Hepatitis A Vaccination Programs Prevention Effectiveness

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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

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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

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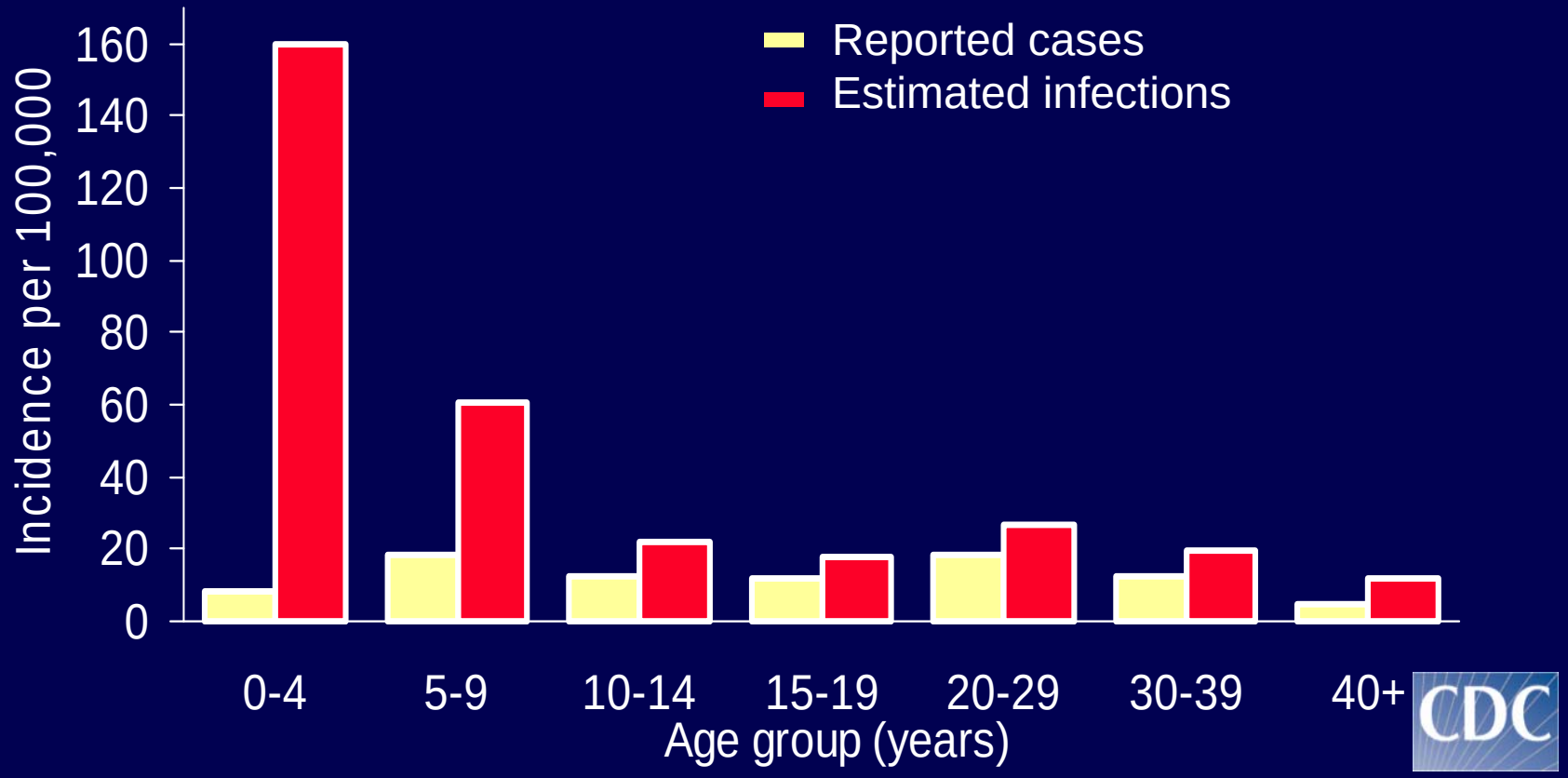
Reported and Estimated Average Hepatitis A Incidence, by Age Group, United States, 1980-1999



Source: Armstrong & Bell, Pediatrics, 2002

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)
Catalonia, Spain	12 years	1998	A/B vaccine
Puglia Region, Italy	15 months 12 years	1997	A/B vaccine for adolescents
Israel	18 months	1999	
Argentina	12 months	2005	Single dose

