# The Main Modes of HBV Transmission in Children, Central Asian Region

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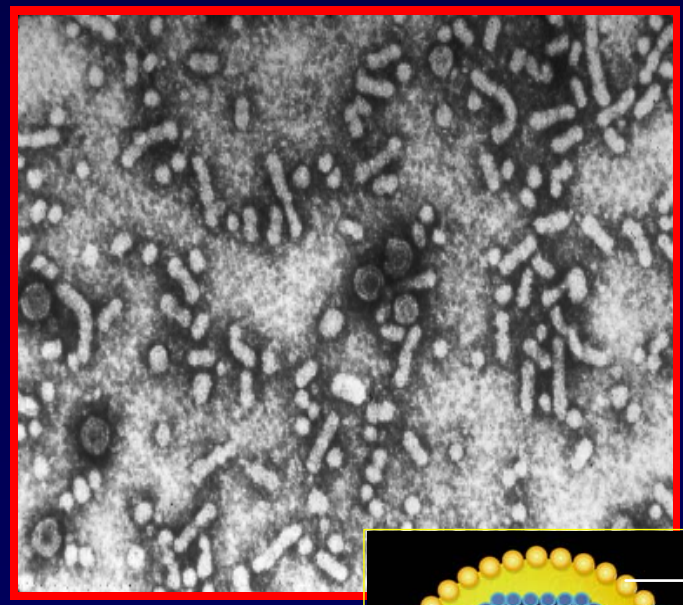
# Hepatitis B Virus

