

# PROJECT PRAKASH

Programmed Approach to Knowledge and Sensitization on Hepatitis

## HEPATITIS INDUCTION PROGRAM FOR NURSES

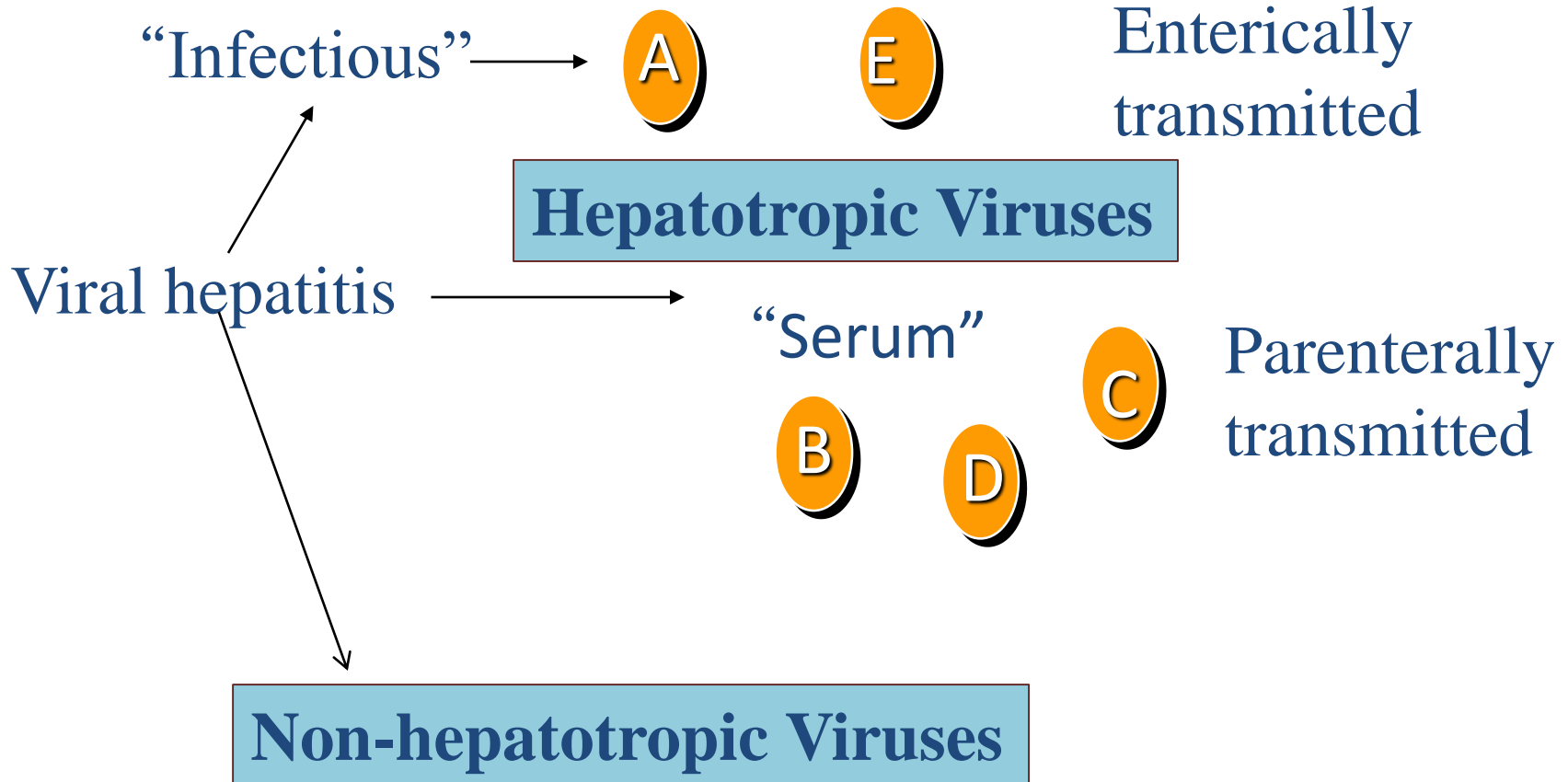
# LAB DIAGNOSIS OF VIRAL HEPATITIS

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# Viral Hepatitis



: CMV/EBV/HSV/Dengue/influenza

# Viruses causing hepatitis

	HAV	HBV	HCV	HDV	HEV
<b>Family</b>	Picornaviridae	Hepadnaviridae	Flaviviridae	Delta agent (satellite virus)	Hepeviridae
<b>Nucleic acid</b>	ssRNA	dsDNA	ssRNA	ssRNA	ssRNA
<b>Routes of transmission</b>	Fecal-oral	Parenteral	Parenteral	Parenteral	Fecal-oral
<b>Chronic hepatitis</b>	No	Yes	Yes	Yes	No (Yes- HEV genotype 3)
<b>Oncogenic potential (HCC)</b>	No	Yes	Yes	-	No
<b>Vaccine available</b>	Yes	Yes	No	HBV vaccine is protective	(Recently finished trials)