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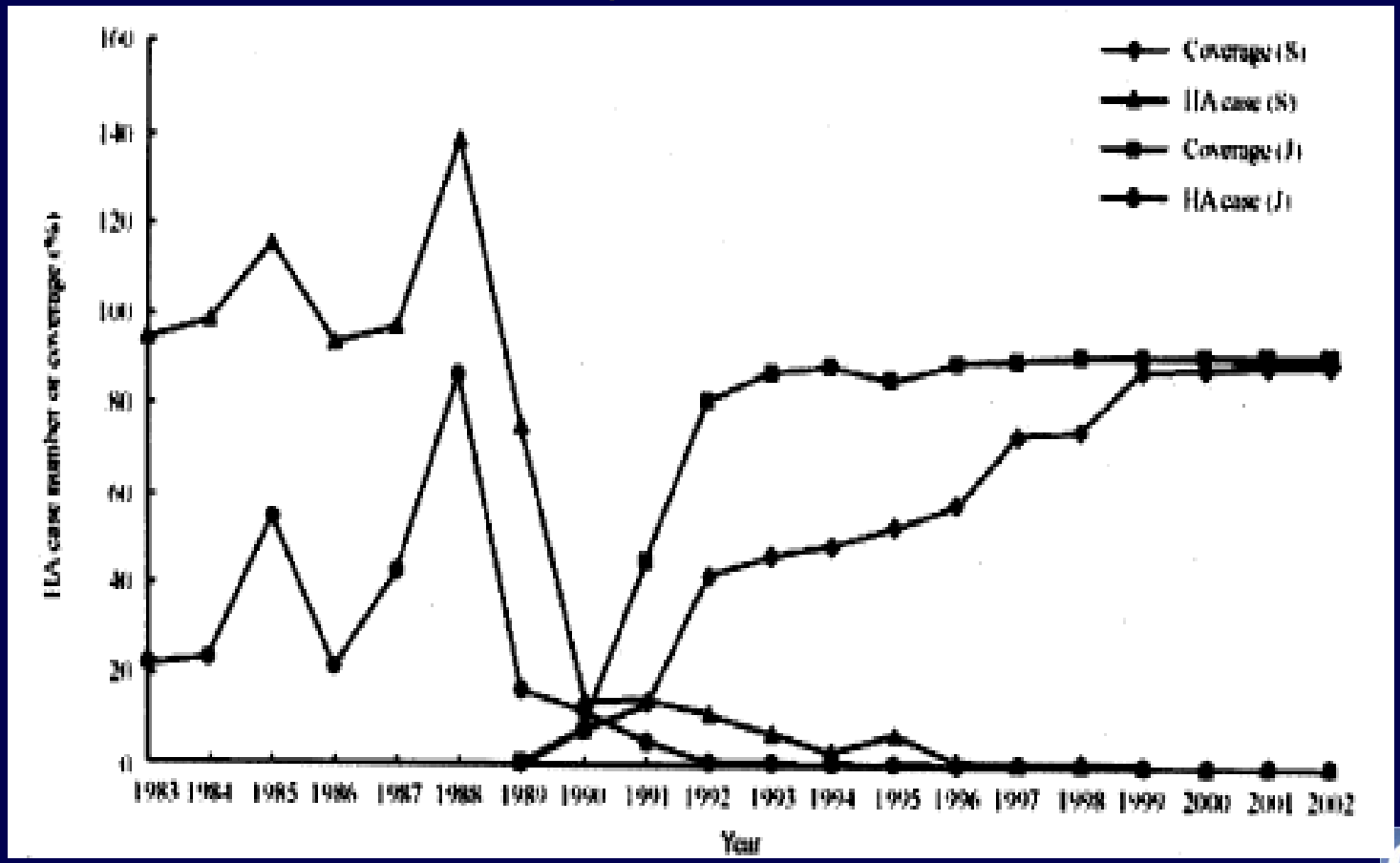
Hepatitis A Vaccination of Children Shengsi County and Jiaojiang City, Zhejiang Province, China

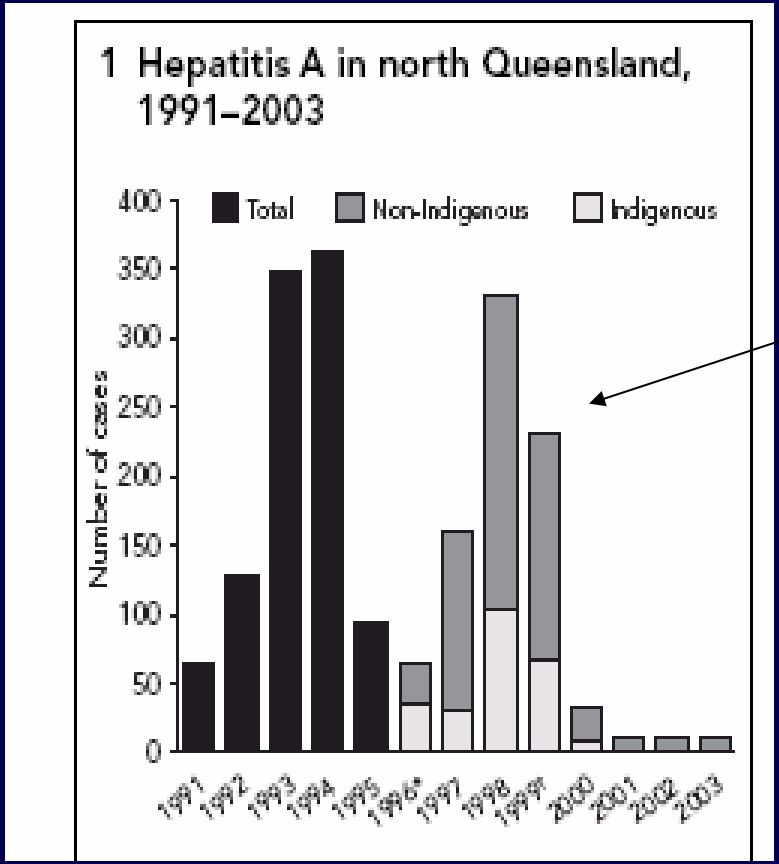
- Begun as demonstration project in 1992
- Initial vaccination of children ages 1-15 years
- Subsequent ongoing vaccination of each new cohort
- Single dose live attenuated vaccine (ZhePu)
- Estimated coverage 85%-90%

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

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



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



Vaccination program

	Before Program 1996-99		After Program 2000-03	
	< 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

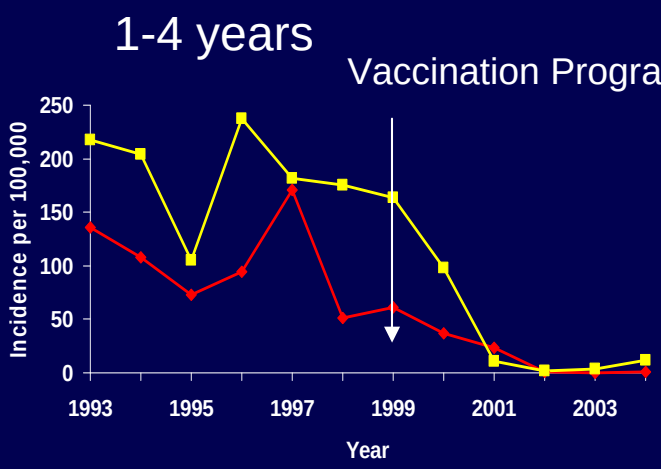
Source: Hanna et al. Med J Aust 2004

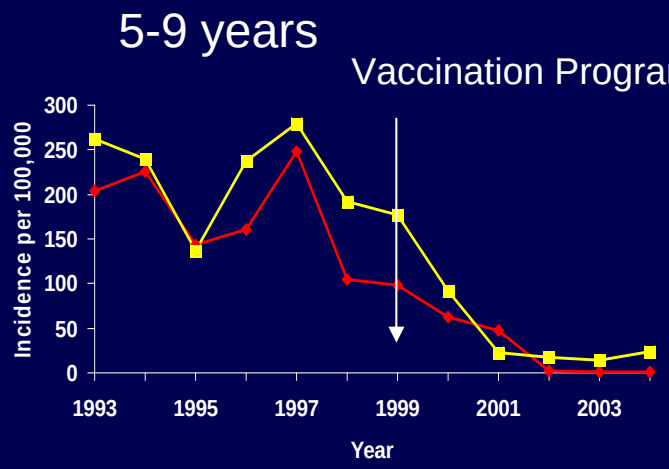
Childhood Hepatitis A Vaccination Program Israel

