepatitis B only)
= Approved for adults
= Approved for children

Infants Born to Mothers who Have Hepatitis B: Hepatitis B Vaccine Schedules



Vaccine and HBIG Shot Administration Sites for Infants

Shots must be administered in opposite limbs

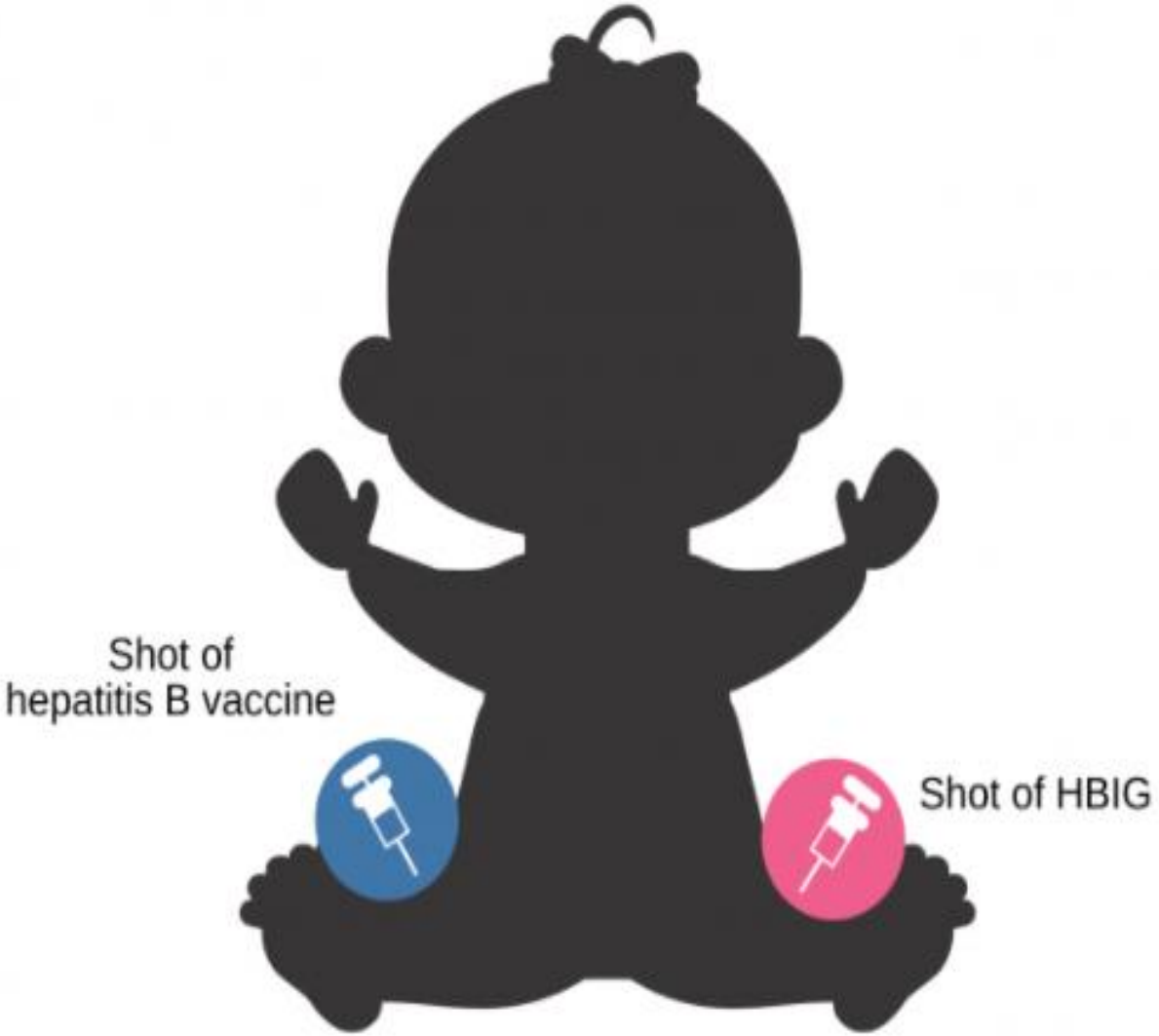


TABLE 1

Common serologic patterns in hepatitis B virus infection and their interpretation

HBsAg	Anti-HBs	Anti-HBc	HBeAg	Anti-HBe	Interpretation
+	–	IgM	+	–	Acute hepatitis B
+	–	IgG[1]	+	–	Chronic hepatitis B with active viral replication
+	–	IgG	–	+	Chronic hepatitis B with low viral replication
+	+	IgG	+ or –	+ or –	Chronic hepatitis B with heterotypic anti-HBs (about 10% of cases)
–	–	IgM	+ or –	–	Acute hepatitis B
–	+	IgG	–	+ or –	Recovery from hepatitis B (immunity)
–	+	–	–	–	Vaccination (immunity)
–	–	IgG	–	–	False-positive, less commonly, infection in remote past

[1] Low levels of IgM anti-HBc may also be detected.