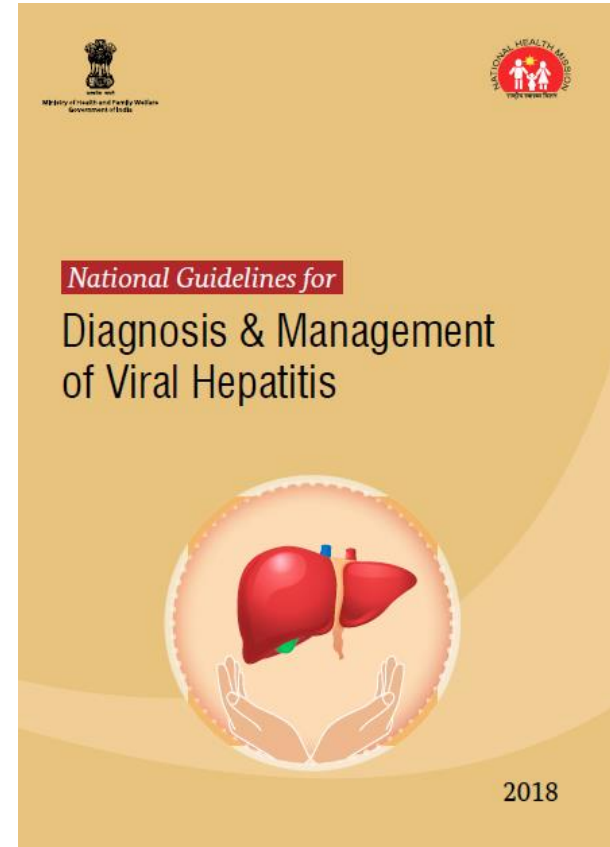
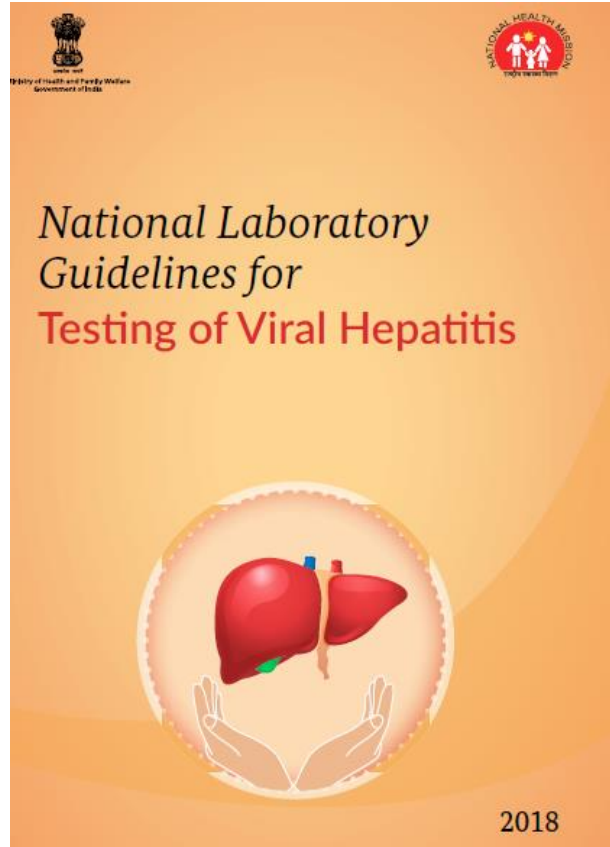
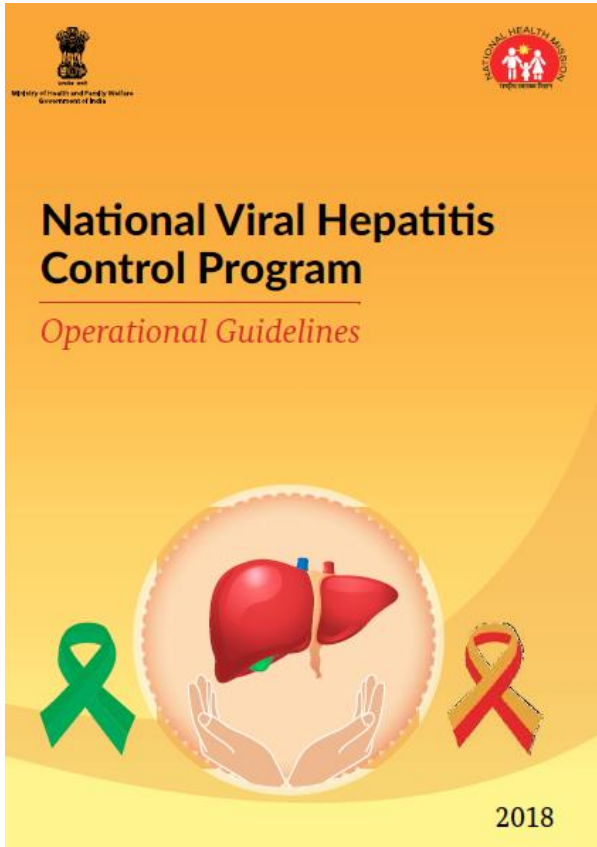




# VH Testing in India : current practices

- Blood/organ donors : HBsAg, anti HCV, HBcTotal?
- **Patients with abnormal LFT:** HBV,HCV,HAV? HEV?
- HCW with NSI: HBV,HCV
- Newborns born to HBs Ag positive mothers
- *Pregnant females*
- *Prior to surgery??*

