

Module: GIT

Hepatitis A, B, C, D & E



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Dept. Community Medicine

Lesson Plan



- Domain Learning: Cognitive
- Allotted time in hours: 1 hour
- Teaching Faculty: Dr Noreen Shah
- Learning Sites: KGMC, Lecture Theatre
- Learning Strategies: Didactics/lectures assignments
- Recommended Books and Websites:
- Assessment Tools: MCQs, SAQ, OSPE

Learning Objectives:



- At the end of this lecture the students will be able to;
- Describe the Causes, Transmission, and Symptoms of Viral Hepatitis Infections.
- Describe their various Prevention and Control Measures.

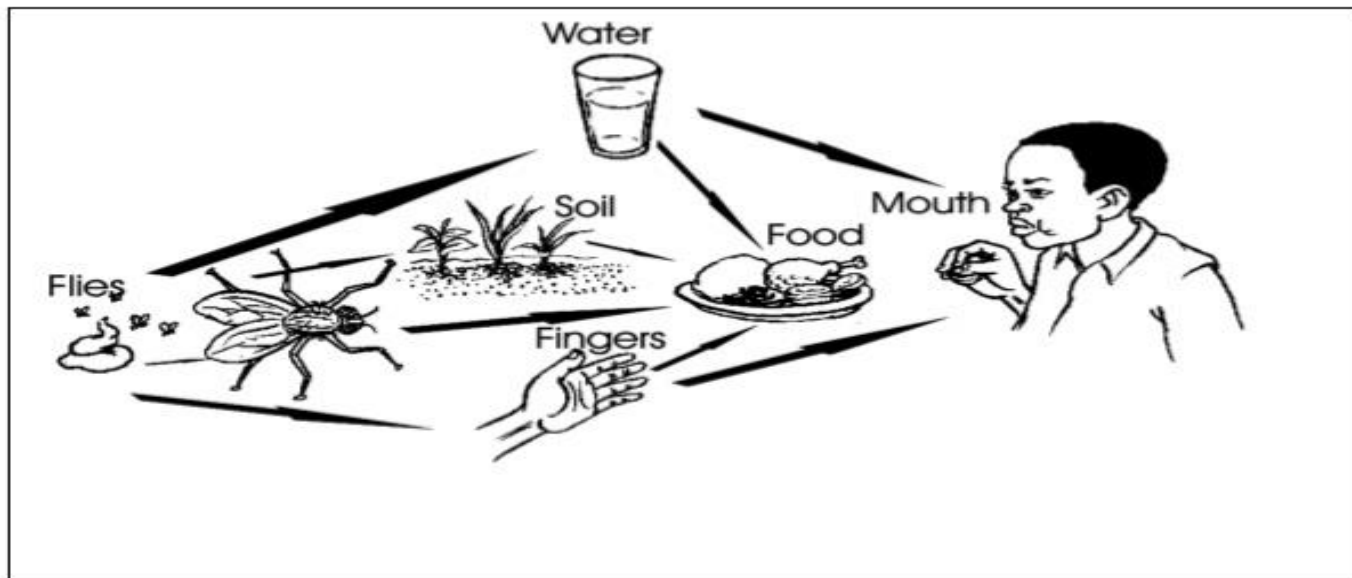
Definition



- Hepatitis is the liver inflammation of liver with virus.
- There are 5 types A, B, C, D, and E.
- A different virus is responsible for each type.
- Hepatitis A is acute, short-term, while B, C, & D are most likely to become chronic.
- Hepatitis E is usually acute but can be dangerous in pregnant women.

Hepatitis A

Fecal-oral Transmission route



(AMREF, 2007)

Hepatitis A



- One of the oldest diseases, causing inflammation of the liver.
- Globally, about 1.4 million cases occur every year.
- **Causative agent:** Hepatitis A virus (HAV)
- **Route of infection:** Faecal – oral route.

Modes of transmission



- The virus is primarily spread when an uninfected and unvaccinated person ingests food or water that is contaminated with the faeces of an infected person.
- The disease is closely associated with
 - Unsafe water or food
 - Inadequate sanitation
 - Poor personal hygiene
 - Oral-anal sex.

Risk factors



- Not vaccinated persons
- Poor sanitation
- Lack of safe drinking water
- Injectable drugs users
- Living in a household with an infected person
- Travelling to areas of high endemicity

Epidemiology



- Globally, there are an estimated 1.4 million cases of hepatitis A every year.
- It occurs sporadically or in epidemics worldwide, with a tendency for cyclic recurrences.
- The epidemics can be also prolonged, affecting communities for months through person-to-person transmission.



- The disease can lead to significant economic and social consequences in communities as it takes months from recovery of illness to return to work.
- It does not cause chronic liver disease and is rarely fatal
- But can cause a fatal condition fulminant hepatitis - acute liver failure.

Geographical distribution (WHO)



- Geographical distribution areas can be characterized as having
 1. **High level**
 2. **Intermediate level**
 3. **Low levels of hepatitis A virus infection.**

Areas with High Levels of Infection



- In low- and middle-income countries with poor sanitary and hygienic conditions the infection is common in children.
- 90% of the children have been infected before 10 years of age, mostly without symptoms.
- Epidemics are uncommon because older children and adults are generally immune.

Areas with Intermediate Levels of Infection:

