

Global Overview of Hepatitis A Vaccination Programs: Prevention Effectiveness

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Outline

- Background
 - Hepatitis A vaccines
 - Control and prevention strategies
- Importance of childhood vaccination
- Global overview of hepatitis A vaccination programs
- Summary

Hepatitis A Vaccines

- Available since early 1990's
- Four inactivated hepatitis A vaccines available worldwide
 - Safe
 - Effective
 - Long lasting protection *

* Source: Hammitt LL et al. J Infect Dis. 2008 Dec 15;198(12):1776-82.

Hepatitis A Vaccines

Control and Prevention Strategies

- Population groups at increased risk (e.g., international travelers, injection drug users)
- “Mass vaccination”
 - Routine infant/childhood
 - Outbreaks

Hepatitis A Vaccines

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Reasons to Vaccinate Children

- Generally have the highest disease and infection rates
- Herd immunity results in benefits outside of vaccinated cohorts
- Eventually results in immunity in entire population as vaccinated cohorts age

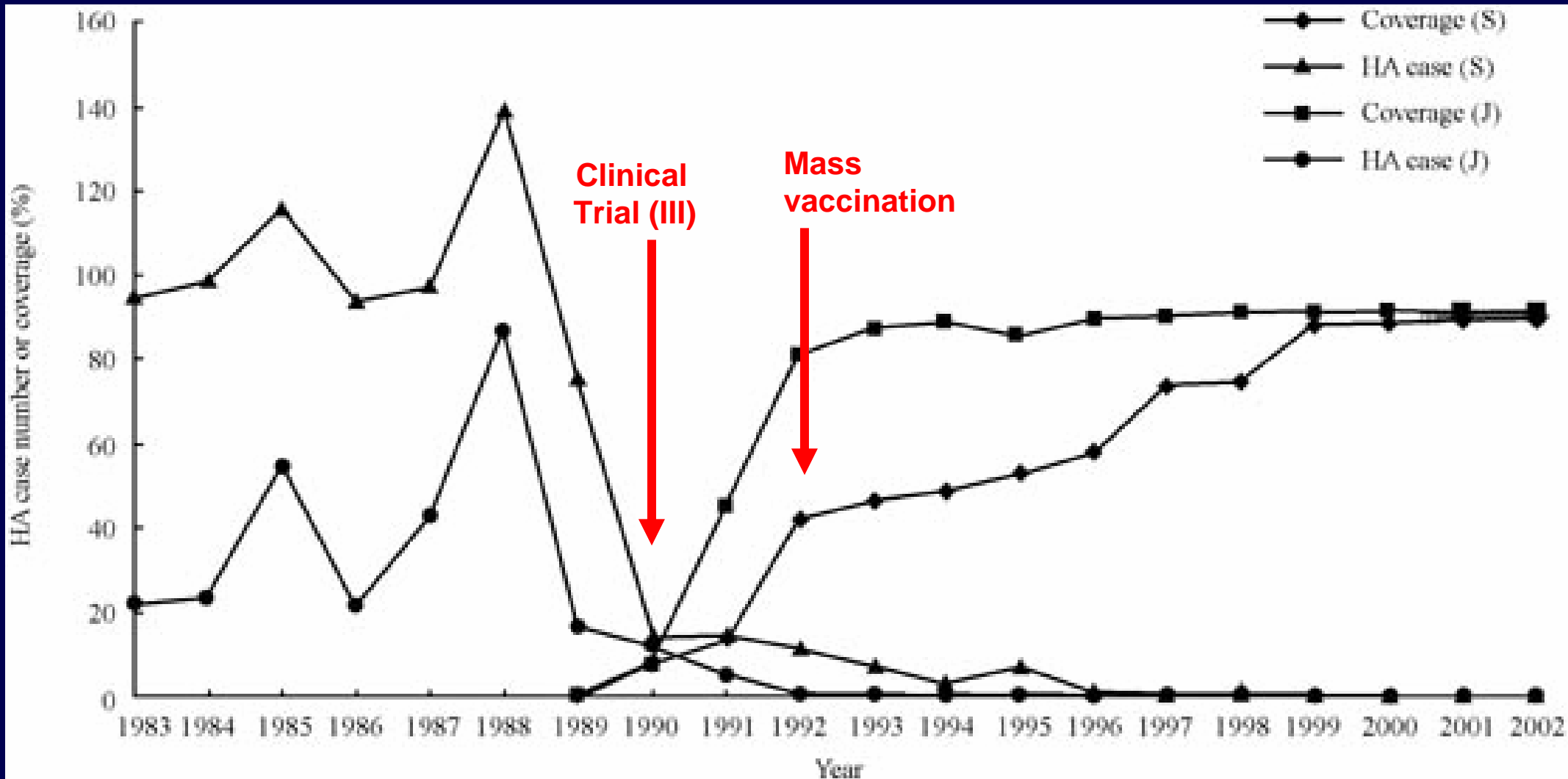
Selected Countries with Routine Childhood Hepatitis A Vaccination Programs; 2007

Country	Target Ages	Year Begun	Comments
Zhejiang Province, China	1-15 years	1992	Single dose live attenuated vaccine
North Queensland, Australia	18 months; catch-up to age 6 years	1999	Indigenous population
United States	2-18 (regional)	1999	2006 - national (12 months)
Puglia Region, Italy	15 months 12 years	1997	A/B vaccine for adolescents
Israel	18 months	1999	Two dose
Argentina	12 months	2005	Single dose
Minsk, Belarus	6 years	2003	Single dose

China: Hepatitis A Vaccination of Children

- Shengsi County and Jiaojiang City, Zhejiang Province, China
- Begun as demonstration project in 1992
- Initial vaccination of children ages 1-15 years
- Subsequent ongoing vaccination of each new cohort
- Single dose live attenuated vaccine (ZhePu)
- Estimated coverage 85%-91%

Reported Hepatitis A Cases among Children < 16 years and Hepatitis A Vaccine Coverage, Shengsi County and Jiaojiang City, Zhejiang Province, China (1983 to 2002)



Source: Zhuang FC, et al. Chinese Medical Journal 2005;118:1851-6.

Australia: Childhood Hepatitis A Vaccination Program in Queensland

- Two large outbreaks in 1991 and 1998
- Program begun in 1999
- Disproportionate number among indigenous children
- Two doses (18 month; 2 years)
- Routine childhood immunization

