

Viral Hepatitis Prevention Board Meeting Rotterdam, The Netherlands, November 13-14, 2008

rivm

National Institute
for Public Health
and the Environment



Universitair Medisch Centrum
Utrecht

Epidemiology of hepatitis B in The Netherlands

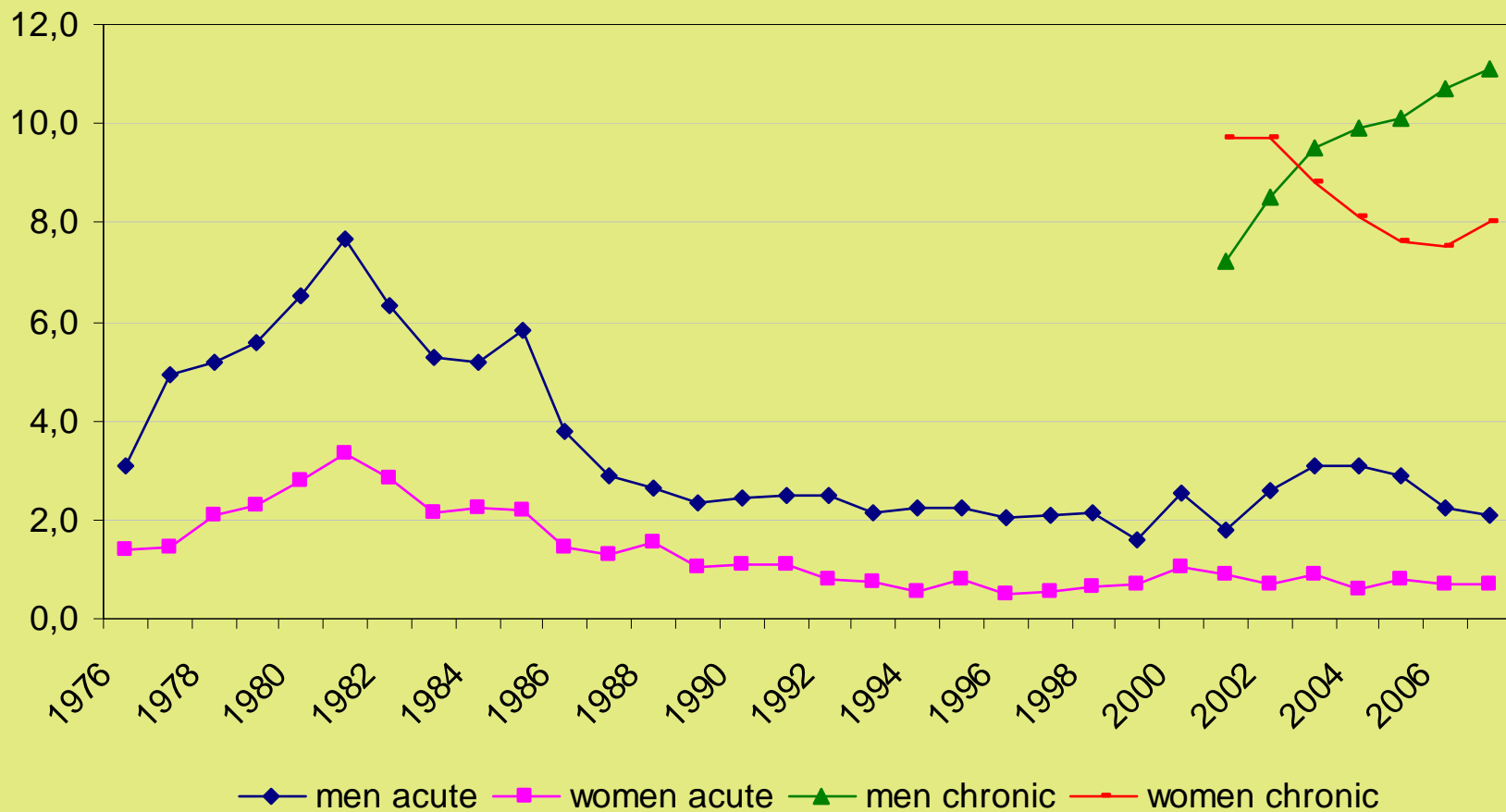
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Outline

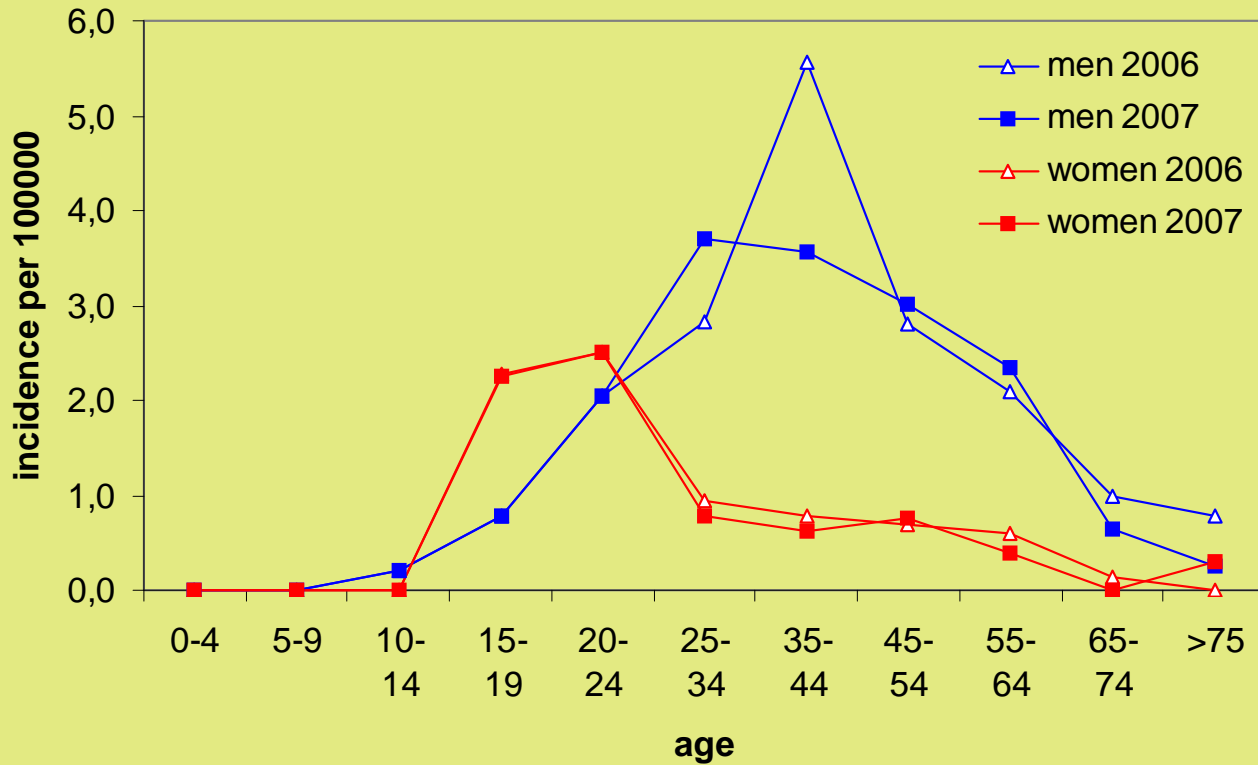
- Prevalence and incidence of notified cases by age and risk group
- Epidemiological studies
 - Seroprevalence studies
 - Modelling
 - Enhanced surveillance (BRON study)
 - Molecular epidemiology
- International dimensions
 - NL low endemic country, no universal vaccination
- Conclusions