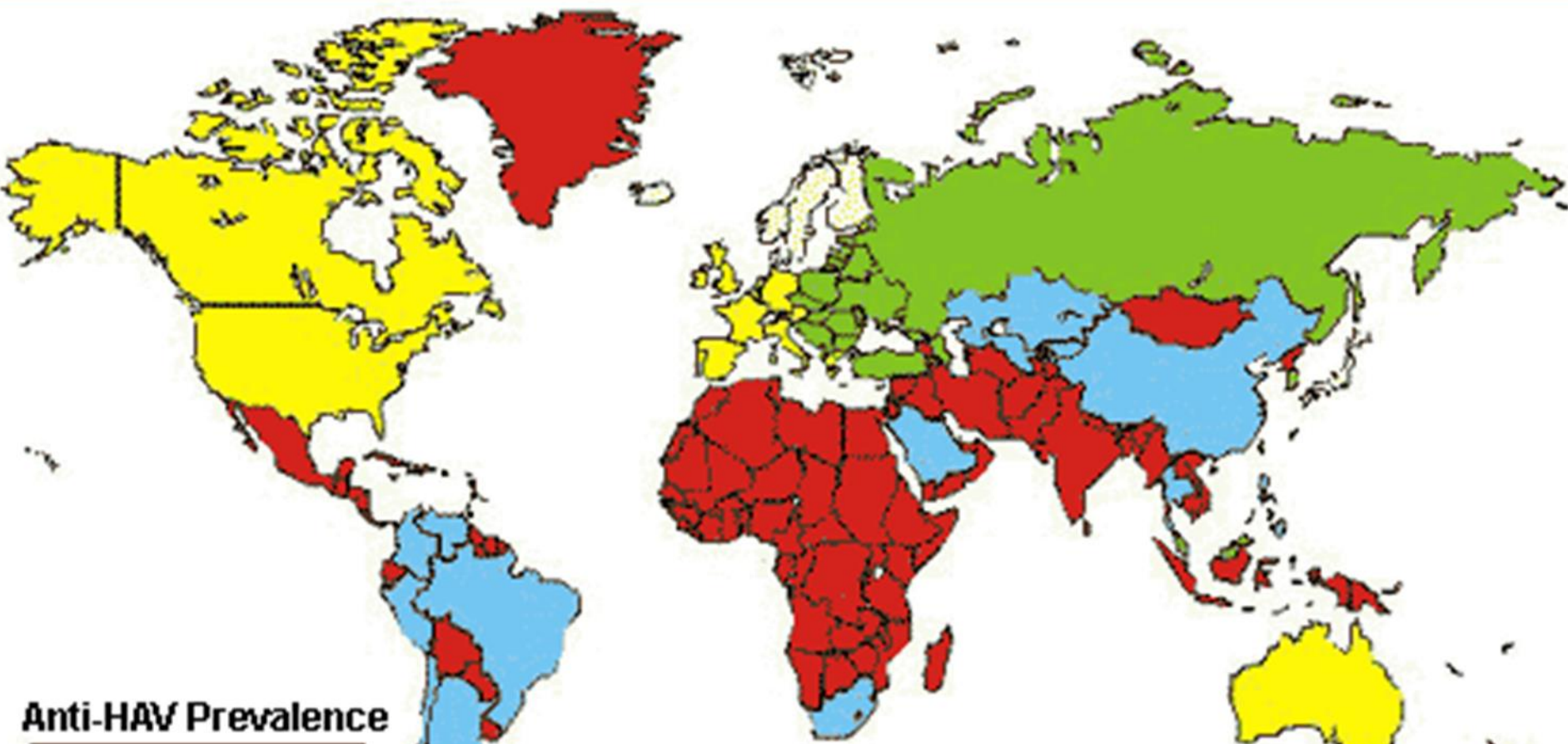


- In middle-income countries, and regions where sanitary conditions are variable, children often escape infection in early childhood and reach adulthood without immunity.
- This higher susceptibility in older age groups may lead to higher disease rates and large outbreaks.

Areas with Low Levels of Infection



- In high-income countries with good sanitary and hygienic conditions, infection rates are low.
- Disease occur among adolescents and adults in:
 - i. Injectable drug users
 - ii. HIV/AIDs
 - iii. Male homosexuals
 - iv. People travelling to areas of high endemicity
 - v. In isolated populations - closed religious groups.
 - vi. Homeless persons.



Anti-HAV Prevalence

- High
- High/Intermed.
- Intermediate
- Low
- Very Low

Symptoms



- Symptoms range from mild to severe, include fever, malaise, loss of appetite, diarrhoea, nausea, abdominal discomfort, dark-coloured urine and jaundice.
- Adults have signs and symptoms more than children.
- The severity of disease and fatal outcomes are higher in older age groups.



- Children under 6 years do not experience symptoms, only 10% develop jaundice.
- In older children and adults, infection is usually severe with jaundice in more than 70% of cases.
- Relapses may occur.



- **Incubation period:** 14 – 28 days – it can live outside the body for months, depending on the environmental conditions.
- **Diagnosis:**
- Detection of HAV-specific Immunoglobulin IgG and IgM antibodies in the blood.
- Reverse transcriptase polymerase chain reaction (RT-PCR) to detect the hepatitis A virus RNA

Hepatitis E





- Hepatitis E is caused by hepatitis E virus (HEV).
- Route of transmission: Faecal - oral.
- Transmitted mainly through contaminated water.
- Virus has 4 different genotypes 1, 2, 3 & 4.
- Genotypes 1 and 2 have been found only in humans.
- Genotypes 3 and 4 circulate in animals (pigs, wild boars, and deer) without causing any disease, but can occasionally infect humans.

- The infection is self-limiting and resolves within 2–6 weeks.
- Occasionally a serious disease - fulminant hepatitis (acute liver failure) develops that may lead to death.
- Pregnant women, particularly those in the 2nd or 3rd trimester, are at increased risk fulminant hepatitis.
- About 20–25% of women in 3rd trimester can die.
- Rarely chronic hepatitis E is reported in immunosuppressed people (organ transplant), with genotype 3 or 4 HEV infection.

