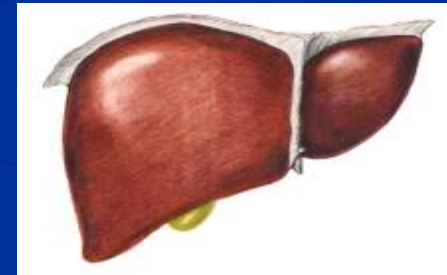


Hepatitis B Vaccination and Prevention

Angela M. Jo, MD, MSHS

What is Hepatitis B?

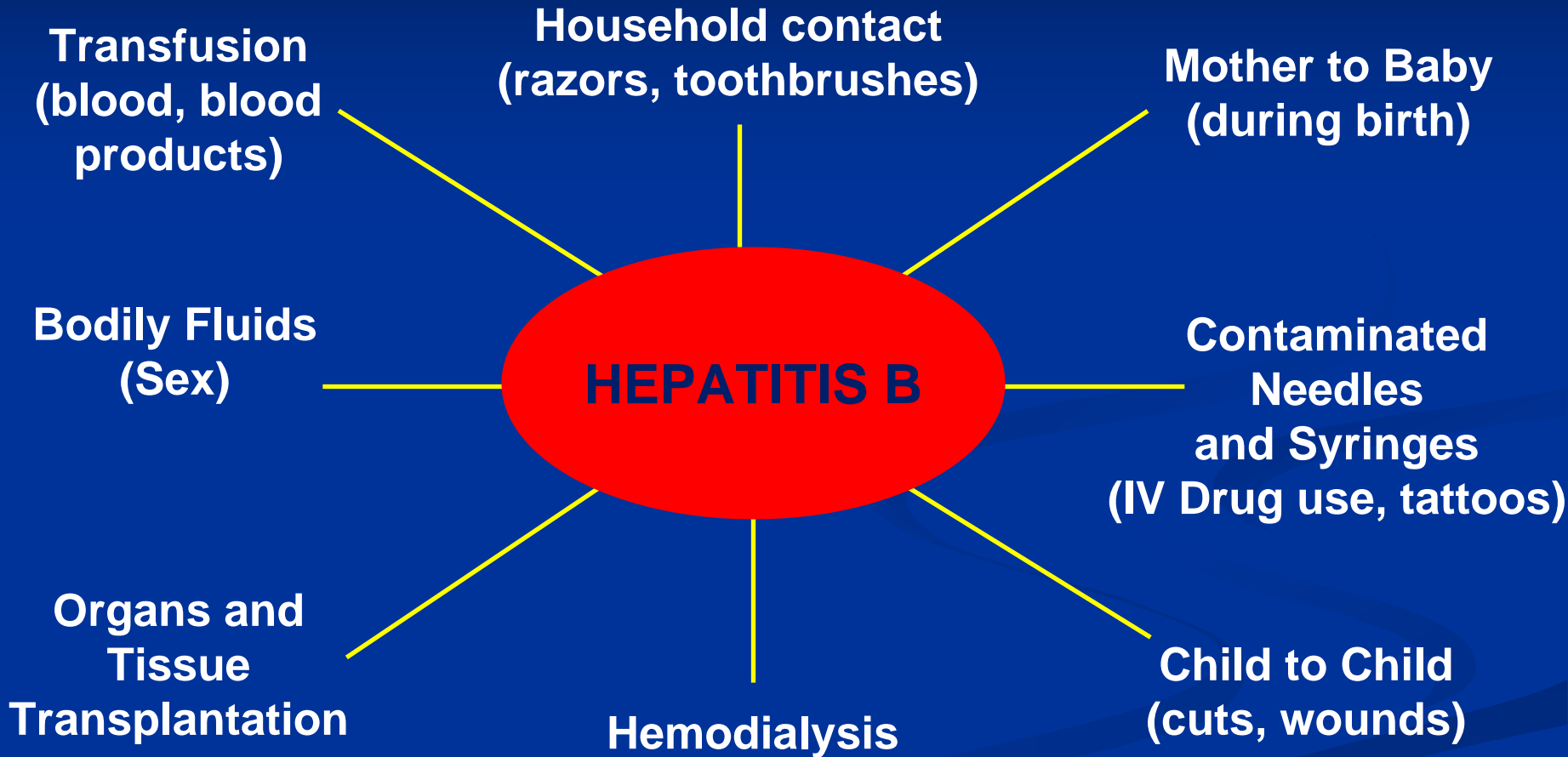
- A virus that lives in blood and other bodily fluids
- An infectious disease that causes liver disease and cancer
- 100 x more infectious than the HIV