Australia: Childhood Hepatitis A Vaccination Program in Queensland

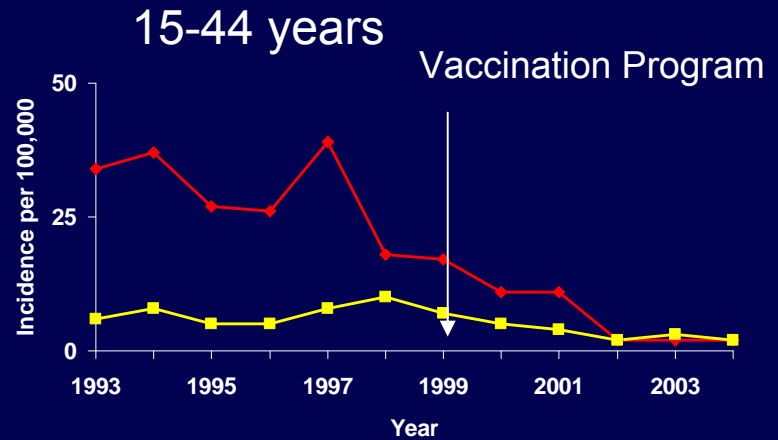
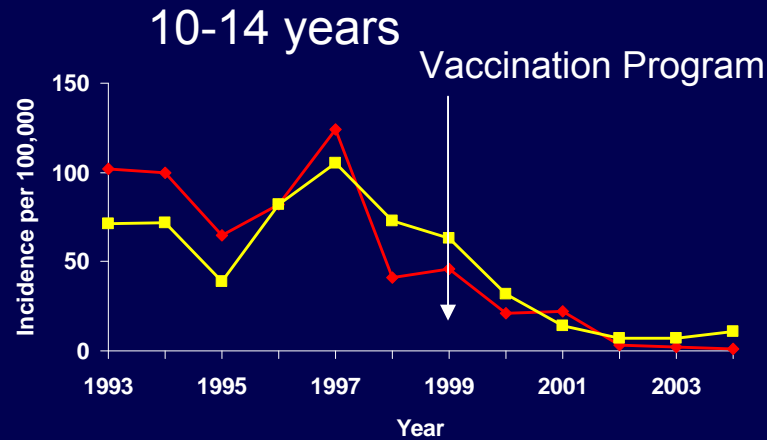
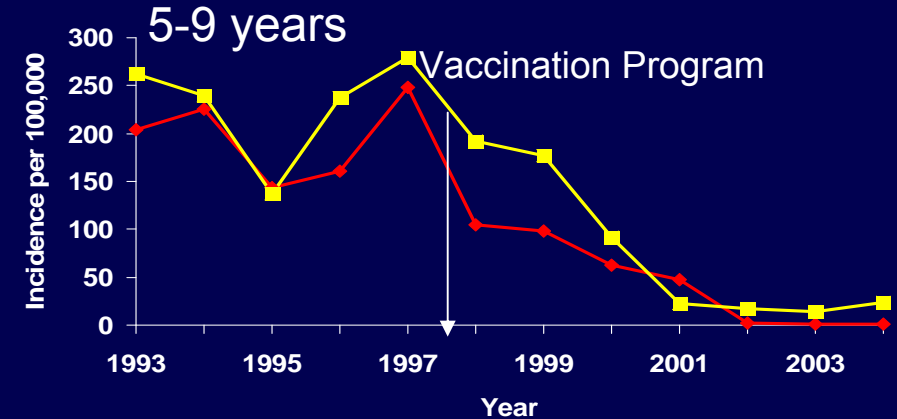
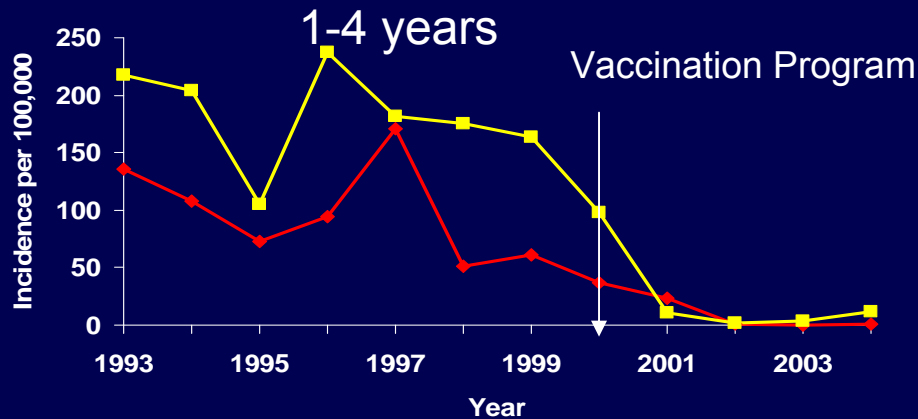
Number of cases in 2000-2003: 12 fold reduction since 1996-1999

	Before Program 1996-1999		After Program 2000-2003	
	< 5 years	≥ 5 years	< 5 years	≥ 5 years
Indigenous	41 cases	196 cases	1 case	8 cases
Non indigenous	33 cases	517 cases	2 cases	55 cases

Israel: Childhood Hepatitis A Vaccination Program

- July 1999
- Vaccination of all 18 month old children
- Vaccine provided free of charge, as part of regular immunization program
- Estimated first dose coverage in vaccinated cohorts – 90%; second dose – 85%