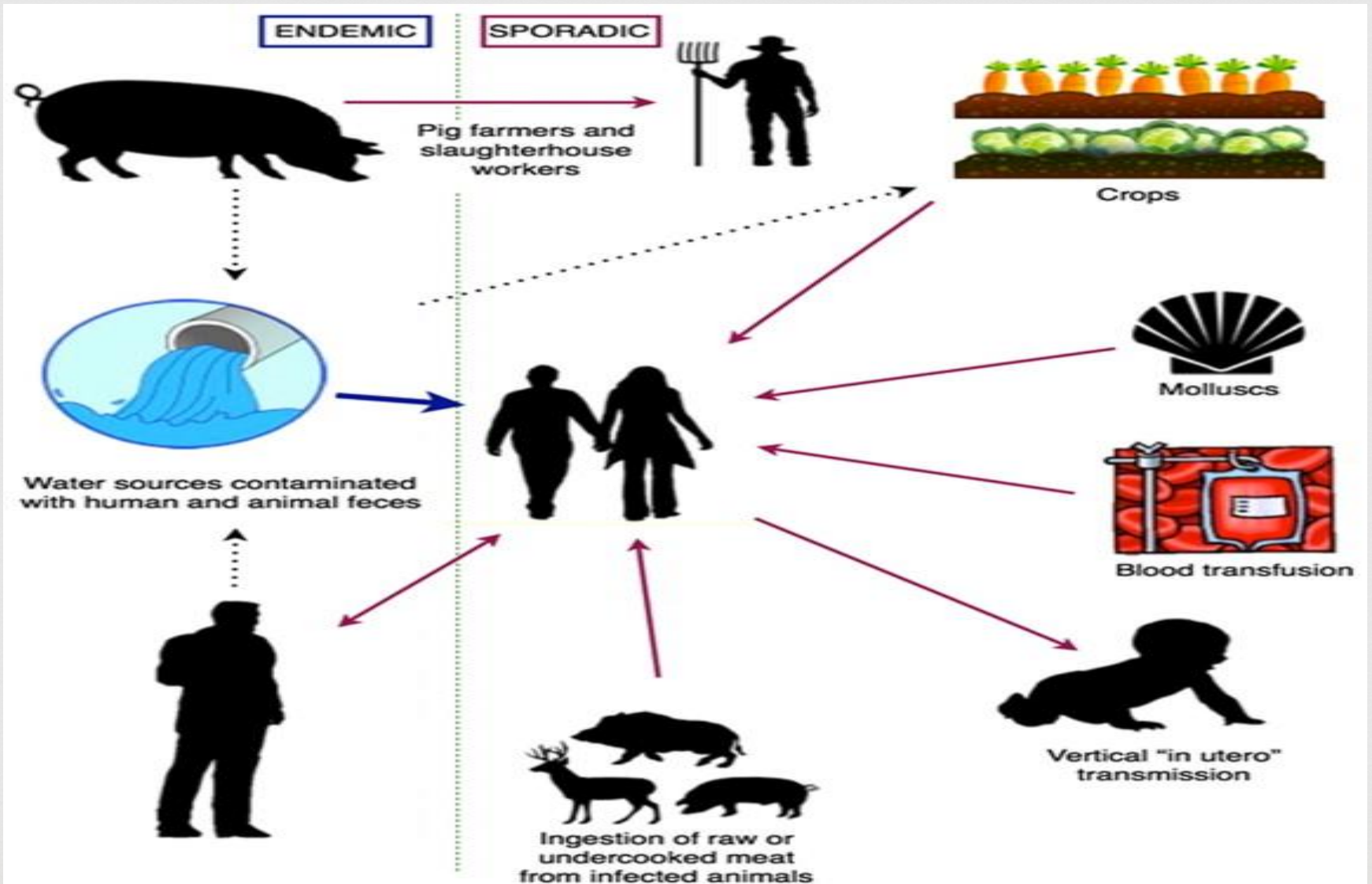
Geographical Distribution

- Hepatitis E infection is found worldwide.
- The disease is common in low & middle income countries with limited access to clean water, sanitation, hygiene and health services.
- In these areas, the disease occurs both as outbreaks and as sporadic.
- The outbreaks follow faecal contamination of drinking water and affect hundreds to thousand of people.

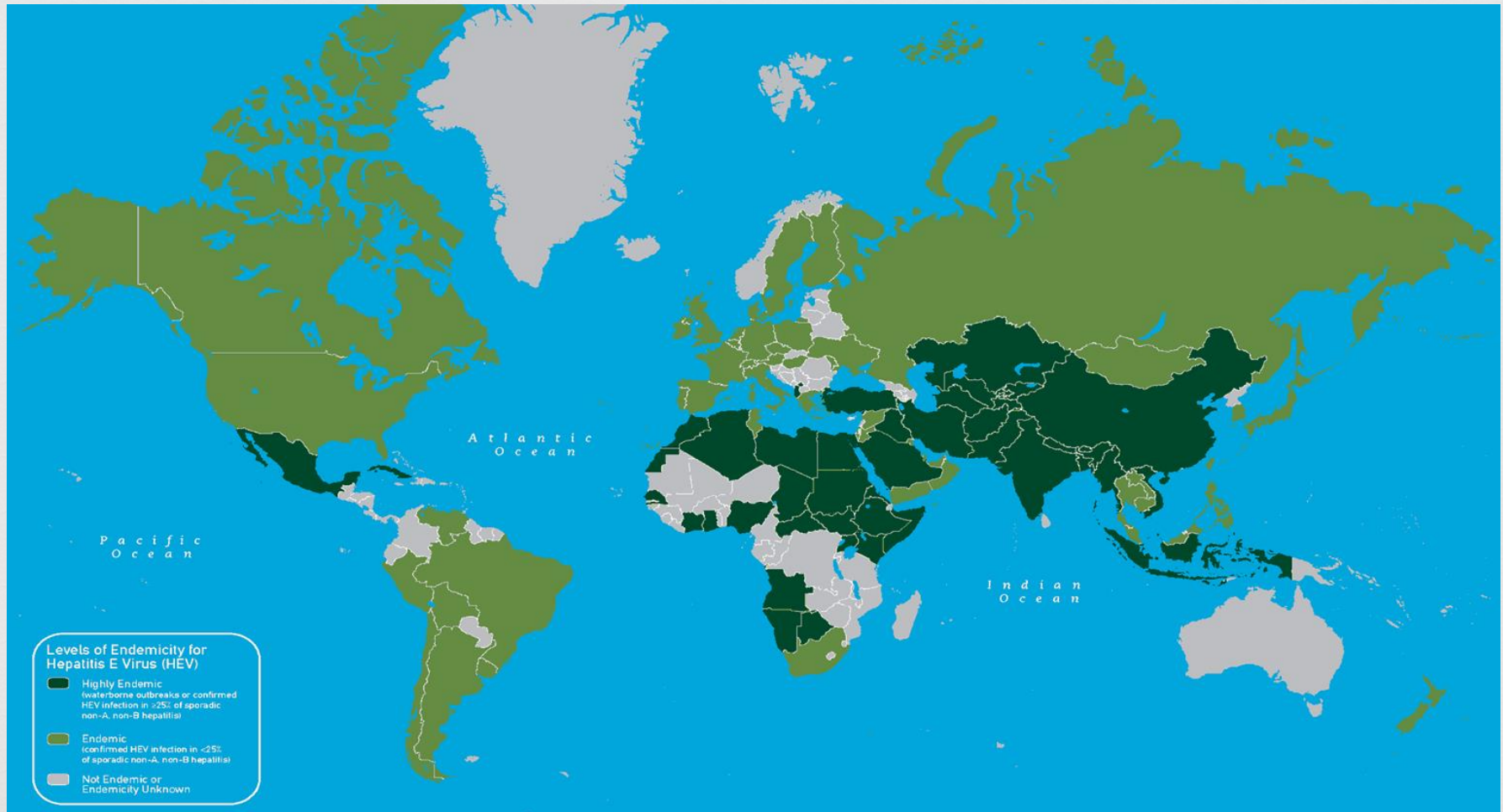


- Sporadic cases are related to contamination of water, at a smaller scale.
- In areas with better sanitation and water supply, the disease is infrequent, with only sporadic cases that are caused by genotype 3 virus (animal origin) by ingestion of undercooked animal meat.