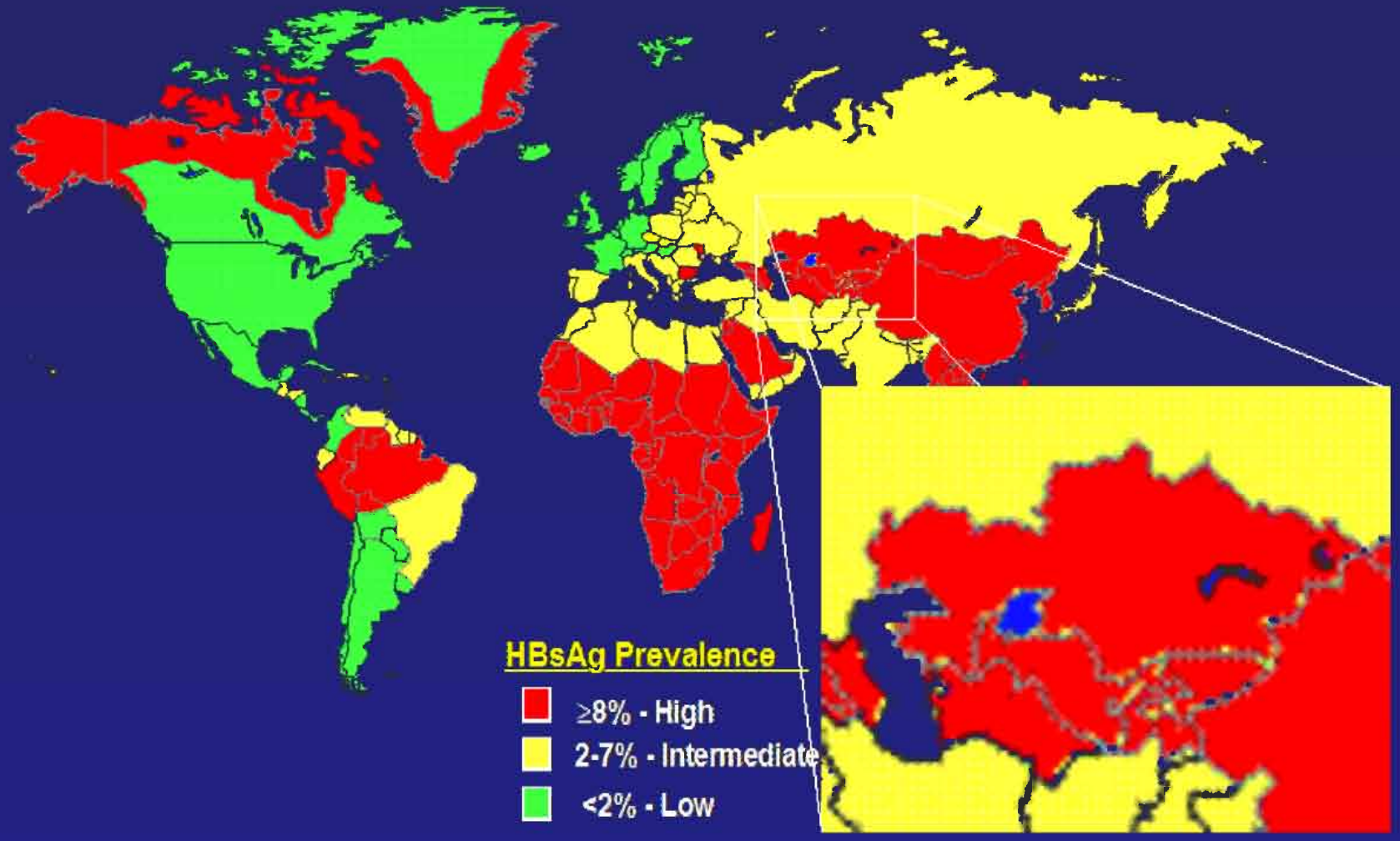
•Circular DNA genome

• Member of the family of Hepadnaviridae

•Nucleocapsid proteins including HBcAg and HBeAg; envelope proteins



# Geographic Distribution of Chronic HBV Infection

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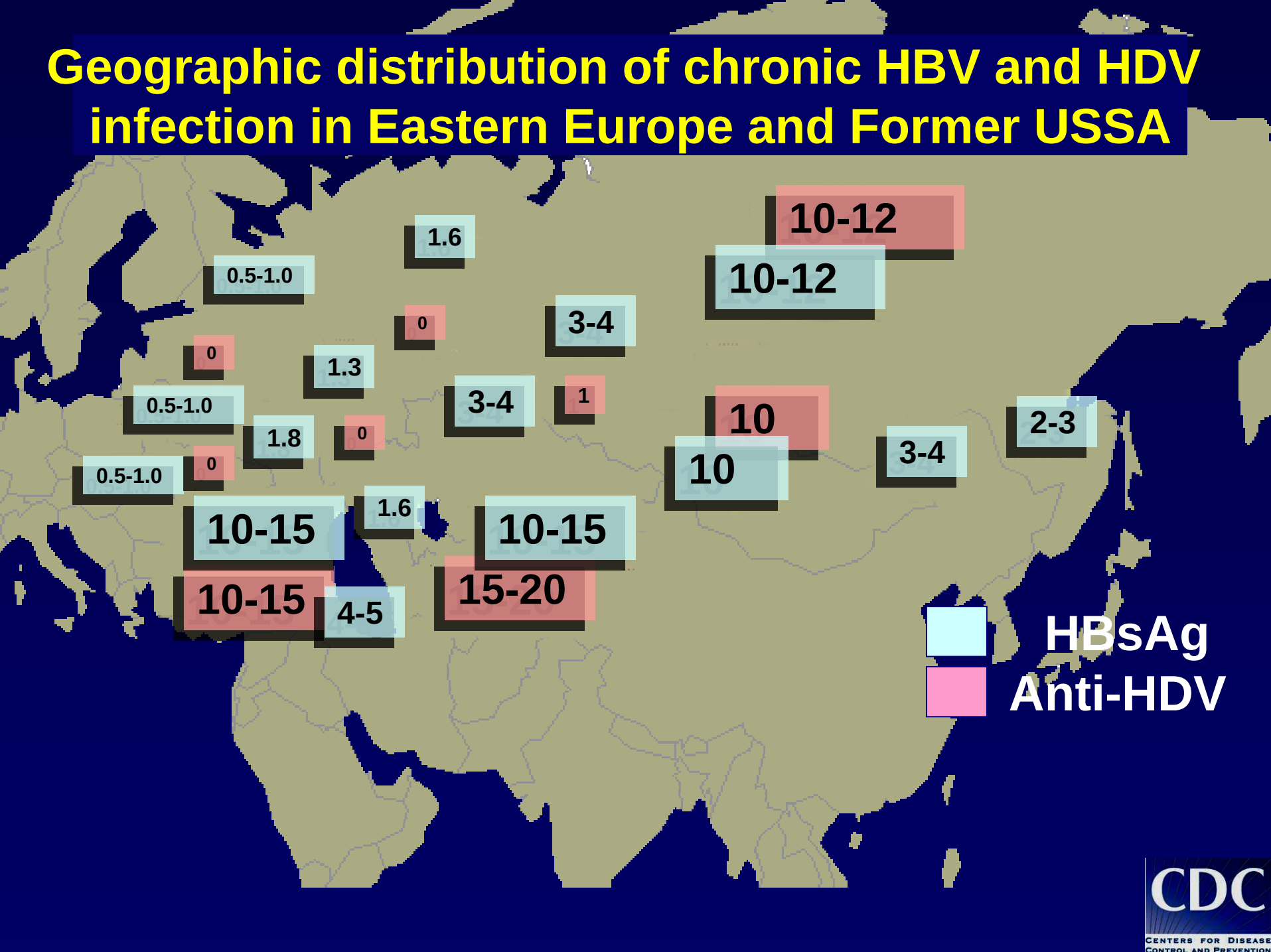
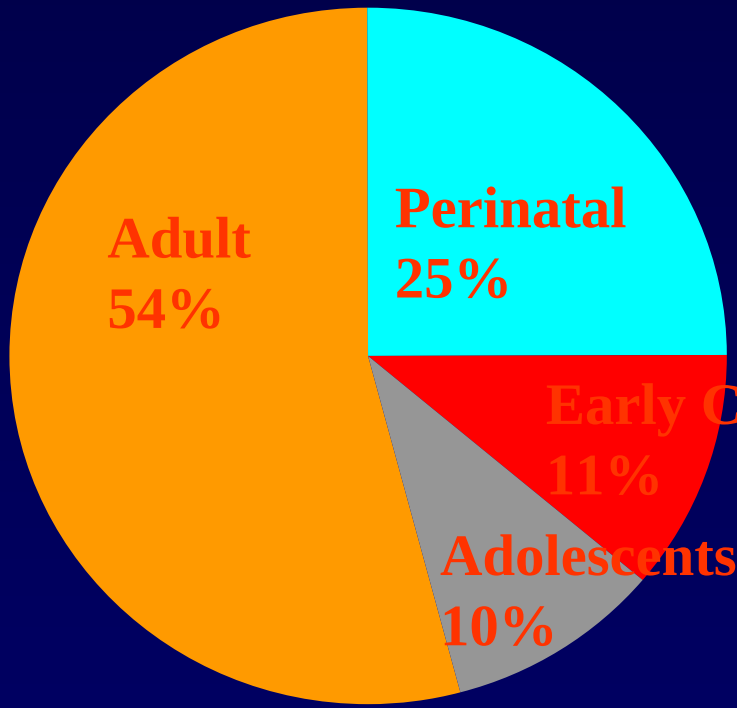
# Geographic distribution of chronic HBV and HDV infection in Eastern Europe and Former USSA



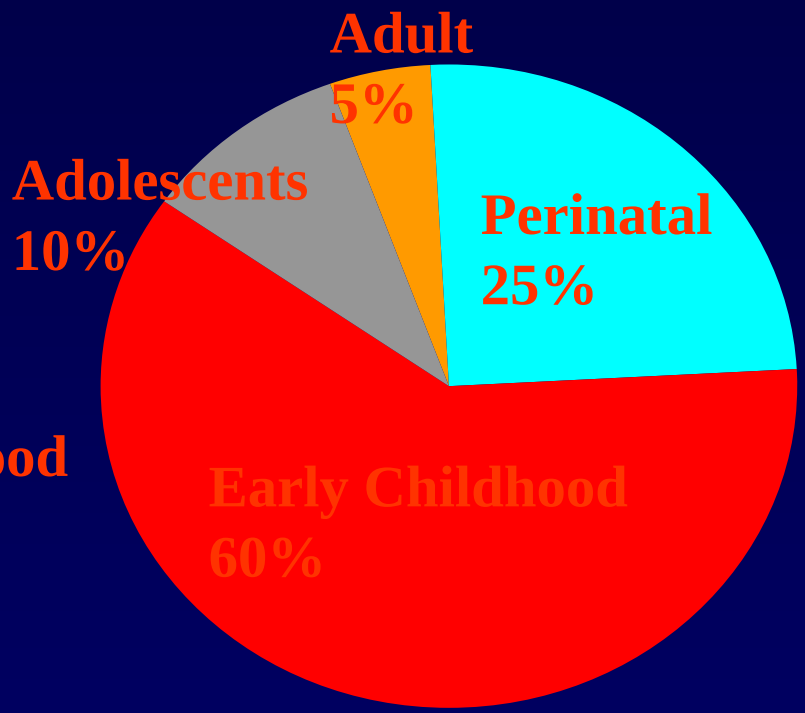
# Differences in Age at Acquisition of Chronic HBV Infections by Endemicity

**Low HBsAg Prevalence**




Perinatal and early childhood infections: 30-40%

**High HBsAg Prevalence**




Perinatal and early childhood infections: 70-80%

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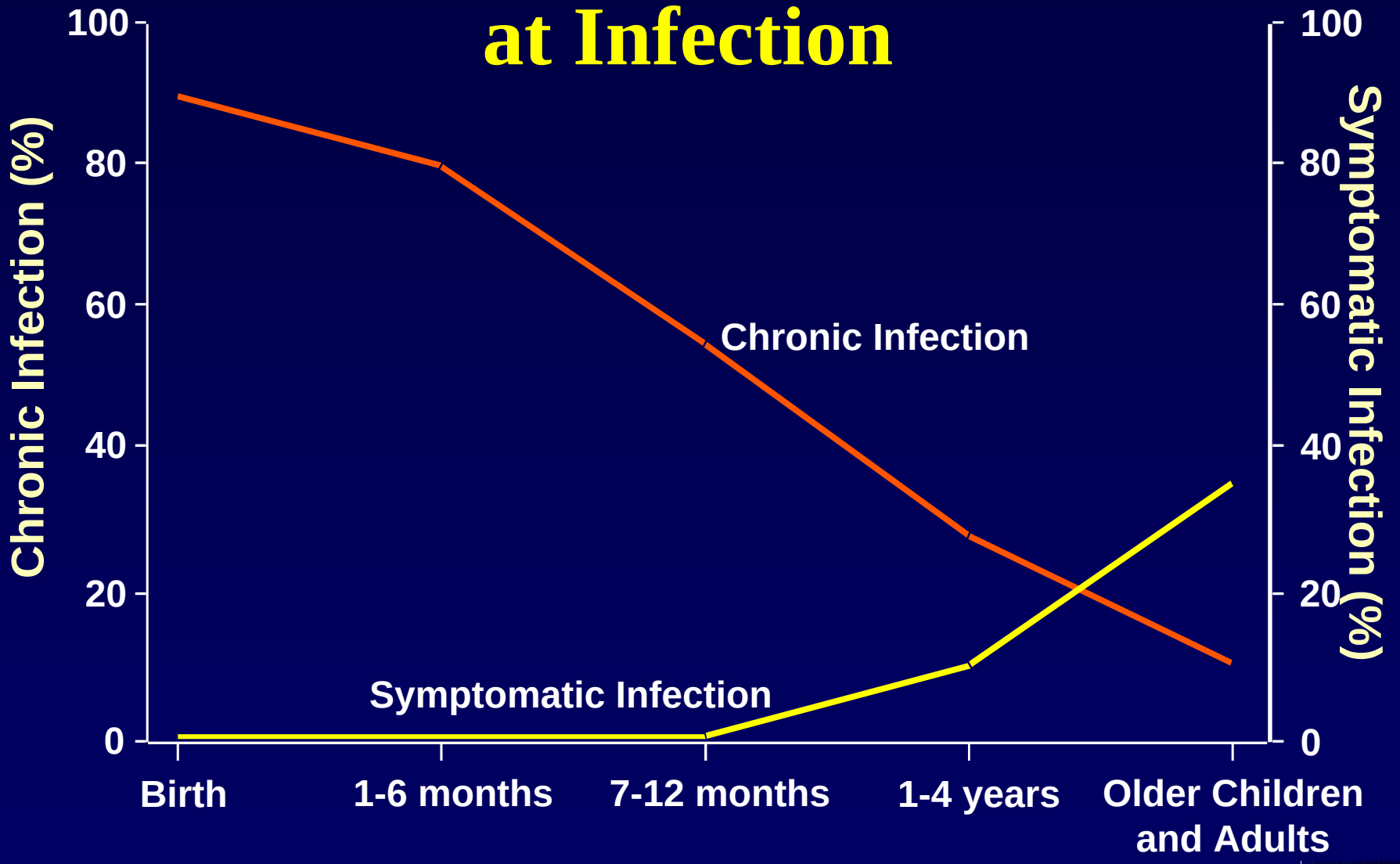
# Outcome of HBV Infection by Age at Infection