Hepatitis A Incidence, by Age and Population Group, Israel, 1993-2004



■ Jews
 ■ Non-Jews

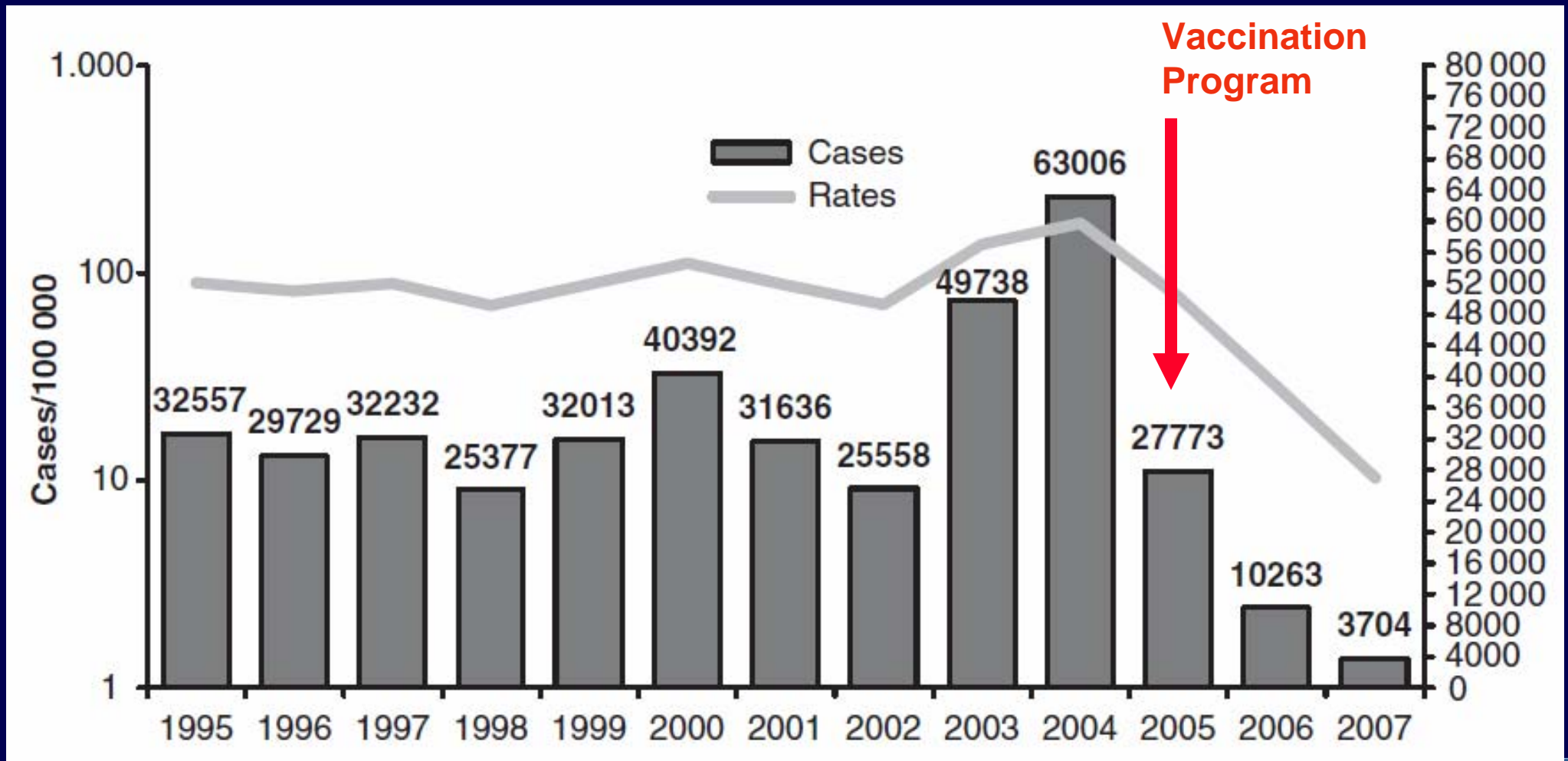
Source: Dagan et al, JAMA 2005



Argentina: Childhood Hepatitis A Vaccination Program

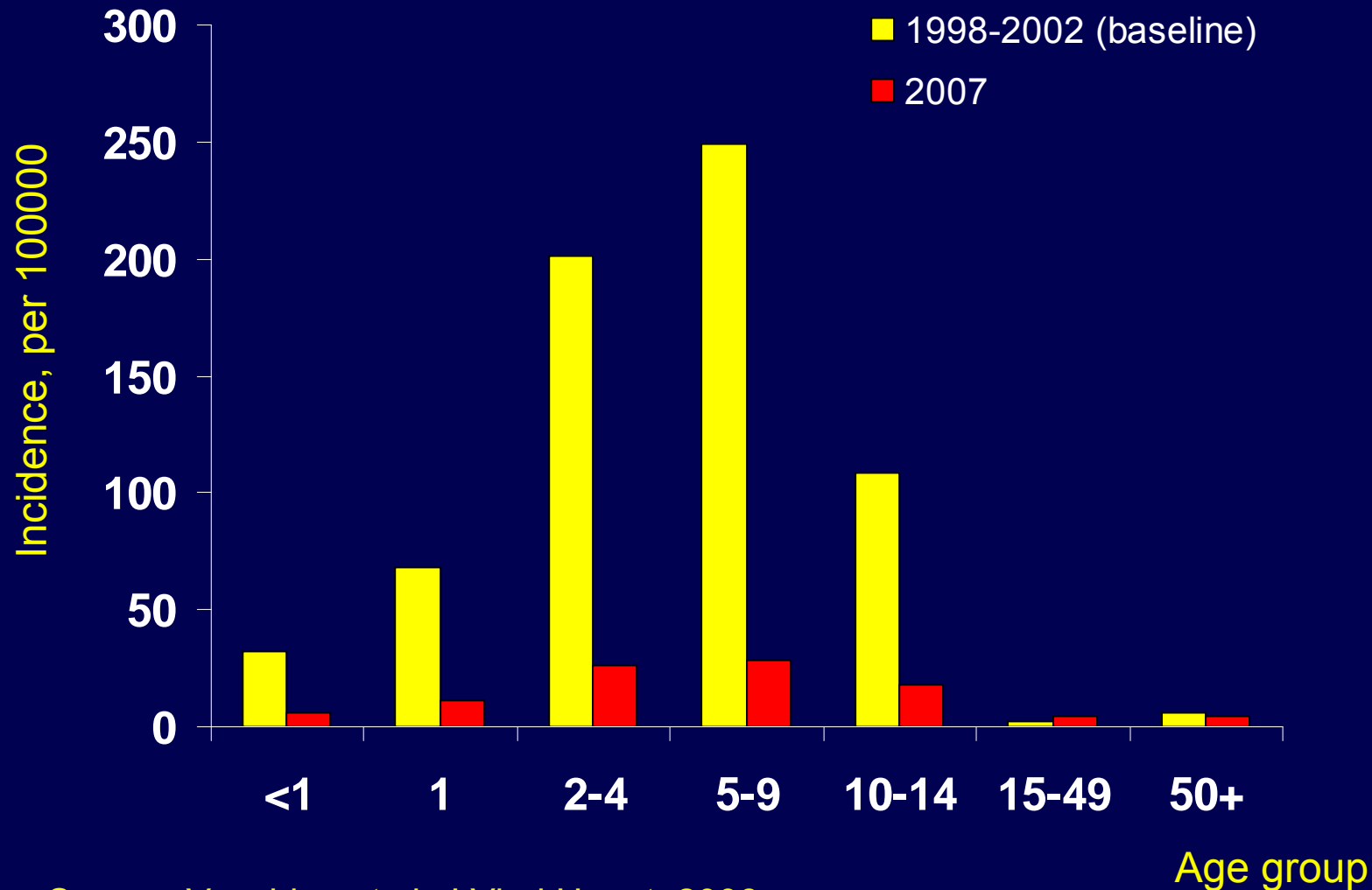
- Universal single-dose hepatitis A immunization program
- June 2005
- Children aged 12 months
- Most vaccines provided free of charge
- Vaccine coverage 95% in 2006

Reported Incidence and Number of Hepatitis A Cases, Argentina, 1995-2007



Source: Vacchino et al, J Viral Hepat. 2008

Hepatitis A incidence by age groups, Argentina, 1998-2002 (baseline) and 2007

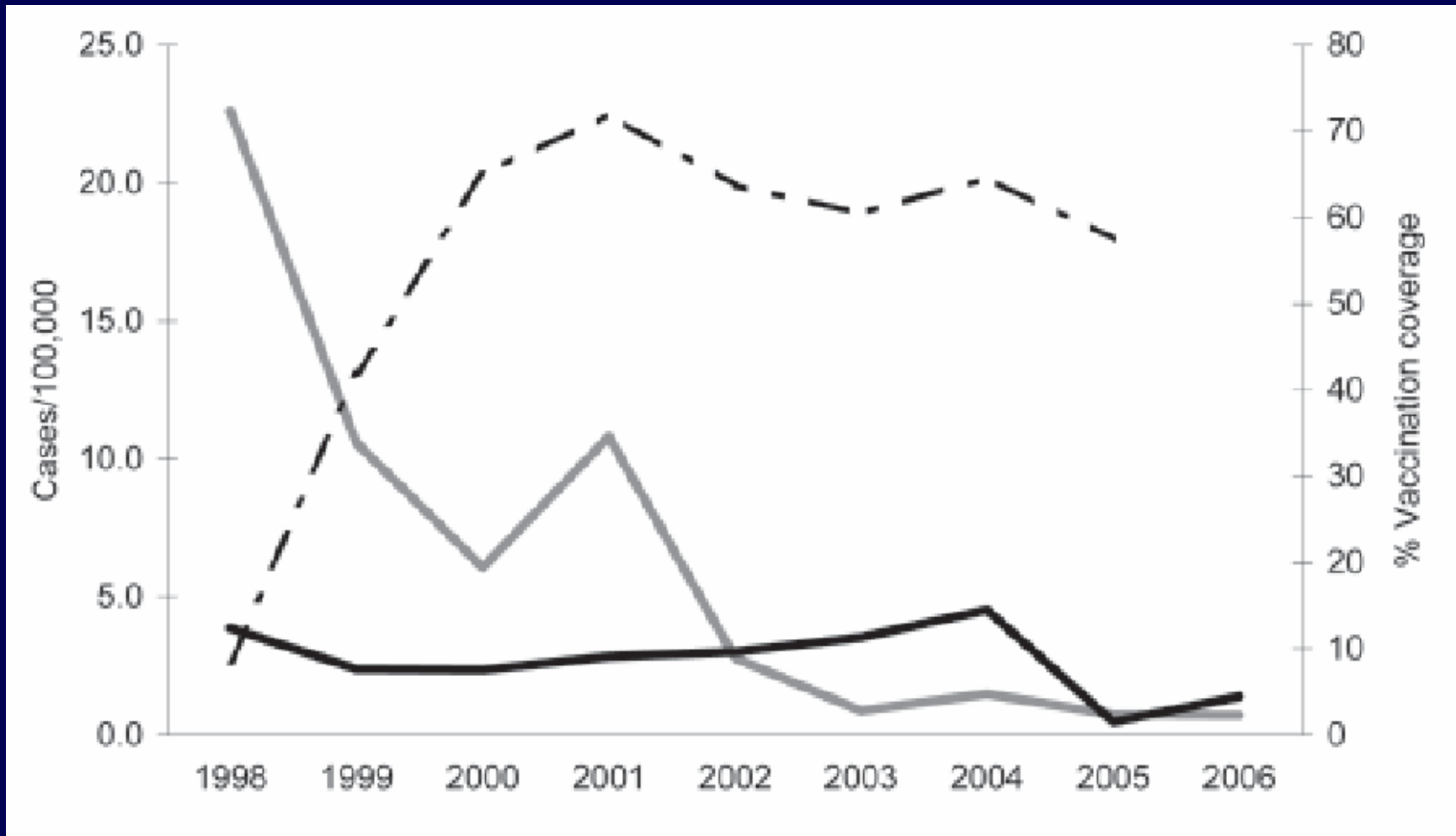


Source: Vacchino et al, J Viral Hepat. 2008

Italy: Childhood Hepatitis A Vaccination Program in Puglia region

- Begun in 1998 after a large outbreak
- Vaccine offered free of charge to children 15-18 months, adolescents – 12 years old
- Until 2002, combined Hepatitis A/B vaccine
- Since 2003 only hepatitis A
- Coverage < 20% in toddlers; 65% in adolescents