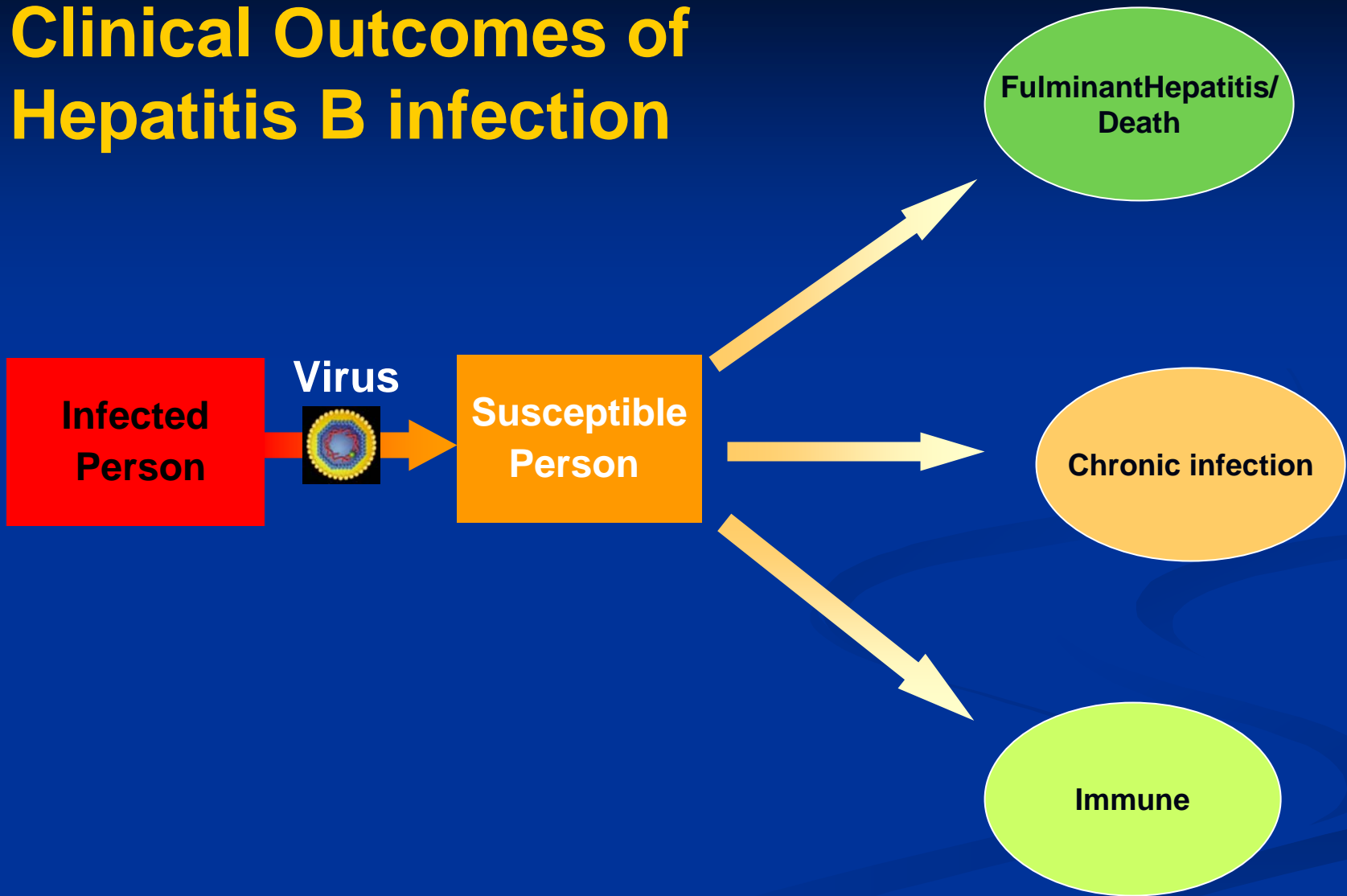
Concentrations of Hep B in body fluids

High	Moderate	Low/Not Detectable
blood	semen	urine
serum	vaginal fluid	feces
wound exudates	saliva	sweat
		tears
		Breast milk


