Hepatitis

Proph . Dr. Hadi J. Suhail

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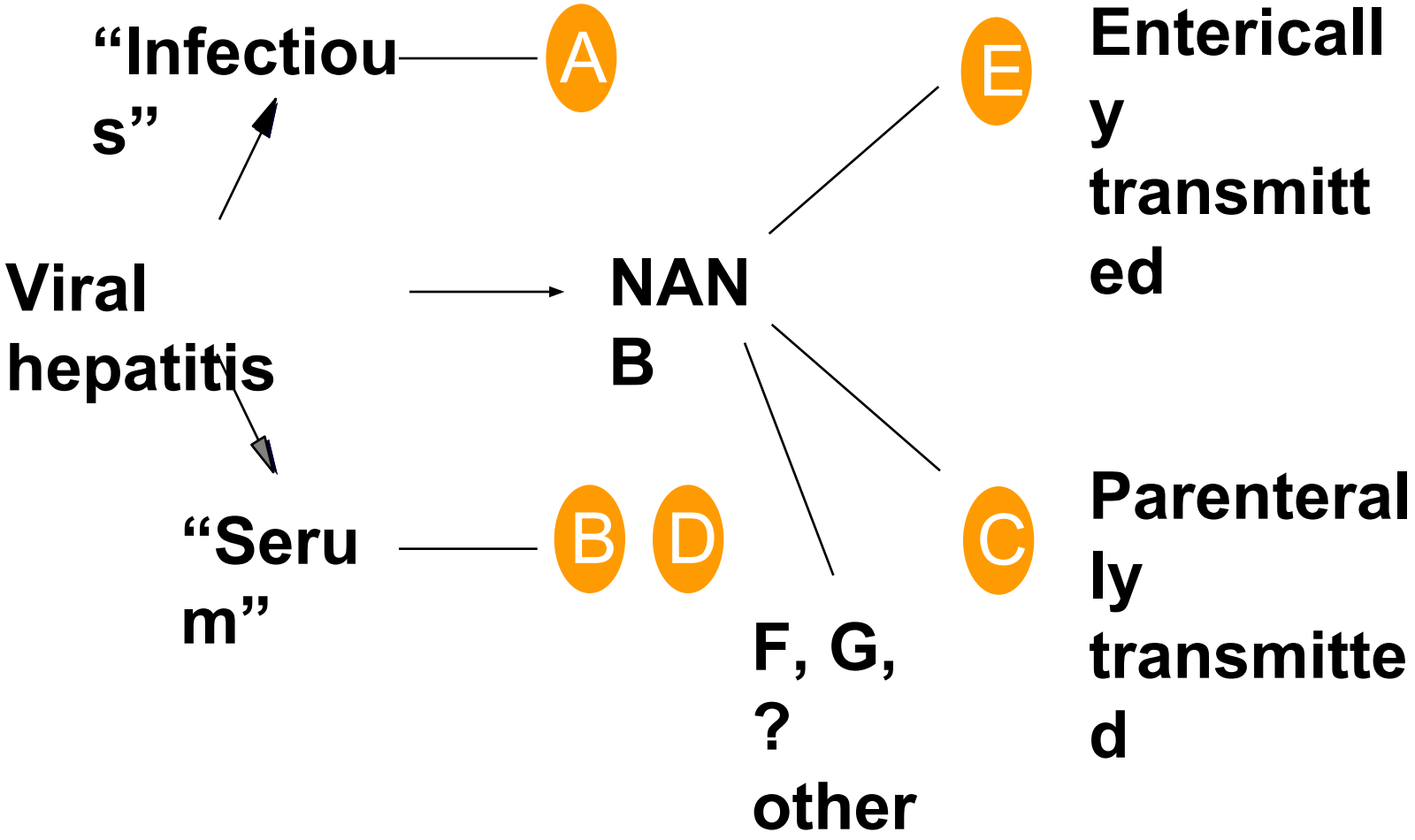
Viral Hepatitis



Hepatitis

- Characterized by inflammation and necrosis of hepatic cells.