Vaccination coverage and incidence of hepatitis A in Puglia region and Italy, 1998-2006

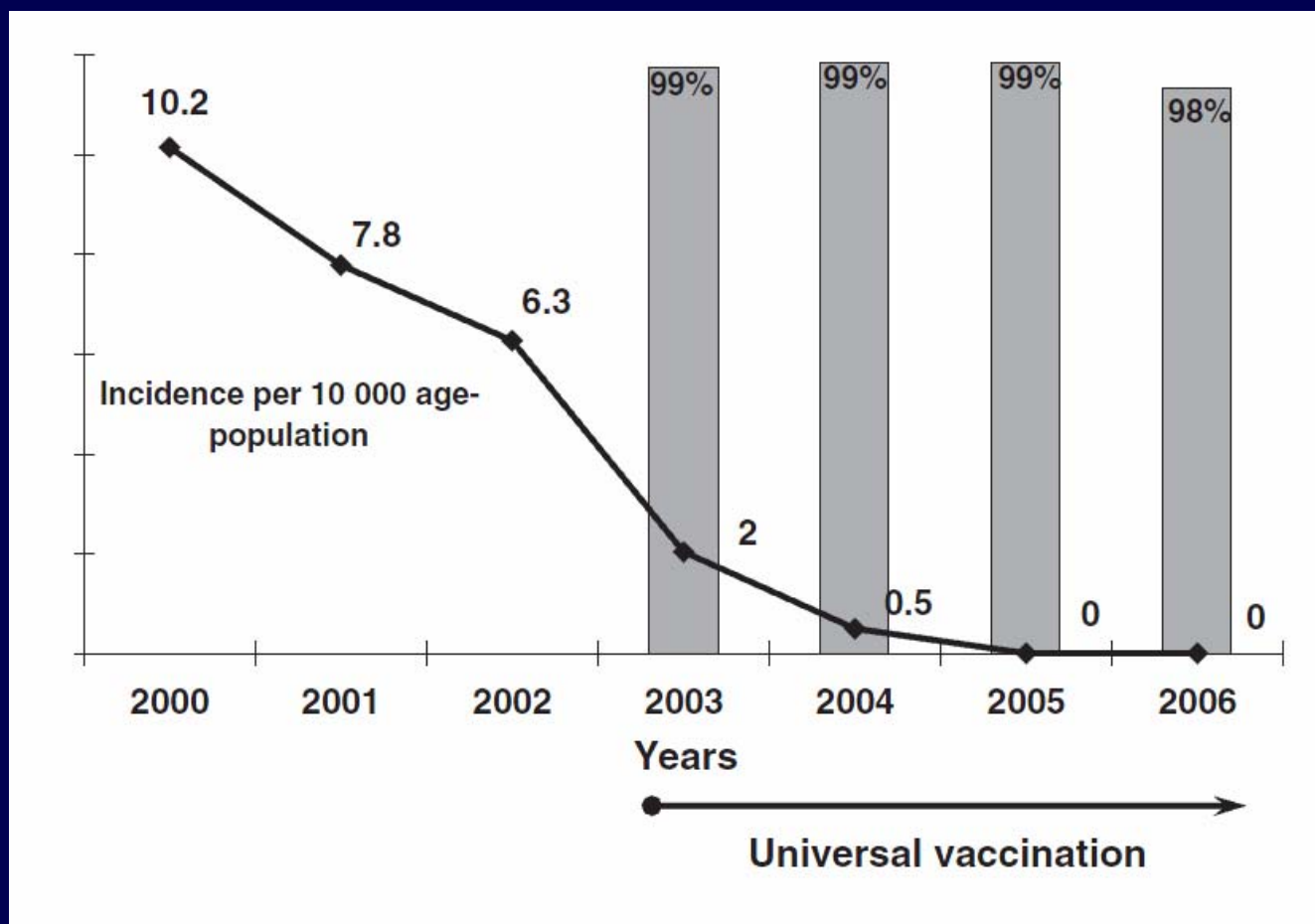


Source: Lopalco, et al EID 2008

Belarus: Childhood Hepatitis A Vaccination Program in Minsk city

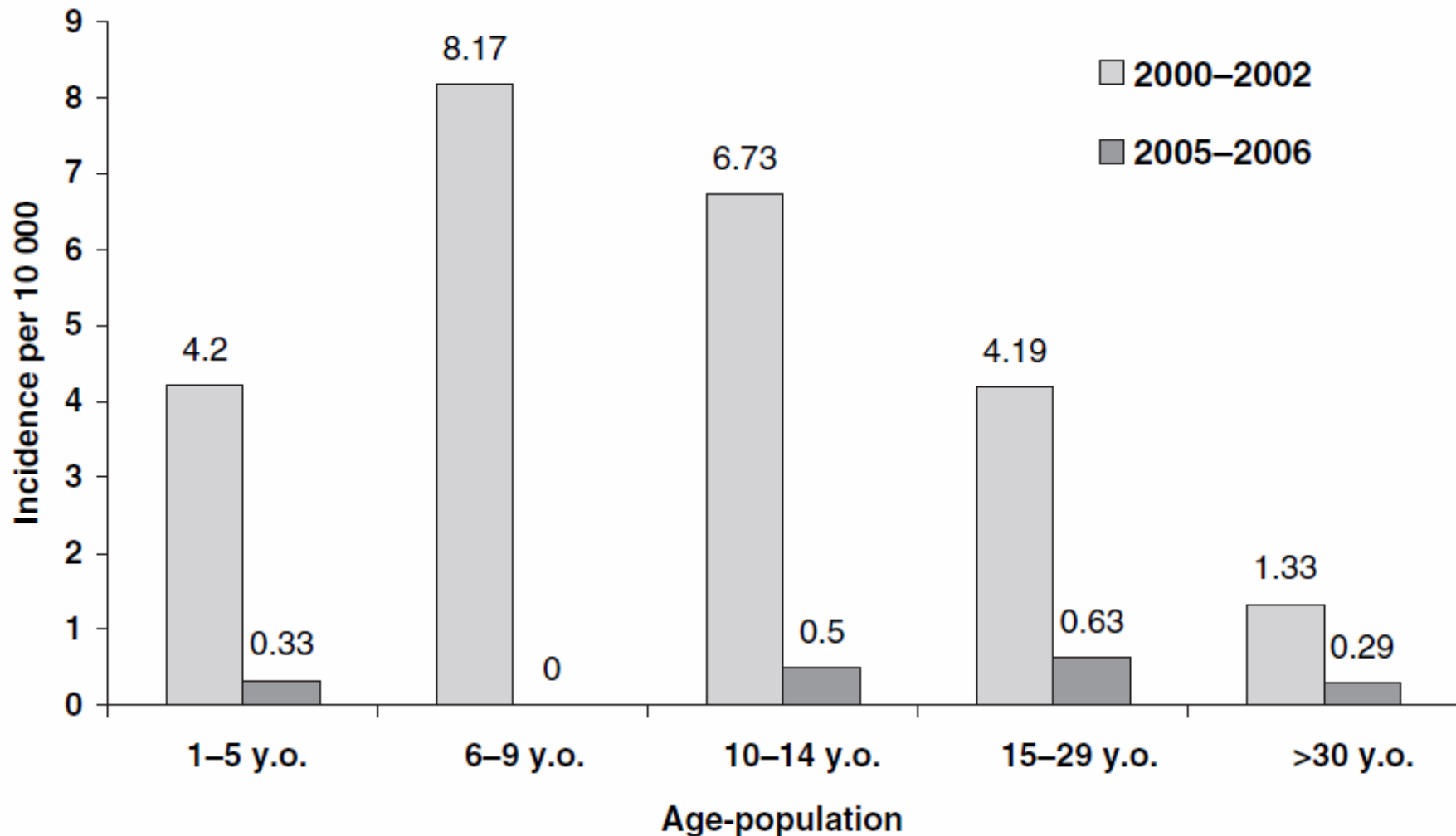
- Universal hepatitis A vaccination
- Begun in 2003
- Children aged 6 year (school entry age)
- Coverage: 98.6% of 6-9 year age cohort

