Epidemiology of viral hepatitis 2025-2

PART 2

HBV State	HBsAg	Anti-HBs	HBeAg	Anti-HBe	Anti-HBc IgM	Anti-HBc IgG
Acute HBV	+	-	+	-	+	-
Chronic HBV	+	-	+ or -	- or +	-	+
Resolved HBV	-	+	-	+	-	+
Vaccinated	-	+	-	-	-	-
Window period	-	-	-	-	+	+

HBV Vaccination

[redacted] Infant Hepatitis B Vaccine Schedules

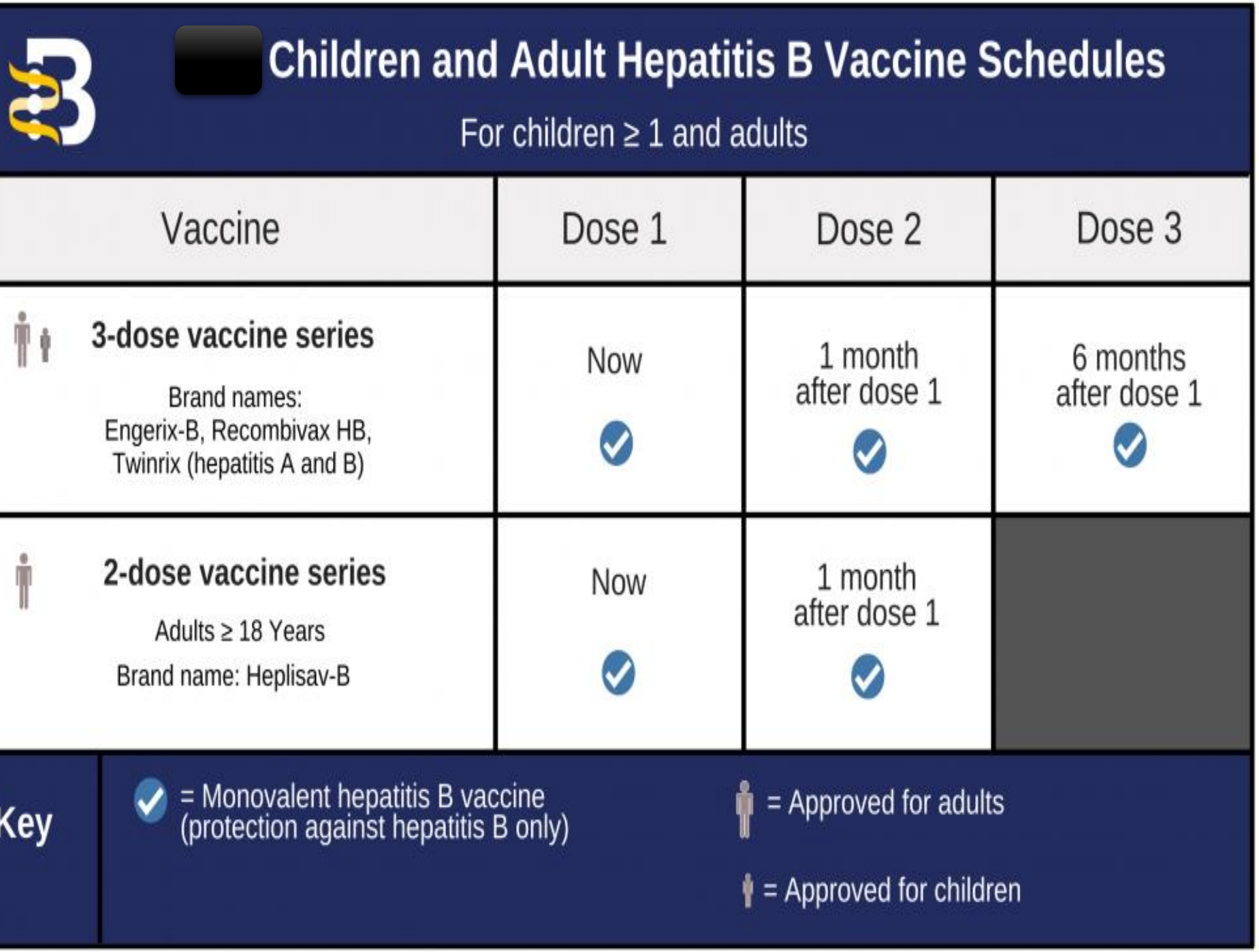
For infants < 1 year of age

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 Schedules for Infants Born to Mothers who have Hepatitis B

For infants < 1 year of age

Vaccine	Dose 1 "Birth Dose"	Dose 2	Dose 3	Dose 4
3-dose vaccine series U.S. brand names: Engerix-B, Recombivax HB Brands may vary outside the U.S.	