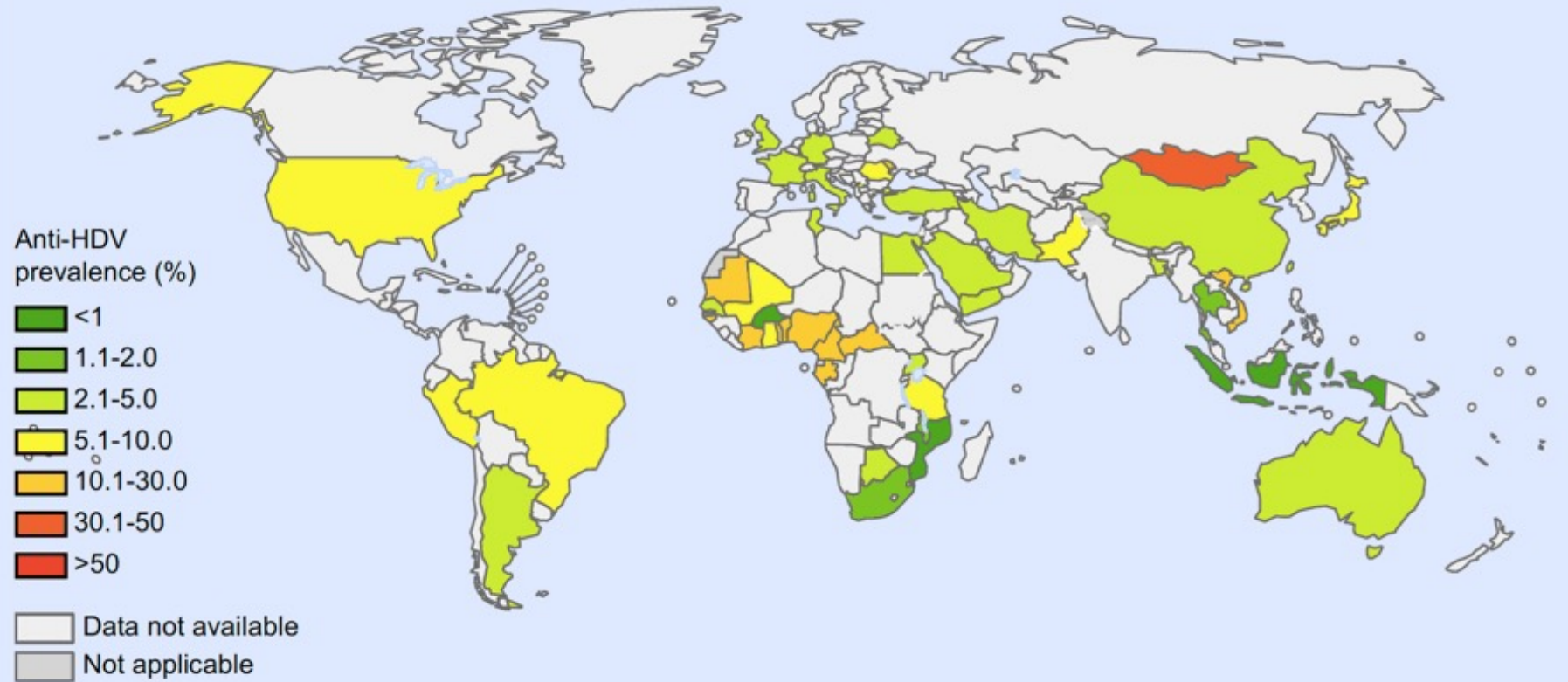


Hepatitis B and D Coinfection

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Global HDV Prevalence

Prevalence of anti-HDV among HBsAg positive people in the general population



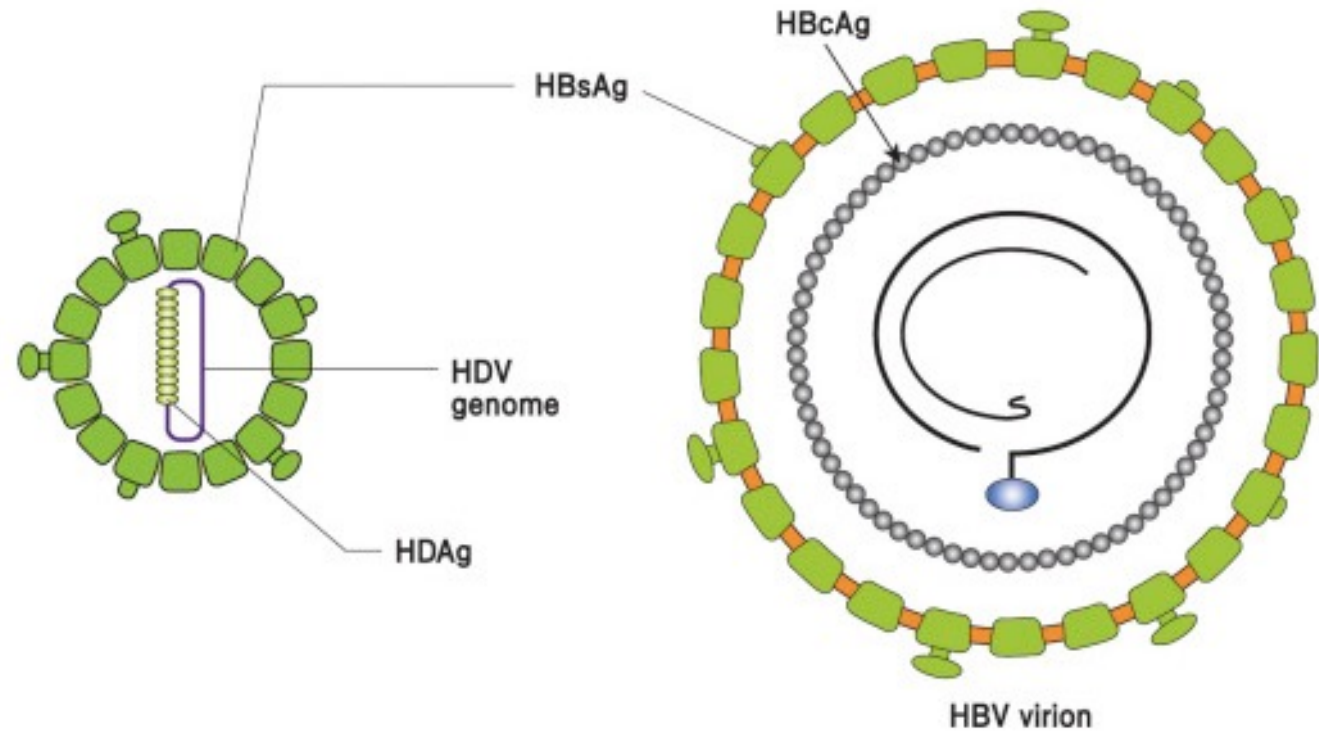
Global prevalence 4.5% among HBsAg-positive patients or 0.16% in total population: 12 million people

High prevalence reported in Mongolia, Republic of Moldova, and countries of middle and west Africa

Patients at Risk for HDV

- Persons with HBV
- Persons who inject drugs
- Hemodialysis recipients
- Sex workers
- Men who have sex with men
- People with HIV and HCV

HDV Requires HBV for Replication



From Wang-Shick Ryu, Molecular Virology of Human Pathogenic Viruses, 2017