Incidence of notified cases of acute and chronic HBV infection (1976-2007)

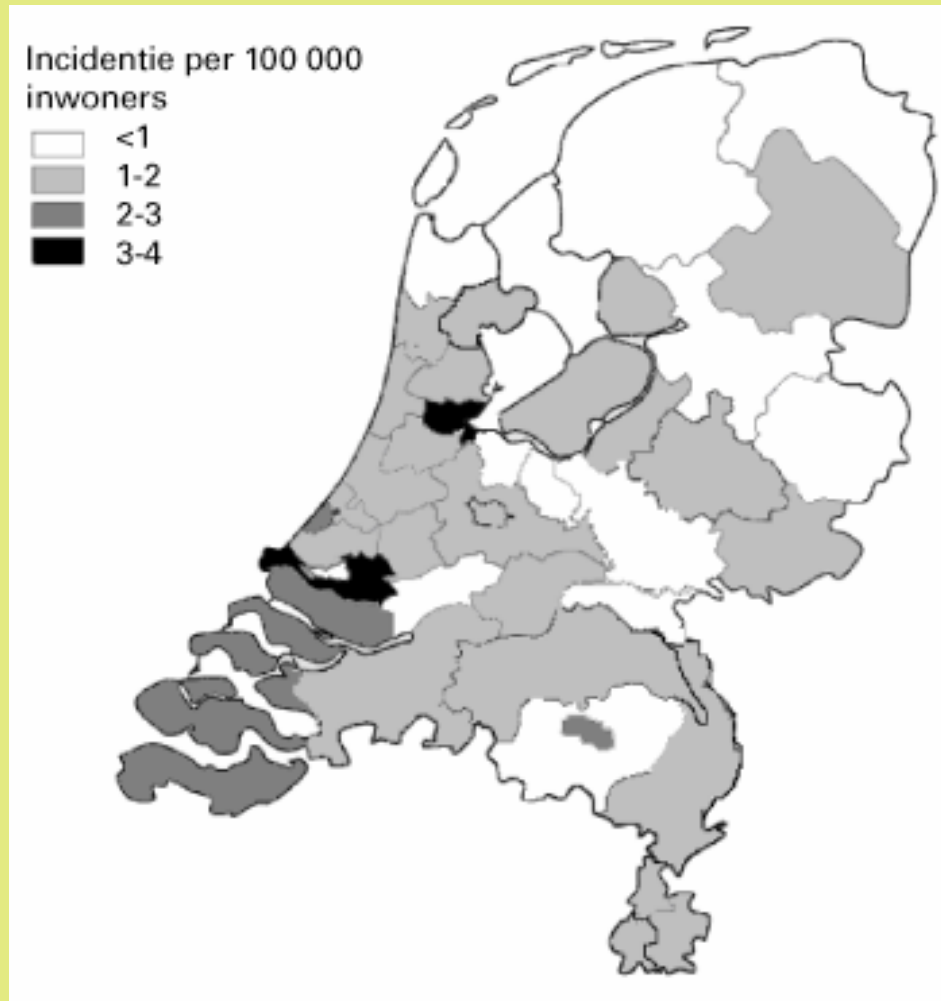


Source: Osiris notification system

Age distribution of notified cases

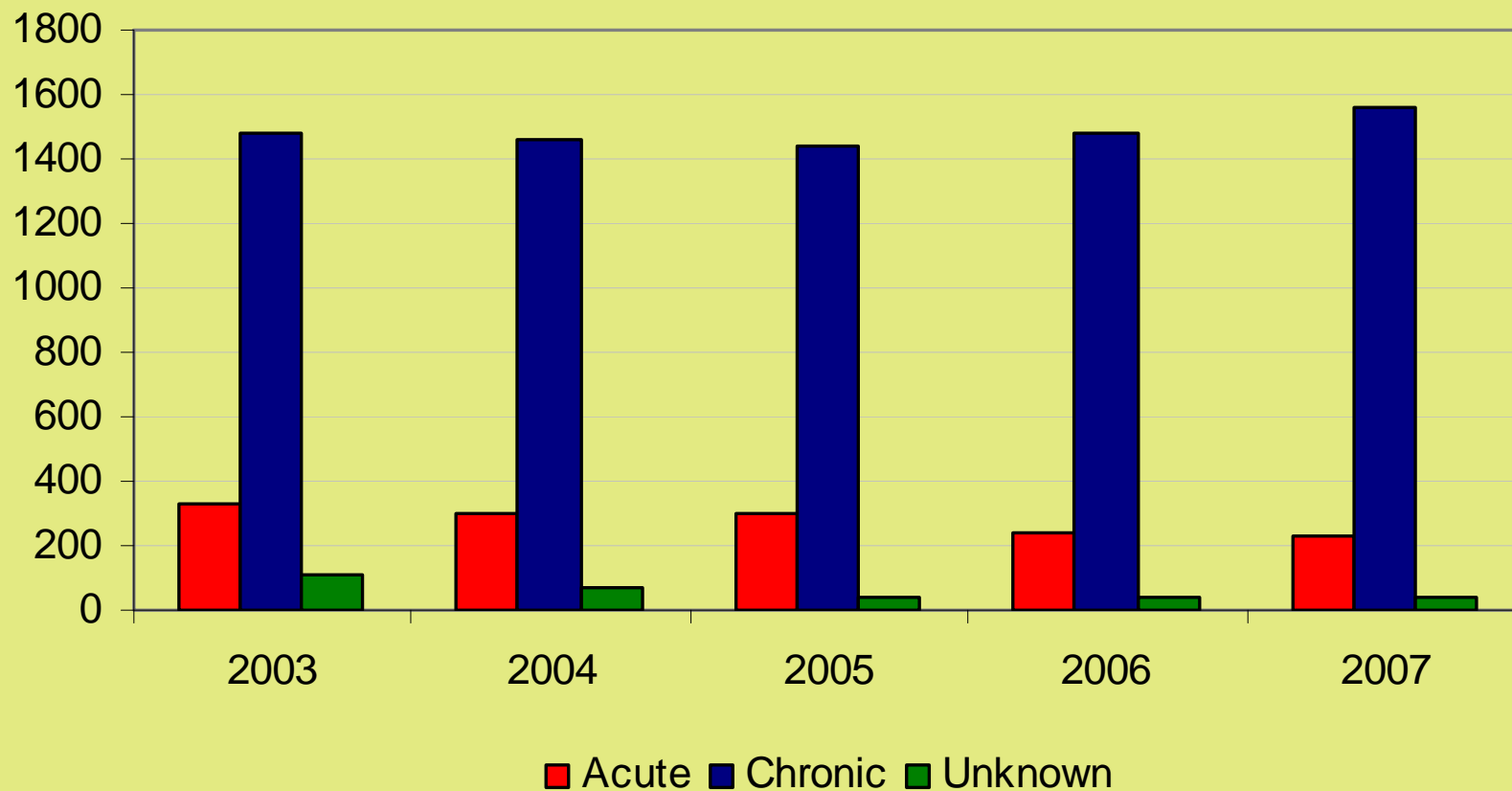


