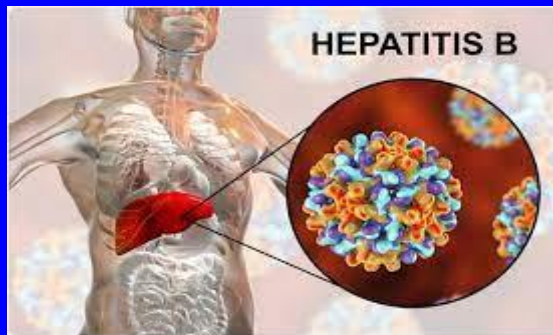




IN THE NAME OF GOD

Occupational Liver Diseases



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CLASSIFICATION OF OCCUPATIONAL LIVER DISEASES

- Chemically Induced Liver Disorders
- Inflammatory Liver Disorders
- Disorders Induced By Physical Agents
- Malignant Liver Diseases



Mechanisms of Toxicity

Category of Agent	Incidence	Experimental Reproducibility	Dose Dependent	Example
Intrinsic toxin				
Direct	High	Yes	Yes	Carbon tetrachloride
Indirect				
Cytotoxic	High	Yes	Yes	Dimethylnitrosamine
Cholestatic	High	Yes	Yes	Methylenedianiline
Host idiosyncrasy				
Hypersensitivity	Low	No	No	Phenytoin
Metabolic abnormality	Low	No	No	Isoniazid

MAJOR HUMAN HEPATOTOXINS

○ Solvents

Carbon Tetrachloride And Other chlorinated Solvent

Dimethylformamide

Toluene

Other Solvents

Mixed Solvent

Halothane And Other Anesthetic Solvents

○ Pesticides (And Related Halogenated Hydrocarbons)

○ Metals

Arsenic

Lead



EVALUATION OF LIVER DISEASE

● Clinical History

medical history

occupational history

exposure history

● Physical Examination

● Laboratory Evaluation

serum marker of hepatobiliary disease

ALT-AST-AP-

biochemical tests of liver function

test of hepatic metabolism

test of hepatic synthetic function

● Anatomic Tests

● Liver Biopsy



Inflammatory Liver Disorders

Agent	Occupation
Hepatitis A virus	Nursery and kindergarten staff Sewer workers
Hepatitis B and C viruses	Health care workers with blood and body fluid contact
Cytomegalovirus	Pediatric health care workers
Coxiella burnetii	Animal care workers Farm workers Slaughterhouse workers
Leptospira icterohaemorrhagiae	Sewer worker Farm workers

MEDICAL SURVEILLANCE

- Surveillance Strategies
- Screening Tests

Clinical Management Of
Abnormal Liver Function Tests



What is occupational cancer?

Occupational cancer is cancer that is caused wholly or partly by exposure to a carcinogen at work.



Liver Cancer



Vinyl chloride, angiosarcoma of the liver
hydraulic cleaner from an open vinyl
chloride reactor, 1974

Chemical Carcinogenesis in humans

Target organs	Agents	Industry	Tumour type
Lung	Asbestos, Arsenic, Mustard gas, nickel, PAH (poly aromatic hydrocarbons), Tobacco smoke	Shipyard & Insulation workers, Smelting of copper, zinc, lead, Mustard gas production w. Nickel mining, refining, plating; Coke oven workers, Aluminum reduction workers, Environment with active smoker	Squamous, large cell and small cc, adenocarcinoma
Pleura	Asbestos		Mesothelioma
Oral cavity	Tobacco smoke, alcohol beverage, Nickel	Boot & shoe productions. Furniture manufacture, Alcohol productions	Squamous cell carcinoma
GI	Smoked, salted, pickled food, Tobacco, alcohol	Rubber Industry	adenocarcinoma Squamous CC
Liver	Aflatoxin, vinyl chloride, tobacco, alcohol, thorium dioxide		Hepatocellular C, Hemangiosarcoma



Chemical Carcinogenesis in humans

Kidney	Tobacco Smoke, phenacetin		Renal cell Carcinoma
Bladder	Tobacco, phenacetin benzidine	Magneta manufacture, auramine manufacture	Transitional cell carcinoma
Prostate	Cadmium		Adenocarcinom
Skin	Arsenic, benzopyrene, coal, mineral oil, cyclosporin A,PUVA	Coal gasification coke production.	SCC,BCC
Bone marrow	Benzene, tobacco, Ethylene oxide, Anti-neoplastic agents cyclosporin A	Rubber workers	Leukemia, Lymphoma



Type of Cancer	Related to Occupational Exposure Estimated % (USA)
Lung	6.3-13%
Bladder	3-19%
Mesothelioma	?
Leukemia	0.8-2.8%
Laryngeal	1-20% (men)
Skin Cancer (non-melanoma)	1.5-6% (men)
Sinonasal and nasopharyngeal	31-43% (men)
Kidney	0-2.3%
Liver	0.4-1.1 (vinyl chloride only; men)