# Sources of Hepatitis B Virus Infection
# High or Intermediate Endemicity Countries

| Age | Route/source of Infection |
|---|---|
| Newborn | Mother - perinatal infection |
| Early childhood (1- 5 years) | Inapparent parenteral (horizontal)<br>Direct parenteral - injections, nosocomial, transfusion |
| Childhood | Inapparent parenteral (horizontal)<br>Direct parenteral - injections, nosocomial, transfusion |
| Adolescent/Adult | Sexual |

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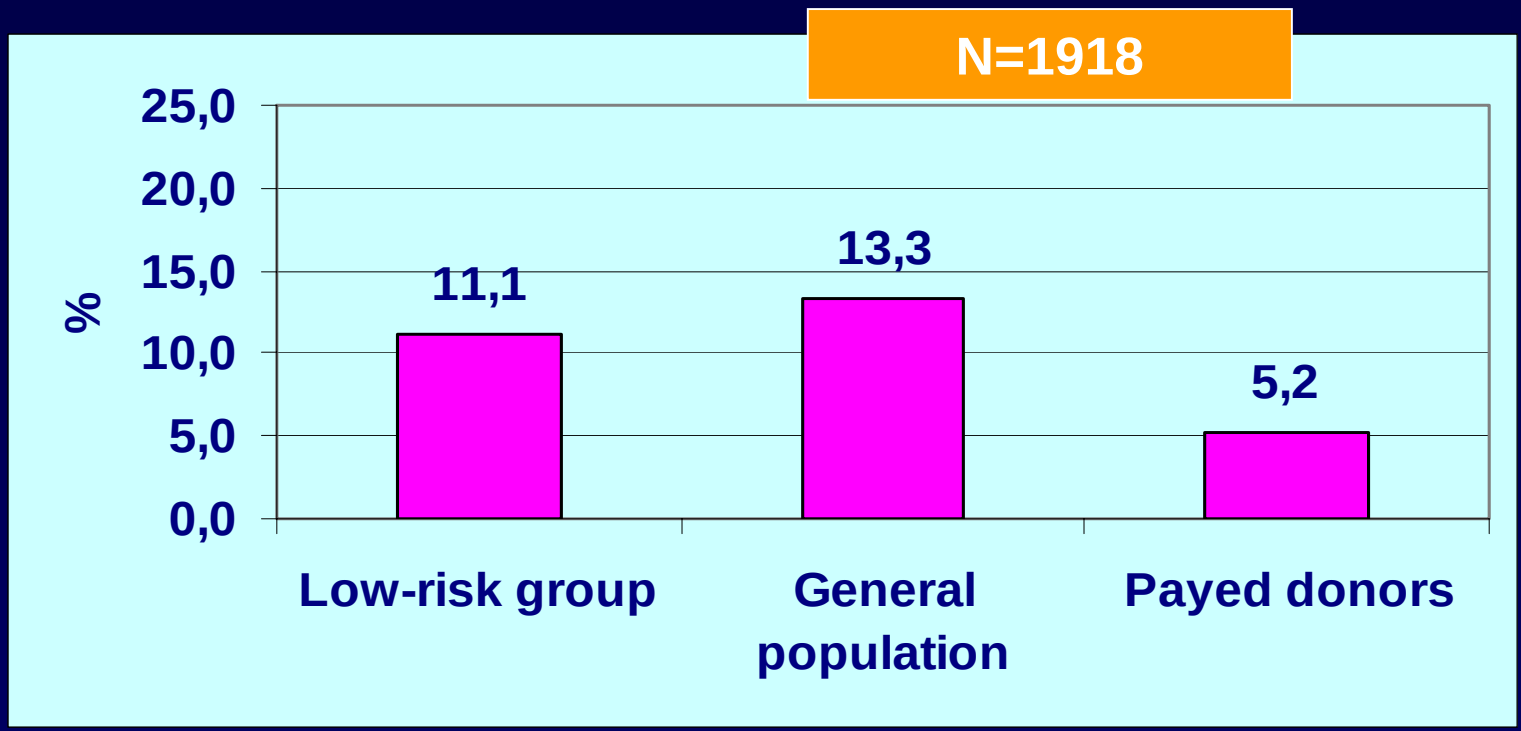
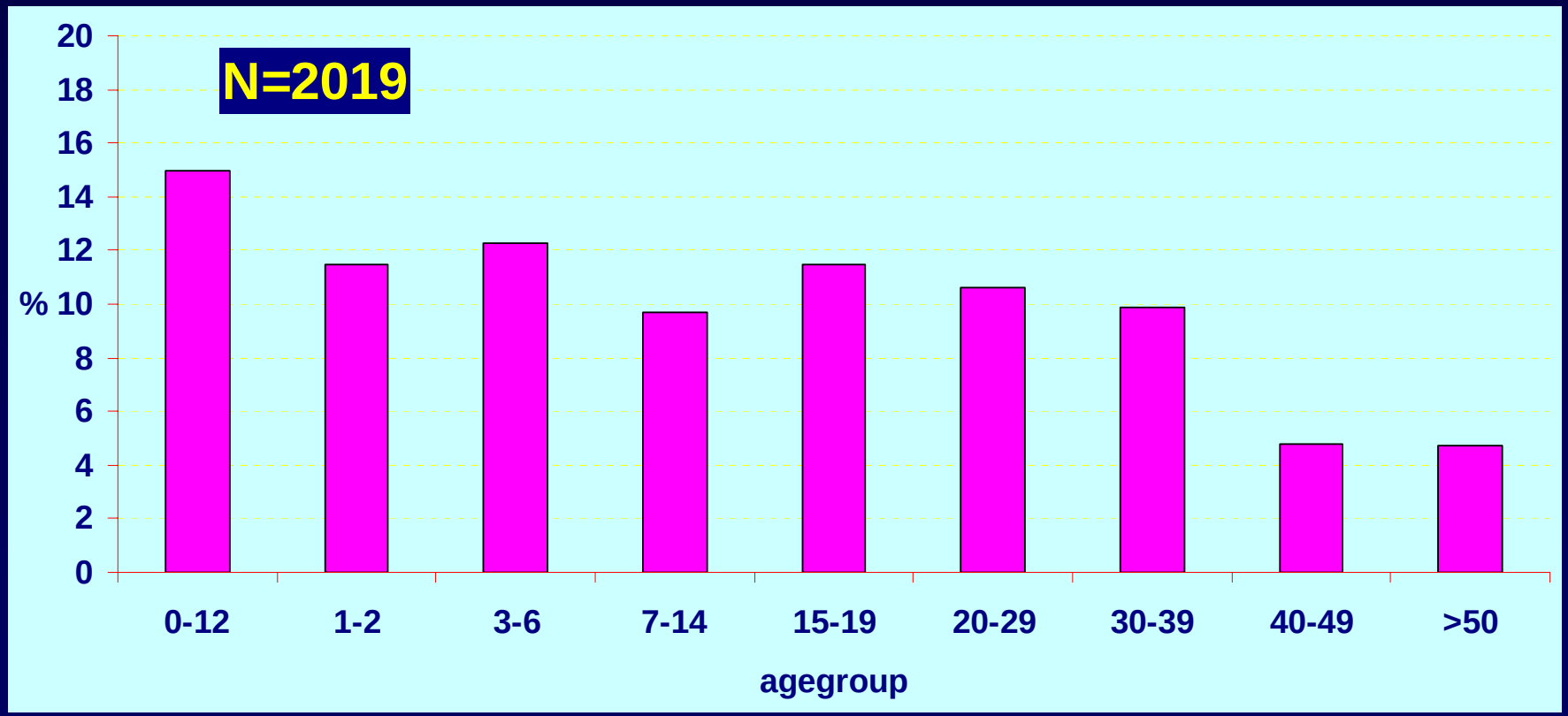
# Chronic Hepatitis B Prevalence, prier to HepB Vaccination, Uzbekistan, 1999-2000