Geographical distribution

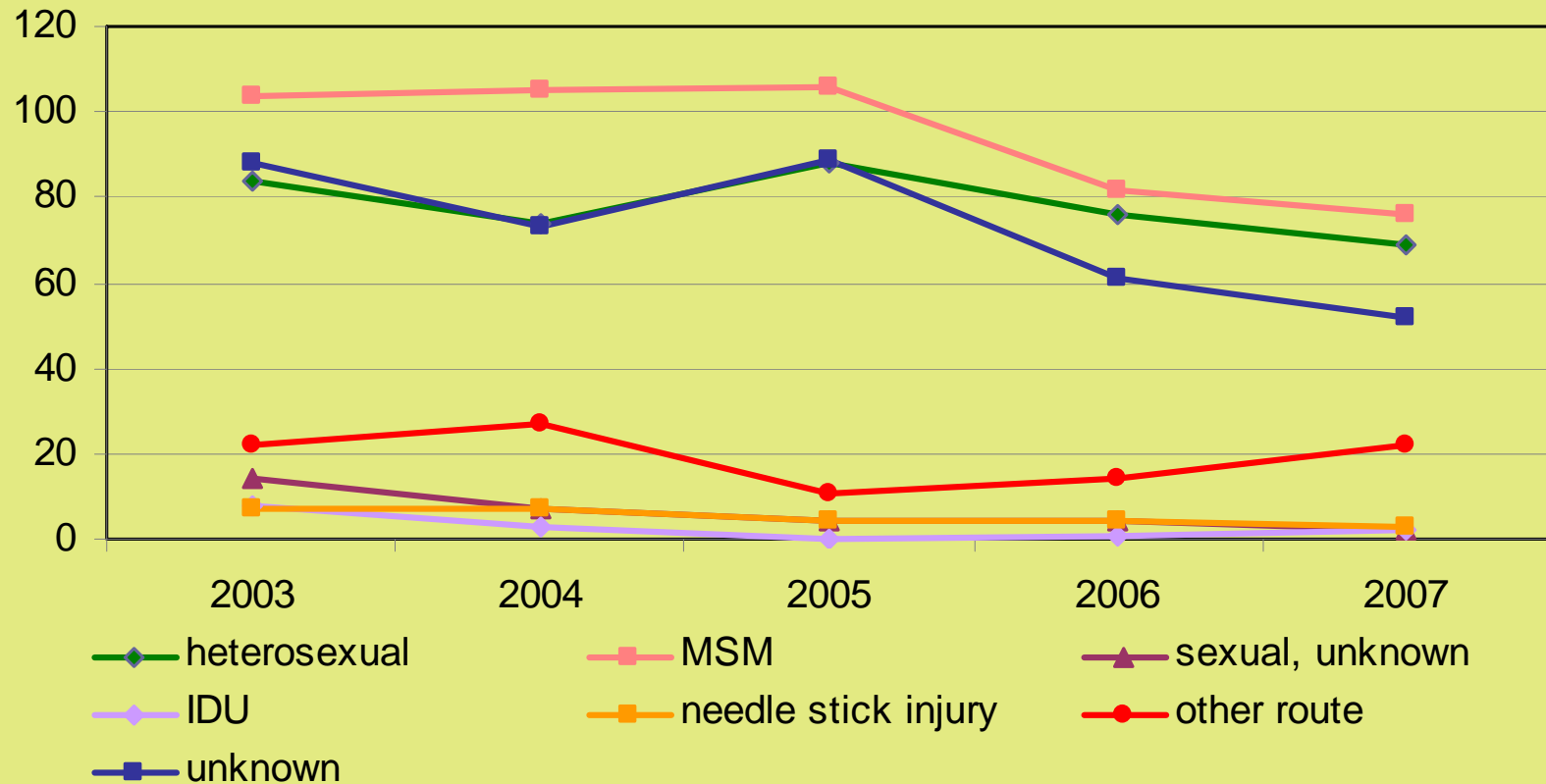


Koedijk et al Inf Bull 2007

Numbers of notified cases of HBV infection 2003-2007

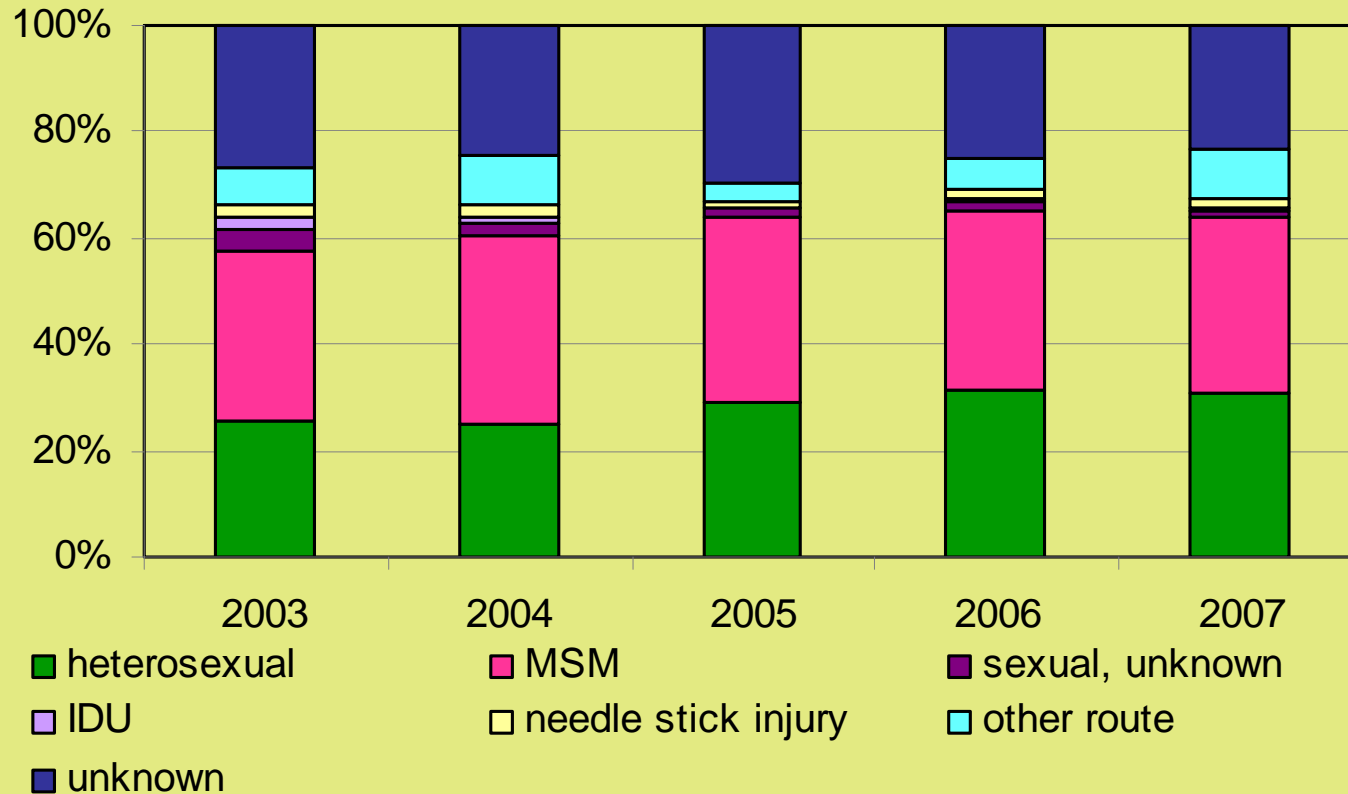