Hepatitis A Incidence in 6 Year Old Children and Vaccine Coverage, Minks, Belarus, 2000-2006



Source: Fisenka et al, Vaccine 2008

Hepatitis A Incidence Rate by Age Group Before and After Vaccination Program Implementation, Minsk, Belarus, 2000-2006



Hepatitis A incidence in vaccinated and non-vaccinated children aged 1-17 years, 2003-2006

	n	Hepatitis A cases	Incidence (per 10000)
Vaccinated	65 171	2	0.31
Non-vaccinated	210 900	131	6.2

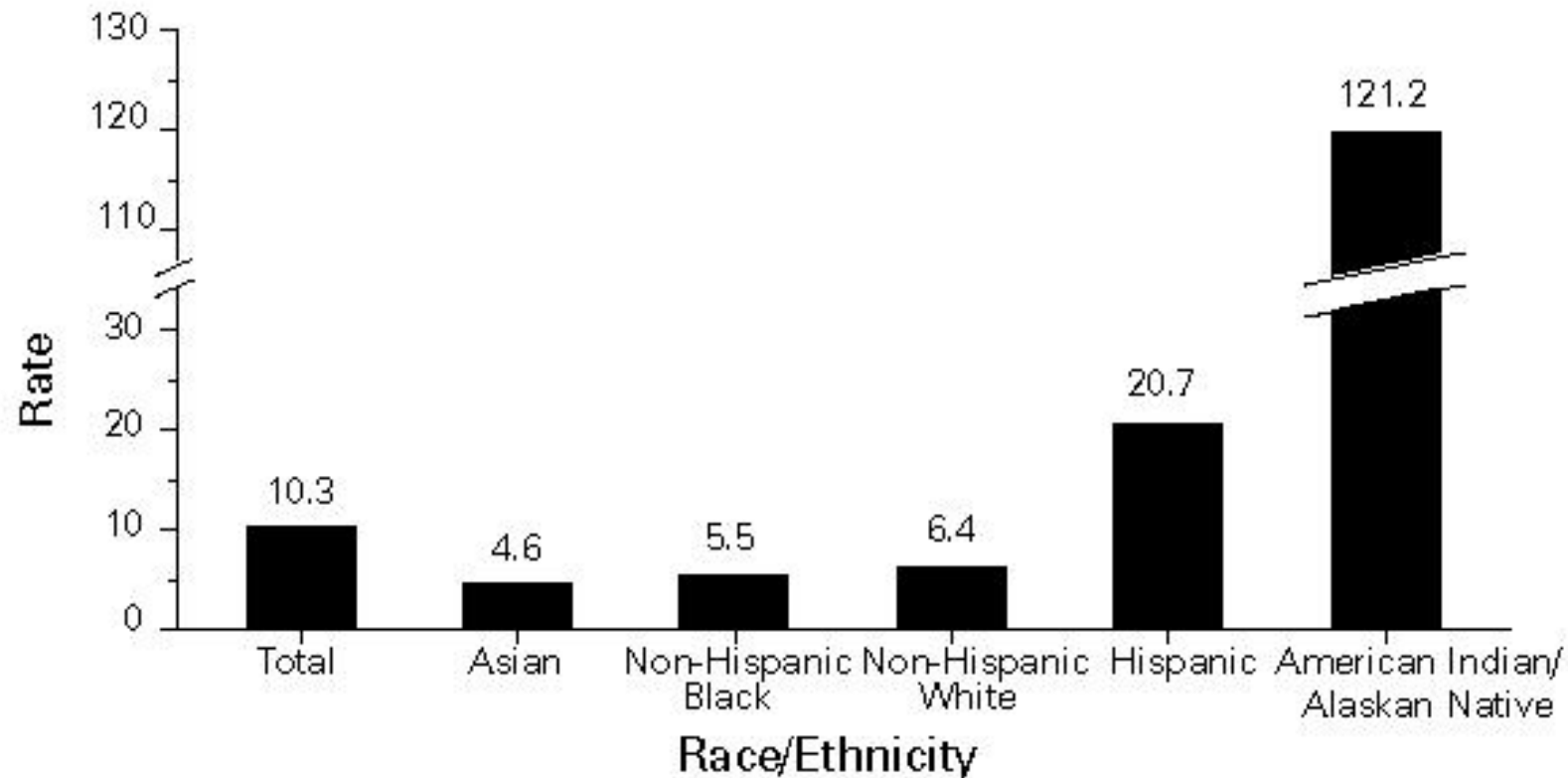
Source: Fisenka et al, Vaccine 2008

United States: Incremental Recommendations for Hepatitis A Vaccination of Children Advisory Committee on Immunization Practices (ACIP)

- 1996
 - Children living in communities with the highest disease rates
 - Persons at high risk for infection
- 1999
 - Children living in states and communities with consistently elevated rates during “baseline period”
 - 17 primarily Western and Southwestern states
 - Approximately one third of US population
- 2006
 - Nationwide
 - 12-23 month old cohort

ACIP 1996 Recommendations

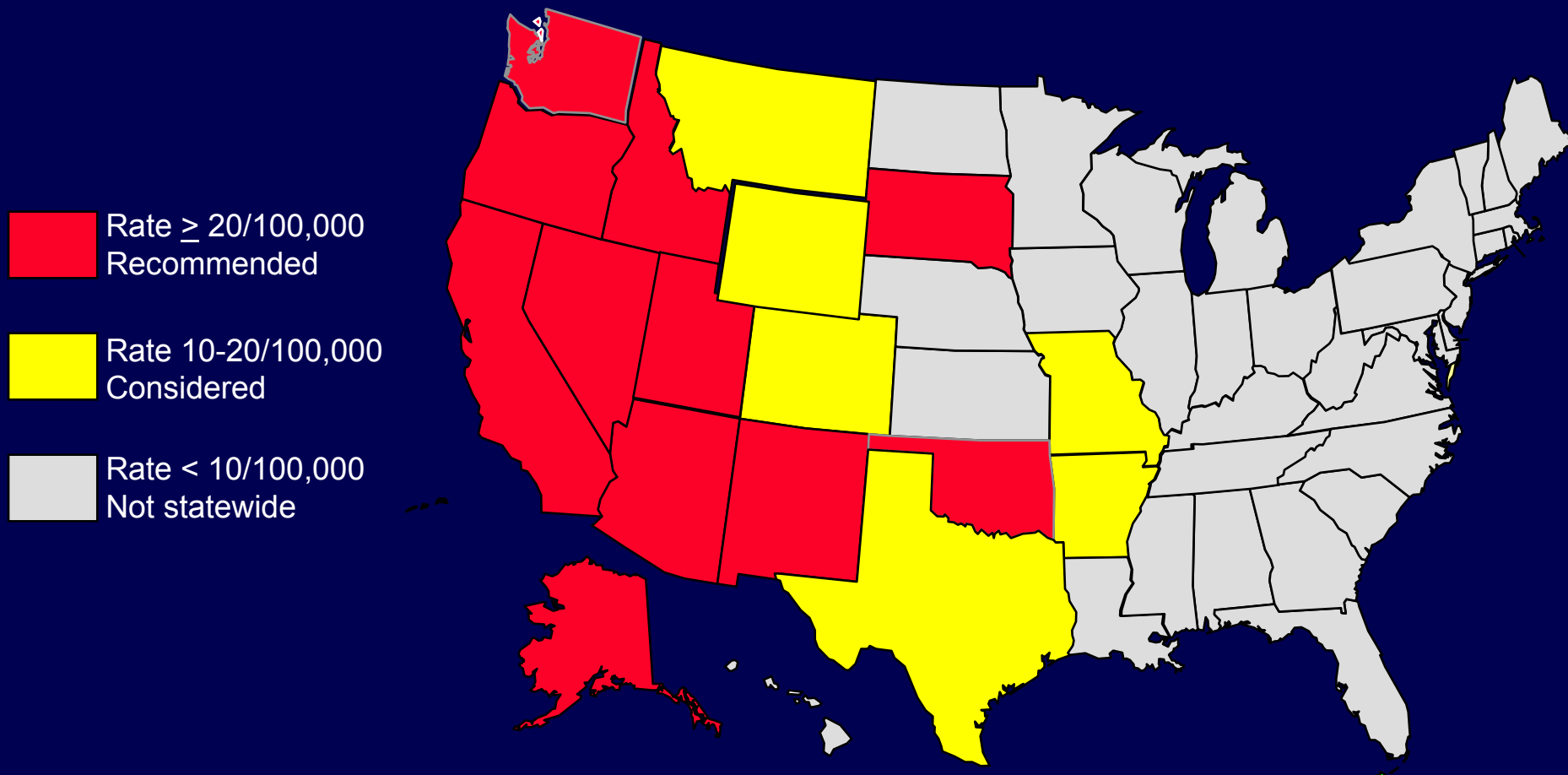
FIGURE 1. Rates* of reported hepatitis A cases, by race/ethnicity — United States, 1994