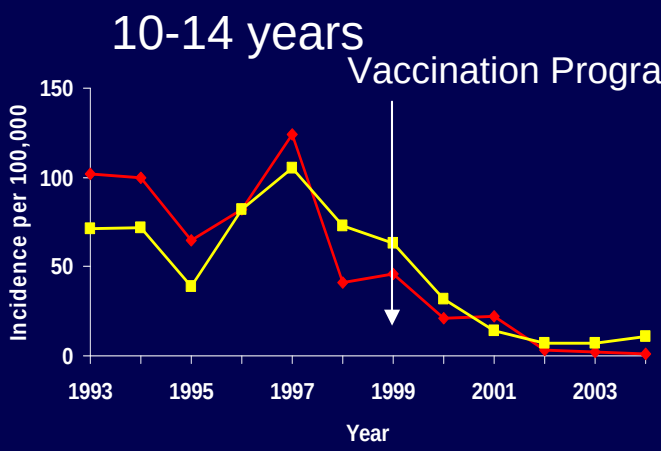
- Beginning in July 1999, vaccination of all 18 month old children
- Vaccine provided free of charge, as part of regular immunization program
- Estimated first dose coverage in vaccinated cohorts – 90%

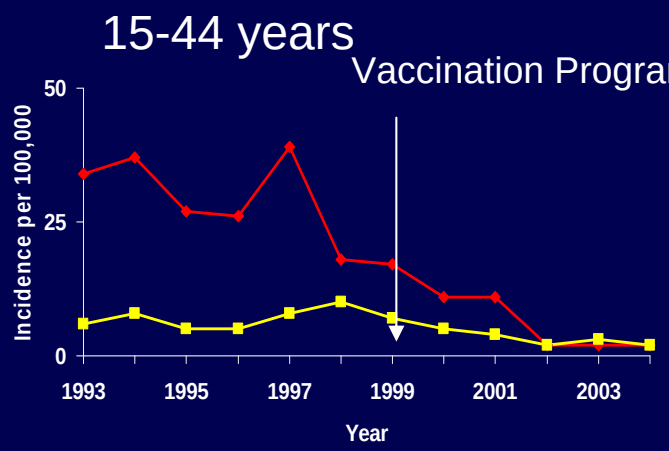
Source: Dagan et al, JAMA 2005

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









Jews

Non-Jews

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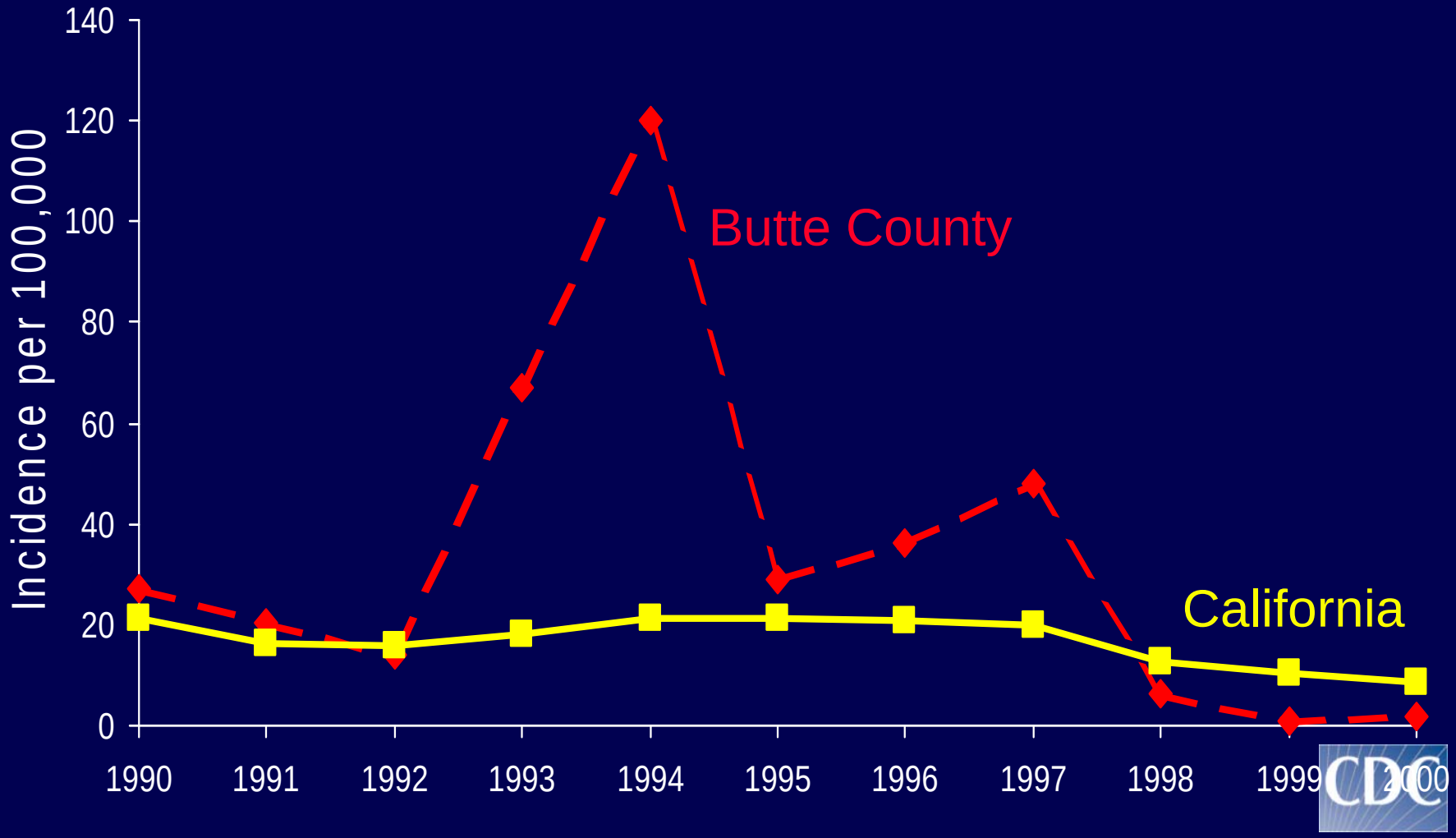
Source: Dagan et al, JAMA 2005