Acute HBV infections by risk group



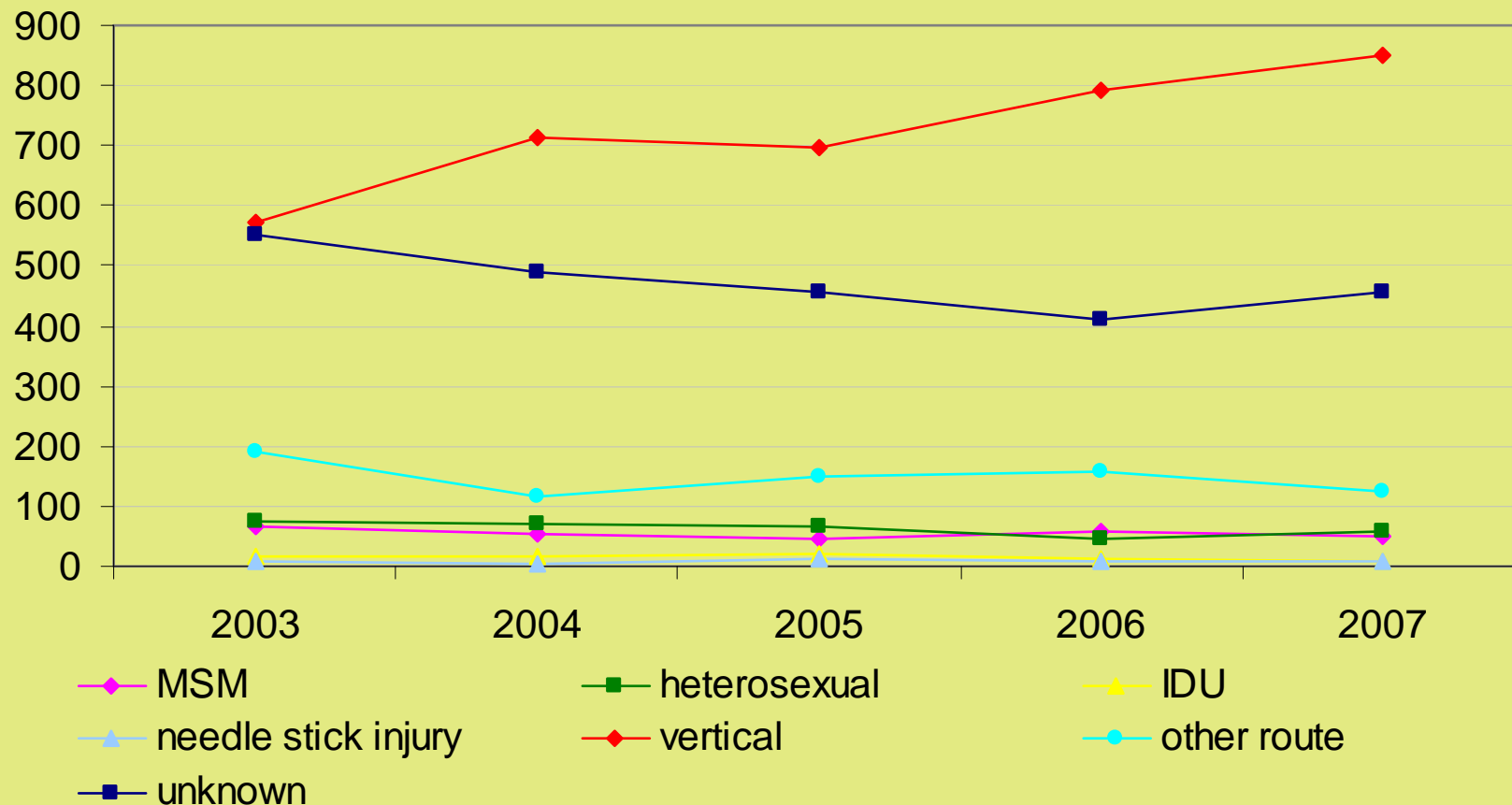
2007: sexual contact 65%, IDU 0,9%, needle stick injuries 1%, other 10%, unknown 23%
19% first generation migrants, 17% infected abroad