*Per 100,000 population.

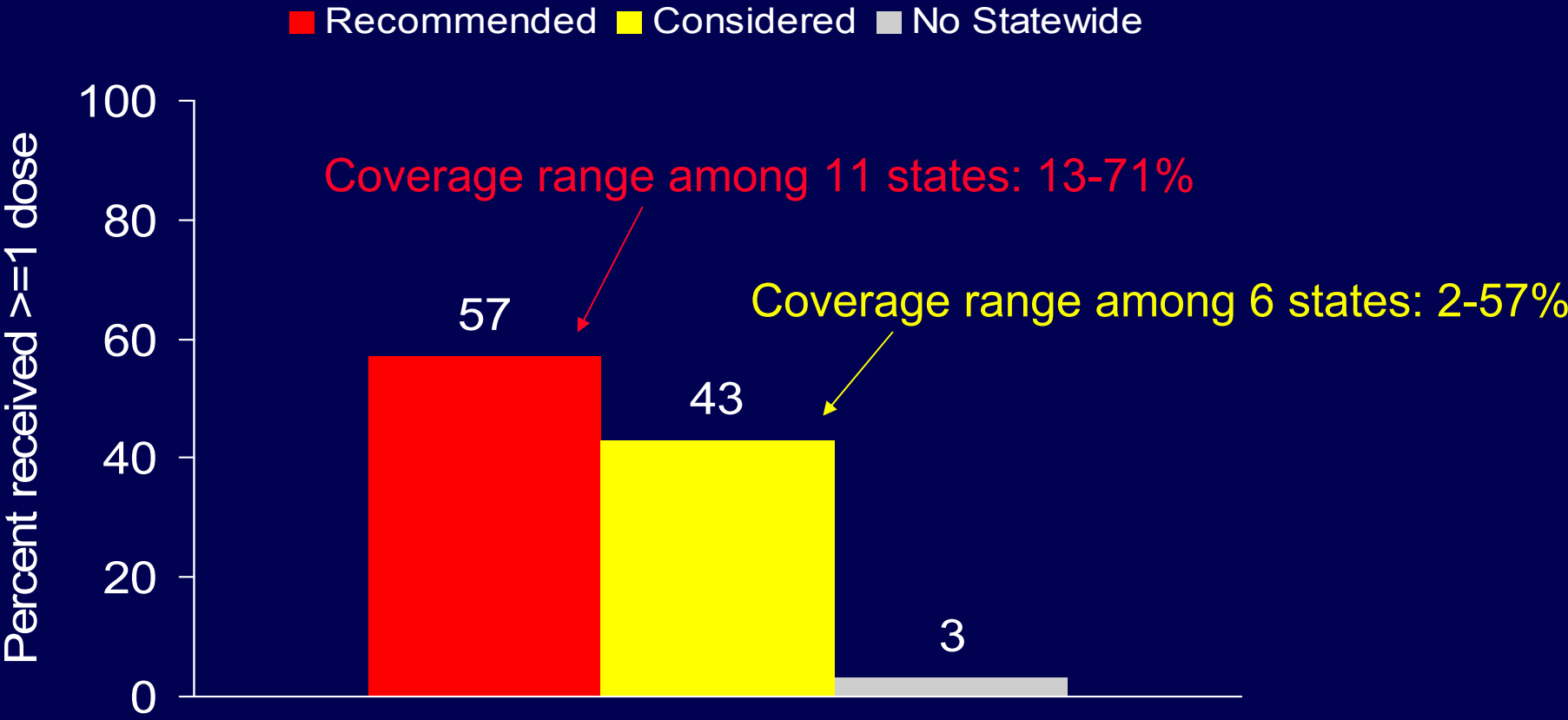
1999 ACIP Recommendations

for Statewide Routine Hepatitis A Vaccination of Children*



* Based on average incidence rate during baseline period (1987- 97)

Hepatitis A Vaccine Coverage (≥ 1 dose) among 24-35 Month Old Children, National Immunization Survey (NIS), United States, 2005