- *Severity of symptoms may vary from client to client. Onset of symptoms also varies according to the incubation period of the specific virus.*

Hepatitis

Three phases:

- **Pre-Icteric:** (also called prodromal)

This is the period of **maximal infectivity.**

Circulating immune complexes may cause fatigue, anorexia, depression, headache, weight loss, muscle pain, nausea, vomiting, changes in taste and smell, and fever.

Right upper quadrant tenderness may be noted.

Hepatitis

Icteric: (clinical stage)

Characterized **by jaundice**. There is a defective uptake, conjugation and/or distribution of bile. Bilirubin is diffusing into the tissues. Urine is darker. Stools are clay colored.

- Persistent fatigue.
- Liver is enlarged and tender.

Hepatitis

Post-Icteric: (recovery stage)

- **Convalescent phase. Jaundice is disappearing, but it does not mean** recovery.
- It **may last weeks to months.**

Viral Hepatitis - Overview

Types of Viral Hepatitis

	A	B	C	D	E
Source of Virus	Feces	Blood / Blood Derived Body Fluids	Blood / Blood Derived Body Fluids	Blood / Blood Derived Body Fluids	Feces
Routes of Transmission	Fecal-Oral	Percutaneous Permucosal	Percutaneous Permucosal	Percutaneous Permucosal	Fecal-Oral
Chronic Infection	No	Yes	Yes	Yes	No
Prevention	Pre- / Post-Exposure immunization	Pre- / Post-Exposure immunization	Blood Donor Screening / Risk Behavior Modification	Pre- / Post-Exposure immunization Risk Behavior Modification	Ensure Safe Drinking Water

Symptoms of Hepatitis

- Jaundice
- Pale stools
- Dark urine
- Malaise
- Anorexia
- Nausea, vomiting
- Abdominal pain
- Headache
- Myalgia
- Skin rash, pruritis
- Arthralgia, arthritis
- Fever

Hepatitis A Virus

- Naked RNA virus
- Related to enteroviruses, formerly known as enterovirus 72, now put in its own family: hepatovirus
- One stable serotype only
- Difficult to grow in cell culture: primary marmoset cell culture and also in vivo in chimpanzees and marmosets
- 4 genotypes exist, but in practice most of them are group 1

Hepatitis A Clinical Features

Incubation period:	Average 30 days Range 15-50 days
Jaundice by age group:	<6 yrs <10% 6-14yrs 40-50% >14 yrs 70-80%
Complications:	**Fulminant hepatitis** (sudden severe onset of hepatitis; very painful) **Cholestatic hepatitis** (liver inflammation due to arrested bile excretion) **Relapsing hepatitis** (liver inflammation occurring after recovery)
Chronic sequelae:	None
Re-infection possible after recovery:	No

Hepatitis A Virus Transmission

- Close personal contact
  (e.g., household contact, sex contact, child day-care centers)
- Contaminated food, water
  (e.g., infected food handlers)
- Blood exposure (rare)
  (e.g., injection drug use, rarely by transfusion)