Within 24 hours of birth (Hepatitis B vaccine + HBIG (if available)	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 + HBIG (if available)	6 weeks of age (Combination vaccine)	14 weeks of age (Combination vaccine)	24 weeks of age (Combination vaccine)

Key

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

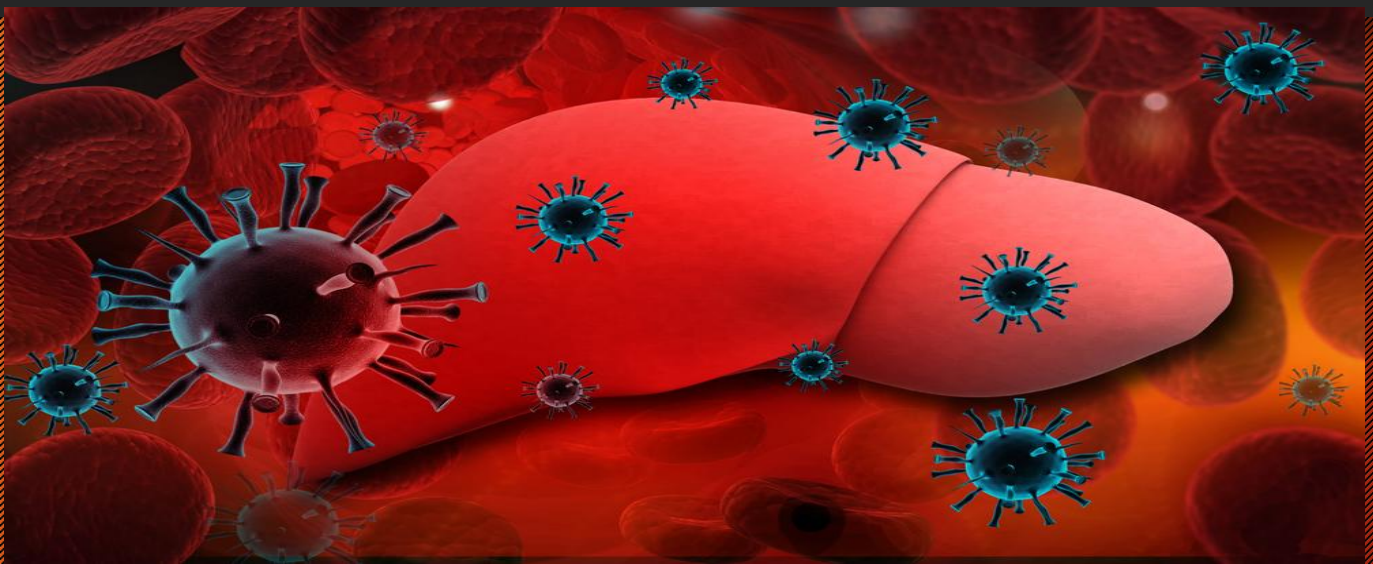
= Hepatitis B Immunoglobulin (HBIG)

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

The high-risk persons for whom the vaccination is recommended are

- persons with high-risk sexual behaviour.
- Household contacts of HBsAg-positive
- Drug users, persons ,blood or blood products
- Recipients of solid organ transplantation.
- Occupational risk of HBV infection, as care workers
- International travellers to HBV endemic countries.