Transmission of Hep B Infection



Clinical Outcomes of Hepatitis B infection



Immune Status



Immune

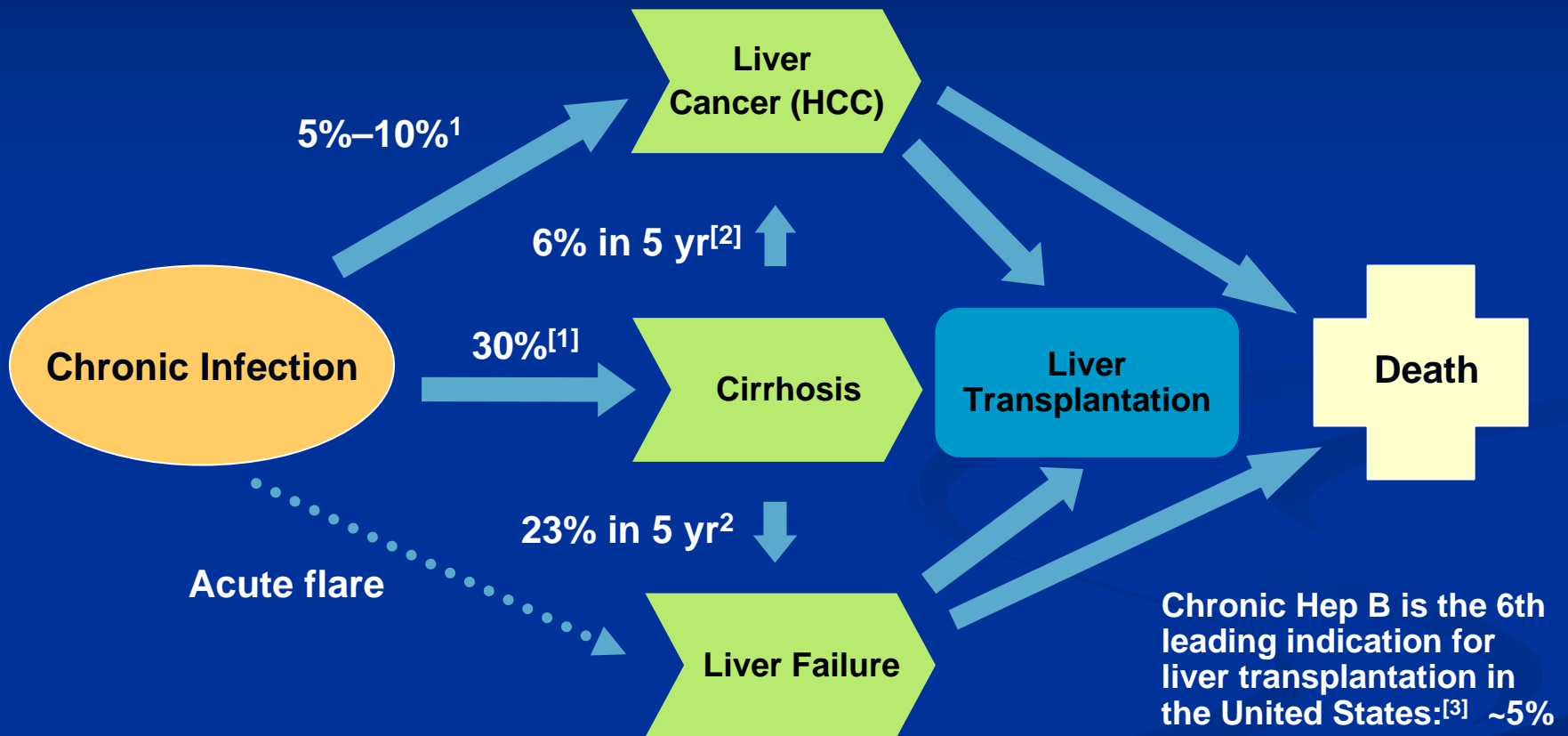
- Your body has successfully fought off the virus completely
- You will not get this disease again
- You cannot transmit the virus to others

Chronic Hepatitis B

Chronic Infection

- You may develop cirrhosis or liver cancer
- You may not look or feel sick unless the disease is very advanced
- You can spread Hepatitis B to others

Hepatitis B Disease Progression



1. Torresi J, et al. *Gastroenterology*. 2000;118:S83. 2. Fattovich G, et al. *Hepatology*. 1995;21:77.
3. Perrillo RP, et al. *Hepatology*. 2001;33:424.

Chronic Hepatitis B

Chronic Infection

- People who have chronic Hep B infection might be called “hepatitis B carriers.”
- About 1.25 million people living in the United States have chronic (life-long) Hep B infection.
- About 15%-25% of persons with chronic Hep B infection might die from either cirrhosis or liver cancer
- Chronic infection occurs in:
 - ~ 90% of infants infected with Hep B at birth
 - ~ 30% of children infected at age 1- 5 years
 - 2- 6% of people infected after age 5 years

Hepatitis B Symptoms



- Incubation 6 weeks to 6 months
- Most people do not have any symptoms unless acute or very advanced chronic disease
- Tiredness
- Loss of appetite
- Fever
- Stomach-ache
- Dark urine
- Light colored stools
- Jaundice
- Swelling of abdomen