Carcinogens

- Carcinogens cause the majority of fatal occupational diseases in the World
- Every year, occupational exposure to carcinogens
- **Many cases of occupational cancer are preventable**

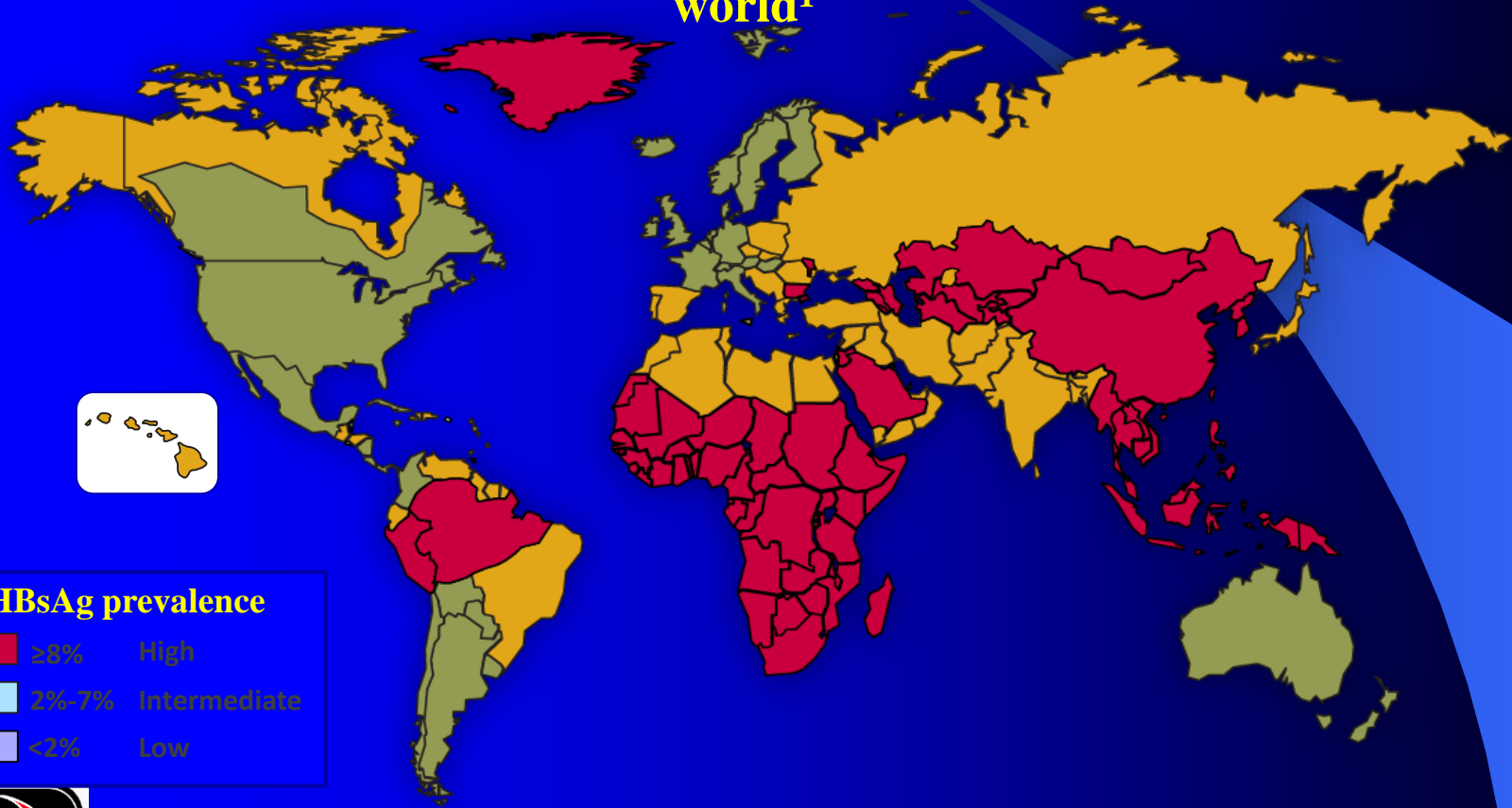


Hepatitis B

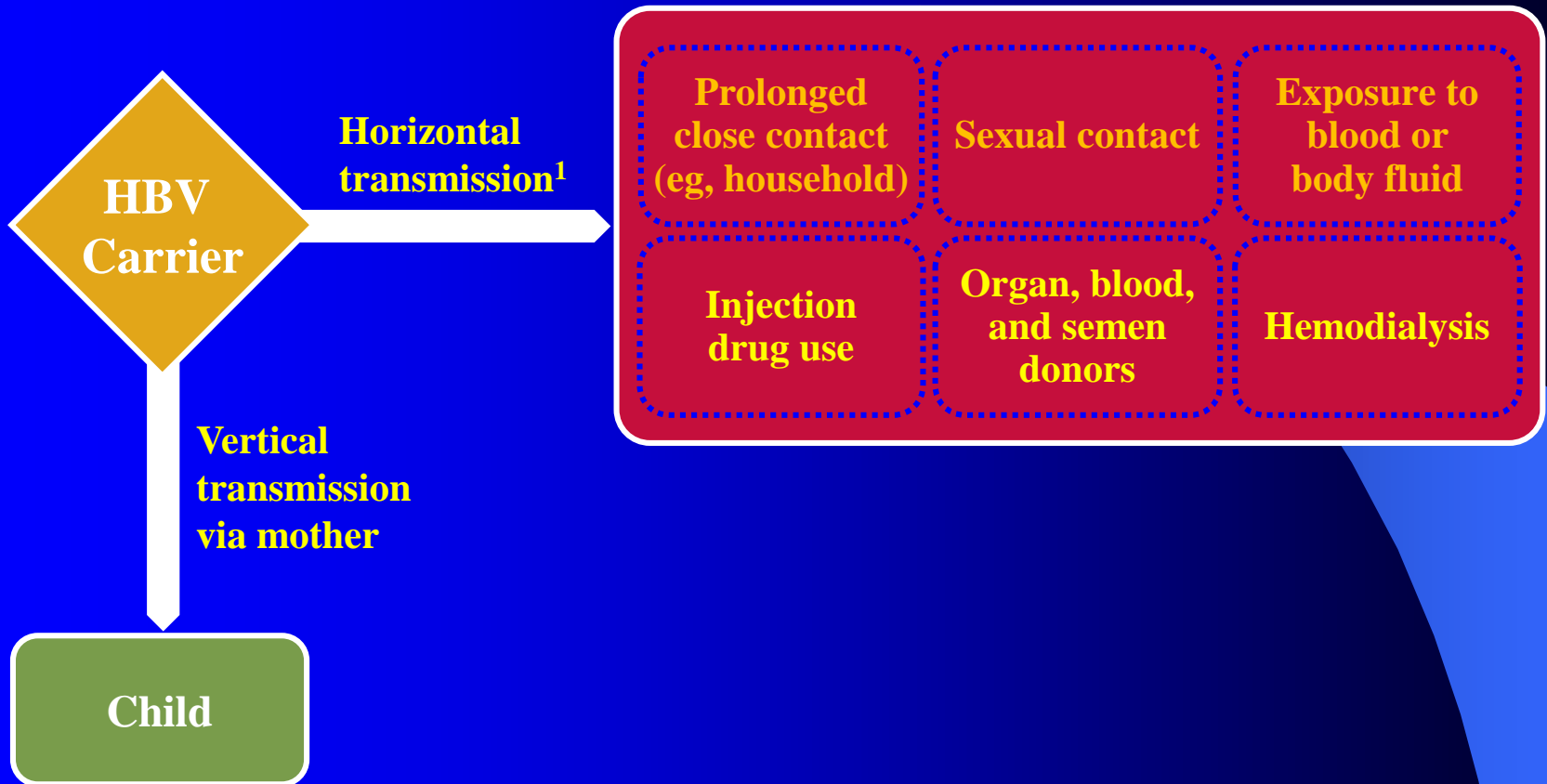


Chronic Hepatitis B Is a Global Health Problem

HBV infection is the most common chronic viral infection in the world¹



Routes of HBV Transmission



HBsAg=hepatitis B e antigen.

Blood Borne Pathogens

● HBV

- virus that causes hepatitis B
- incubation period 45 to 180 days
- person is infectious if test for antigen (HBsAG) is positive
- unvaccinated persons are susceptible
 - vaccination is recommended for persons with occupational exposure