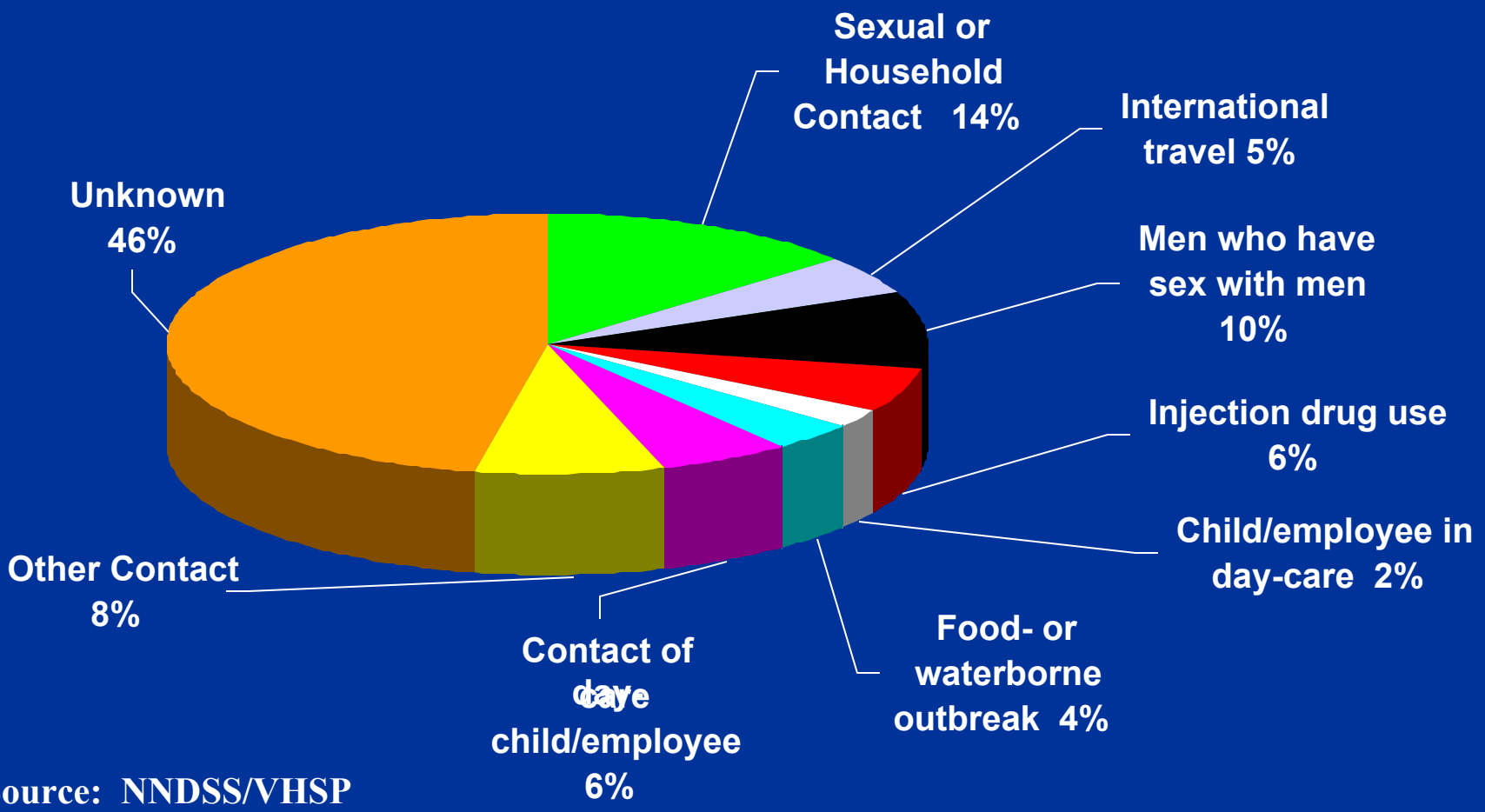
Hepatitis A Virus Transmission

- Fecal-oral transmission leads to spread between close contacts
- Greatest period of communicability: 2 weeks before onset of jaundice
- Virus is stable in environment for months