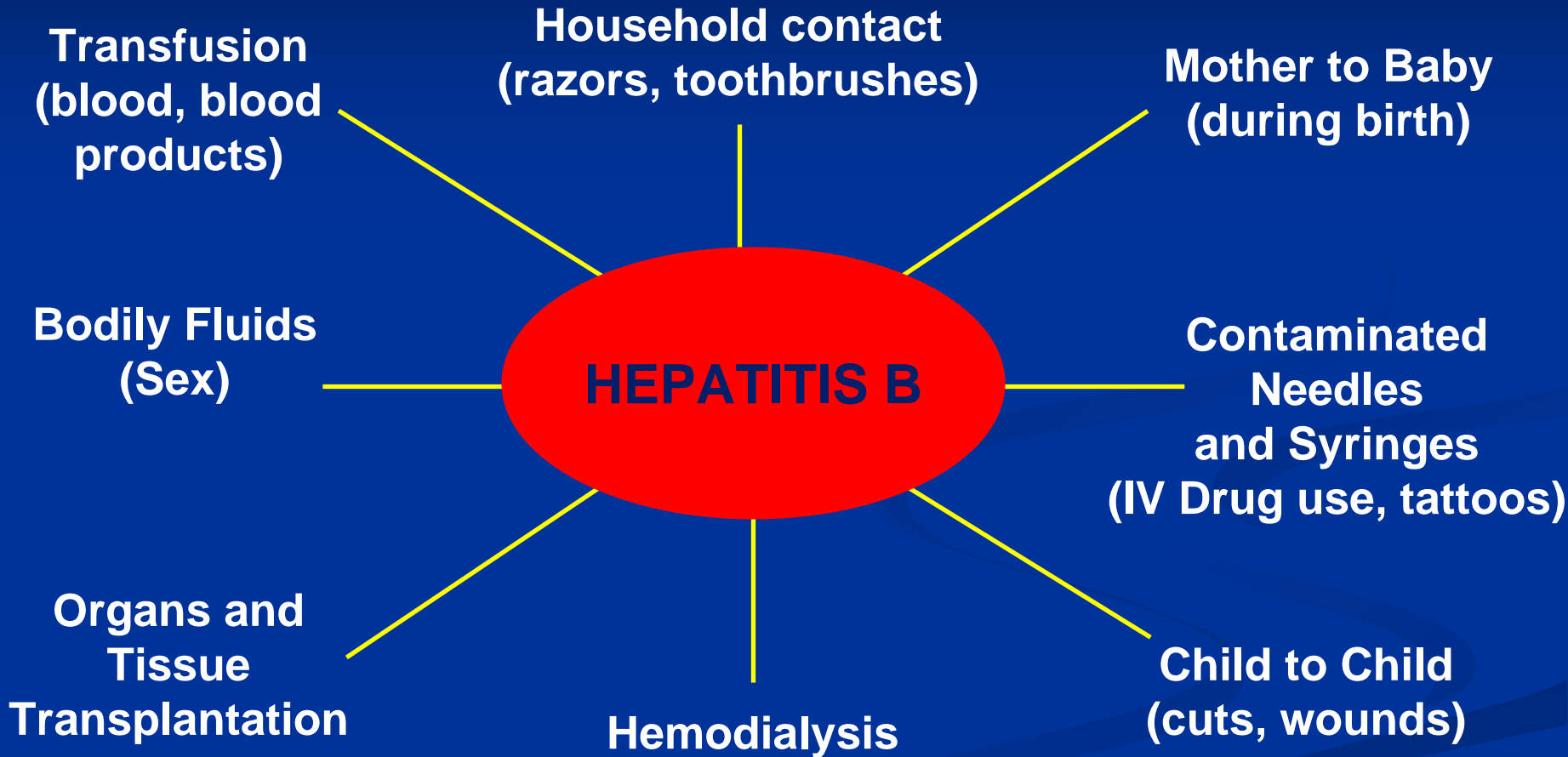
**Is Hepatitis B
infection
Preventable?**