Transmission

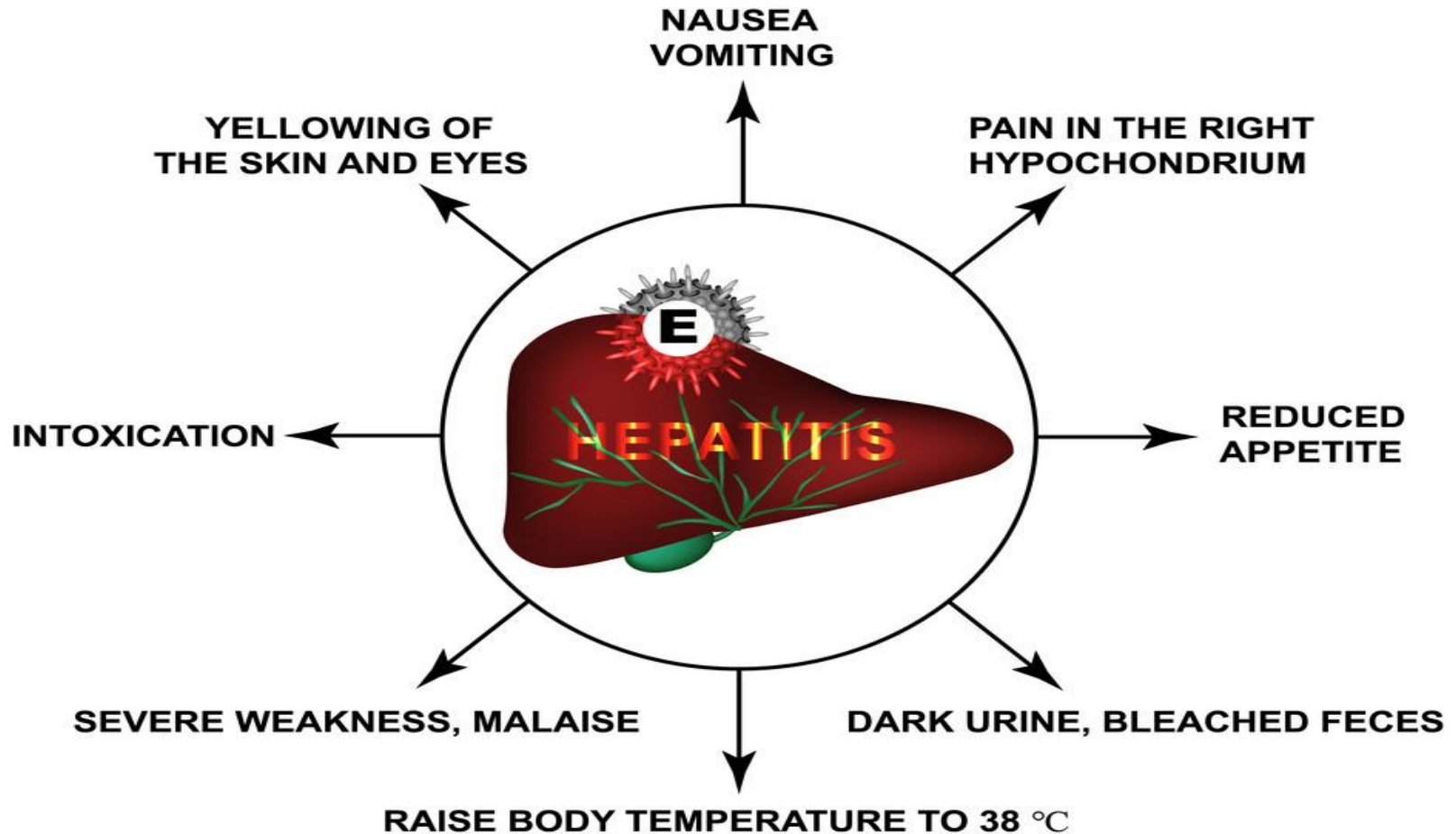


Hepatitis E distribution 2018- 2020



SYMPTOMS OF HEPATITIS E

Incubation period: 2 to 10 weeks (average of 5 to 6 wks.)



Diagnosis



- Detection of specific IgM antibodies. Rapid tests are available for field use.
- Reverse transcriptase polymerase chain reaction (RT-PCR) to detect the hepatitis E virus RNA in blood and/or stool

Treatment of hepatitis A & E

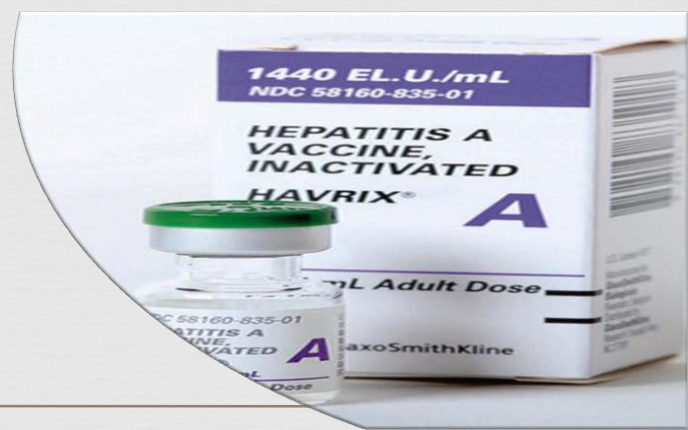
- There is no specific treatment.
- Recovery from symptoms may be slow and take several weeks or months.
- Avoid unnecessary medications, do not give paracetamol and antiemetic's.
- Hospitalization is unnecessary in the absence of acute liver failure.
- Therapy is aimed at maintaining comfort and adequate nutritional balance, including replacement of fluids

Prevention of Hepatitis A & E



- i. Adequate supplies of safe drinking water
 - ii. Proper disposal of sewage within communities
 - iii. Personal hygiene practices such as regular hand-washing
- **Hepatitis E vaccine:** No FDA-approved vaccine E is currently available. In 2012 a recombinant vaccine was approved in China.

Hepatitis A vaccine



- Several injectable inactivated hepatitis A vaccines are available with no vaccine licensed for children younger than 1 year of age.
- In China, a live attenuated vaccine is also available.
- Nearly 100% of people develop protective levels of antibodies to the virus within 1 month after injection of a single dose of vaccine.
- 2 vaccine doses ensure a longer-term protection of about 5 to 8 years after vaccination.
- The vaccine can be given as part of regular childhood immunization programmes and also to travellers.