Transmission

- Percutaneous contact
- Less common: mucosal contact with infectious blood or bodily fluids
- Most common routes of transmission:
 - Sexual contact with infected individual
 - Injection drug use with sharing needles, syringes or drug preparation equipment
 - Contact with blood or open sores with blood from infected person
 - Needle sticks or exposures to sharps
 - Contaminated instruments
 - Sharing razors or toothbrushes with infected person
 - Mother to child via birth

What is the impact of HDV in a patient with HBV?

HDV and HBV Coinfection

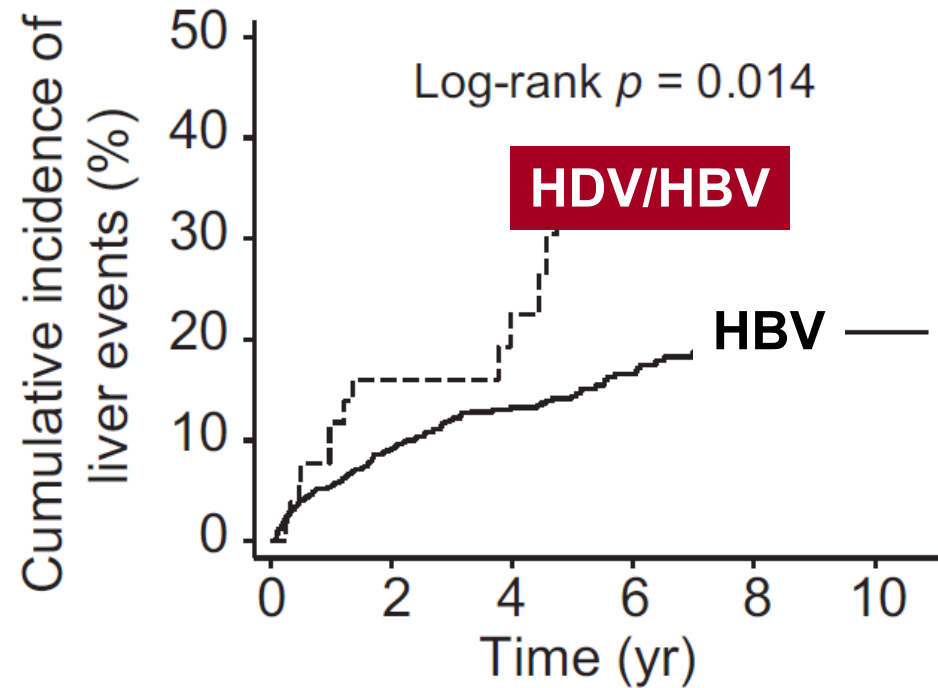
- Occurs as simultaneous infection of HBV and HDV
- Generally less common