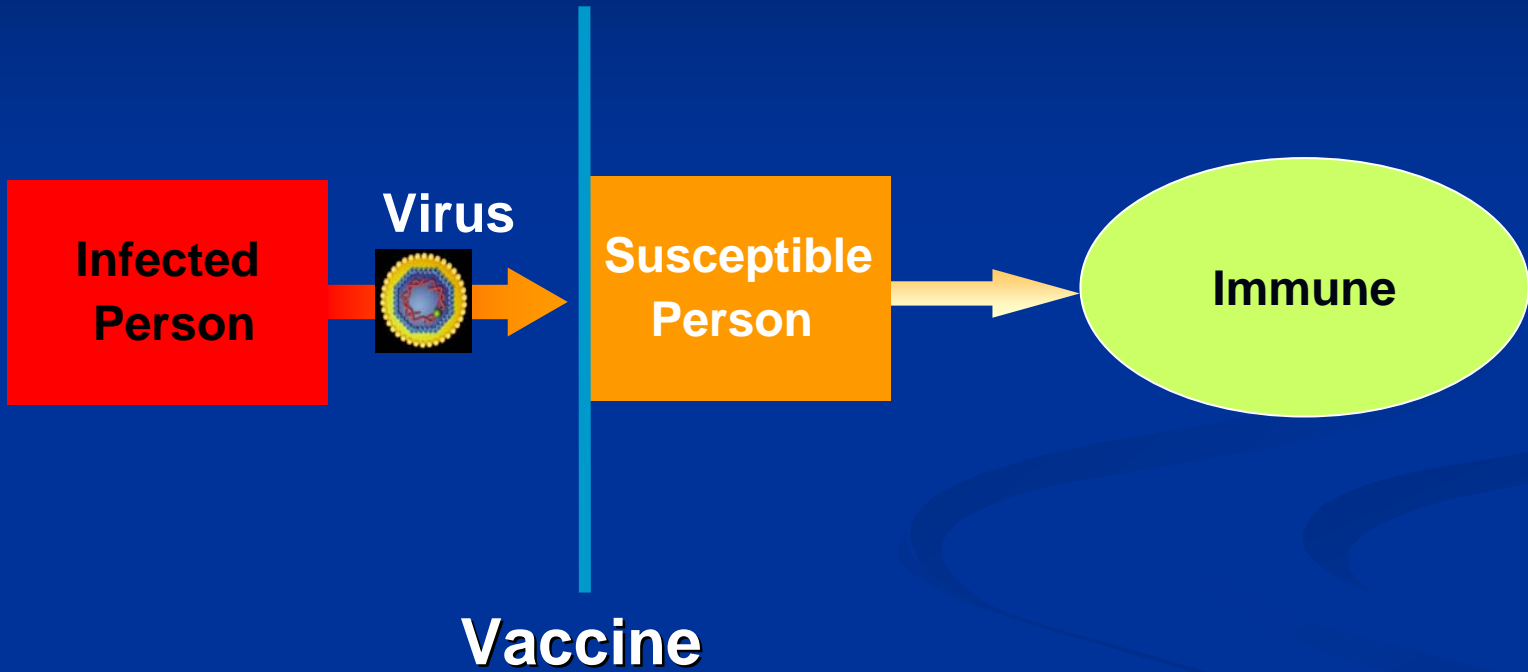
Hep B Prevention Strategies

- Vaccinate susceptible individuals
- Avoid sharing toothbrushes, razors, or other personal care articles that might have blood on them
- Wear gloves if you have to touch anyone's blood or open sores
- Practice safer sex