Acute HBV infections by risk group



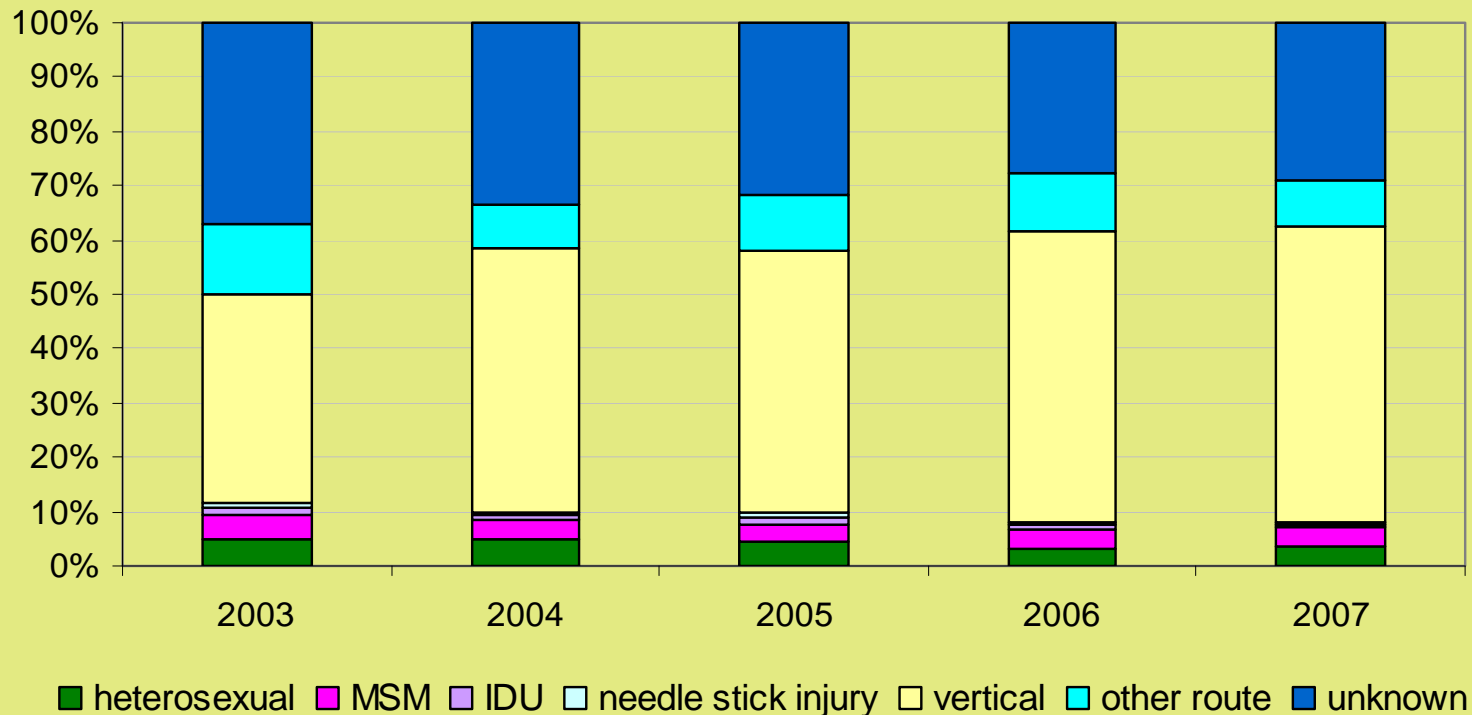
2007: sexual contact 65%, IDU 0,9%, needle stick injuries 1%, other 10%, unknown 23%
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Chronic HBV infections by risk group



2007: sexual 7%, IDU 0,6%, needle stick injury 0,6%, vertical 54%, other route 8%, unknown 29%
78% first generation migrants, 73% infected abroad

Chronic HBV infections by risk group



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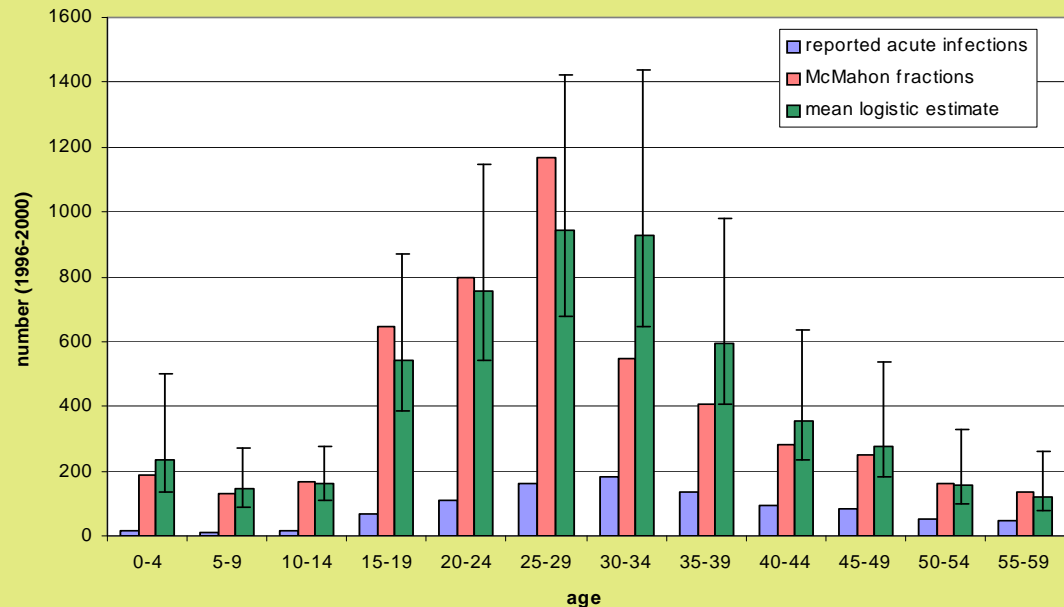
Fraction clinical infections

Age	Numbers infected	Fraction clinical infections (%)
0-4	21	9.5
5-9	61	9.8
10-19	58	10.3
20-29	22	13.6
≥ 30	27	33.3