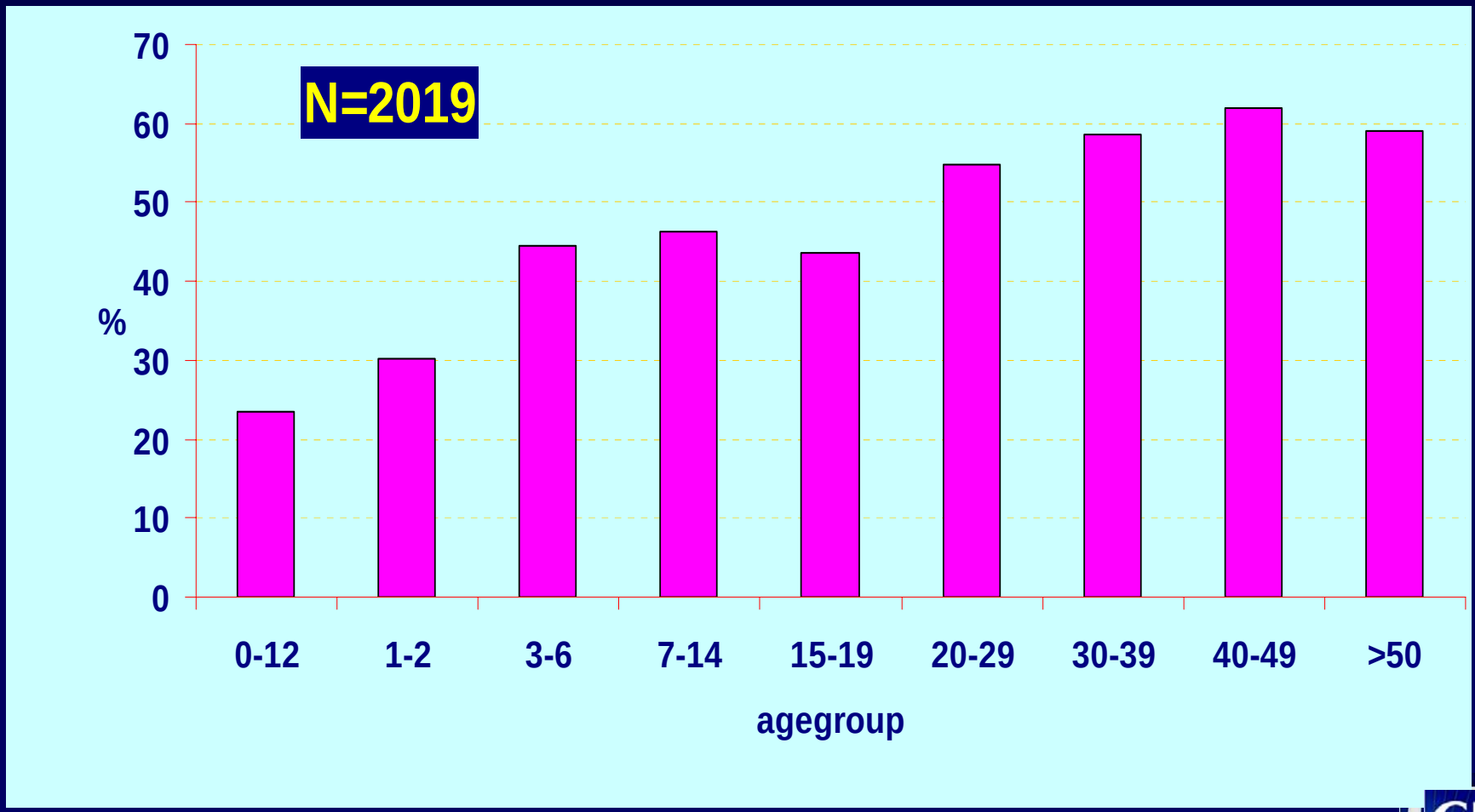



Risk factors and seroprevalence of hepatitis B virus, hepatitis C virus and HIV infection in Uzbekistan, R.Ruzaibakiev and coll.