HDV Superinfection

- Patients with HBV subsequently infected with HDV
- More likely for more aggressive disease progression, higher risk of cirrhosis and liver cancer
- More than 80% of patients with superinfection develop chronic HDV

HBV/HDV Leads to Worse Outcomes than HBV Monoinfection

A



Number at risk	0	2	4	6	8	10
HBV monoinfected	1091	685	434	266	123	36
HBV/HDV co-infected	53	33	24	7	2	2

Progression to Cirrhosis is Faster with HBV/HDV Coinfection

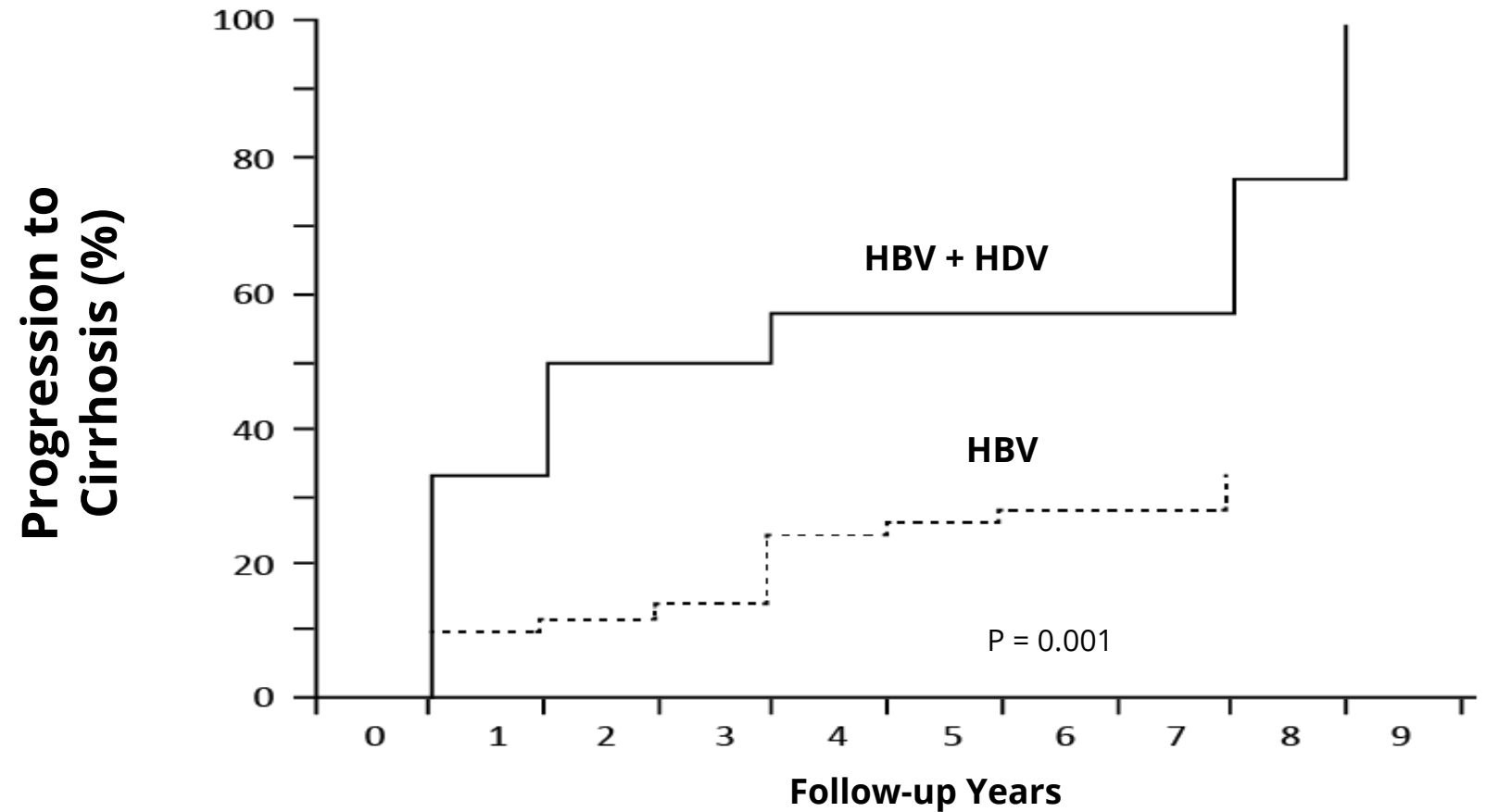



TABLE 2. Primary and Secondary Analyses of Risks for Clinical Outcomes in 337 Patients With Anti-HDV Positivity, According to Baseline Variables of HDV RNA Status, Cirrhosis Status, and Age

Predictor	Hazard Ratio (95% CI)	P Value
Any liver-related event (n = 43)		
HDV RNA	3.83 (1.49, 9.83)	0.005
Cirrhosis	11.01 (5.69, 21.26)	<0.001
Age	1.05 (1.03, 1.08)	<0.001
HCC (n = 13)		
HDV RNA	2.55 (0.55, 11.78)	0.23
Cirrhosis	3.16 (1.22, 11.13)	0.02
Age	1.08 (1.04, 1.13)	<0.001
Hepatic decompensation (n = 37)		
HDV RNA	4.26 (1.49, 12.18)	0.007
Cirrhosis	14.62 (6.83, 31.29)	<0.001
Age	1.05 (1.02, 1.07)	<0.001
Liver-related death/liver transplantation (n = 28)		
HDV RNA	7.40 (1.74, 31.76)	0.007
Cirrhosis	13.96 (5.83, 33.42)	<0.001
Age	1.07 (1.04, 1.10)	<0.001

Hazard ratios were calculated by Cox regression model using the group with HDV RNA negativity, patients without cirrhosis as reference = 1, and age as continuous variable, respectively. Those with values >1.0 to <1.1 are shown with two decimal places.

Abbreviations: CI, confidence interval; HCC, hepatocellular carcinoma; HDV, hepatitis D virus.