# 28<sup>th</sup> July 2018



# Current Testing Methods

**Samples: Blood  
plasma/serum**



**Rapid  
Diagnostic  
Tests (RDTs)**

Serological  
result within 30 minutes

**Serological  
Tests**

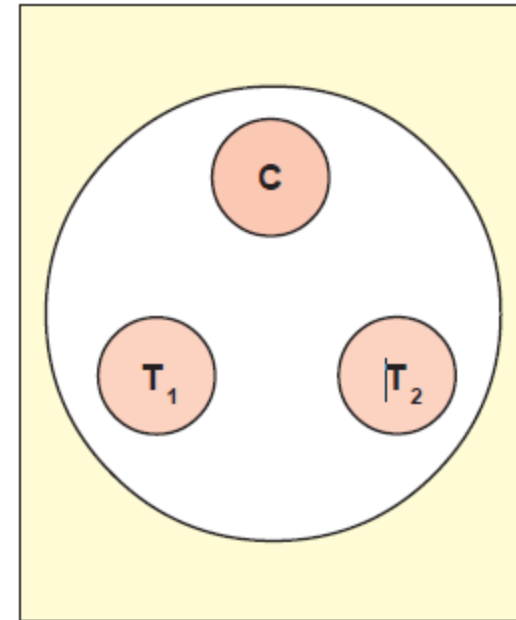
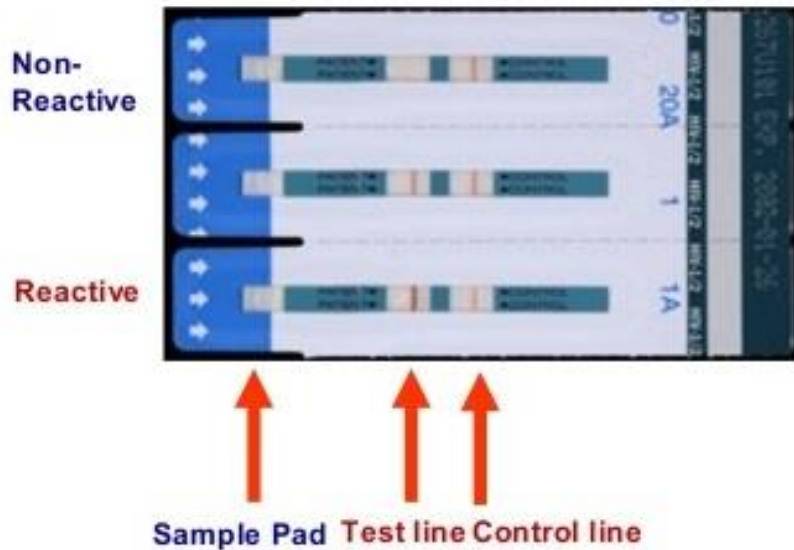
- EIA/ELISA
- CLIA/ECLIA

**Molecular  
Tests(NAT)**

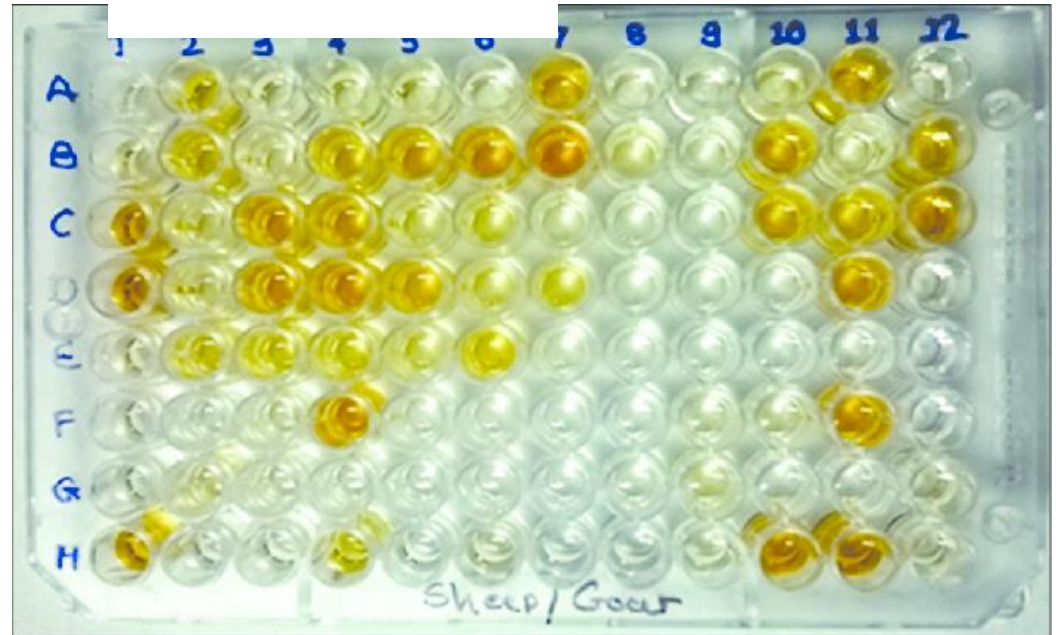
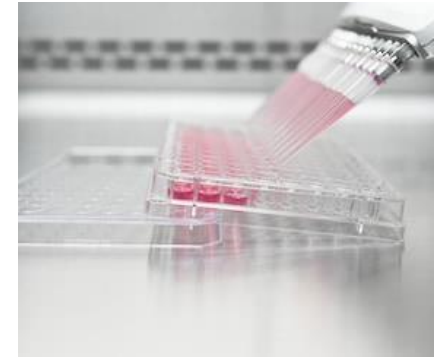
- Qualitative
- Quantitative /Viral load
- Genotyping
- Drug Resistance