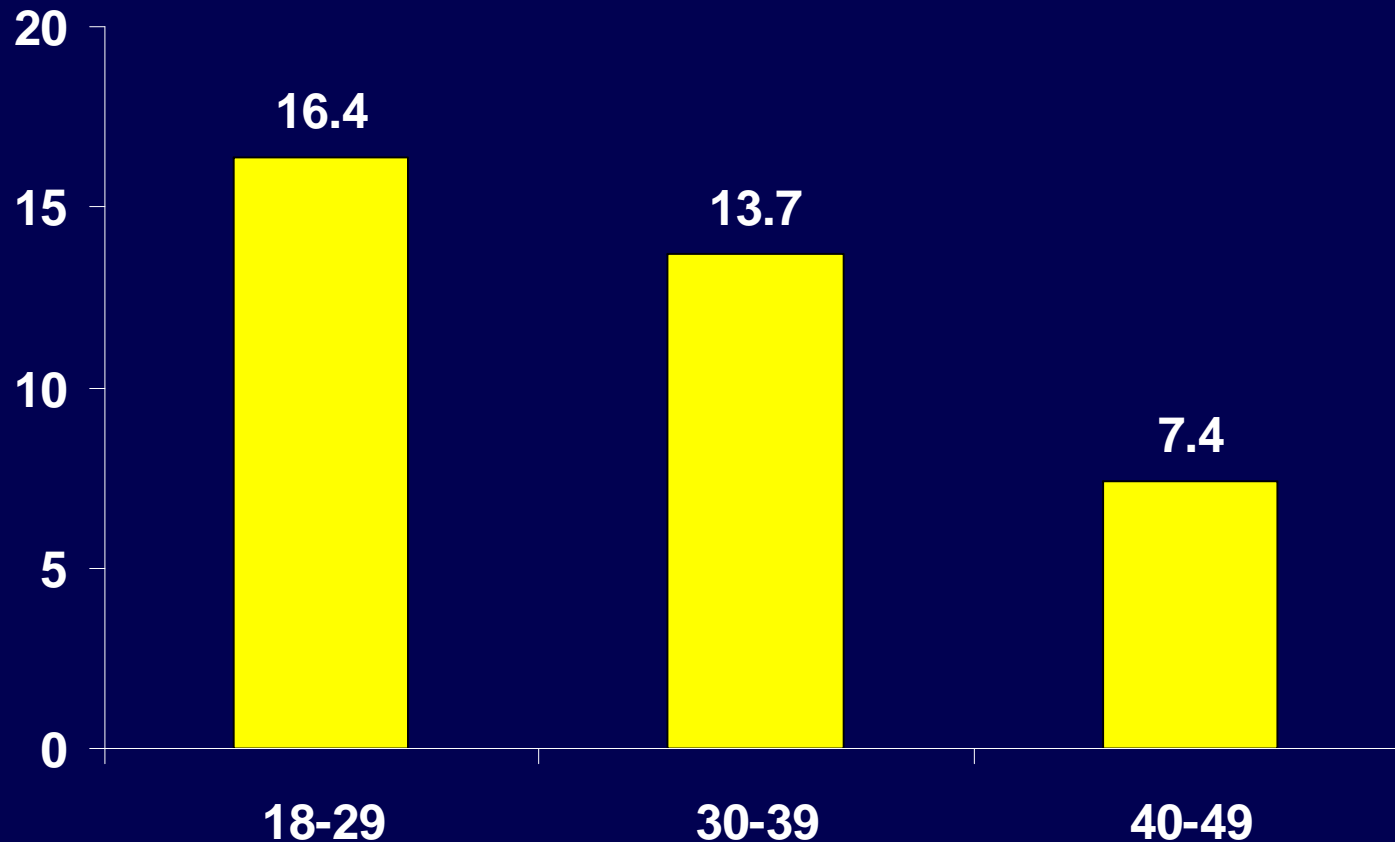


Source: CDC, MMWR. 2007 Jul 13;56(27):678-81



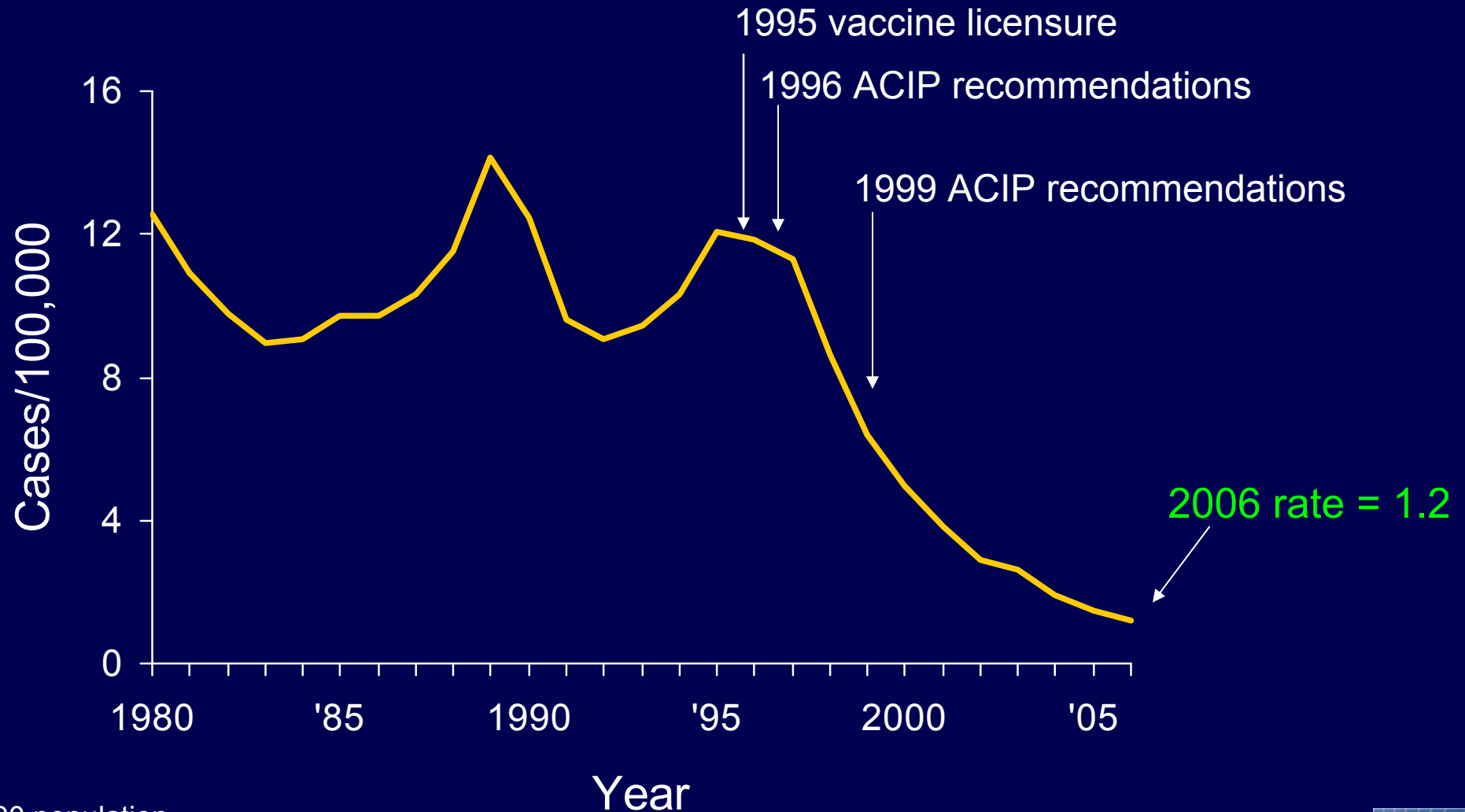
Hepatitis A Vaccination Coverage Among Adults Aged 18–49 Years in the United States by age groups, NIS-Adult 2007

12.1% adults aged 18-49 had ≥ 2 doses



Source: Peng-jun Lu et al, Hepatitis A vaccination coverage among adults aged 18–49 years in the United States, *Vaccine* 27 (2009) 1301–1305

Hepatitis A Incidence*, United States, 1980-2006



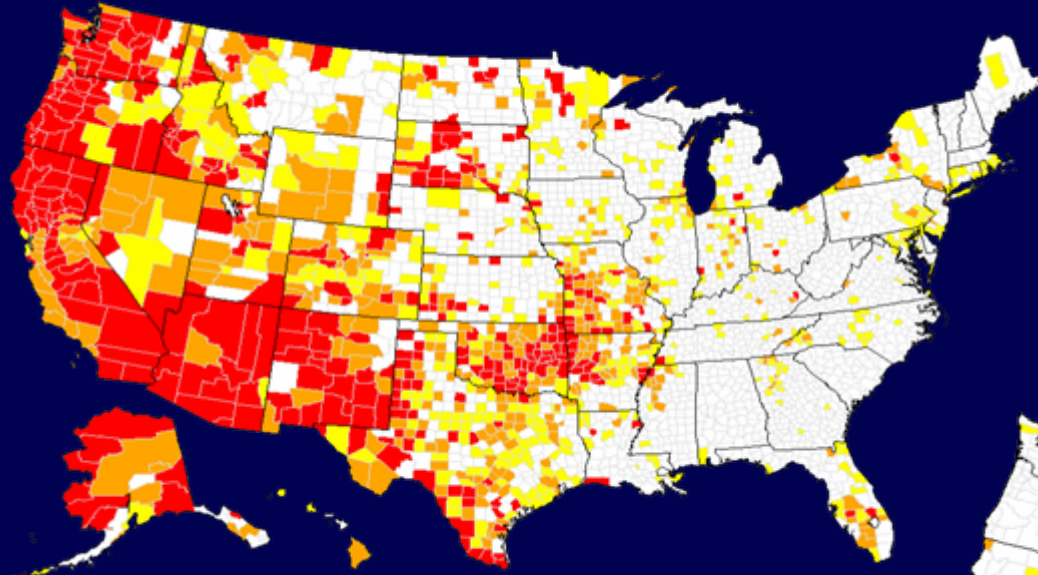
* - per 100000 population

Source: Wasley A, et al. MMWR Surveill Summ. 2008 Mar 21;57(2):1-24.