Global Patterns of Hepatitis A Virus Transmission

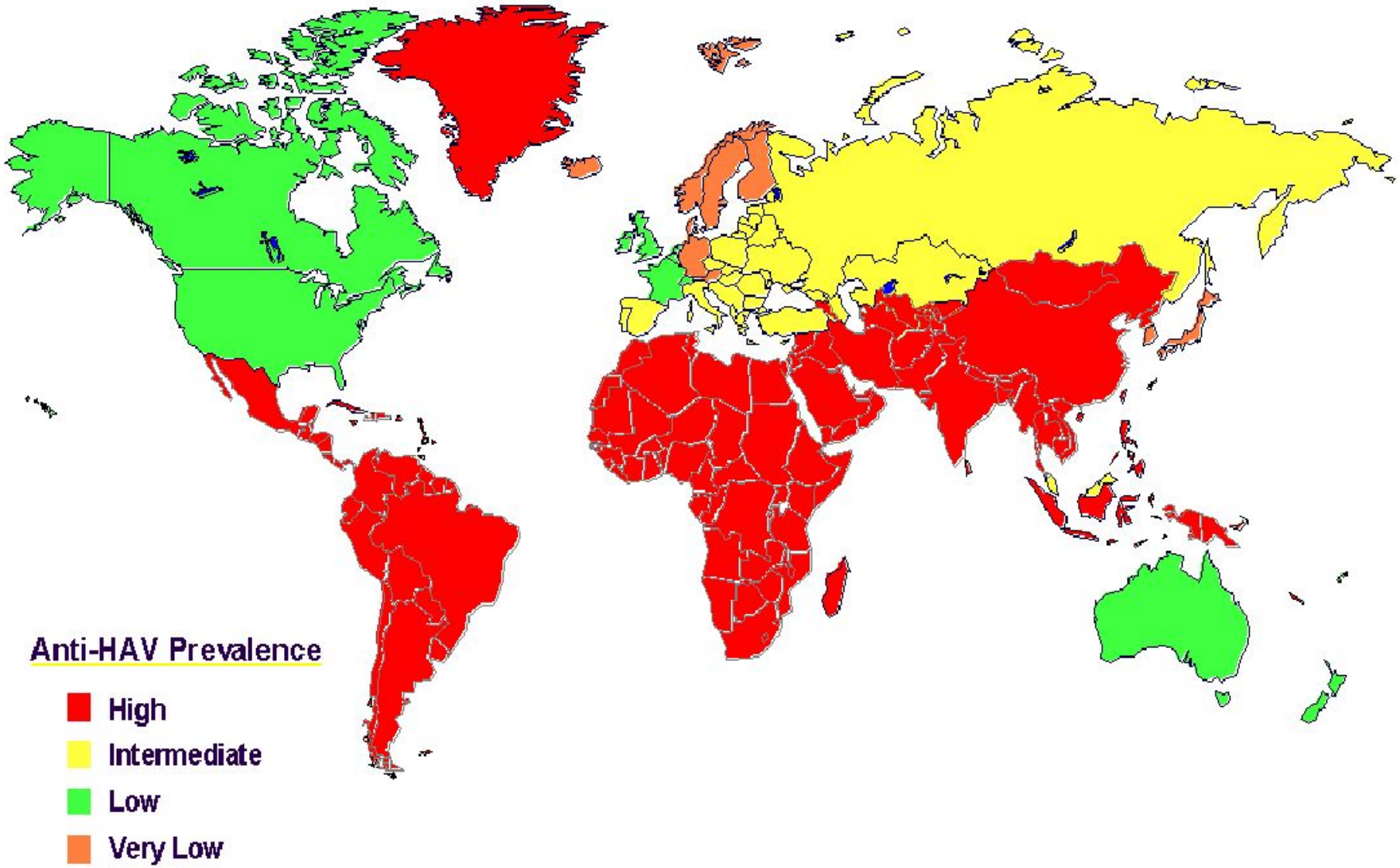
Endemicity	Disease Rate	Peak Age of Infection	Transmission Patterns
High	Low to High	Early childhood	Person to person; outbreaks uncommon
Moderate	High	Late childhood/ young adults	Person to person; food and waterborne outbreaks
Low	Low	Young adults	Person to person; food and waterborne outbreaks
Very low	Very low	Adults	Travelers; outbreaks uncommon

Risk Factors Associated with Reported Hepatitis A, 1990-2000, United States



Source: NNDSS/VHSP

Geographic Distribution of HAV Infection



Diagnosis

- Acute infection is diagnosed by the detection of HAV-IgM in serum by EIA.
- Past Infection i.e. immunity is determined by the detection of HAV-IgG by EIA.
- Cell culture – difficult and take up to 4 weeks, not routinely performed
- Direct Detection – EM, RT-PCR of faeces. Can detect illness earlier than serology but rarely performed.