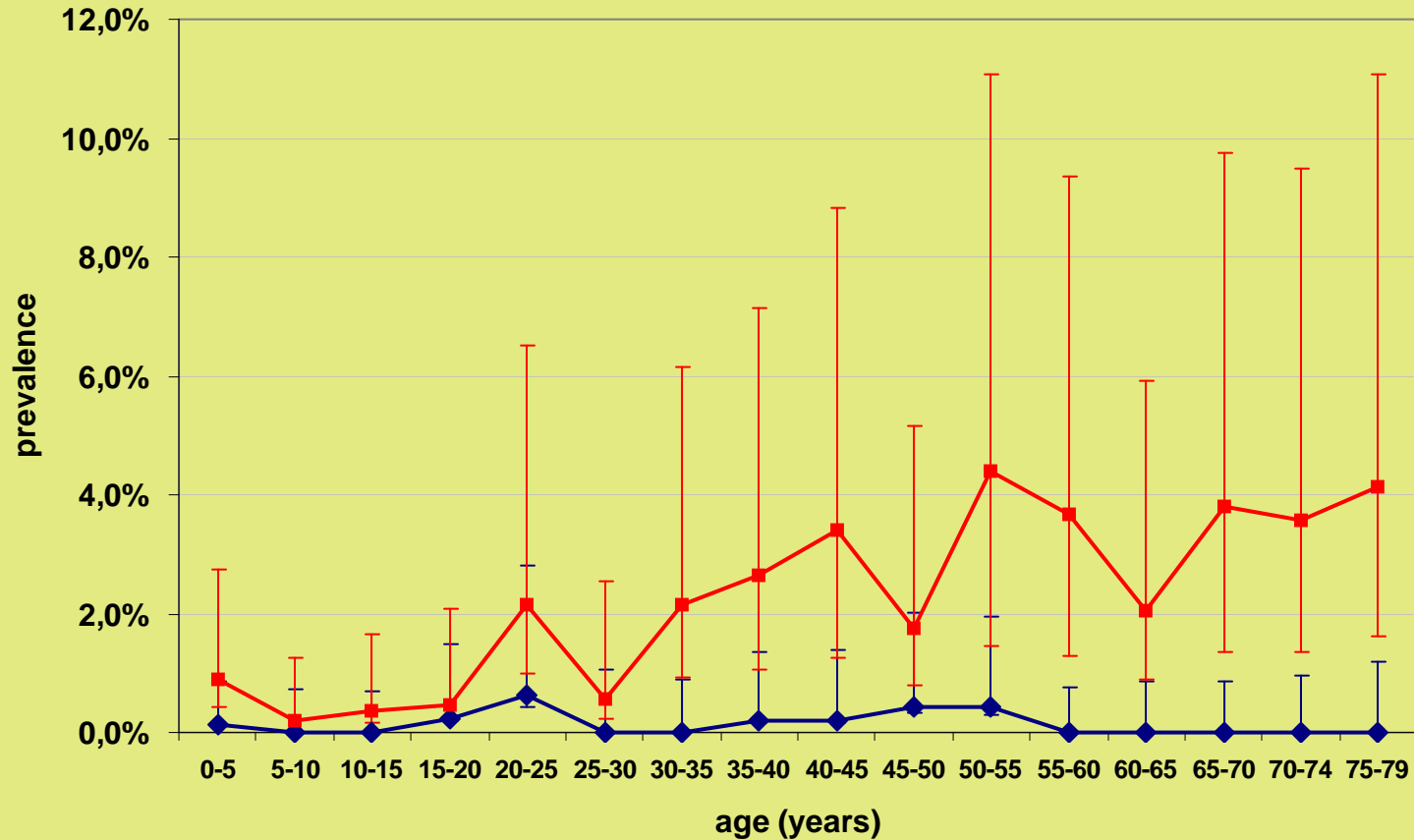
McMahon et al. JID 1985

Underreporting?

75% of symptomatic cases reported in England
(Ramsay et al. Vaccine 1998)



Seroprevalence study in representative population sample, PIENTER study 1995



Van Marrewijk et al 1999

◆ HBsAg+ ■ antiHBc+

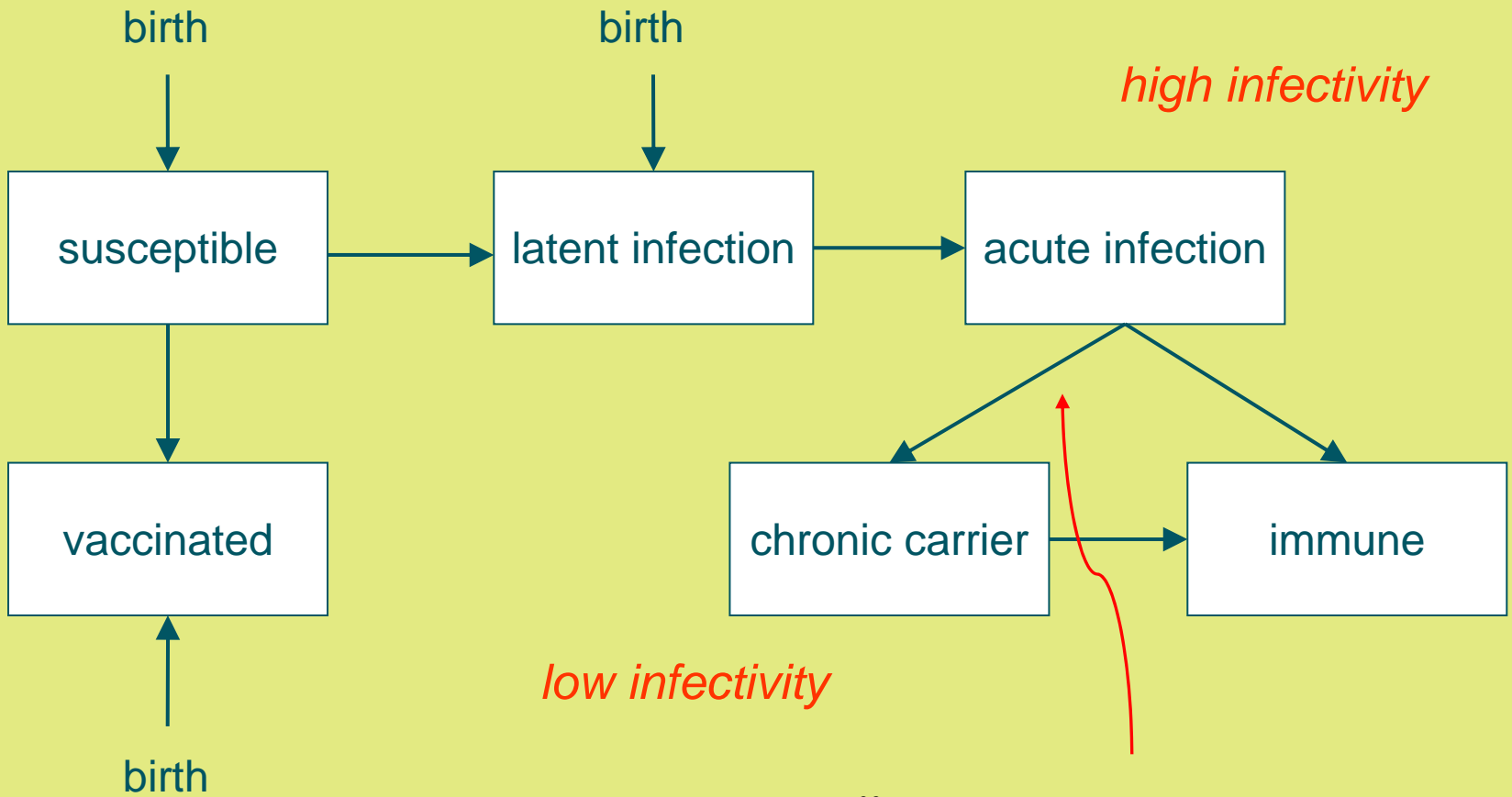
Overall prevalence: 0.2% HBsAg+ and 2.1% antiHBc+

New seroprevalence study with oversampling of migrant populations conducted in 2007, results to come soon.