Progression and Complications of CHB

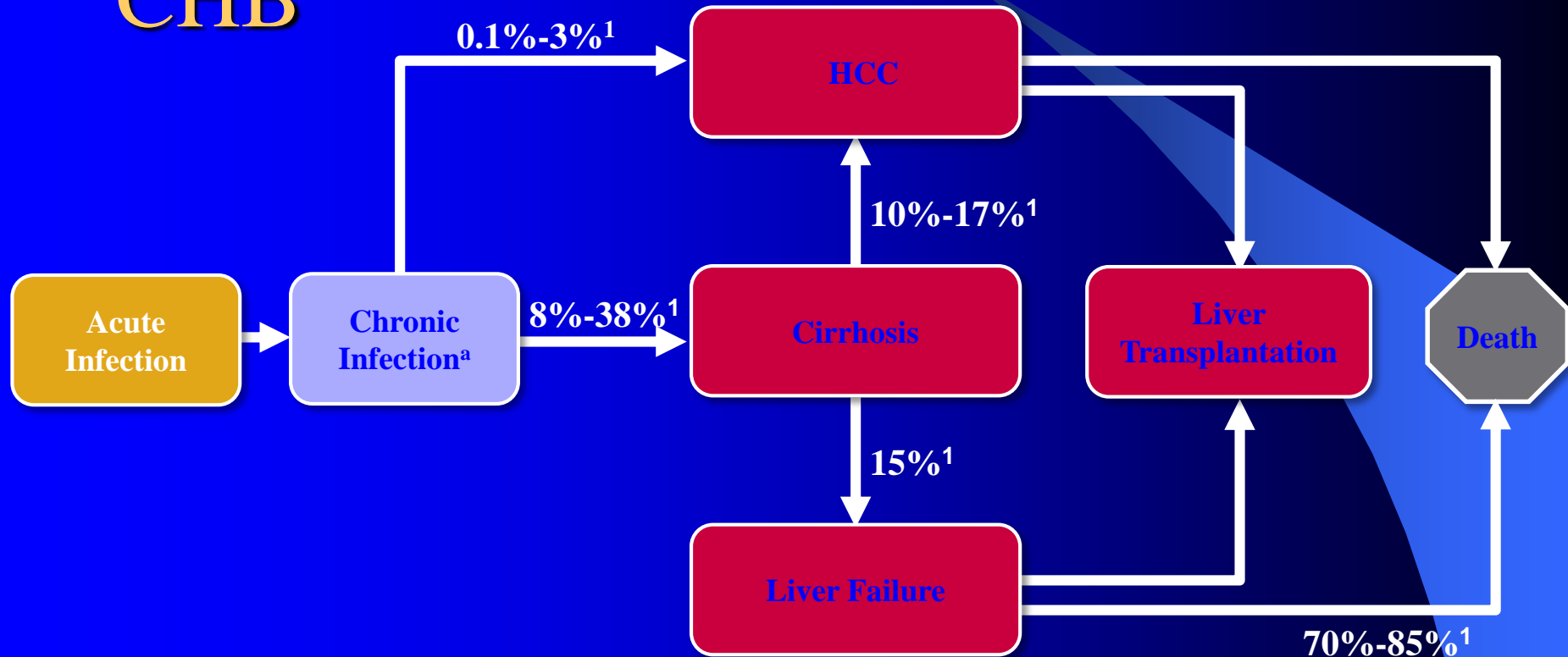


Figure adapted from Fattovich G, et al. In: Marcellin P, (ed.) *Management of Patients With Viral Hepatitis*. Paris: APMAHV; 2004.

^aChronic infection is defined as the persistence of positive test results for hepatitis B surface antigen or HBV DNA for at least 6 months.²

Percentages are 5-year cumulative incidence rates.

HCC=hepatocellular carcinoma.

HBV Infection Can Be Prevented

Screen for HBV Infection

Involves simple blood tests for serologic markers of infection¹

Identify CHB-infected patients^{1,2}

- Counsel to prevent transmission of infection to others
- Provide appropriate medical management

Identify unprotected patients for HBV vaccination^{1,2}

- Hepatitis B vaccination is the most effective measure to help prevent HBV infection and its consequences³
- It is important to screen for HBV infection before vaccination¹



HBV Vaccination

Populations recommended for HBV vaccination by the CDC¹

- All newborns^a
- All unvaccinated children and adolescents through 18 years of age
- All unvaccinated adults at risk for infection and those requesting protection from HBV infection

• Primary vaccination consists of 3 intramuscular doses given at 0, 1, and 6 months²

- A full 3-dose vaccine series is associated with immunity in >90% of healthy adults²



^aInfants born to HBsAg-positive mothers should also receive hepatitis B immune globulin ≤ 12 hours of birth.³

1. CDC. Vaccination and Immunizations: Hepatitis B In-Short. <http://www.cdc.gov/vaccines/hcp/vis/vis-statements/hep-b.html>. February 2, 2012. Accessed March 25, 2015;

2. CDC. *Morb Mortal Wkly Rep*. 2006;55:1-33; 3. CDC. *Morb Mortal Wkly Rep*. 2005;54:1-33.

Hepatitis B Virus

- Virus affects the liver
- Symptoms include:
nausea, vomiting, fever, abdominal
pain, jaundice
- 100 times more infectious than HIV



Exposure Control: Protect Yourself

- Read the Exposure Control Plan
- Use engineering and work practice controls
- Use personal protective equipment
- Know what to do in case of an exposure



Thank You for Attention