Preventing Hepatitis A

- **Hygiene** (e.g., hand washing)
- **Sanitation** (e.g., clean water sources)
- **Hepatitis A vaccine**
- **Immune globulin** (IG)

ACIP Recommendations – Hepatitis A Vaccine

Pre-exposure Vaccination

- Persons at increased risk for infection*
  - men who have sex with men (MSM), whether sexually active or not
  - users of injection and non-injection drugs
  - persons with health conditions (clotting factor disorders; chronic liver disease, including hepatitis C)
  - travelers to intermediate & high HAV-endemic countries

See eligibility criteria in GA Immunization Program Manual
http://health.state.ga.us/programs/immunization/publications.asp

ACIP Recommendations – Hepatitis A Vaccine

Pre-vaccination Testing

- **Considerations:**
  - cost of vaccine, serologic testing (including visit)
  - prevalence of infection
  - impact on compliance with vaccination
- **Likely to be cost-effective for:**
  - adults born or lived in high endemic areas
  - adults >40 years of age
  - older adolescents, young adults in certain groups (Native Americans, Alaska Natives, Pacific Islanders)

Hepatitis A Laboratory Tests

- Anti-HAV IgM
  - Generally detectable 5-10 days before onset of symptoms
  - Can persist up to 6 months
- Anti-HAV IgG
  - Appears during convalescent phase of infection
  - Remains present in serum for lifetime
  - Confers enduring protection against disease

Hepatitis A Laboratory Tests (cont.)

- **Total anti-HAV**
  - **Measures both anti-HAV IgG and anti-HAV IgM**
  - **A *positive* test for total anti-HAV together with a *negative* test for anti-HAV IgM indicates immunity consistent with either past infection or vaccination**

Hepatitis A Vaccines

- Highly immunogenic
  - 97%-100% of children, adolescents, and adults have protective levels of antibody within 1 month of receiving first dose; essentially 100% have protective levels after second dose
- Highly efficacious
  - In published studies, 94%-100% of children were protected against clinical hepatitis A infection after the equivalent of one dose of vaccine