Hepatitis A Prevention Demonstration Project Butte County, CA; 1995-2000

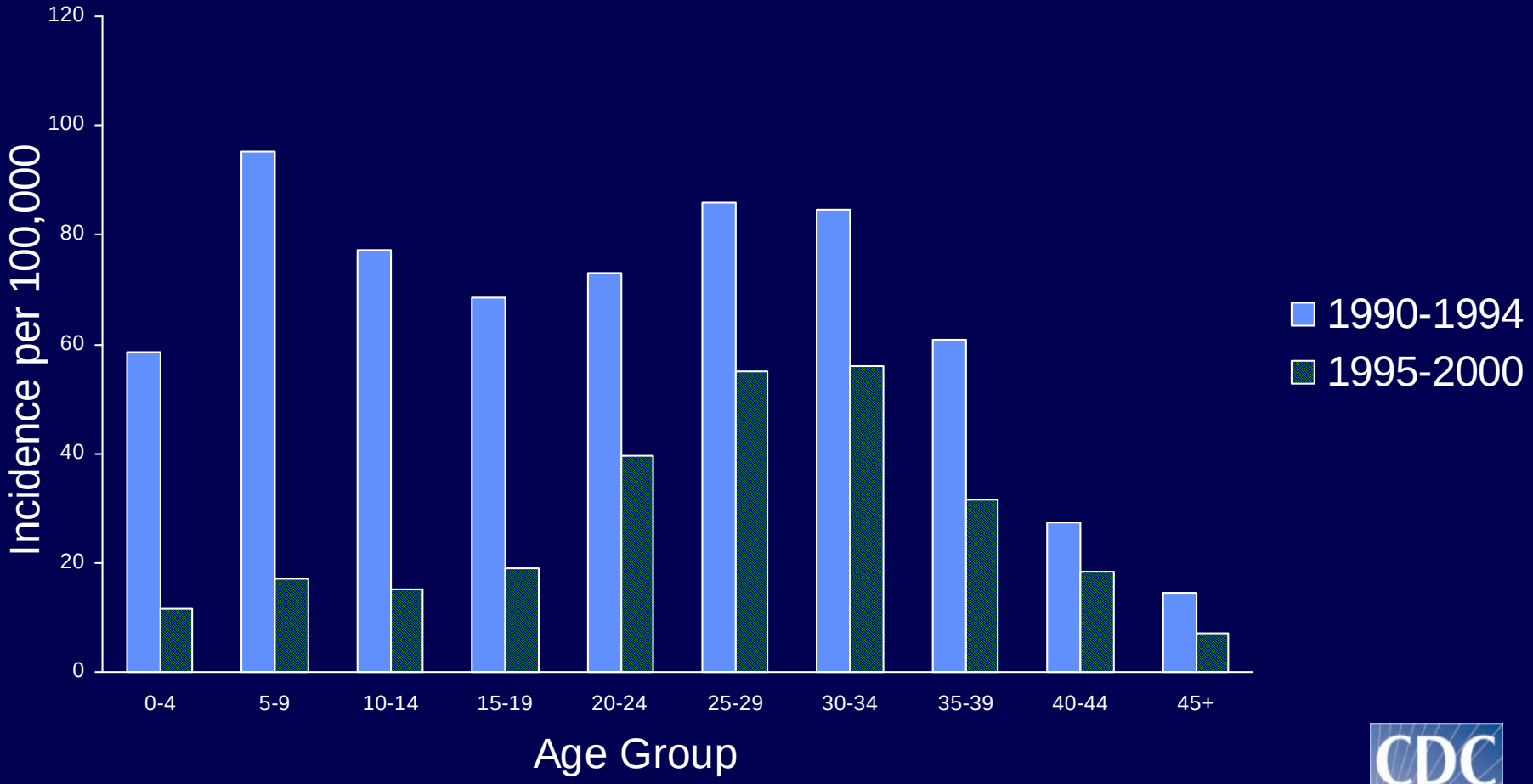
- Target population – children 2-12 years old
  - Ongoing vaccination of new cohorts
- Project features
  - Provision of free vaccine
  - Provider and school-based vaccination
  - Vaccination registry
  - Active surveillance
- 2000 vaccination coverage
  - 62% first dose
  - 40% complete series

Hepatitis A Annual Incidence, Butte County and California, 1990-2000



Source: Averhoff et al, JAMA, 2001

Average Age-Specific Hepatitis A Incidence, Butte County, CA, 1990-94 and 1995-2000



Source: Averhoff et al, JAMA, 2001

Incremental Recommendations for Hepatitis A Vaccination of Children U.S. Advisory Committee on Immunization Practices

- 1996 - Children living in “high rate” communities
  - Mostly indigenous populations
- 1999 - Children living in states/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

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Features of Regional Hepatitis A Vaccination Program, United States, 1999-2006

- 17 states with consistently elevated rates during “baseline period”
  - Focus on areas with highest disease burden
- Children, aged 2-18 years
  - Focus on younger children
  - Multiple possible strategies
- Same funding mechanism as routinely recommended infant vaccines