Transmission of Hep B Infection





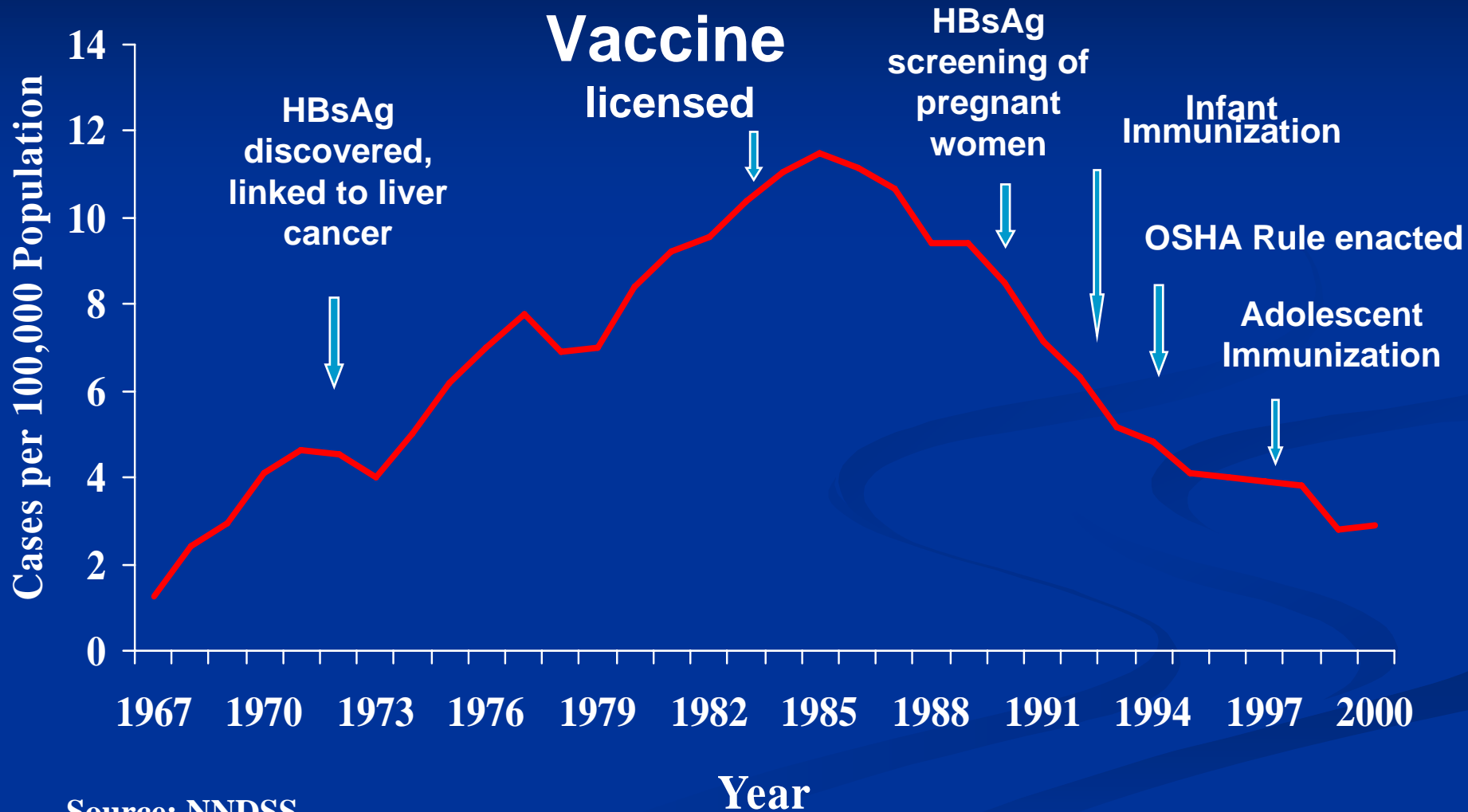
Hepatitis B Vaccine

- Available in the U.S. since 1981
- Usually given as 3 shots over a 4-6 month period
 - There is also a 2-shot schedule for 11-15 year olds
- Safe and effective
 - Does not contain any live virus
 - Protection will last for at least 15 years
- Recommended for:
 - all infants
 - all children and adolescents
 - adults at increased risk (includes health care workers, those who are from **high prevalence countries**)

Strategies to Eliminate Hep B Transmission in the United States

- **Prevent perinatal Hep B transmission**
- **Universal infant vaccination (early 1990's)**
- **Screening and Vaccination of adults in high-risk groups**
- **Catch up Vaccination:**
 - ∞ **all children and adolescents but focus on 11-12 year olds**