Hepatitis E virus

Hepeviridae Hepevirus

Hepatitis E Virus

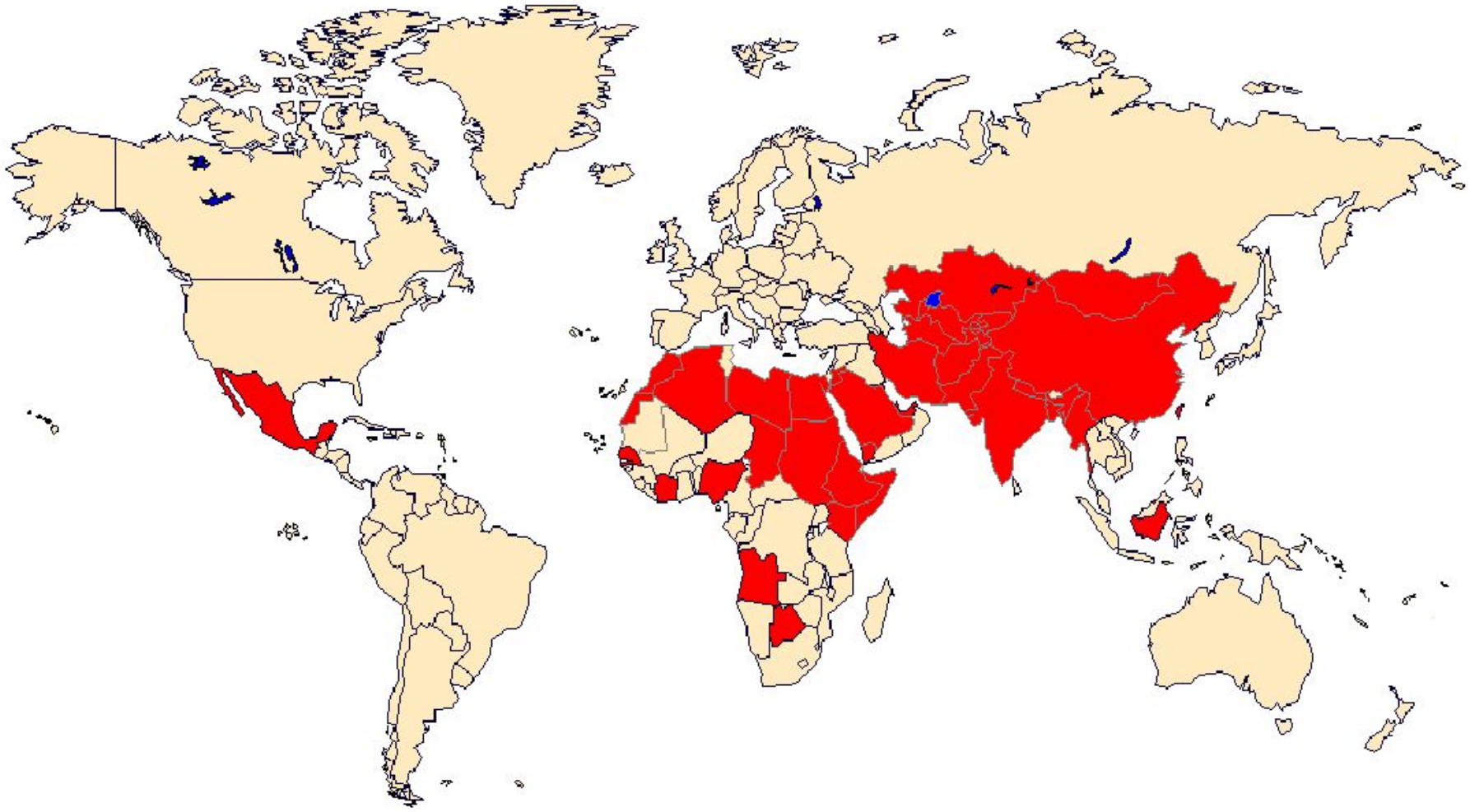
- unenveloped RNA virus, 32-34nm in diameter
- +ve stranded RNA genome, 7.6 kb in size.
- very labile and sensitive
- Can only be cultured recently

Hepatitis E - Clinical Features

- Incubation period: Average 40 days
  Range 15-60 days
- Case-fatality rate: Overall, 1%-3%
  Pregnant women, 15%-25%
- Illness severity: Increased with age
- Chronic sequelae: None identified

Geographic Distribution of Hepatitis E

Outbreaks or Confirmed Infection in >25% of Sporadic Non-ABC Hepatitis



Hepatitis E - Epidemiologic Features

- Most outbreaks associated with faecally contaminated drinking water.
- Several other large epidemics have occurred since in the Indian subcontinent and the USSR, China, Africa and Mexico.
- In the United States and other nonendemic areas, where outbreaks of hepatitis E have not been documented to occur, a low prevalence of anti-HEV (<2%) has been found in healthy populations. The source of infection for these persons is unknown.
- Minimal person-to-person transmission.
- Risk groups for severe course: Pregnancy, DM, obesity, hypertension, ischemic heart disease

Epidemiological features of hepatitis E in disease-endemic areas

Large outbreaks in involving several hundred to several thousand persons developing countries

Sporadic hepatitis cases frequent

Fecal–oral transmission (usually through contaminated water) is the predominant route of transmission

Insignificant person-to-person transmission

Parenteral transmission known but appears to contribute to only a minority of cases

- Mother-to-newborn (transplacental) transmission known
- Highest attack rate among young adults aged 15–40 years, with
- relative sparing of children
- High attack rate and mortality among pregnant women, particularly those in second and third trimesters
- Low overall case fatality rate
- Chronic infection ? Immunosuppression?
- Superinfection can occur among persons with chronic liver disease
- Overall attack rates during hepatitis E outbreaks have ranged from 1% to 15%.

- Diagnosis

Detection of anti-HEV IgM and IgG

Detection of virus RNA (rarely applied)

- **Prevention**
  Possibly contaminated drinking water should be avoided as should uncooked food in endemic areas.
- Immune globulin is not effective if it comes from donors in western countries.
- There is no vaccine.