HEPATITS C VIRUS



- **Can range in severity from a mild illness lasting a few weeks to a lifelong illness.**
- **It is among the most common virus that infect the liver and it has been shown to be a major cause of parenterally transmitted hepatitis.**

Transmission

Most commonly transmitted through exposure to infectious blood.

This can occur through:

- **Contaminated blood transfusions??, blood products, and organ transplants.**
- **injections given with contaminated syringes and needle-stick injuries in health-care settings;**
- **injection drug use**
- **Being born to a hepatitis C-infected mother.**
- **Less common as STI.**

Incubation period

2 weeks to 6 months.

- High prevalence of HCV infection occurs in certain countries such as Egypt, where >20% of the population (as high as 50% in persons born before 1960) in some cities is infected.
- 100 million chronic carriers worldwide (>3%)
- 4 million with chronic HCV (1.5-2%)
  - 30 thousand new HCV cases per year (incidence decreasing)
  - 10 thousand deaths/year from HCV (incidence increasing)

Natural history

- Acute hepatitis is rare
  - Fulminant hepatitis is extremely rare
  - 15% can spontaneously resolve infection
  - 85% develop chronic infection
  - HCV RNA becomes + 2 weeks after exposure
  - HCV Ab becomes + by 12 weeks .

Natural History

- 30% with HCV have normal ALT
  - 20% have normal or minimal histology
  - 80% have abnormal histology
  - 15% have advanced histology
  - Disease progression is slower
- Mean progression =
  - Chronic hepatitis 13.7 years
  - Cirrhosis 20.6 years
  - Hepatoma 28.3 years
  - 20% have cirrhosis at 20 years

HCV screening recommendations:

Category	Recommendation	Test
All adults (18-79 years)	One-time screening	Anti-HCV antibody → HCV RNA if positive
Pregnant women	Each pregnancy	Anti-HCV antibody → HCV RNA if positive
High-risk groups (any age)	Screen regardless of age	Anti-HCV antibody → HCV RNA if positive

High-risk groups include:

- Injection drug users (current or past)
- Blood transfusion!!! or organ transplant before 1992
- Hemodialysis patients
- HIV-infected individuals
- Tattoos/piercings in unregulated settings
- Children born to HCV-infected mothers

- After acute HCV infection, the likelihood of remaining chronically *infected* approaches

  85–90%.
- Although many patients with chronic hepatitis C have no symptoms, cirrhosis may develop in as many as 20% within 10–20 years of acute illness.
- Cirrhosis has been reported in as many as 50% of patients with chronic hepatitis C.

DIAGNOSIS

- Specific serologic diagnosis of hepatitis C can be made by demonstrating the presence in serum of anti-HCV.

- Assays for HCV RNA=PCR are the most sensitive tests for HCV infection and represent the “gold standard” in establishing a diagnosis of hepatitis C.

PROPHYLAXIS

- IG is ineffective in preventing hepatitis C and is no longer recommended for post exposure prophylaxis in cases of perinatal, needle stick, or sexual exposure.
- Although prototype vaccines that induce antibodies to HCV envelope proteins have been developed, currently, hepatitis C vaccination is not feasible practically.