# Rapid Diagnostic Tests



# ELISA (Enzyme linked immunosorbant assay)



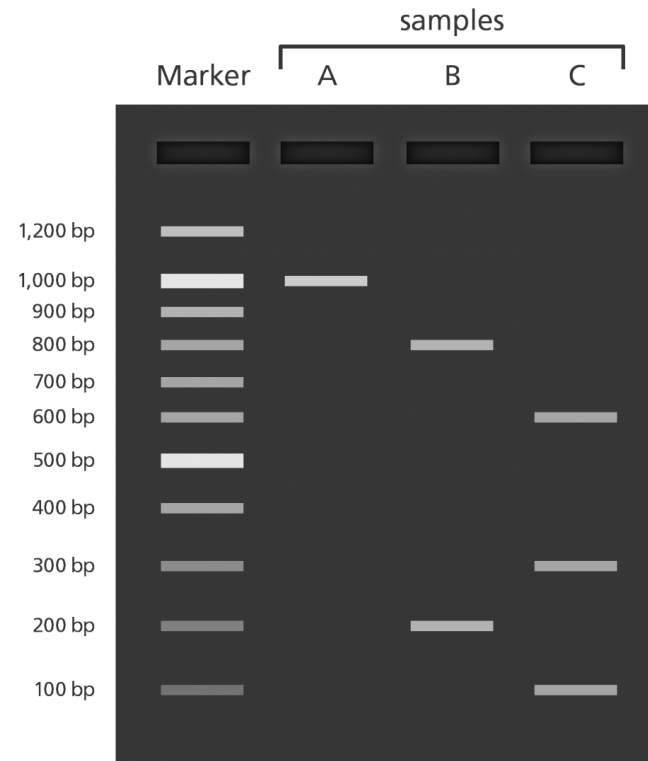
# Automated ELISA



# Chemiluminescent microparticle immunoassay (CLIA)

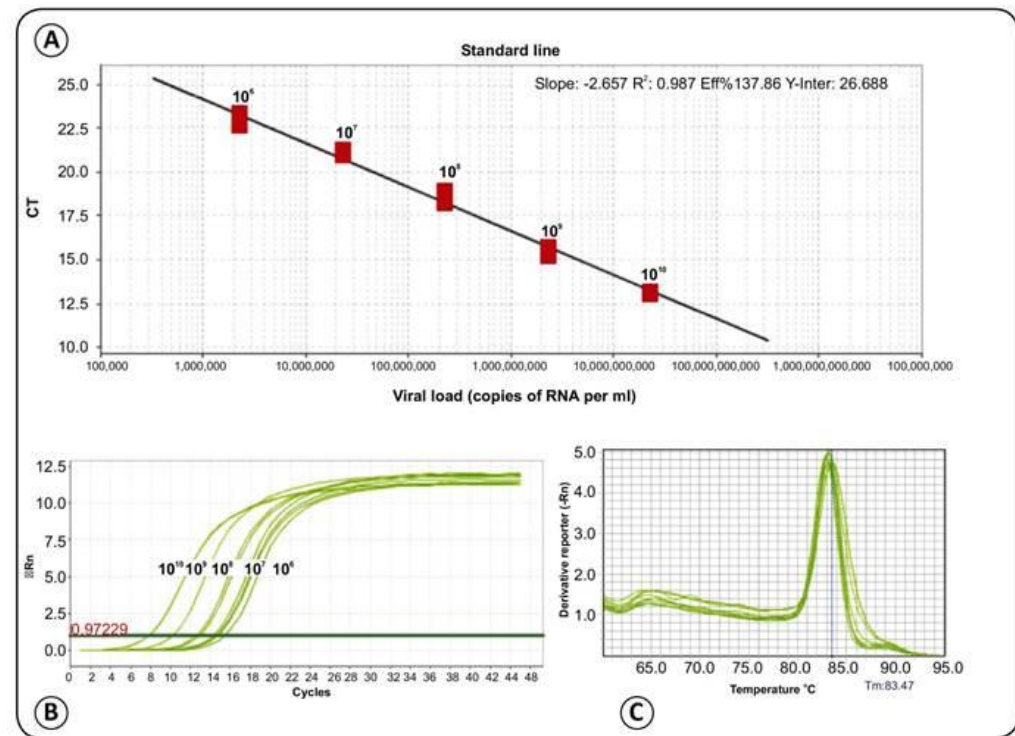


# Polymerase chain reaction (PCR)





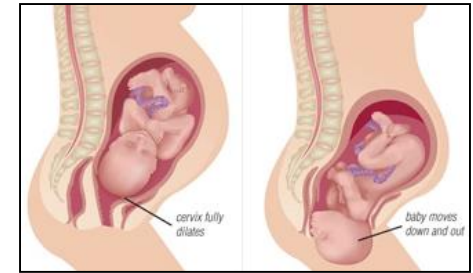
# Real time PCR



Copies/ml  
IU/ml

# Hepatitis B Virus

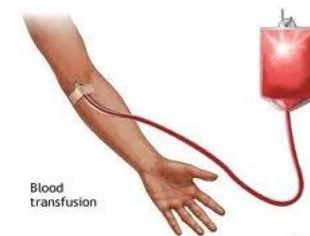
- 1) **perinatal** - mother to baby (vertical transmission)
  - during parturition, or immediately after birth
  - major route in the developing world including India
  - Asia, sub-Saharan Africa