Hepatitis B

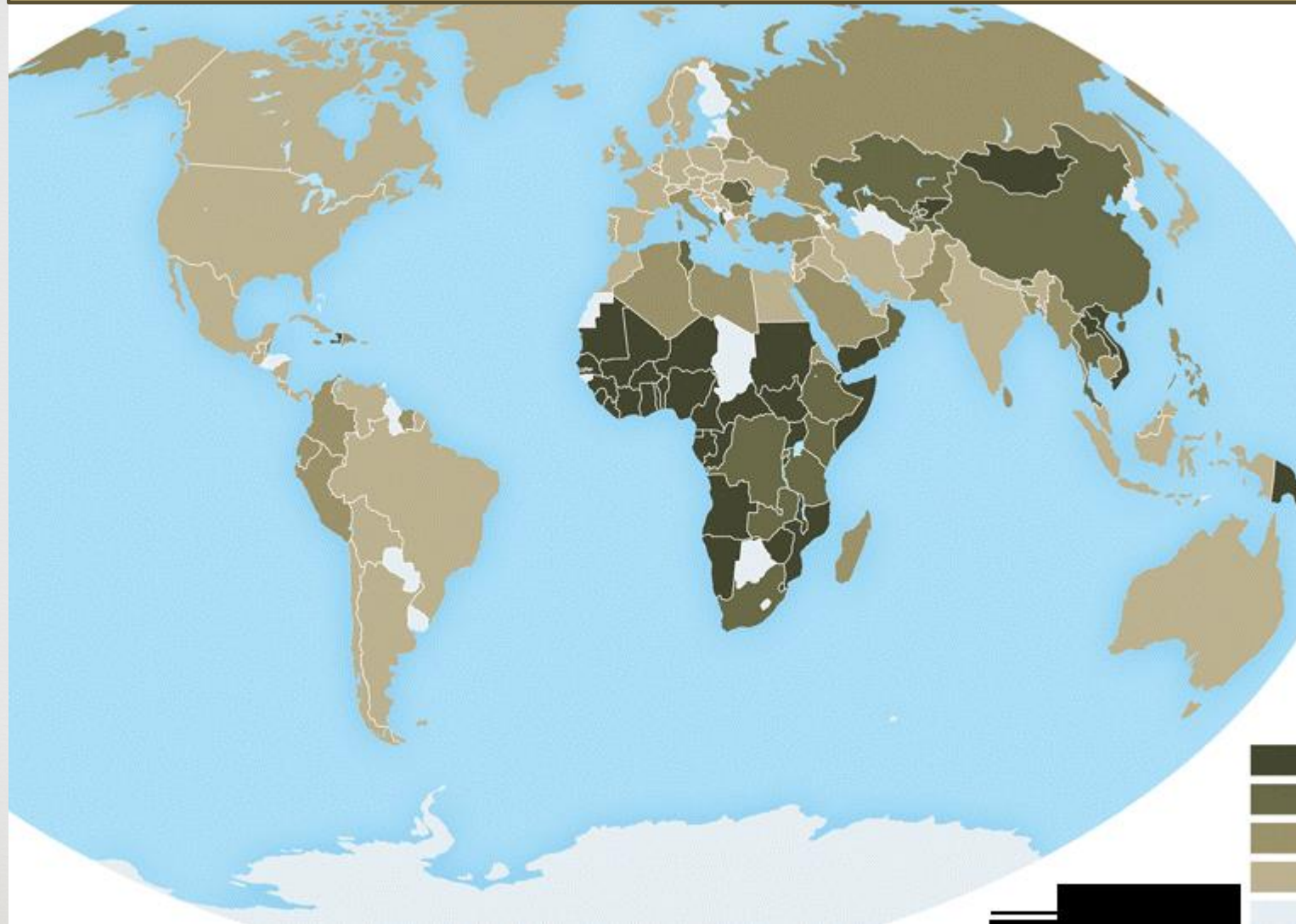


Hepatitis B



- A life-threatening liver infection can end in chronic liver disease leading to cirrhosis, cancer and death.
- An estimated 780,000 people die each year
- **Causative agent:** Hepatitis B virus (HBV).
- **Incubation period:** is 75 days on average, vary from 30 to 180 days.

Hepatitis B Distribution world wide 2020



- High >8%
- Intermediate 5 %-7%
- Low intermediate 2% - 4%
- Low < 2%

Geographical distribution



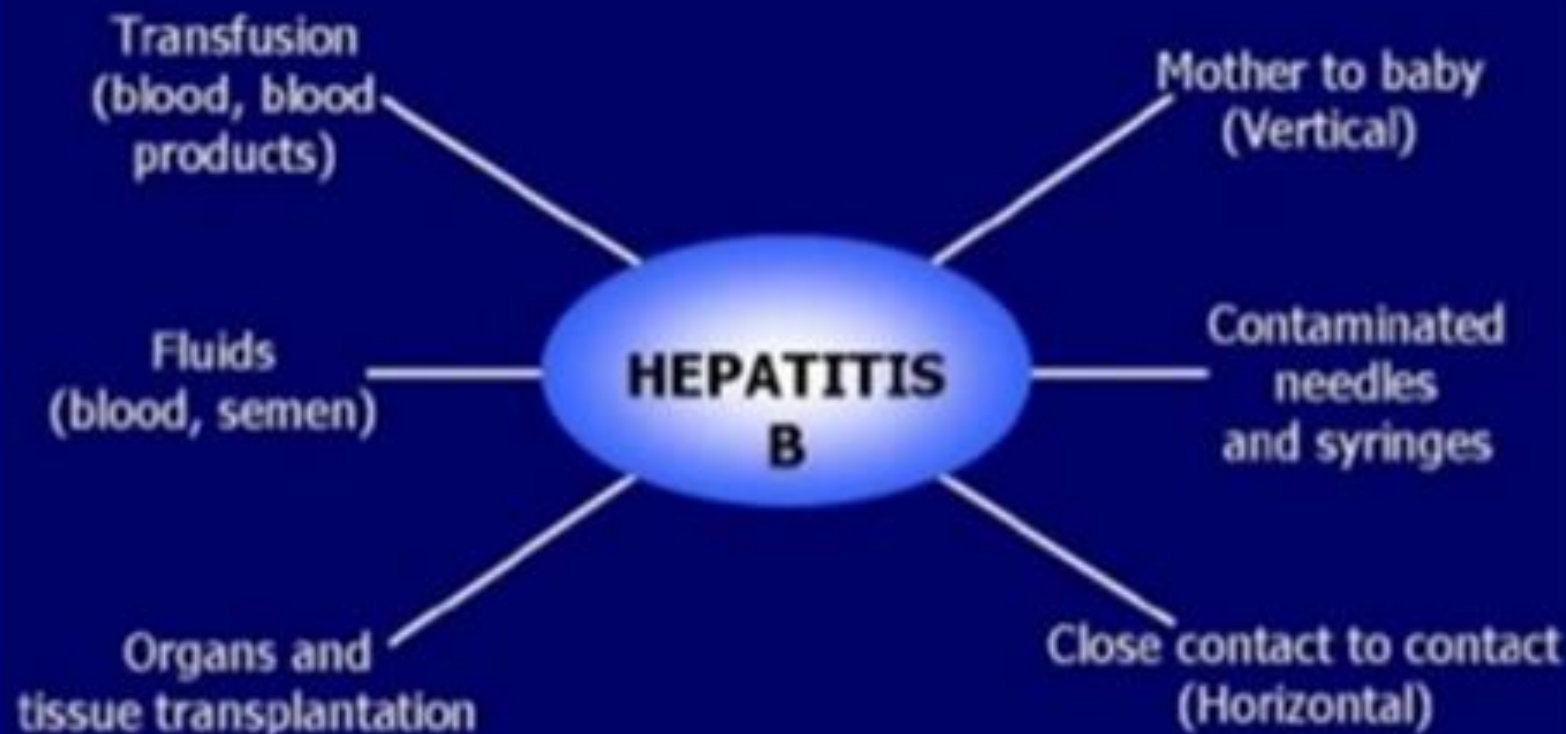
- **Hepatitis B prevalence is highest in;**
- WHO Western Pacific and African Region with 6.2% and 6.1% respectively.
- WHO Eastern Mediterranean, South-East Asia and European Region, 3.3%, 2% and 1.6% respectively.
- WHO Americas Region 0.7% of the population is infected.