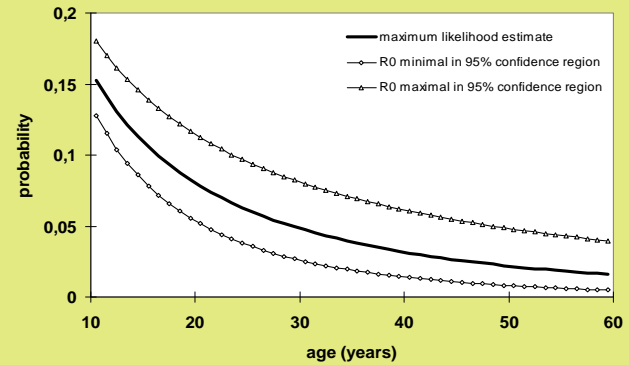
Insights from mathematical modelling

- Development of dynamic transmission model with
 - stratified by age and sexual activity
 - sexual, vertical, and horizontal transmission
 - hetero- and MSM populations
 - Age dependent probability of becoming chronic carrier
- Model used to assess effects of vaccination
- Analysis of basic reproduction number and transmission dynamics in risk groups

Williams et al. Epidemiol Infect 1996;
Kretzschmar et al Epidemiol Infect 2002;
Kretzschmar & de Wit Lancet Inf Dis 2008

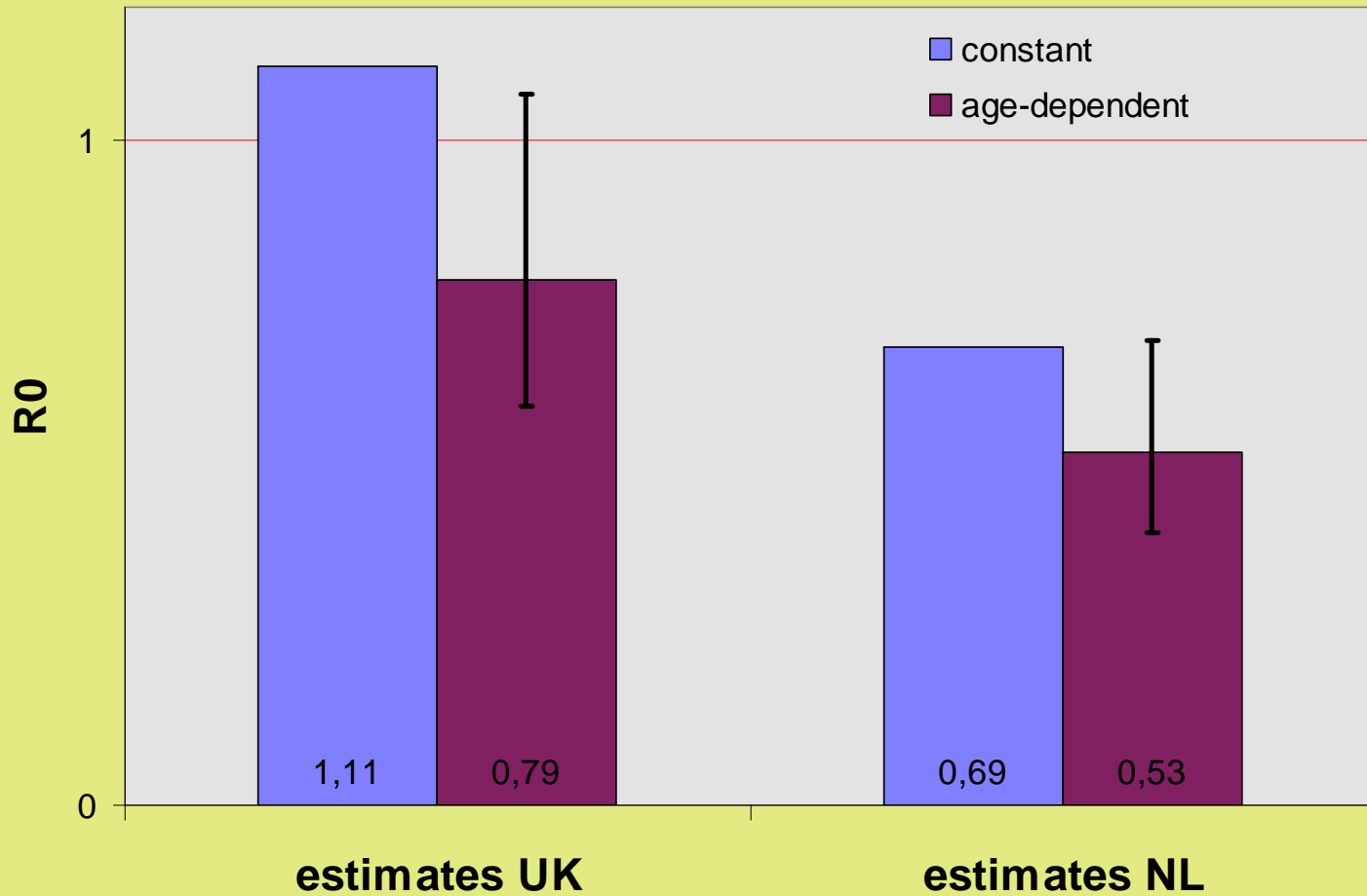


Model features



probability of chronic infection

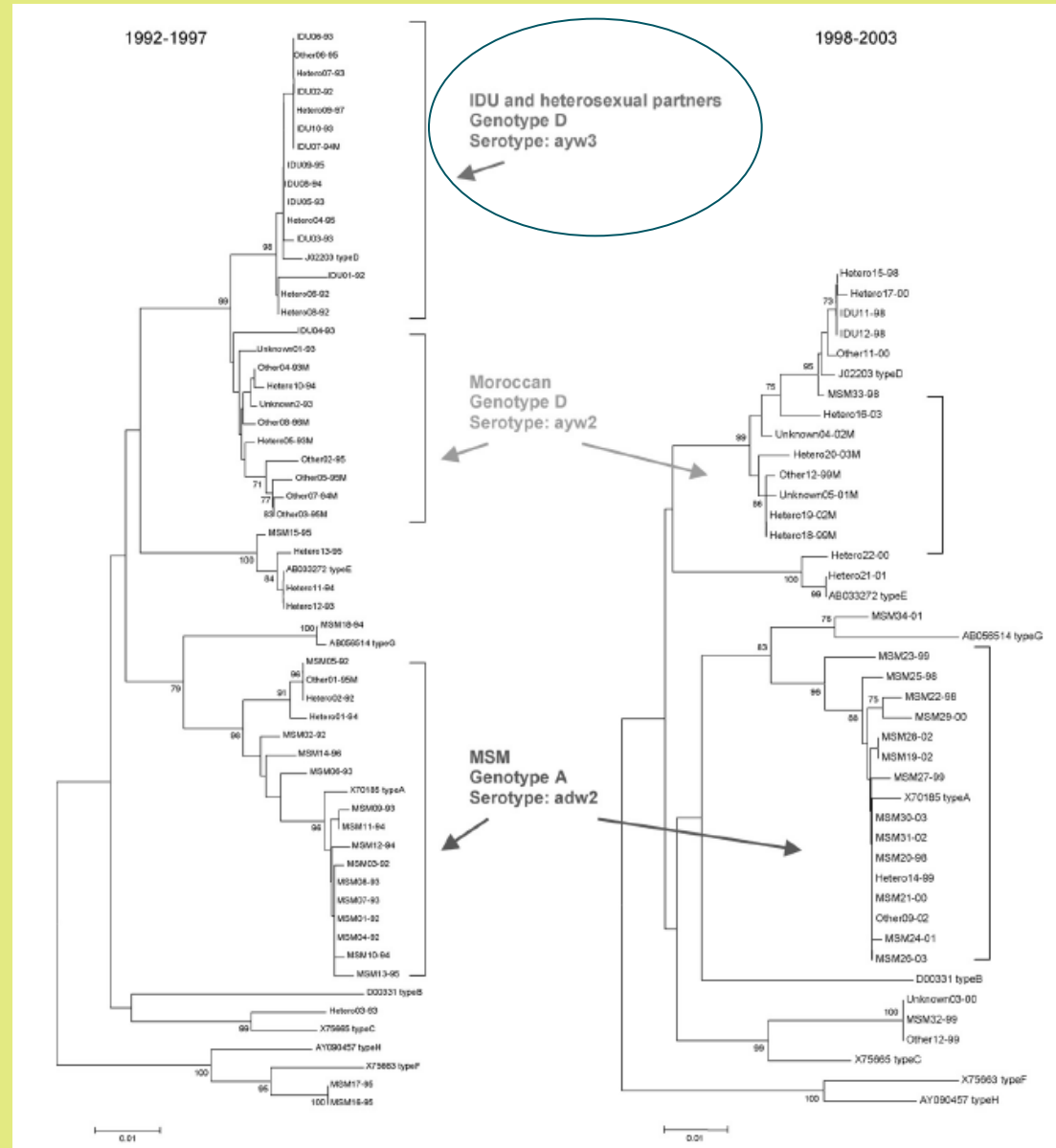
Estimates for R_0 for the heterosexual population