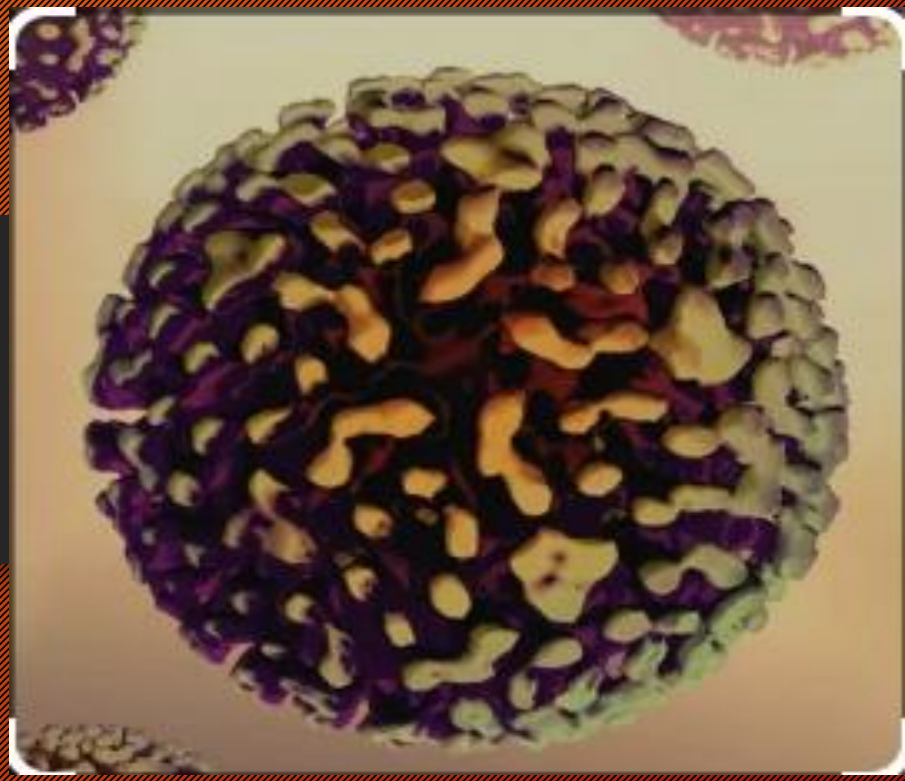
Primary prevention

There is no vaccine for hepatitis C.

The risk of infection can be reduced by avoiding :

- **Unnecessary and unsafe injections;**
- **Unsafe blood products;**
- **Unsafe sharps waste collection and disposal;**
- **Use of illicit drugs and sharing of injection equipment;**
- **Unprotected sex with hepatitis C-infected people;**
- **Sharing of sharp personal items that may be**
- **Contaminated with infected blood;**
- **Tattoos, piercings, and acupuncture performed with**
- **Contaminated equipment.**

Delta Hepatitis
Hepatitis D



Types of Infection

- **Coinfection:** HDV + HBV simultaneously → usually acute hepatitis
- **Superinfection:** HDV infection in chronic HBV carrier → higher risk of chronic hepatitis and severe liver disease

- Defective RNA virus, requires presence of HBV Surface Ag
- More common in southern, eastern Europe, Middle East, and South America
- Transmission is similar to HBV

Diagnosis:

- HDV Ag, HDV RNA, HDV Ab.
- Acute Hepatitis
  - Co-infection with HBV
    - Fulminant hepatitis is more common (35%)
    - Progression to chronic infection is uncommon
  - Super-infection of HBV
    - Acute exacerbation of ongoing hepatitis
    - Chronic liver disease occurs in 90%