- 2) **sexual** - major route in the developed world
  - U.S., western Europe



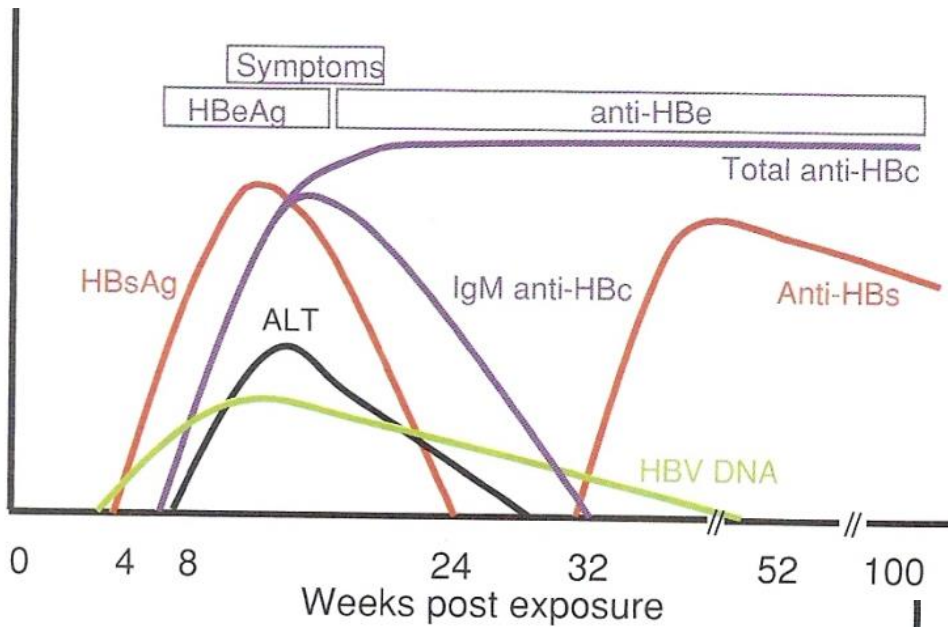
- 3) **others routes**
  - injection drug use (IDU)
  - blood transfusion (BT)
  - hemodialysis



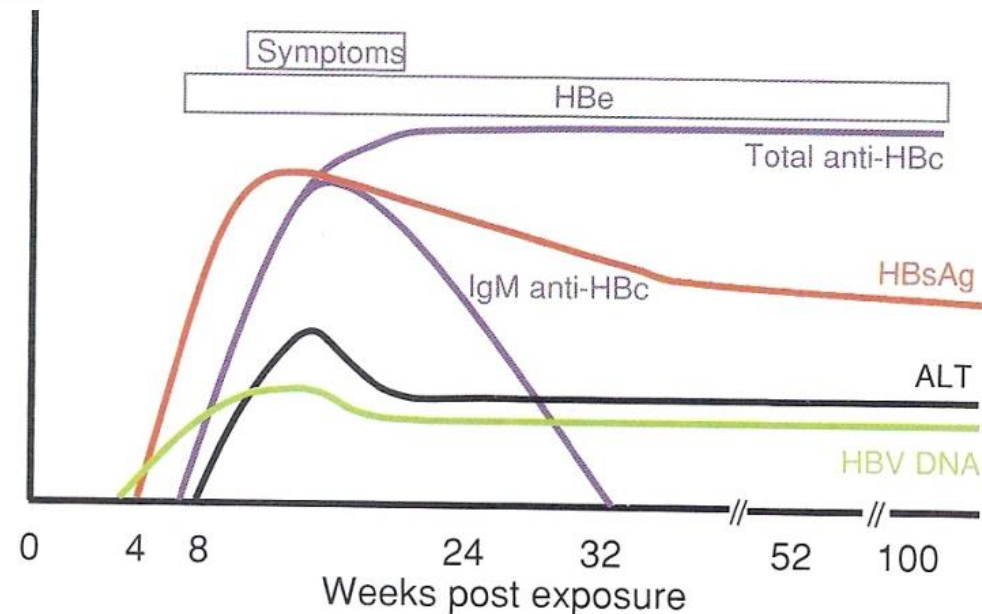
# Antigens and antibodies

Antigens	Antibodies
HBsAg	anti-HBs
HBcAg *	anti-HBc
HBeAg	anti-HBe

# Acute vs. chronic hepatitis B



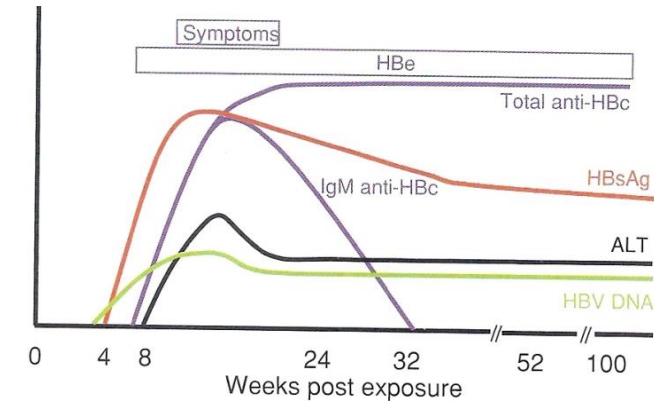
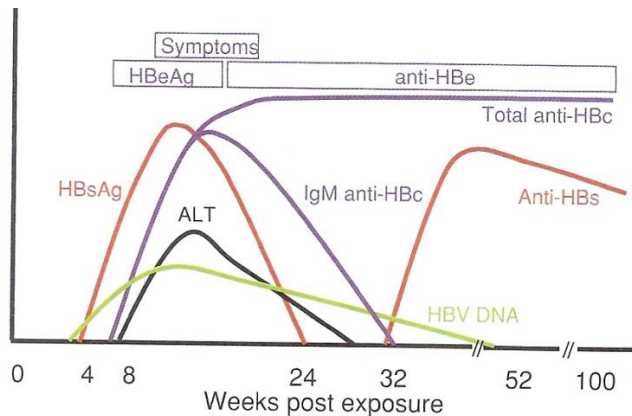
**Acute HBV infection with recovery**