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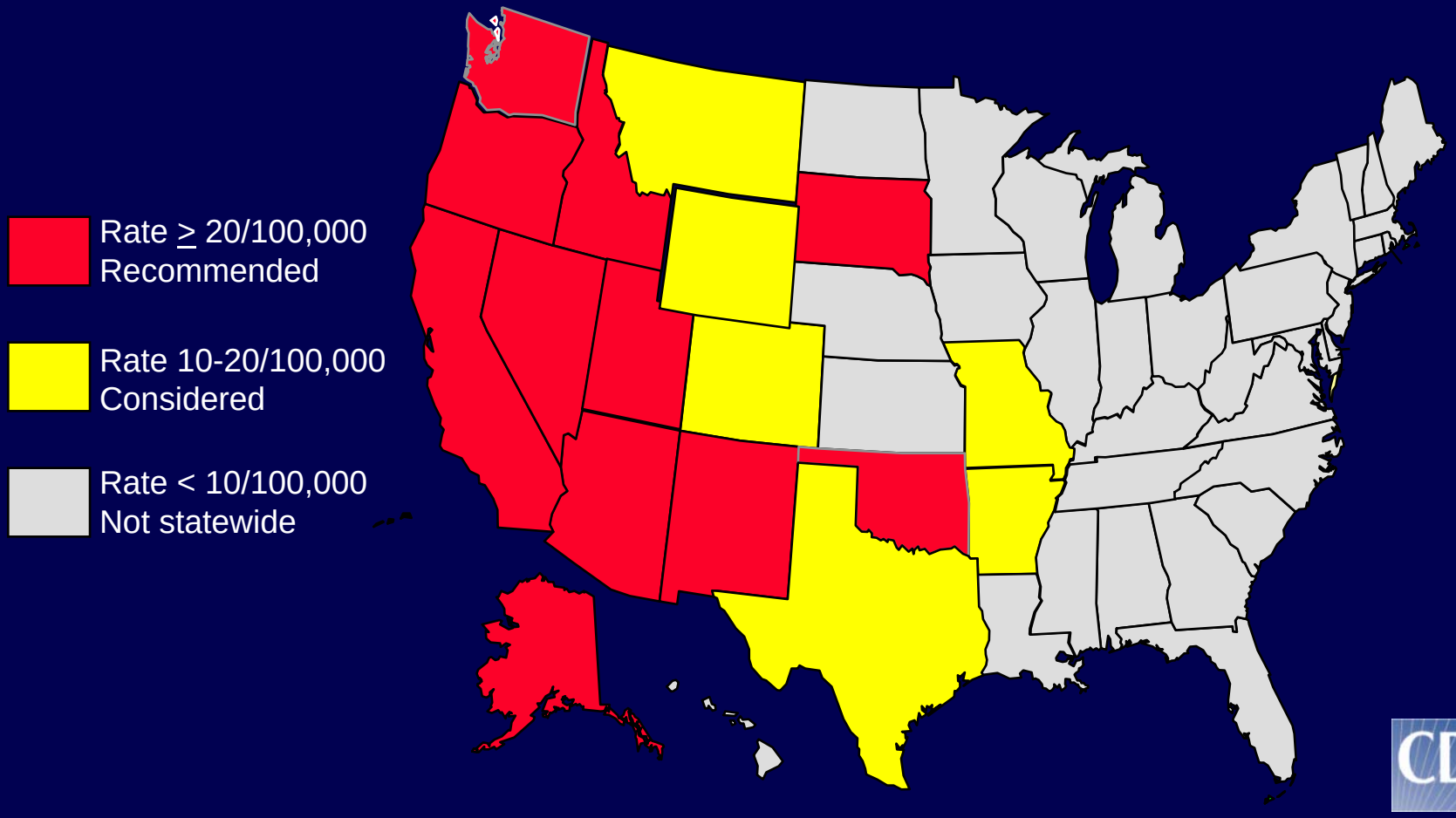
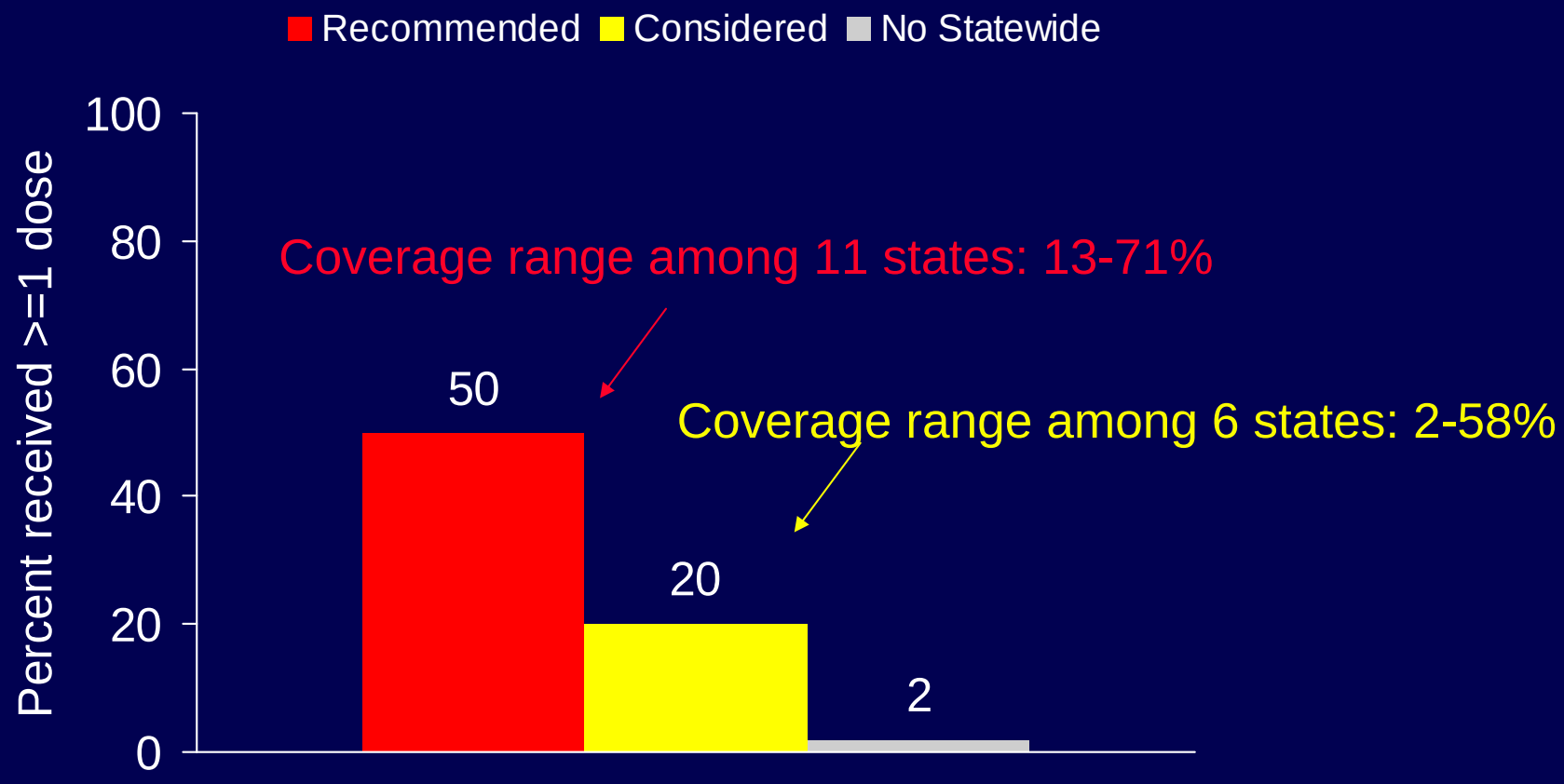
1999 ACIP Recommendations for Statewide Routine Hepatitis A Vaccination of Children*