# Distribution of Chronic HBV Infection by Age Groups before Immunization, Osh, Kyrgyzstan, 1989

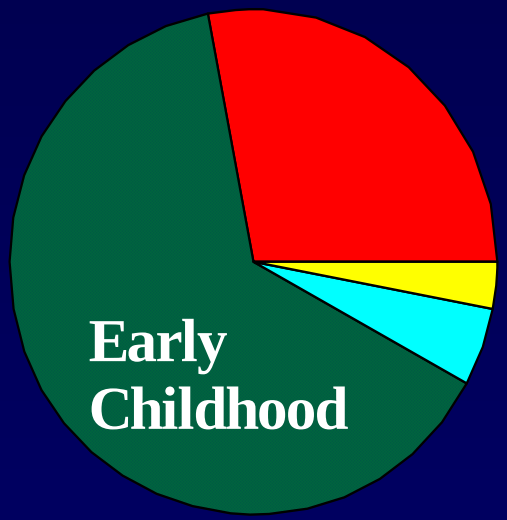


# Distribution of HBV Infection by Age Groups before HepB Vaccination, Osh, Kyrgyzstan, 1989



# Age of Aquisition of Chronic HBV Infection in High Endemic Areas

**High HBeAg (40%)**

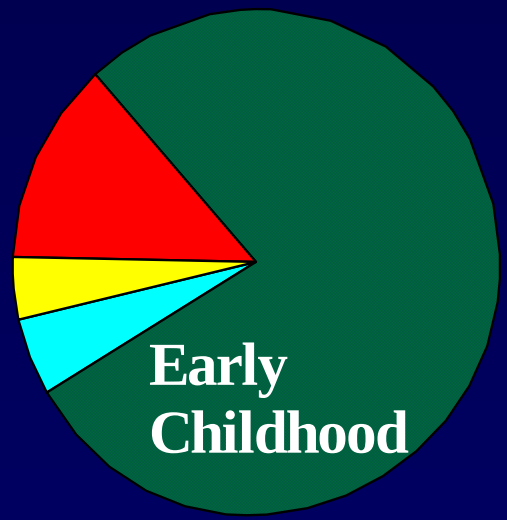



Perinatal

Adult

Adolescent

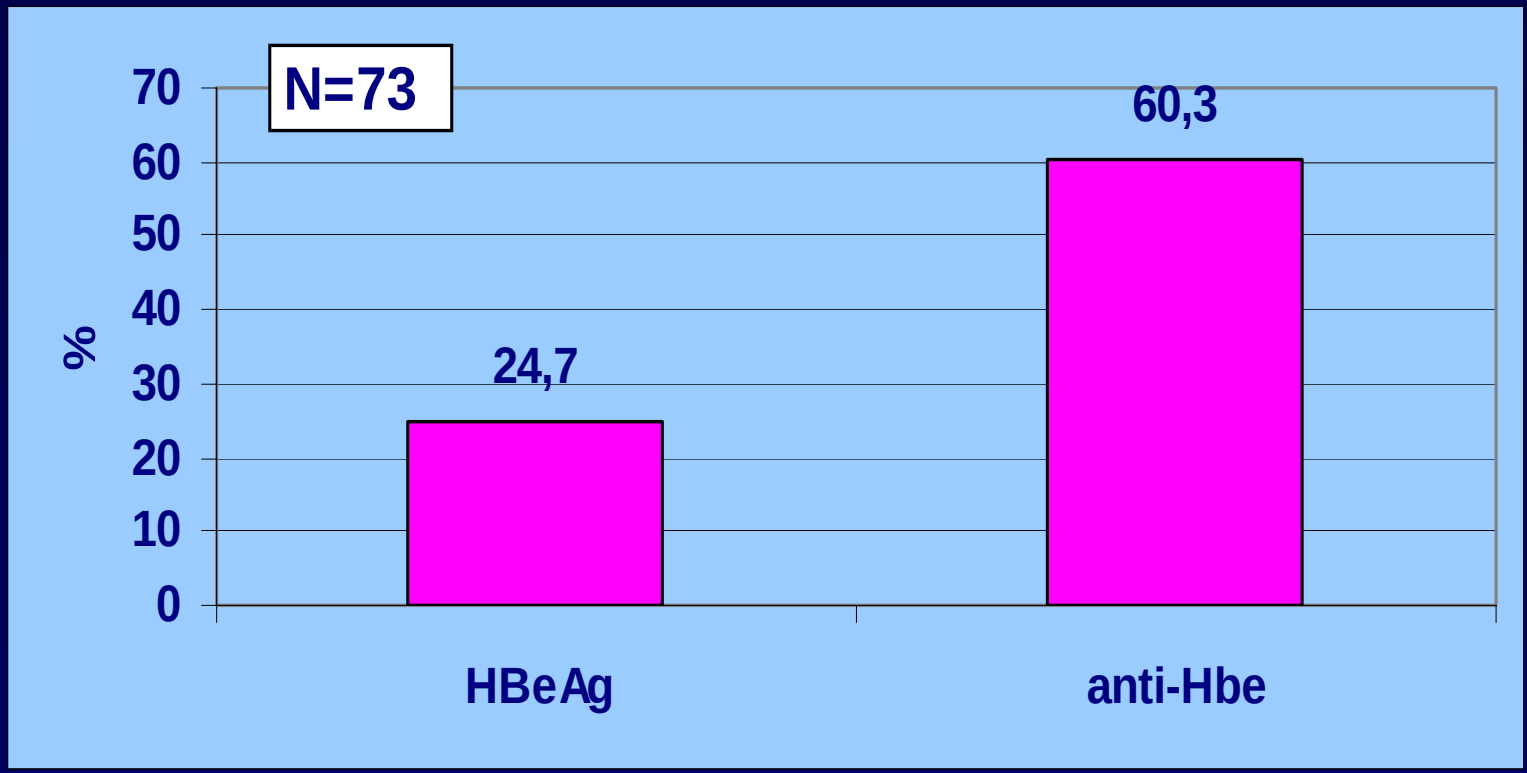
**Low HBeAg (10%)**



# Risk of Perinatal HBV Transmission by HBeAg Serostatus of Mother

| Serostatus of Mother | | % Infants Infected |
|---|---|---|
| *HBsAg* | *HBeAg* | |
| Positive | Positive | 85%-100% |
| Positive | Negative | 5%-30% |

# HBeAg and anti-HBe Prevalence in Central Asia, Osh, Kyrgyzstan, 2005

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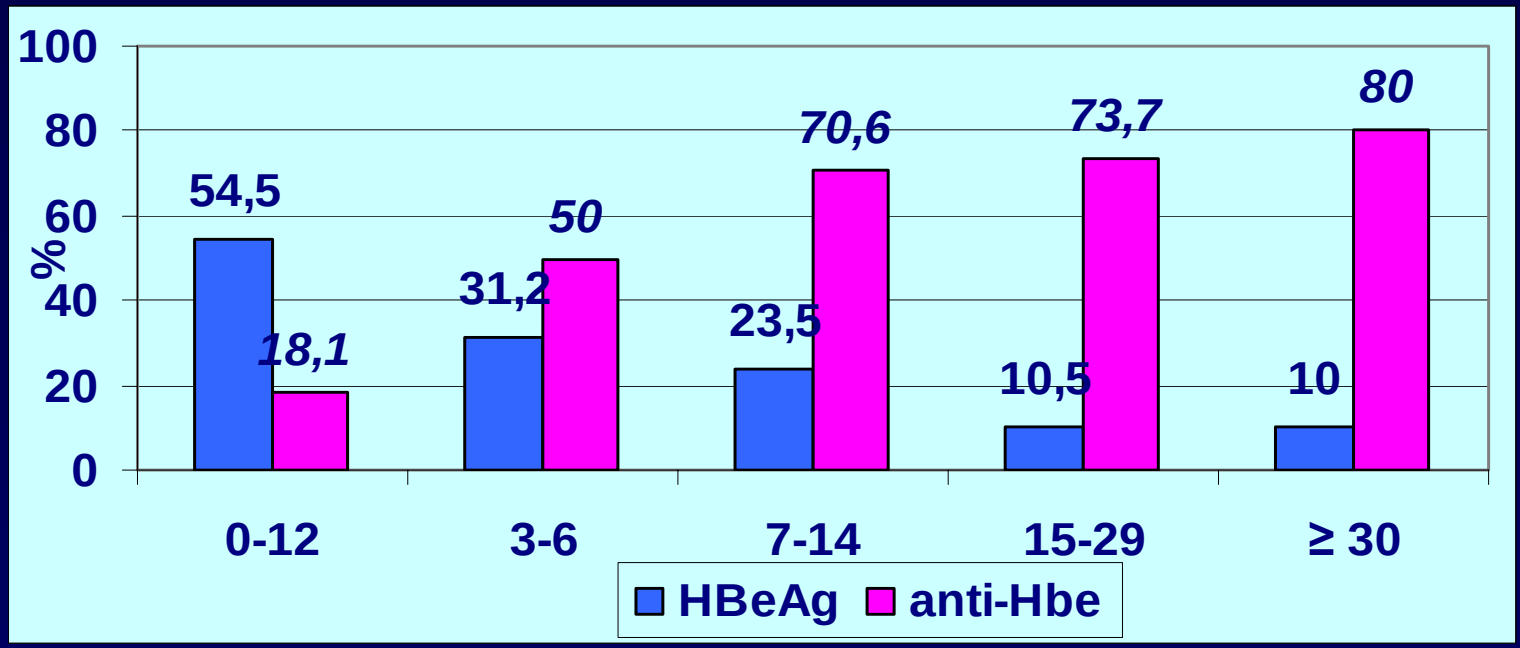
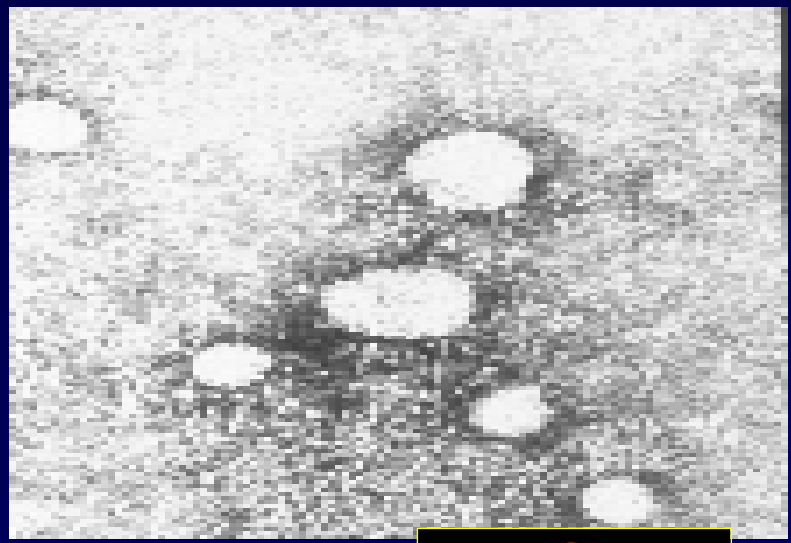
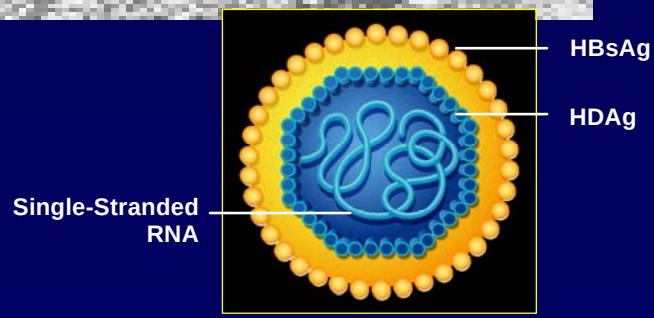
# HBeAg and antiHBe Prevalence by Age, Central Asia, Kyrgyzstan, 2005