**Chronic hepatitis B (CHB)**

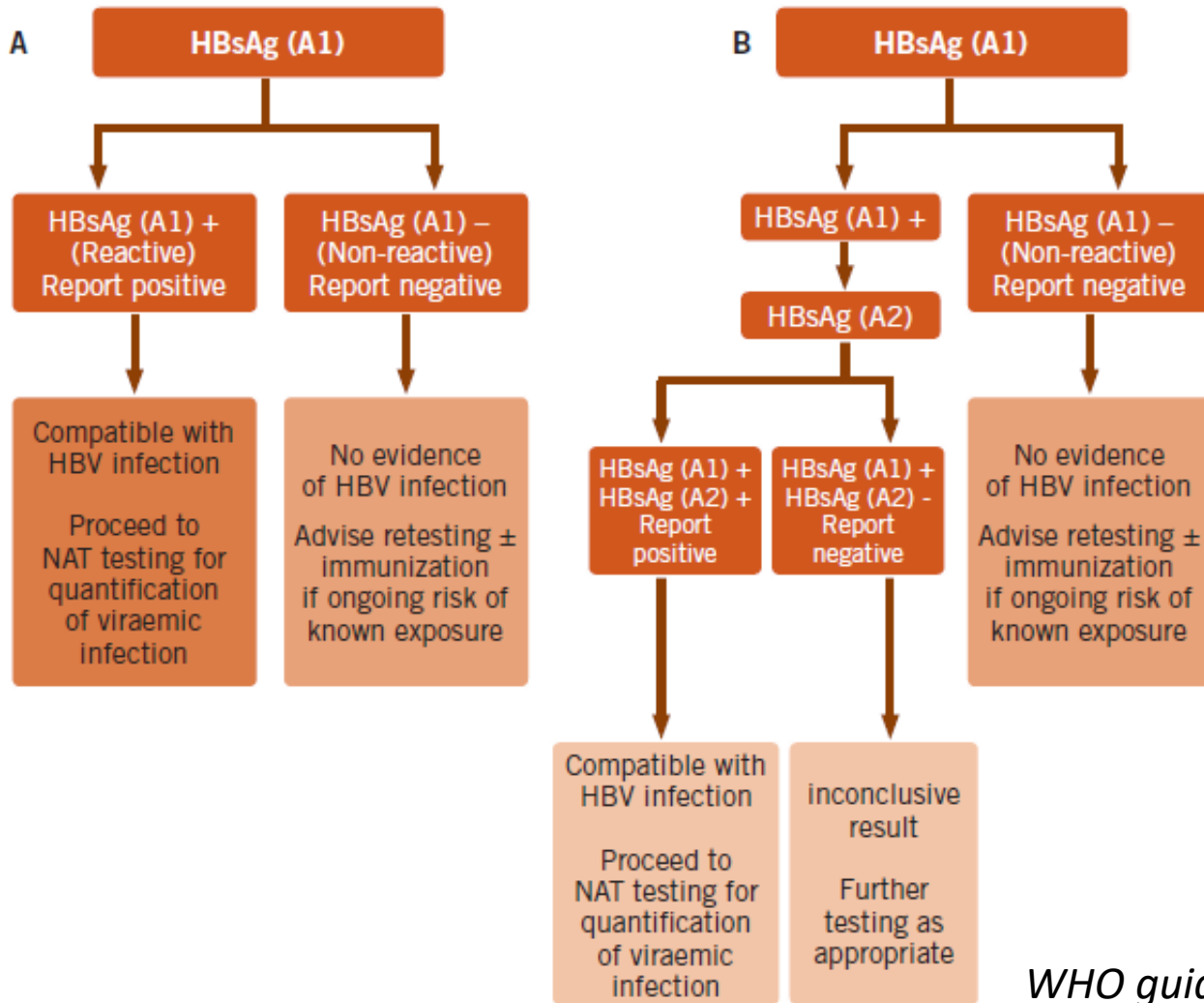
# Different scenarios

HBsAg	Anti-HBs	Anti-HBc	HBeAg	Anti-HBe	Interpretation
+	-	IgM	+	-	Acute hepatitis B, high infectivity
+	-	IgG	+	-	Chronic hepatitis B, high infectivity
-	+	IgG	-	-/+	Recovery from HBV infection
-	-	IgG	-	-	HBV infection in the remote past
-	+	-	-	-	Immunization with HBV vaccine