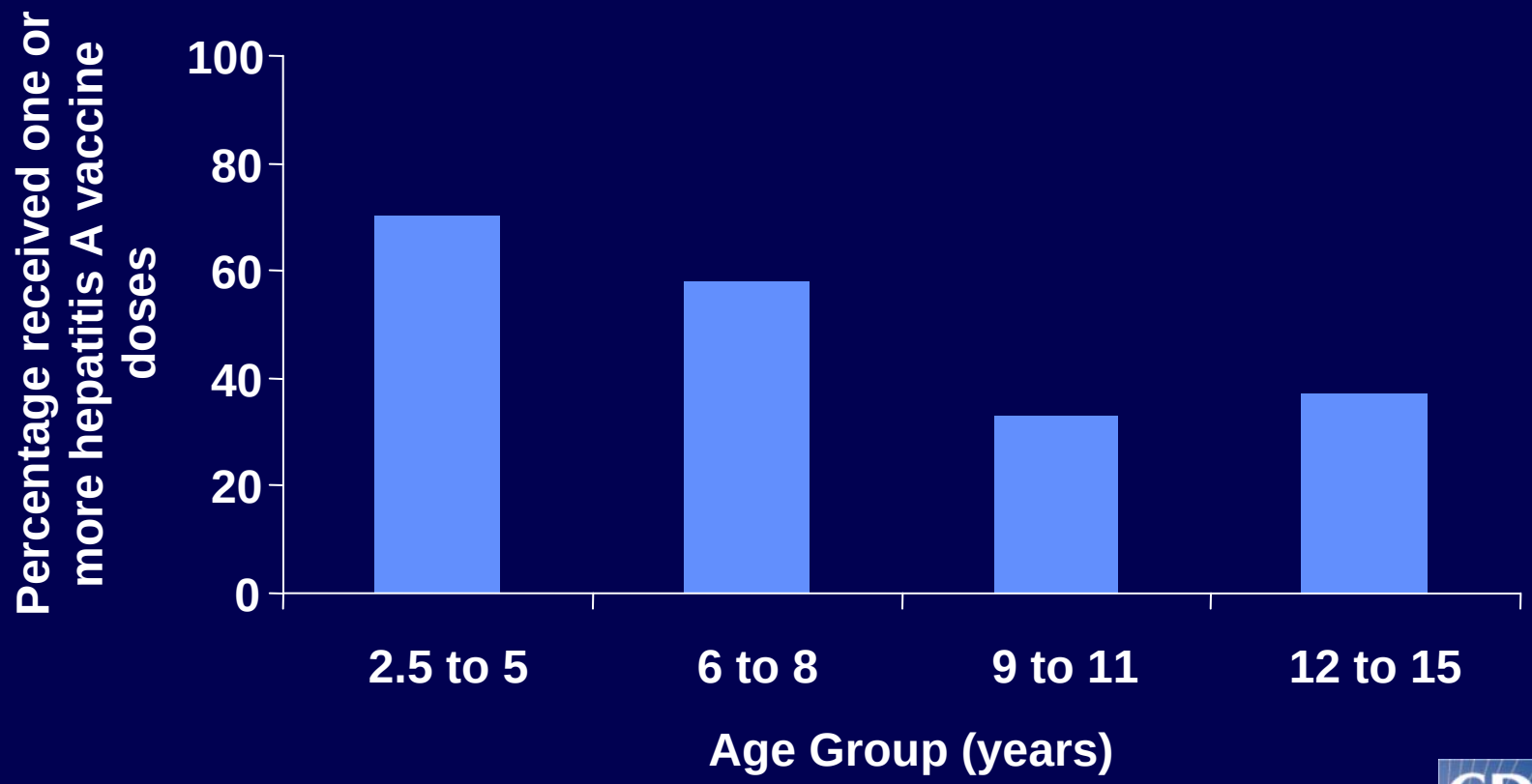
* Based on average incidence rate during baseline period (1987- 97)