# Hepatitis D Virus

- Diameter 35-37 nm
- Circular single strained RNA
- Depends on HBV replication



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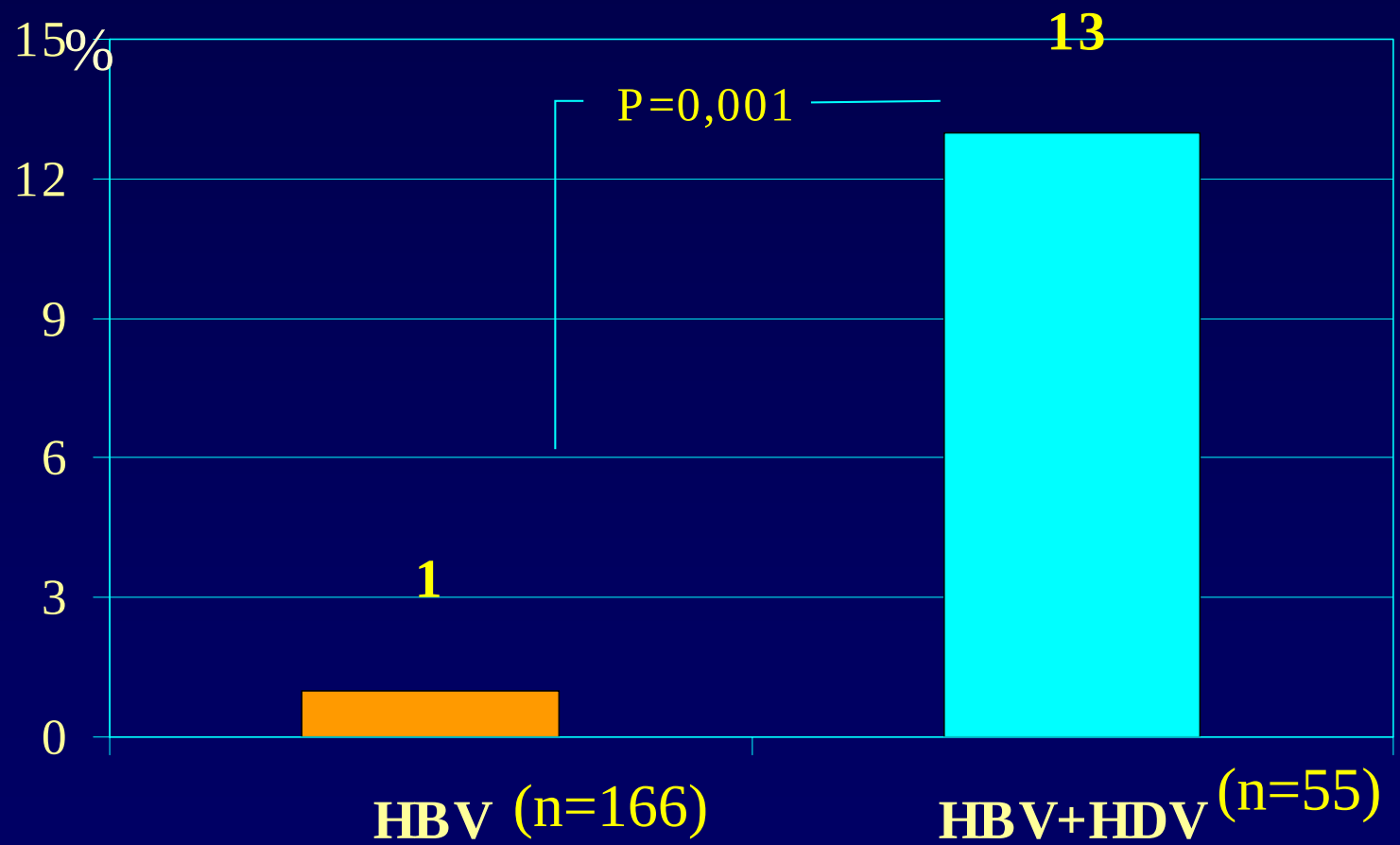
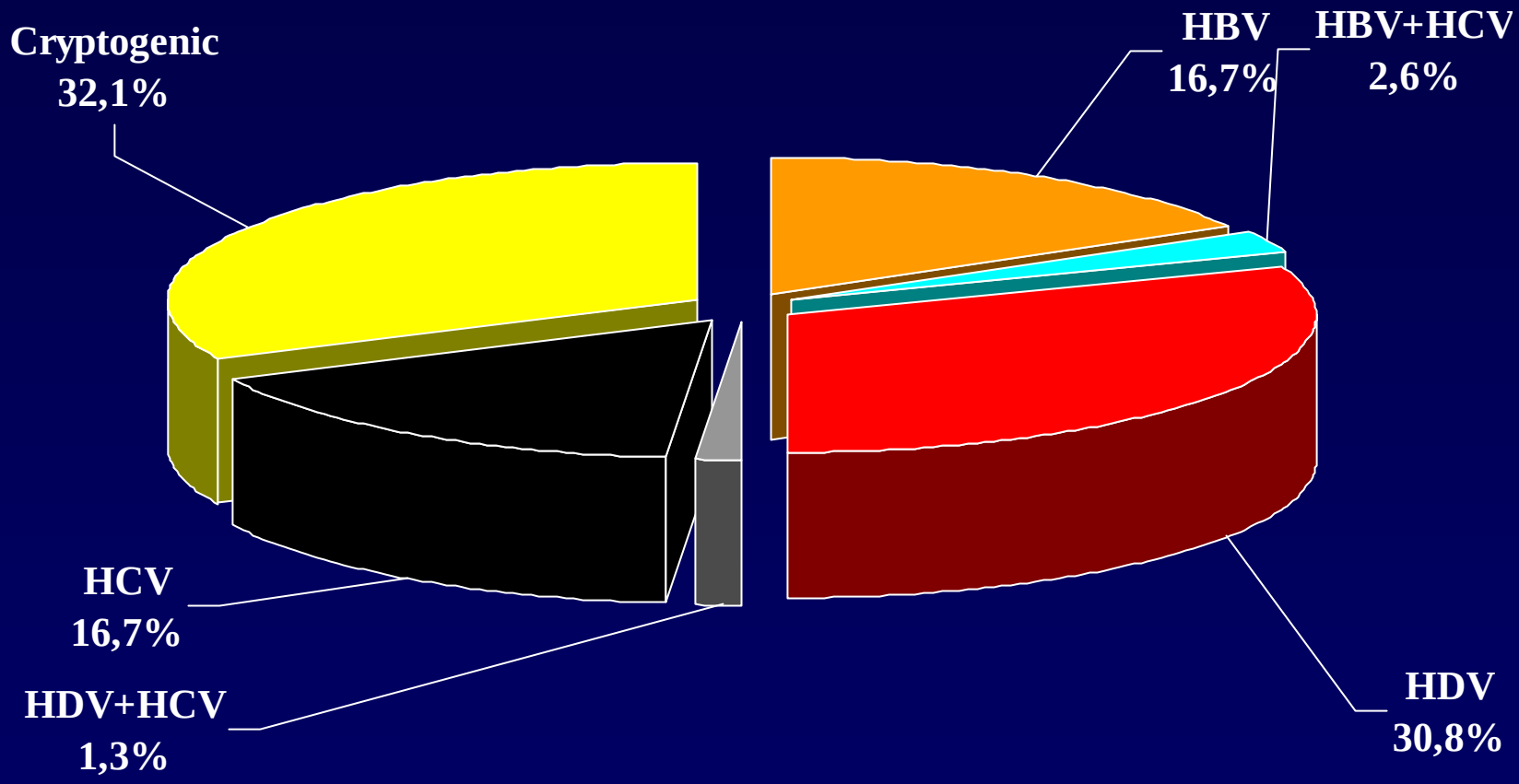
# Hepatitis D Virus
# Aquistion of Infection