Hepatitis A incidence based on passive reporting – All ages

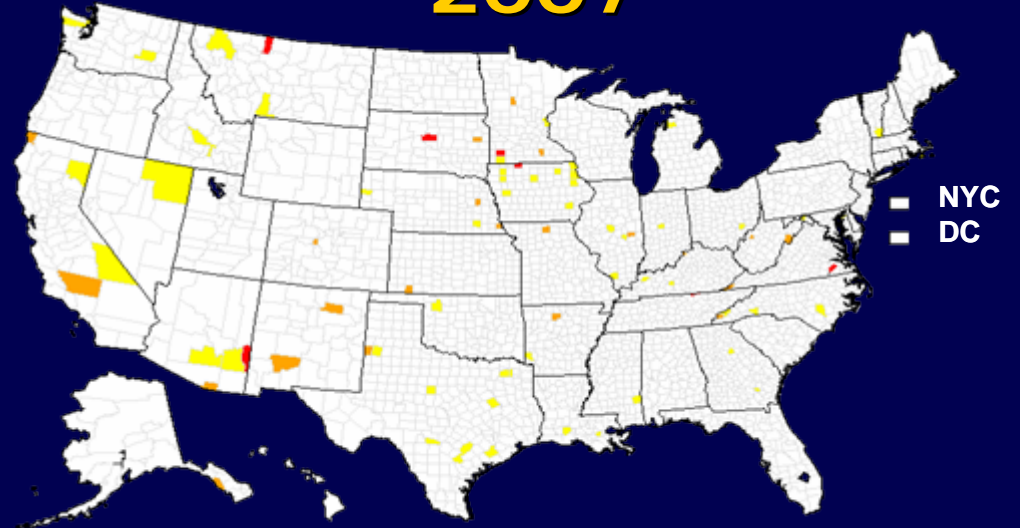
1987–1997



Rate*



2007



*Per 100,000 population

•NNDSS, CDC unpublished

Impact on Health Care Utilization, U.S. 1996-2004

Medstat MarketScan Database

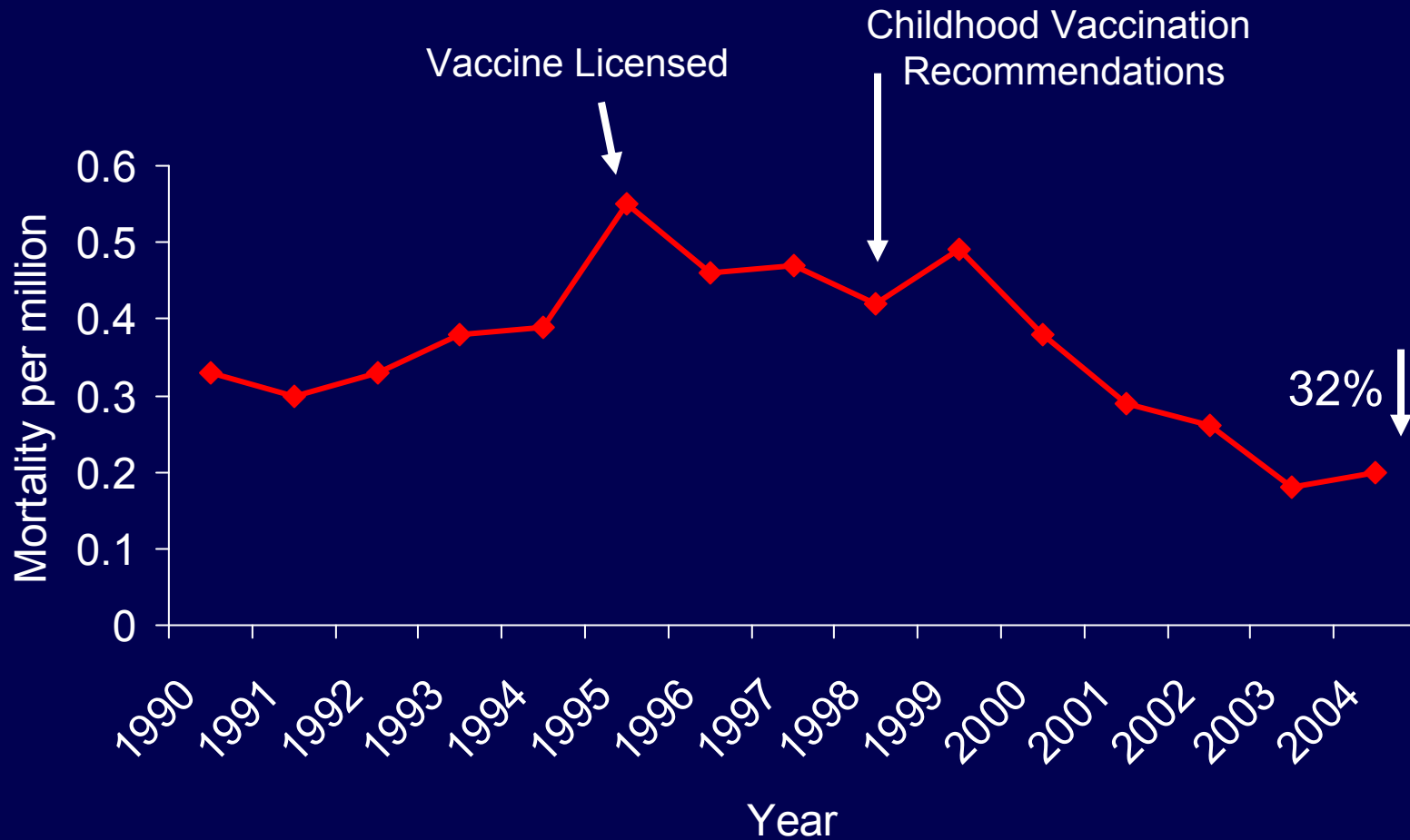
Comparing baseline (1996-97) to 2004, statistically significant declines:

- Hospitalizations – 69%
- Ambulatory visits – 42%

Adjusted to US population, medical expenditures for hospitalizations and ambulatory visits declined:

- 68% reduction
- \$29.1 million (baseline) to \$9.3 million (2004)

Age-Adjusted Hepatitis A Mortality Rates, United States, 1990-2004



Source: Vogt et al; JID in press

ACIP 2006 Recommendations

- Implement routine nationwide hepatitis A vaccination
 - Vaccine licensed for use in children 12-23 months old
- Make existing childhood vaccination programs sustainable
- Integrate the vaccine into routine childhood vaccination program

Current ACIP recommendations for Hepatitis A vaccination

- Children at age 1 year (i.e. 12-23 months)
- Persons at high risk for infection:
 - Traveling to or working in countries with high or intermediate endemicity
 - MSM
 - Persons who use injection and/or noninjection drugs
 - Persons who have occupational risk for infection
 - Persons with clotting-factor disorder
 - Persons with chronic liver disease
 - Non traveling contacts of international adoptees

Impact of Childhood Hepatitis A Vaccination Programs Summary

- Results indicate considerable public health impact
 - Effective in protecting vaccinated individuals
 - Reduction of hepatitis A incidence with modest vaccination coverage
 - Evidence of considerable herd immunity among unvaccinated children and adults

Current Issues

- International cooperation
 - recommendations for countries considering implementing programs
- Better surveillance and disease burden data
 - increase in the number of susceptible persons due to epidemiological shift
- Vaccination strategies
 - level of endemicity, socio-economic development and sanitation, and the risk of outbreaks, vaccine costs and cost-effectiveness analyses

Thank you!