High risk for Chronic Hepatitis



- The chronic infection depends on age of infection.
- Children infected before 6 years of age are the most likely to develop chronic infection.
- Infected adults develop chronic infection is $< 5\%$.
- 20–30% chronically infected adults will develop cirrhosis and/ or liver cancer.

Transmission of HBV Infection



- Transmitted via blood or body fluids similar to HIV
- 50–100 times more infectious than HIV.

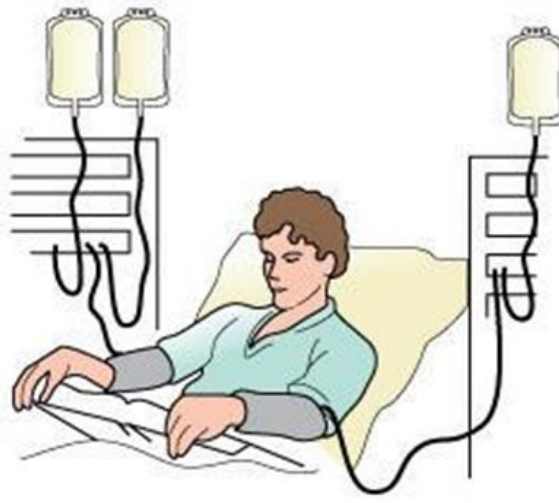
HBV-HIV co - infection



- About 1% of persons living with HBV infection (2.7 million people) are also infected with HIV.
- Conversely, the global prevalence of HBV infection in HIV-infected persons is 7.4%.
- WHO has recommended treatment for HBV to everyone diagnosed with HIV infection, regardless of the stage of disease.
- Tenofovir is recommended as first-line therapy for HIV infection, is also active against HBV.



(a) Nonsterile tattooing needles



(b) Contaminated dialysis equipment



(c) Contaminated vaccination equipment



(d) Nonsterile dental practices



(e) Contaminated drug needles



(f) Nonsterile body piercing equipment

SYMPTOMS OF HEPATITIS B



Incubation period: About 75 days (30 - 180 days).

Diagnosis

- Blood tests are done to distinguish acute & chronic infections.
- In acute infection HBsAg and IgM antibody to the core antigen, HBcAg and HBeAg are present.
- **Note:** HBcAg & HBeAg are core antigens hepatitis B viral proteins. (indicators of active viral replication - meaning the person is infected and can transmit the infection to another person).
- In chronic infection HBsAg is present for at least 6 months (with or without HBeAg).
- This is the principal risk for developing cirrhosis and cancer later in life.

Treatment



- Treatment of acute infection is aimed at maintaining comfort, adequate nutritional balance and fluid replacements.
- Treatment of chronic infection need drugs like,
 - i.** Oral antiviral agents
 - ii.** Interferon injections
- Cirrhosis liver may need transplant with varying degrees of success.
- There is no treatment of liver cancer.

Hepatitis D





- Hepatitis D is a liver disease in both acute and chronic forms caused by the hepatitis D virus (HDV)
- It requires HBV for its replication, so it only occur with hepatitis B infection.
- HDV-HBV co-infection is considered the most severe form of chronic viral hepatitis due to more rapid progression towards liver-related death and hepatocellular carcinoma.

Geographical distribution



- It is estimated that hepatitis D virus (HDV) affects globally nearly 5% of people who have a chronic infection with hepatitis B virus (HBV) and that HDV co-infection could explain about 1 in 5 cases of liver disease and liver cancer.
- High prevalence of HDV infection is in Mongolia, the Republic of Moldova, and countries in Western and Middle Africa.

Transmission



- The routes of HDV transmission are the same as for HBV.
- Vaccination against HBV prevents HDV co-infection, and hence expansion of childhood HBV immunization programmes has resulted in a decline in hepatitis D incidence worldwide.

Hepatitis C

WARNING

Hepatitis C virus can live on an exposed surface like a spoon for days, and inside a used syringe for weeks!



- Hepatitis C virus causes both acute and chronic infection.
- Around 30% (15–45%) of infected persons spontaneously clear the virus within 6 months of infection without any treatment.
- The remaining 70% (55–85%) of persons will develop chronic HCV infection.
- In chronic HCV infection, the risk of cirrhosis ranges between 15% and 30% within 20 years.

Geographical distribution



- Hepatitis C is found worldwide.
- The most affected regions are the WHO Eastern Mediterranean Region and the WHO European Region, with an estimated prevalence of 2.3% & 1.5% respectively.
- Prevalence of HCV infection in other WHO regions varies from 0.5% to 1.0%.