| Coinfection | Superinfection |
| --- | --- |
| Simultaneous inoculation of HDV and HBV | Inoculation of HBV into HBsAg-positive host |

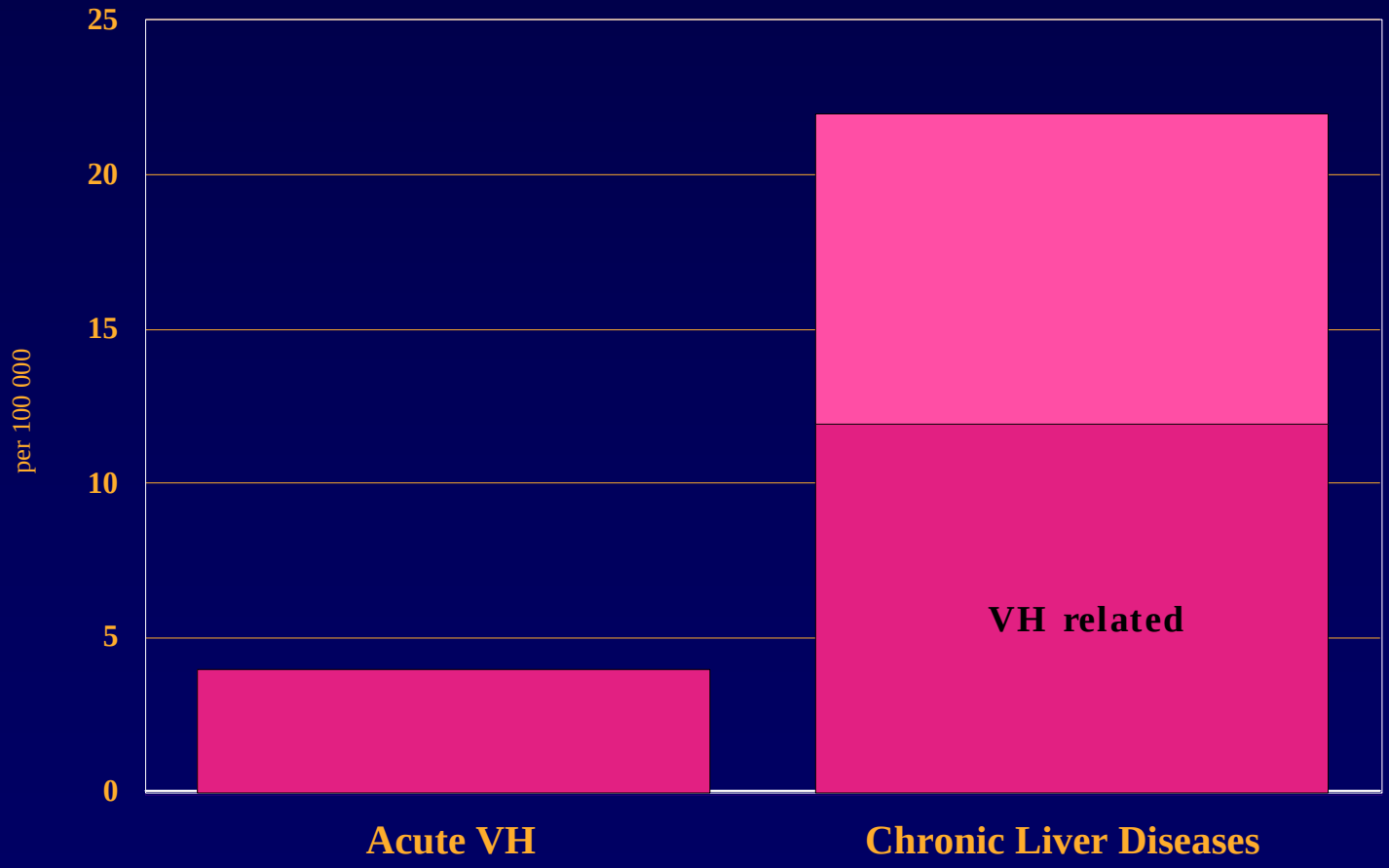
# Case Fatality Rate of Acute HBV and HDV Infection Among Children under 14, Uzbekistan, 1995



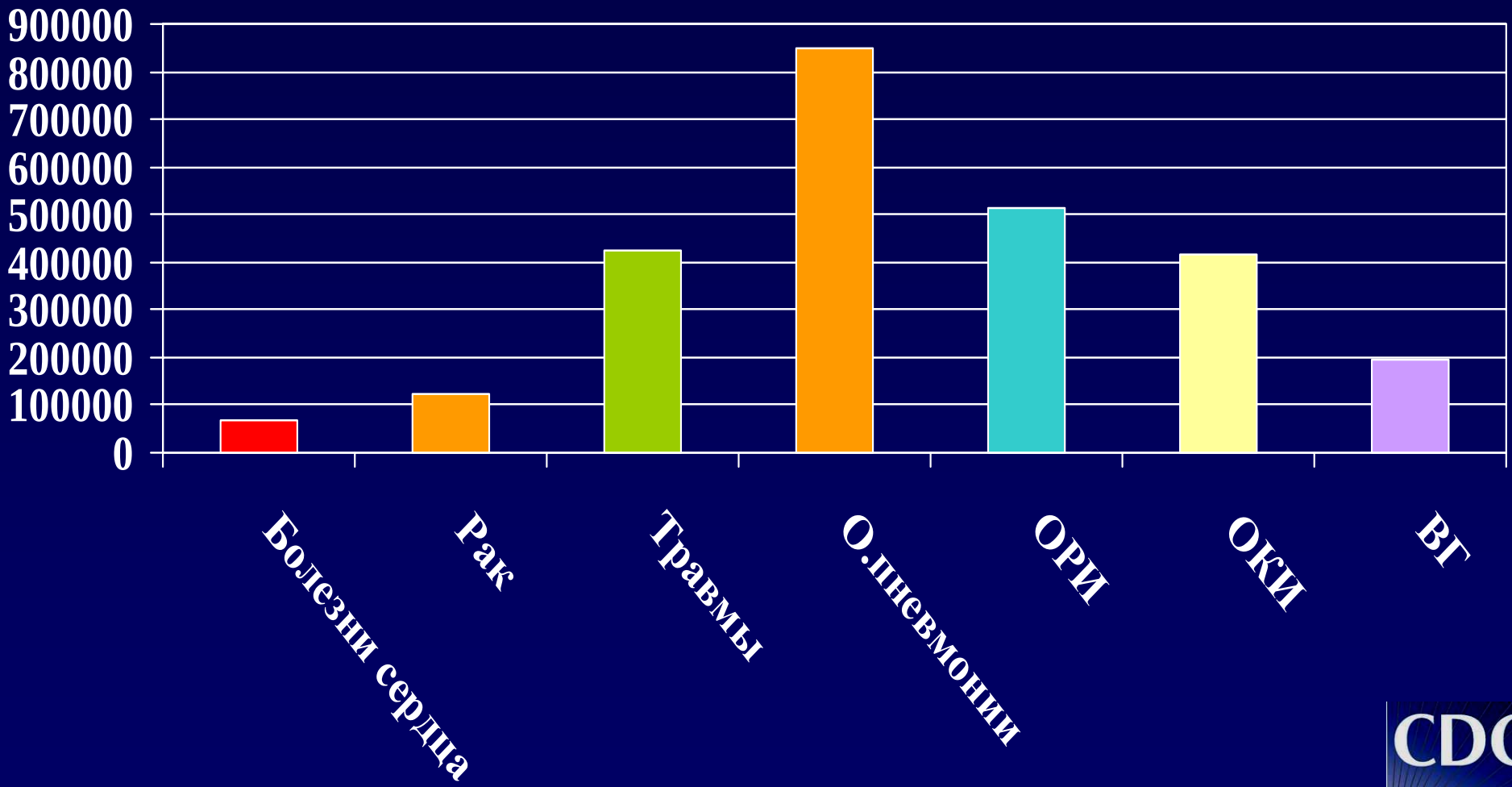
# HBV, HBC and HDV Infection among Children with Chronic Liver Diseases. Ashgabad, Turkmenistan, 1992-1995