# How to test for HBV Infection



WHO guidelines, 2017

# How to test for HDV Infection

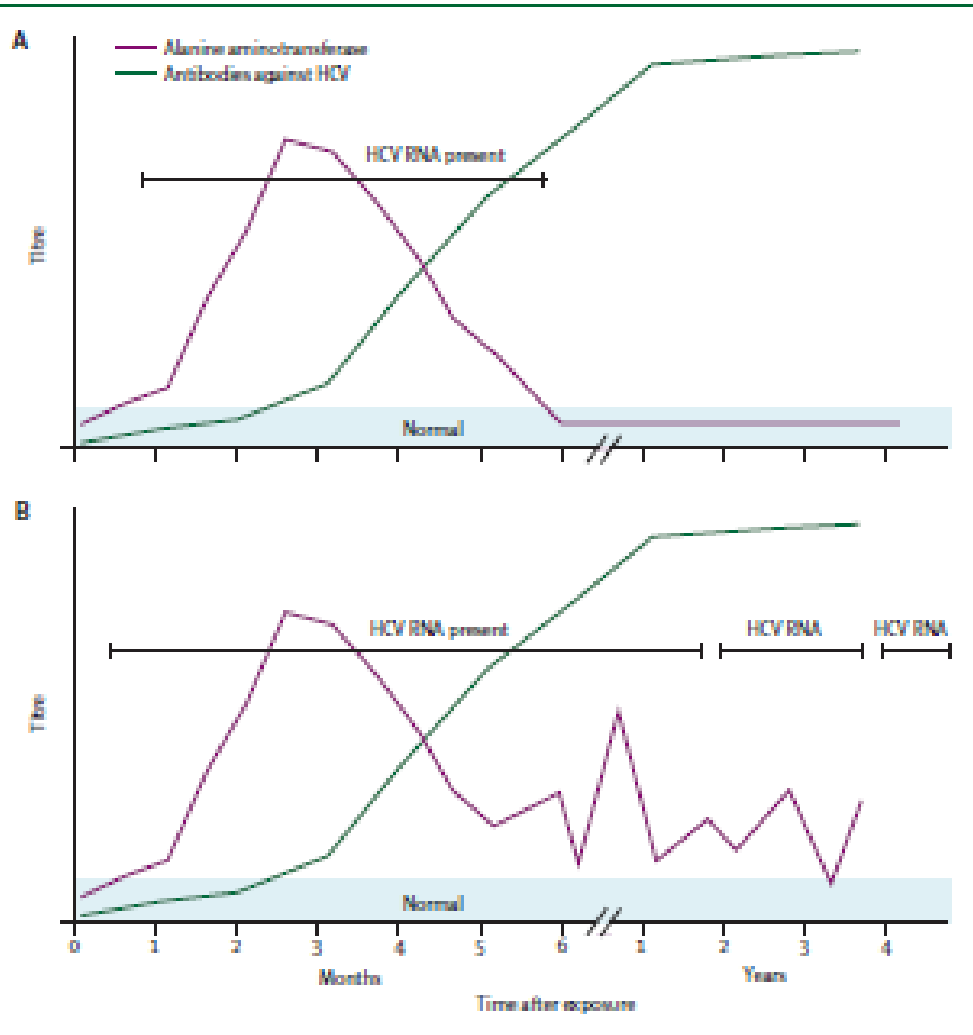
- Can become established only in persons with HBV infection
  - 1) **coinfection**- simultaneous HBV + HDV infection (in a healthy individual)
  - 2) **superinfection**- HBV infected host is now infected with HDV
  
- Serology (antibody detection)- anti-HDV-total and **IgM anti-HDV**
  
- NAAT –RT-PCR

# Hepatitis C- Modes of transmission

- Injection drug use (IDU)
- Unsafe therapeutic injections
- Blood transfusion
- Invasive medical procedures - surgery, dental procedures, dialysis
- Occupational (needle stick injury)
- Other routes - tattooing  
- body-piercing
- Unlikely routes - peri-natal  
- sexual