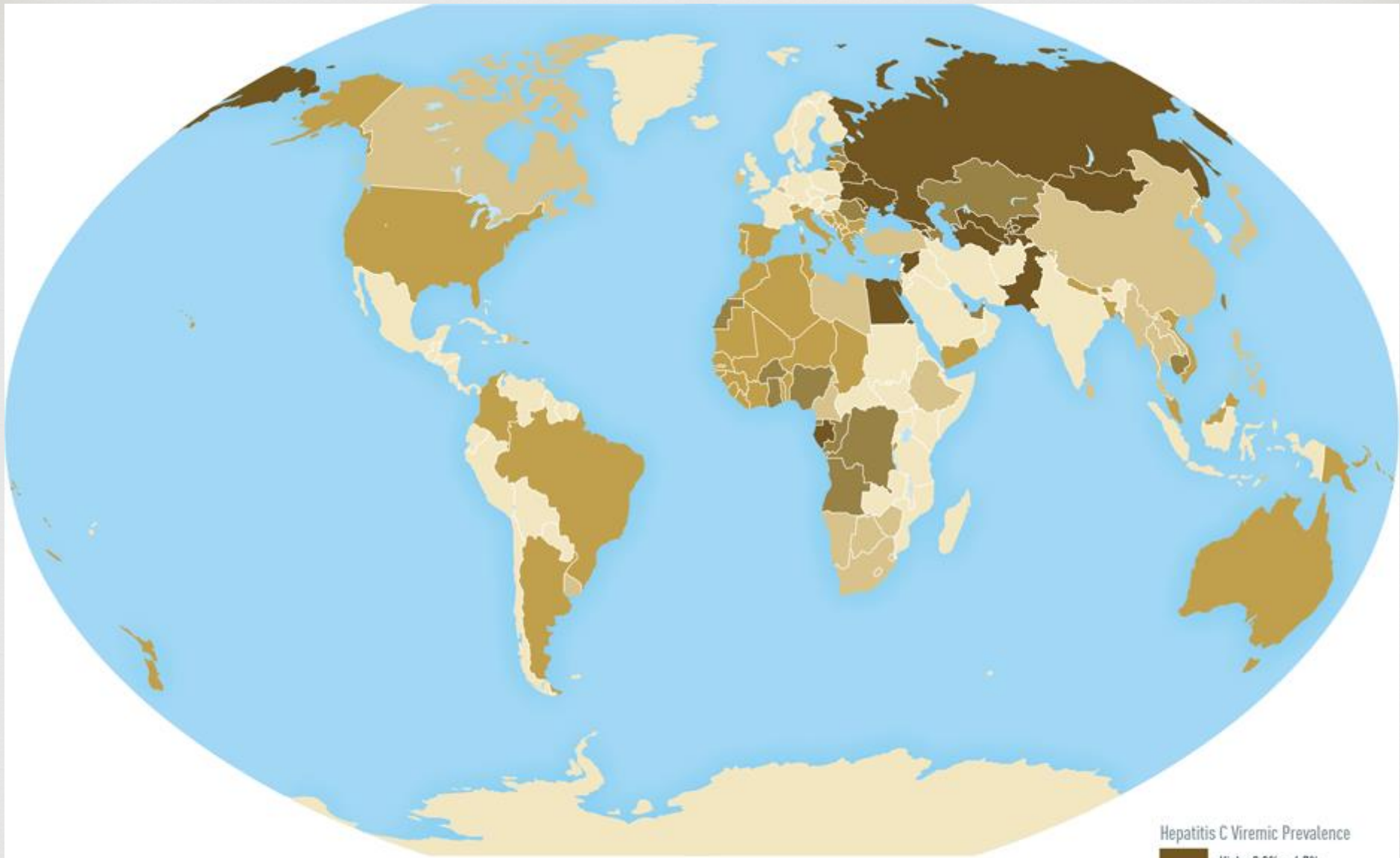


- HCV infections are usually asymptomatic, few people are diagnosed when the infection is recent.
- The infection is also often undiagnosed because it remains asymptomatic until decades after infection when symptoms develop secondary to serious liver damage.

HCV and Pakistan



- In Pakistan 1 in 20% is already infected
- It has the second largest number of hepatitis C virus infections globally.
- Pakistan's HCV epidemic shows homogeneity across the provinces, and over time.
- HCV prevalence is strikingly persistent at high level, with no evidence for a decline over the last three decades.



Hepatitis C Viremic Prevalence

- High: 2.9% - 6.7%
- High Moderate: 1.3% - 2.9%
- Low Moderate: 0.8% - 1.3%
- Low: 0.6% - 0.8%
- Very Low: 0% - 0.6%

Hepatitis C 2020 world wide

Diagnoses:

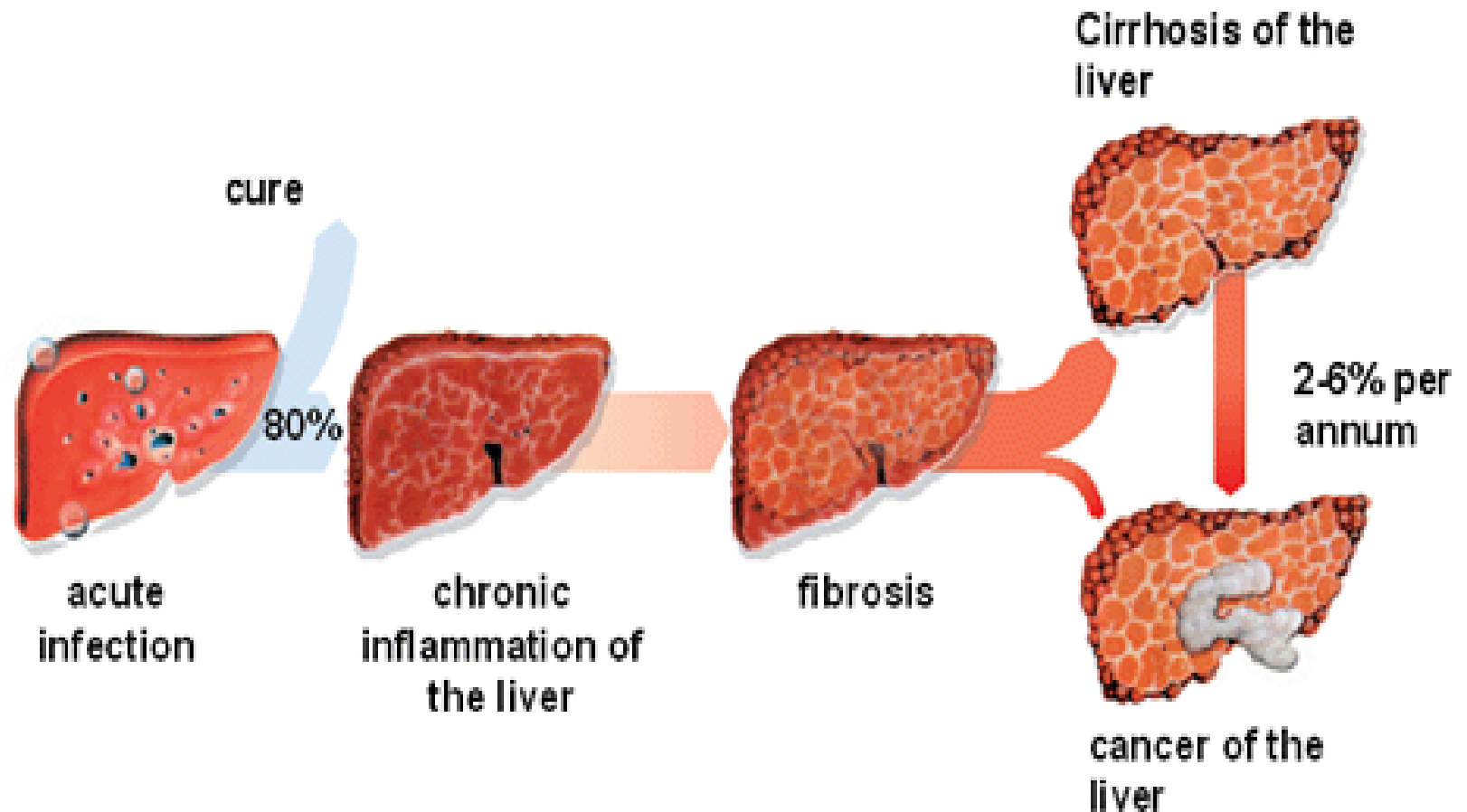


- HCV infection is diagnosed in 2 steps:
 - i. Testing for anti-HCV antibodies with a serological test identifies people who have been infected with the virus.
 - ii. If the test is positive for anti-HCV antibodies, a nucleic acid test for HCV ribonucleic acid (RNA) is needed to confirm chronic infection



- When a person is diagnosed with chronic HCV infection, he/she should have an assessment of the degree of liver damage (fibrosis and cirrhosis)
- It is done by liver biopsy or a variety of non-invasive tests.
- The degree of liver damage is used to guide treatment decisions and management of the disease.