Long-Term Study of Hepatitis Delta Virus Infection at Secondary Care Centers: The Impact of Viremia on Liver-Related Outcomes

Habiba Kamal ^{1,2}, Gabriel Westman,³ Karolin Falconer,^{1,2} Ann-Sofi Duberg,⁴ Ola Weiland,^{1,2} Susanna Haverinen,¹ Rune Wejstål,⁵ Tony Carlsson,⁶ Christian Kampmann,⁷ Simon B. Larsson,⁸ Per Björkman,⁹ Anders Nystedt,¹⁰ Kristina Cardell,¹⁰ Stefan Svensson,¹¹ Stephan Stenmark,¹² Heiner Wedemeyer,¹³ and Soo Aleman^{1,2}

Who Should be Screened for HDV?

- **AASLD Guidance on Screening in Persons with HBsAg-positivity:**
- Persons with HIV
- Persons who inject drugs
- Men who have sex with men
- Persons at risk for sexually transmitted diseases
- Persons from areas of high HDV endemicity
- Persons with low HBV DNA but high ALT levels

Testing for HDV

- In patients with chronic HBV: patients who are HBsAg +
- Anti-HDV total immunoglobulin G (IgG) and IgM
 - If total is detected, PCR for HDV RNA

Therapies for HDV

Goal

- HDV RNA suppression
- Normalize ALT
 - Reduce risk of disease progression
 - Reduce risk of cirrhosis
 - Reduce risk of liver cancer

Treatments

- Pegylated interferon
- “Hepcludex”- bulevirtide (viral entry inhibitor), submitted to FDA

Prevention

- Vaccination against hepatitis B prevents HDV infection

Key Points

- Epidemiological data on HDV are limited due to low screening
 - Delta infections are not common in New Mexico
- HDV infection is associated with hepatitis B virus infection, requires HBsAg
- Coinfection of HDV and HBV results in worse liver related outcomes than HBV mono-infection
- HDV therapies limited-new therapies available soon
- HDV infection preventable with HBV vaccination