Impact of Hep B Prevention in US, 1966-2000

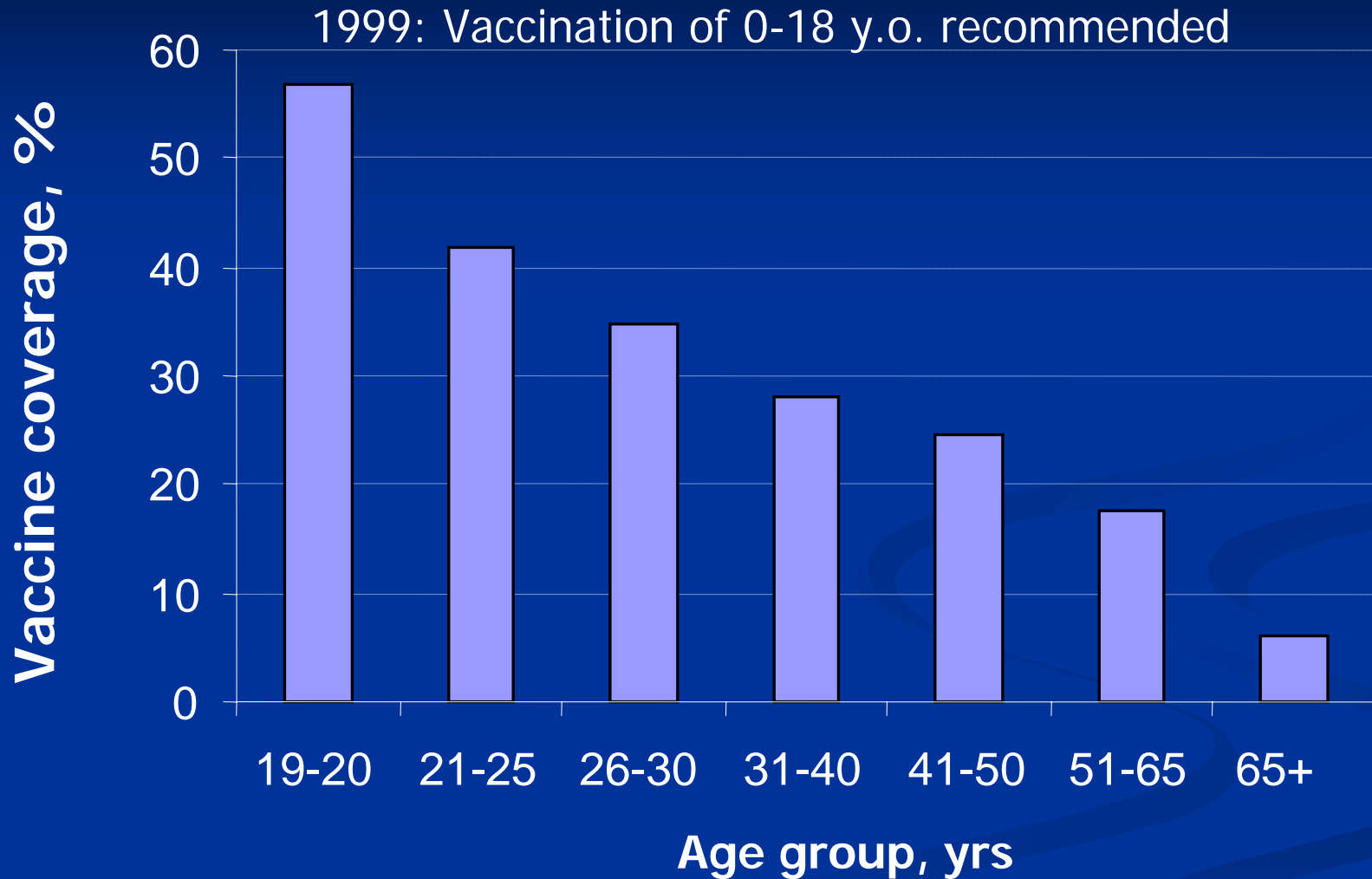


Source: NNDSS

"Catch-up" Vaccinations Are Needed!

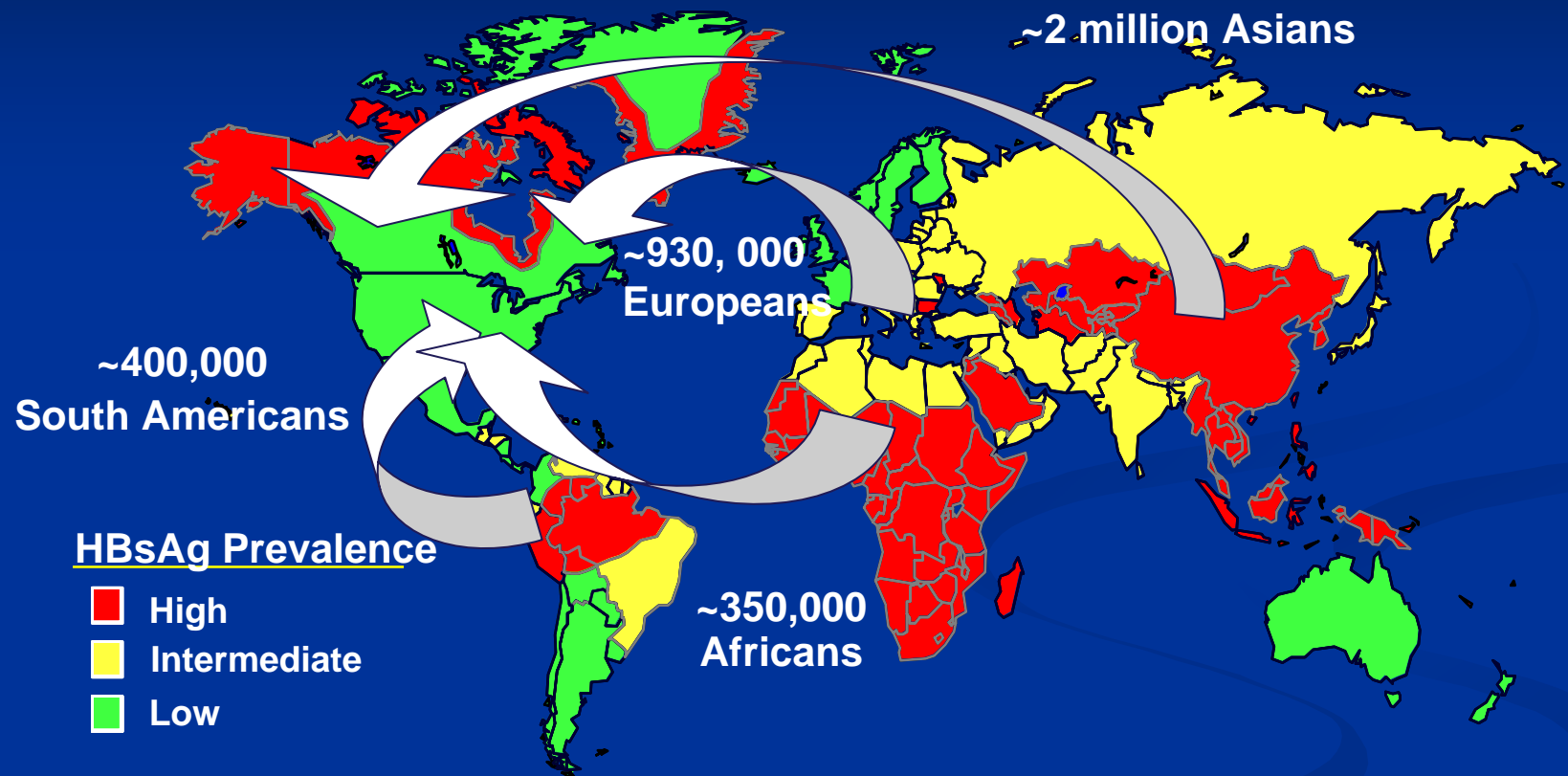
- **Early 1990s:** Universal infant vaccination was initiated and Hep B vaccinations were later recommended for all children, ages 0-18.
- **Late 1990s:** In 1997, California instituted Hep B vaccination requirements for kindergarten entry and for seventh grade entry in 1999.
- **Vaccination rates are low in certain groups.** For example, vaccination rates in Vietnamese and Hmong population ranges 4%-26%. (McPhee et al., 2003; Butler & Chen, 2003 pilot data; Euler, 2001).