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



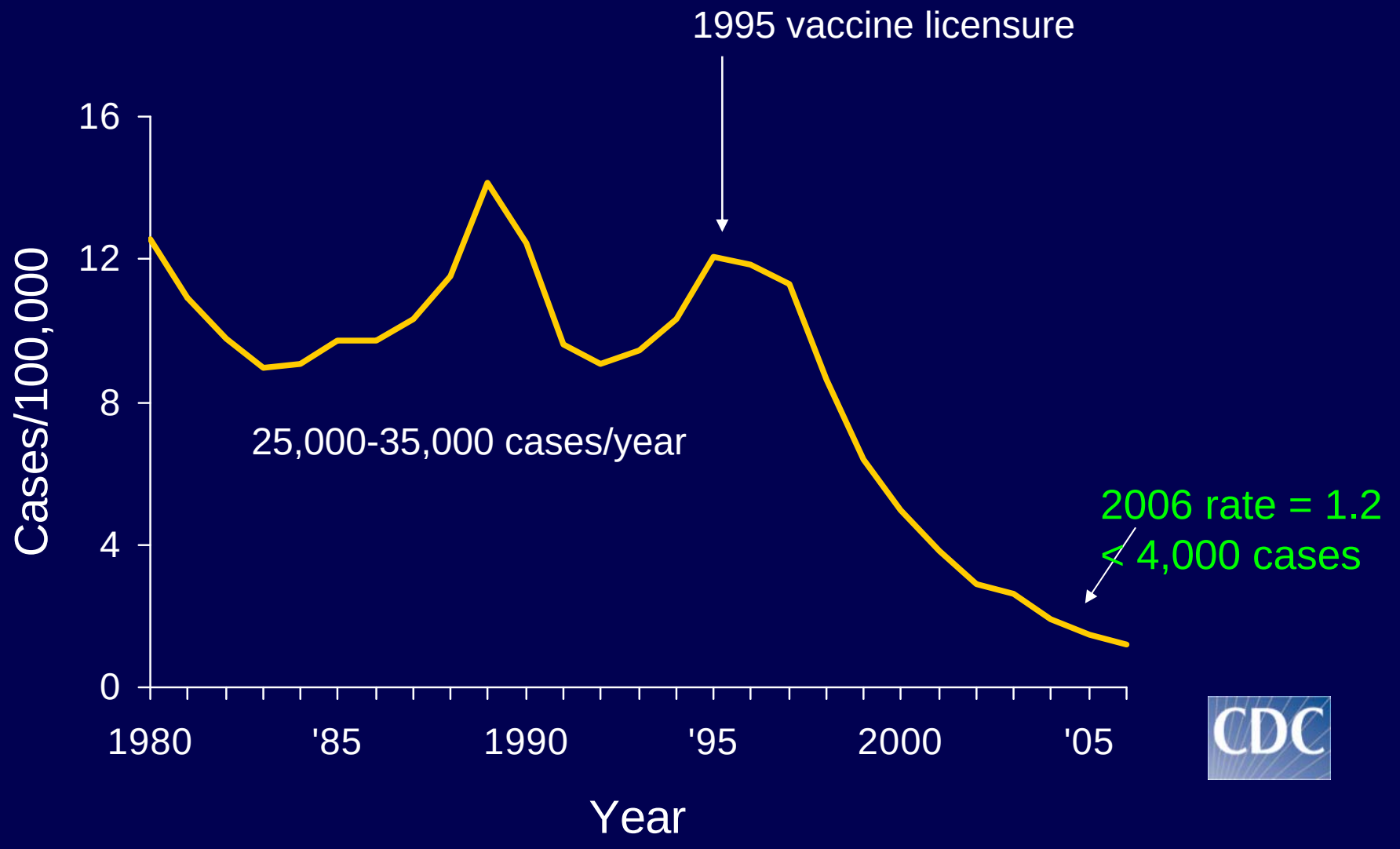
Source: CDC, unpublished.

Hepatitis A vaccine coverage (one or more doses) among Arizona and Oregon children, 2004-5 (n=488)