Implications for epidemiology?

- Homosexual men $R_0 > 1$:
 - Infection persists;
 - Import of infected persons has small impact.
- Heterosexual population $R_0 < 1$:
 - short transmission chains;
 - Import von infected persons determines prevalence.

IDU cluster has disappeared
Effect of vaccination?

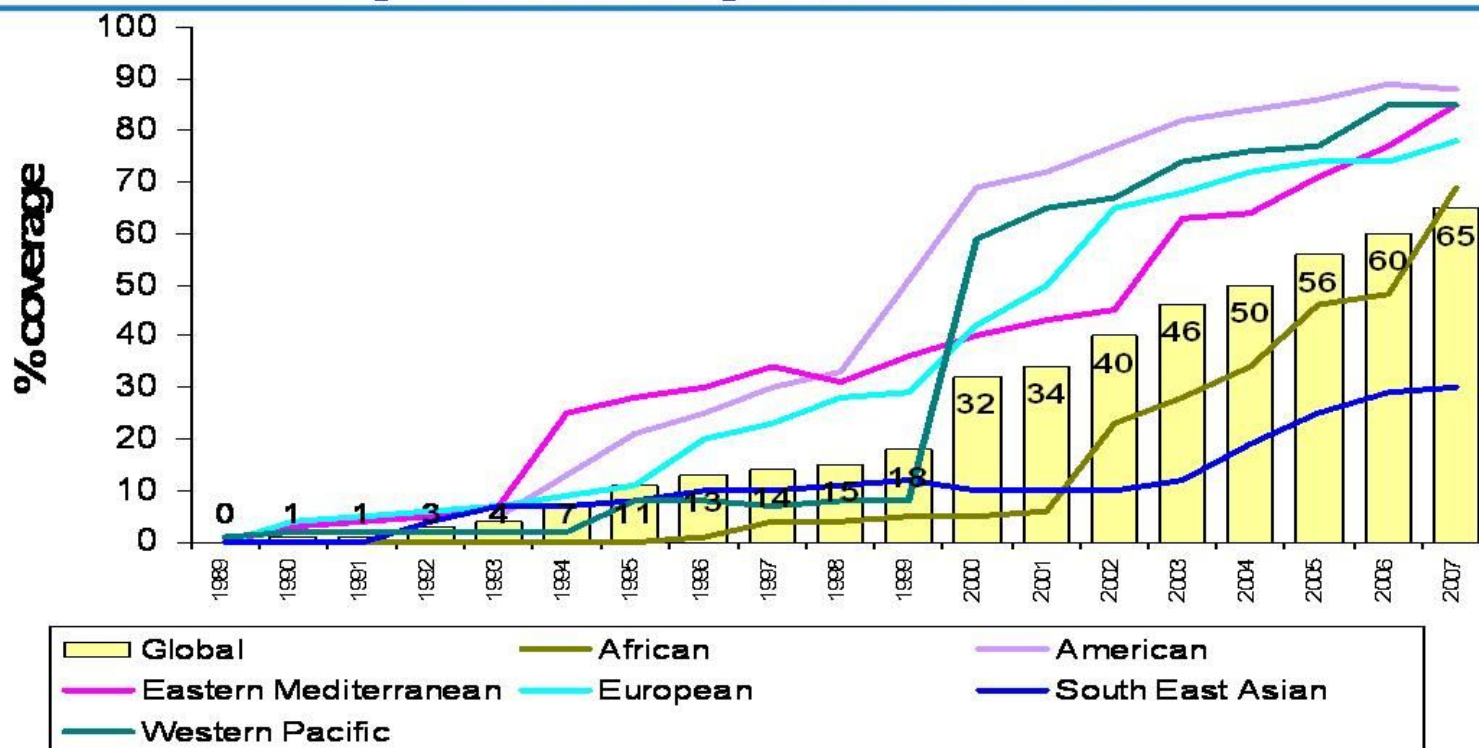


Surveillance

- Enhanced surveillance of acute hepatitis B 1999/2000 (Veldhuijzen et al. 2005)
 - 18.8% of male, 34.3% of female patients are of non-Dutch ethnicity
 - Non-Dutch ethnicity of source: hetero men 65%, women 57%, MSM 30%
- Surveillance of chronic hepatitis B 2001-2003: 54%-76% of patients born in high or medium endemic countries (Koedijk et al. 2005)
- Chronic carriers with Dutch ethnicity mostly infected sexually, chronic carriers with non-Dutch ethnicity mostly infected perinatally (Toy et al 2008)
- Prevalence estimate based on analysis of literature data: population prevalence is between 0.36% and 0.55% (Marschall et al 2008)

Global immunization coverage will impact on epidemiology of low endemic countries

Global Immunization 1989-2007, 3rd dose of Hepatitis B coverage in infants global coverage at 65% in 2007



Source: WHO/UNICEF coverage estimates 1980-2007, August 2008, 193 WHO Member States. Date of slide: 21 August 2008

Conclusions

- Netherlands is a low endemic country
- Incidence of acute infections in MSM and other high risk groups
- Persistent circulation of virus in MSM but not in general heterosexual population
- Prevalence of chronic infections strongly determined by migration from high and medium endemic areas
- Epidemiology of HBV in the Netherlands will change with increasing global vaccination coverage
- Targetted screening required to increase treatment uptake of persons with chronic infection

Acknowledgements

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