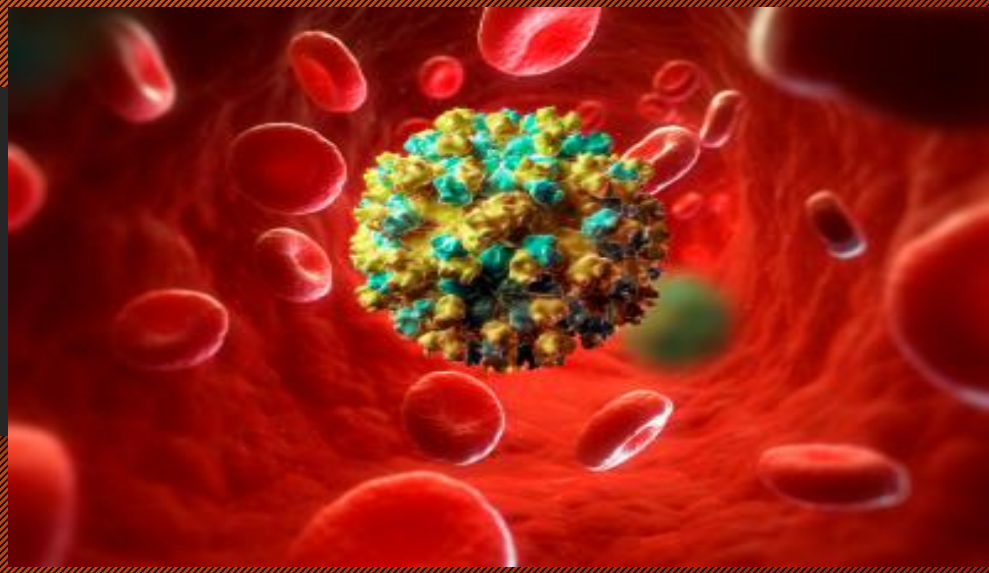
Clinical Impact

- Coinfection: may cause severe acute hepatitis but usually resolves
-
- Superinfection: high risk of **fulminant hepatitis**, chronic HDV, rapid progression to cirrhosis and hepatocellular carcinoma

PREVENTION

- By vaccinating susceptible persons with hepatitis B vaccine.
- No product is available for immunoprophylaxis to prevent HDV superinfection in persons with chronic HBV infection; for these patients,
- avoidance of percutaneous exposures
- limitation of intimate contact with persons who have HDV infection are recommended.

Hepatitis E



- Is essentially a water-borne disease.
- Formerly termed enterically transmitted hepatitis non-A, non-B (HNANB), HEV

Transmission

- **The hepatitis E virus is transmitted mainly through the fecal-oral route, due to fecal contamination of drinking water.**

Other transmission routes include :

- **(a) food-borne transmission**
- **(b) transfusion of infected blood products**
- **(c) vertical transmission from a pregnant woman to her fetus.**

Incubation period

- From 3-8 weeks, with a mean of 40 days.

Prevention

- By maintaining quality standards for public water supplies
- Establishing proper disposal systems to eliminate sanitary waste.
- On an individual level, infection risk can be reduced by :

(a) Maintaining hygienic practices such as hand washing with safe water, particularly before handling food;

(b) Avoiding drinking water and/or ice of unknown purity;

(c) WHO safe food practices.

HEV vaccination

- **WHO Position (Updated 2023)**
- The **WHO** recognizes *Hecolin®* as a **safe and effective vaccine** but has **not yet prequalified** it for international use.
- WHO states it **may be used** in certain high-risk populations and outbreak settings **where it is available**.
- Routine national immunization programs **do not include** the Hepatitis E vaccine yet, mainly due to limited global supply and lack of broad approval.

HEV VACCINE

Aspect	Details
Vaccine name	Hecolin®
Type	Recombinant HEV 239
Schedule	0, 1, and 6 months (IM)
Efficacy	≈ 95%
Approved in	China only
WHO status	Not prequalified yet
Use recommended for	Pregnant women, travelers, outbreak areas, high-risk groups

- A 28-year-old man presents with **fatigue, nausea, dark urine, and jaundice** for 1 week. He reports recent dental intervention. Labs show **ALT 980 U/L, AST 870 U/L.**
- Which is the next step for diagnosis?

A. Anti HAV -IgM
B. Anti HCV -IgG
C. Anti HBs –IgM
D. Anti HBc -IgM
E. Anti HDV -IgG

REFERNCES

- Park,s Text Book Of Preventive And Social Medicine 23rd Edition
- CDC
- WHO-VIRAL HEPATITIS