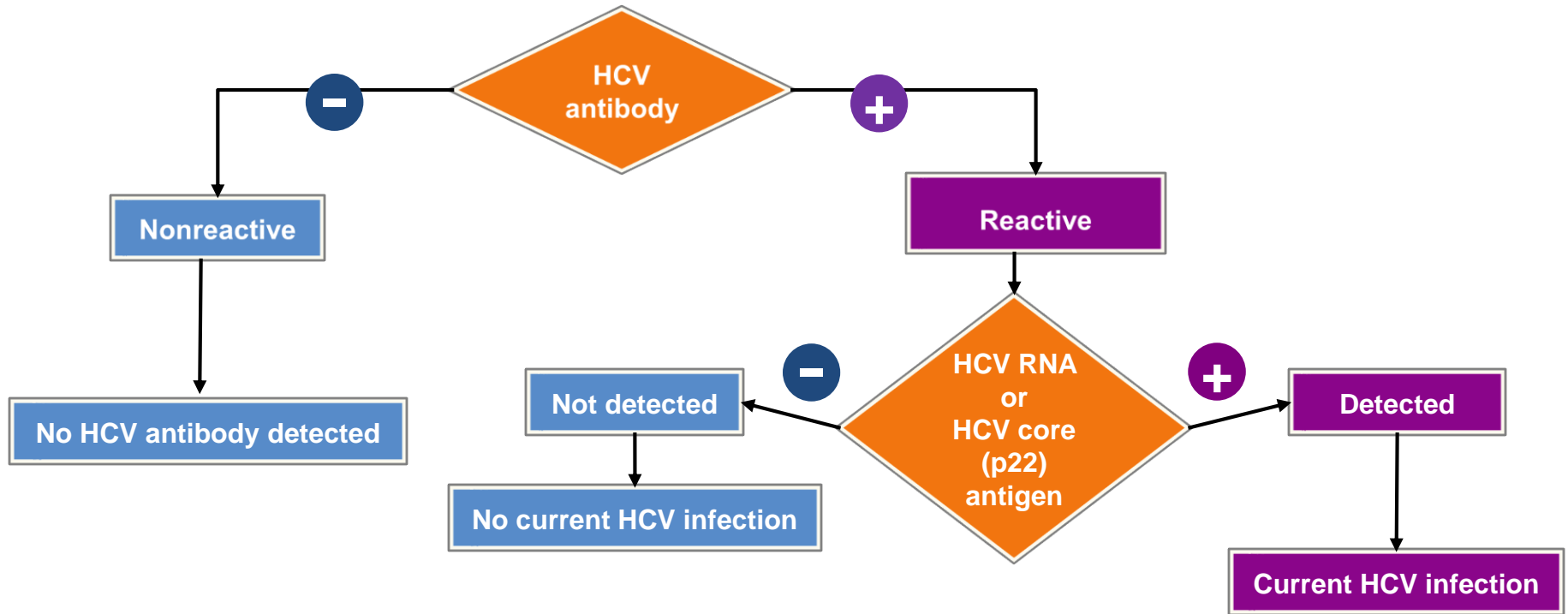
# HCV - recovery vs chronic infection



Anti-HCV	HCV RNA (plasma/serum)	Interpretation(s)
+	+	Hepatitis C infection - acute/chronic
+	-	Recovery from HCV False positive result
-	+	Early acute HCV infection
-	-	Absence of infection

Figure 4: Serological pattern of acute HCV infection with (A) recovery<sup>2</sup> and (B) progression to chronic infection<sup>2</sup>

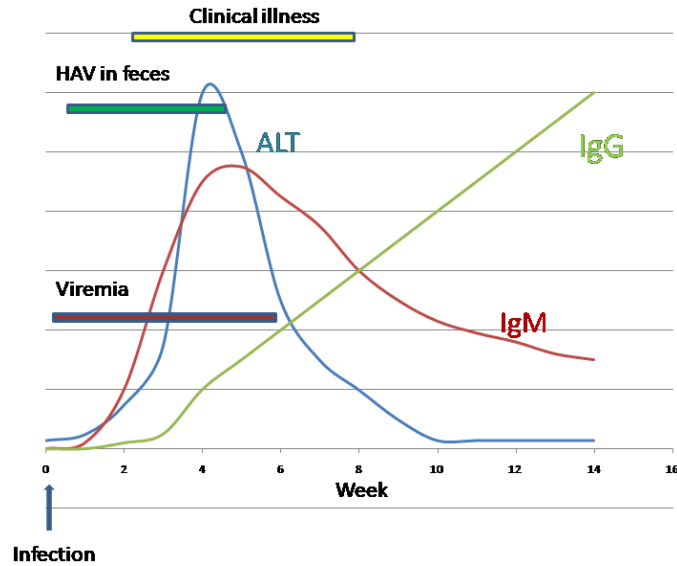
# How to test for HCV Infection



*WHO guidelines ,2017*

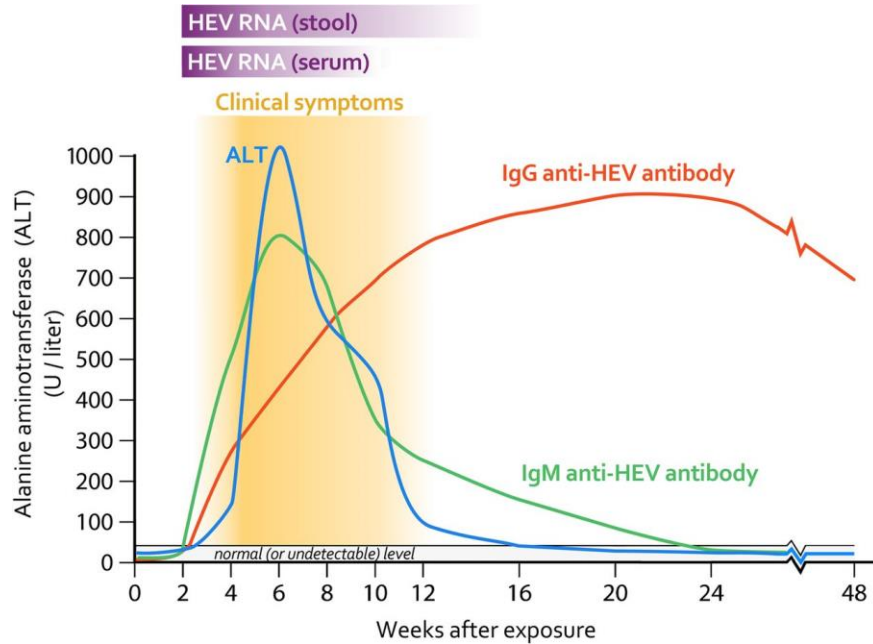


# How to test for HAV Infection



Serological viral markers	Importance
a) <b>Anti-HAV IgM antibodies</b>	Confirms diagnosis of acute Hepatitis A Rapidly increases in titer over 4-6 weeks Declines to non-detectable within 3-6mths
b) <b>Total Anti-HAV antibodies</b>	In the absence of either IgM anti-HAV or an abnormal ALT level, it is suggestive of previous infection with HAV or successful vaccination and protection against future infection. These antibodies appear shortly after the onset of symptoms and confer long-term (usually lifelong) immunity.

# How to test for HEV Infection



Serological viral markers	Importance
<b>c) Anti-HEV IgM antibodies</b>	Current tests are capable of detecting IgM anti-HEV in up to 90% of acute infections if a serum sample is obtained 1 to 4 weeks after the onset of disease. Peaks during first 4 weeks and undetectable after 3 mths in 50% patients
<b>d) IgG Anti-HEV antibodies</b>	Peaks between 2 and 4 weeks after onset of hepatitis and diminishes rapidly thereafter. A rising titer of IgG anti-HEV is also diagnostic.

ELIMINATE ~~HEPATITIS~~



Find The Missing Millions.

**Thank you!**