Adult Hep B Vaccine Coverage, 2002



Source: CDC, National Health Interview Survey

Geographic Prevalence of Chronic Hepatitis B May Be Impacted by Migration



Immigration numbers summed by continent from 1996-2002

Slide from Hepatitis B & Infectious Disease Training Program, 2007, Liver Research Consortium, LLC

Groups who should be tested prior to vaccination

- **Individuals from prevalent regions**
 - South Asia (except Sri Lanka)
 - Africa
 - South Pacific Islands
 - Middle East (except Cyprus)
 - European Mediterranean
 - The Arctic (indigenous populations)
 - South America: Argentina, Bolivia, Brazil, Ecuador, Guyana, Suriname, Venezuela, Amazon region of Colombia and Peru
 - Independent states of former Soviet Union
 - Eastern Europe, including Russia, except Hungary
 - Caribbean: Antigua, Barbuda, Dominica, Dominican Republic, Granada, Haiti, Jamaica, Puerto Rico, St. Kitts and Nevis, St. Lucia, St. Vincent and Grenadines, Trinidad and Tobago, Turks and Caicos

Groups who should be tested prior to vaccination

■ Other high risk groups

- Household and sexual contacts of Hep B carriers
- History of IV drug use
- Men who have sex with men
- Inmates of correctional facilities
- Individuals with elevated liver enzymes (AST/ALT)
- Individuals with HIV or Hep C
- Patients undergoing hemodialysis
- All pregnant women

Rationale for testing in high risk groups

- Blood test will inform a person of the Hep B status
- Vaccine is not effective for those already exposed to the virus
 - Give false sense of security
 - Not cost-effective for high risk groups
- Vaccination does not allow for early detection of liver cancer
- Carriers should be counseled for prevention of transmission
- Carriers should be medically managed

Hepatitis B Testing

- Outcomes of testing:
 - Immune
 - Chronically infected
 - Never been infected (test negative)

Test Negative Individuals

- Susceptible to getting infected
- May seek protection through
 - Vaccination
 - Other prevention strategies (safe sex, wear gloves when touching blood, etc.)

Medical Management

- Acute infections
 - Supportive treatment
- Chronic infections
 - Medications may be effective in 25%-50% of cases.
 - Avoid additional insults to the liver
 - Ongoing lifelong medical evaluations

Approved Treatments for Hepatitis B

Generic Name	Manufacturer	Year Approved for Hepatitis B
Interferon alfa-2b	Schering Corporation	1992
Lamivudine	GlaxoSmithKline	1998
Adefovir dipivoxil	Gilead Sciences	2002
Entecavir	Bristol-Myers Squibb	2005
Peginterferon alfa-2a	Hoffmann La-Roche	2005
Telbivudine	Idenix	2006

Investigational Treatment for Hepatitis B: Nucleoside Analogues

Drug	Common Alternate Name
Valtorcitabine	val-LdC
Emtricitabine	FTC
Clevudine	L-FMAU
Tenofovir	--
Elvucitabine	ACH-126, 443; beta-LFd4C
Amdoxivir	DAPD

Summary

- Hepatitis B is an important public health concern
- Hepatitis B can be prevented
- Testing is needed prior to vaccination in high risk populations
- Focused strategies may be needed to screen and vaccinate high risk populations
- Safe and effective medications are available and more are being developed
- Those with chronic infection should avoid additional insults to the liver and be closely monitored by a physician