Course of illness with Hepatitis C



Other complications. People with chronic hepatitis C may have kidney disease, inflammation of blood vessels or anemia.

Screening of people for Hepatitis B & C



- i. Come from places where infection is common
- ii. Live with someone who has hepatitis B
- iii. Have sex with infected persons.
- iv. Liver enzyme with unexplained abnormal results
- v. Injection drug users
- vi. Health care and public safety workers



- vii. Homosexual men
- viii. Patients on dialysis or on immune suppressive drugs
- ix. Pregnant ladies
- x. Infants born to infected mothers
- xi. Exposure to blood or blood-contaminated body fluids

Prevention of Hepatitis B & C



Hepatitis

Excellent scope in the cases of Hepatitis

Hepatitis B vaccine protects against serious disease causing inflammation and damage to the liver



Vaccination of hepatitis B:



- The hepatitis B vaccine is a safe and effective recommended for all infants at birth and for children up to 18 years.
- It is also recommended for adults living with diabetes and those at high risk for infection due to their jobs, lifestyle, living situations, or country of birth.
- Since everyone is at some risk, all adults should seriously consider getting the hepatitis B vaccine for a lifetime protection against a preventable chronic liver disease.

Dosage:



1. **1st Shot** - At any given time if not given as childhood immunization.
 - In Pakistan it is given in EPI schedule as;
 1. Pentavalent 1 - 6 weeks
 2. Pentavalent 2 - 10 weeks
 3. Pentavalent 3 - 14 weeks
2. **2nd Shot** - At least one month (or 28 days) after the 1st shot
3. **3rd Shot** - At least 4 months (16 weeks) after the 1st shot (and at least 2 months after the 2nd shot).

Primary prevention



- There is no vaccine for hepatitis C, therefore prevention of HBV & HCV infection depends upon reducing risk of exposure by,
 1. Hand hygiene – hand washing and use of gloves
 2. Safe handling & disposal of sharps and waste
 3. Safe cleaning of equipment
 4. Testing of donated blood
 5. Training of health personnel

Secondary and tertiary prevention

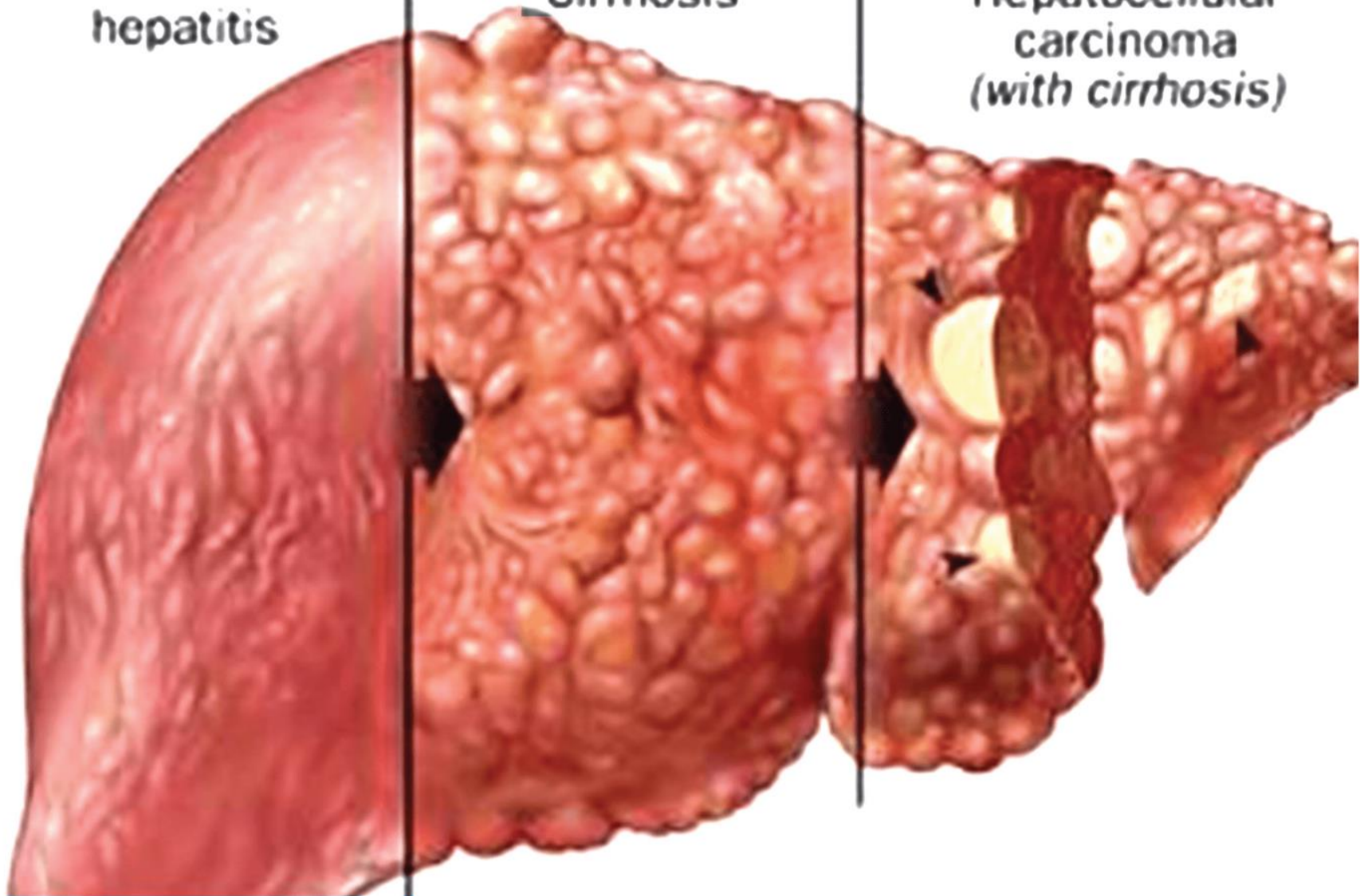


1. **For people infected WHO recommends:**
2. Education & counseling on care and treatment
3. Immunization with hepatitis A & B vaccines to prevent co – infection
4. Provide specific advice to persons with high-risk
5. Identify and test persons for hepatitis C virus infection.
6. Early and appropriate medical management
7. Regular monitoring for early diagnosis of chronic liver disease

Chronic hepatitis

Cirrhosis

Hepatocellular carcinoma
(with cirrhosis)



28th JULY, 2019

WORLD HEPATITIS DAY

Invest in eliminating hepatitis



Mother to newborn



Sharing injected drugs



Healthcare worker



Homosexual



Tattoos and acupuncture



Sharing toothbrush & razor



Infected blood

Thank
you