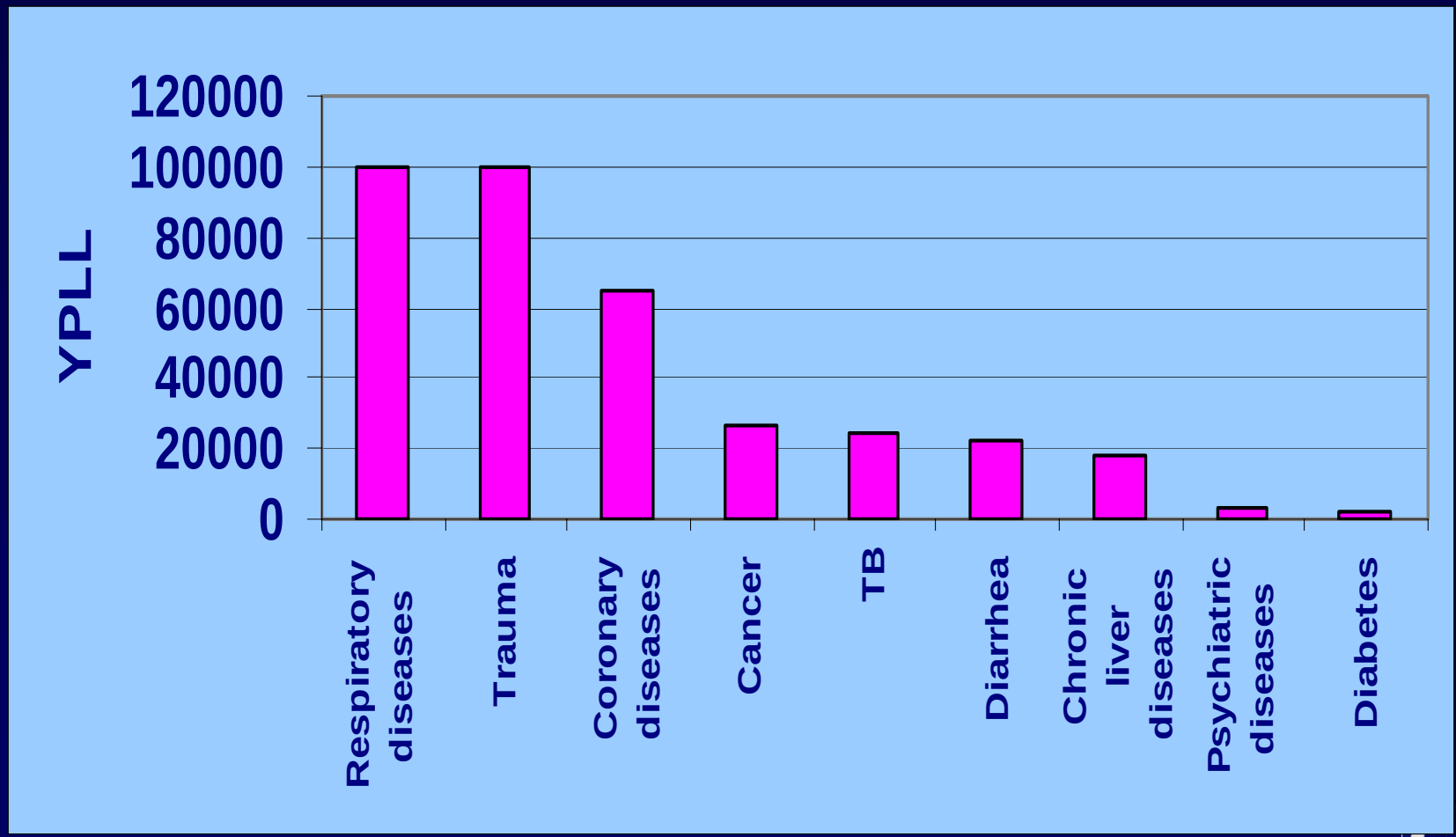
# Estimated Acute VH and Chronic Liver Diseases Mortality prior to vaccination, Central Asia, 1991-1998



# Years of Potential Life Lost for different causes, Uzbekistan, 1987



# YPLL for Significant Death Causes, Kyrgyzstan, 2000



# Risk Factors of Hepatitis B, Kyrgyz Sentinel Surveillance, Children under 5, 2000-2005

| Risk factors | Frequency (N=1556) | | OR | Confidence interval $CI_{0.95}$ | P value |
|---|---|---|---|---|---|
| | Cases (66) | Controls (1404) | | | |
| Blood transfusion | 8.5% | 0.5% | 19.7 | [5.5; 70.2] | <0.001 |
| Injections in hospital | 22.0 % | 6.0% | 4.4 | [2.3; 8.6] | <0.001 |
| Injections in outpatient settings | 13.3 % | 4.7% | 3.1 | [1.4; 6.8] | <0.001 |

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# Risk Factors of Hepatitis B, Kyrgyz Sentinel Surveillance, Children under 2, 2000-2005

| Risk factors | Frequency (N=595) | | OR | Confidence interval $CI_{0.95}$ | P value |
|---|---|---|---|---|---|
| | Cases (34) | Controls (511) | | | |
| Blood transfusion | 16.7% | 0.8% | 25.7 | [5.7; 113.6] | <0.001 |
| Injections in hospital | 33.3% | 8.2% | 5.6 | [2.4; 12.9] | <0.001 |

# Conclusions (1)

- Central Asia region was highly endemic on viral hepatitis B and D
- The high prevalence of hepatitis B and D infection leads to high morbidity and mortality from acute viral hepatitis and chronic liver diseases

# Conclusions (2)

- The high prevalence of HBeAg careers among women with chronic HBV infection results in high prevalence of mother to child transmission
- High proportion of infants and children at early childhood acquire HBV and HDV infections at health care settings

# Recommendations

- Provide sustainable implementation of universal newborn Hep B immunization programs
- Pay particular attention to the timely and proper introduction of the HepB birth dose
  - Trainings and education of neonatologists
  - Immunization of newborns delivered at home