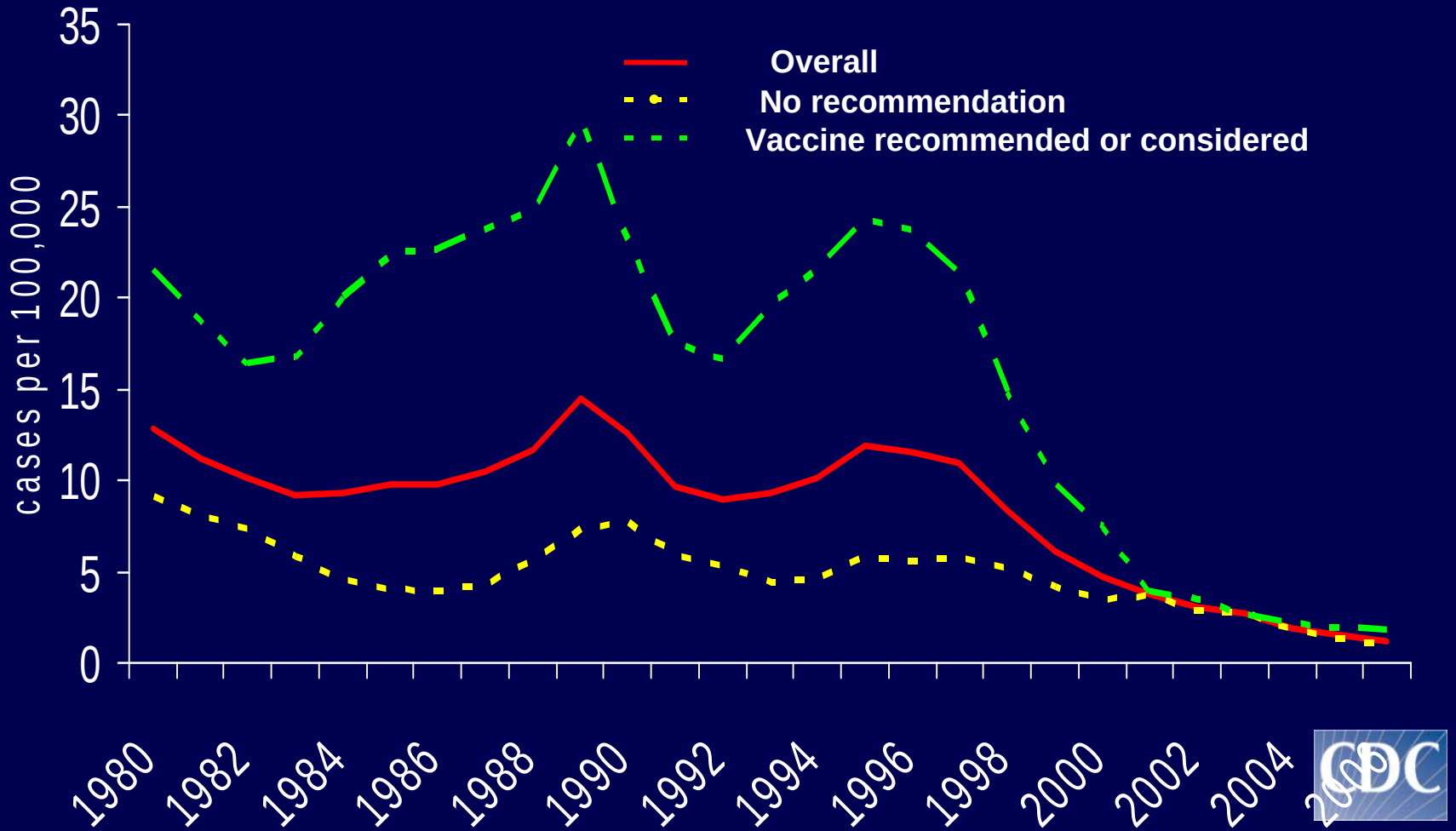


Source: Fiore et al. Amer J Preventive Med, 2007
Telephone survey with provider verification of immunization record

Hepatitis A Incidence, United States, 1980-2006

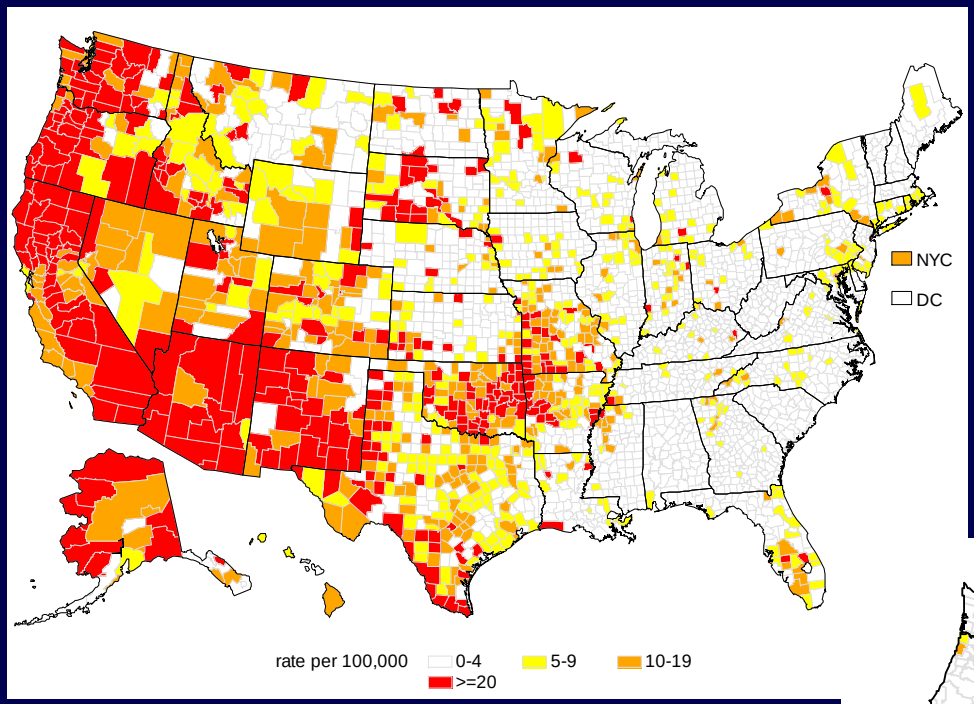


Hepatitis A Incidence, 1980-2006: Vaccinating and Non-Vaccinating States

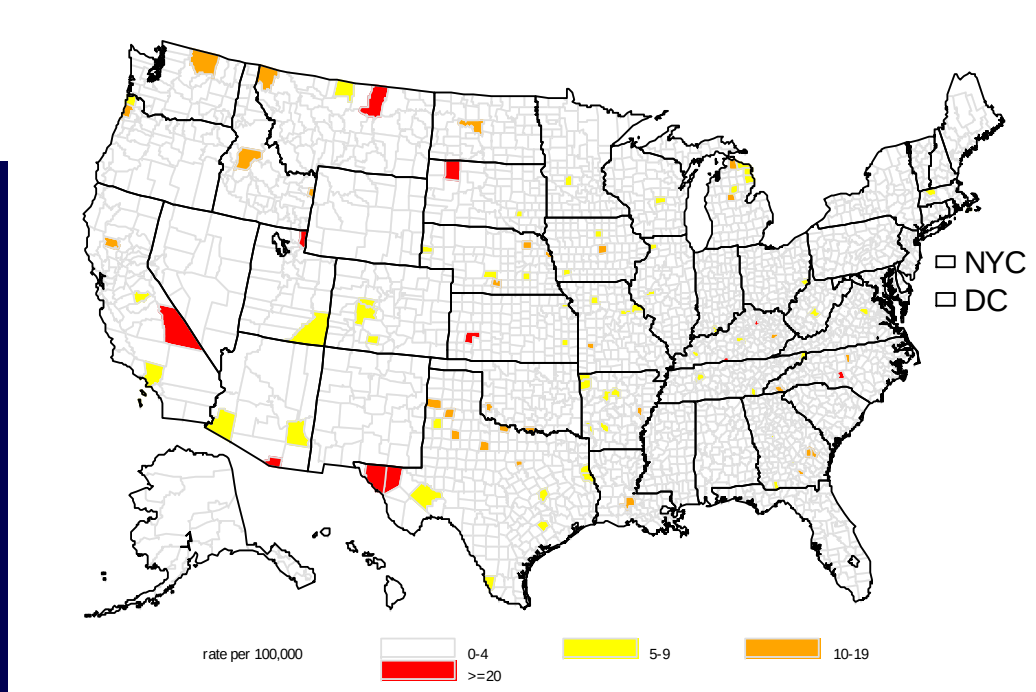


Hepatitis A Incidence

1987-97 average incidence



2006 incidence



Source: NNDSS

Rate per 100,000

- ≥ 20
- 10 - 19
- 5 - 9
- 0 - 4

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:

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

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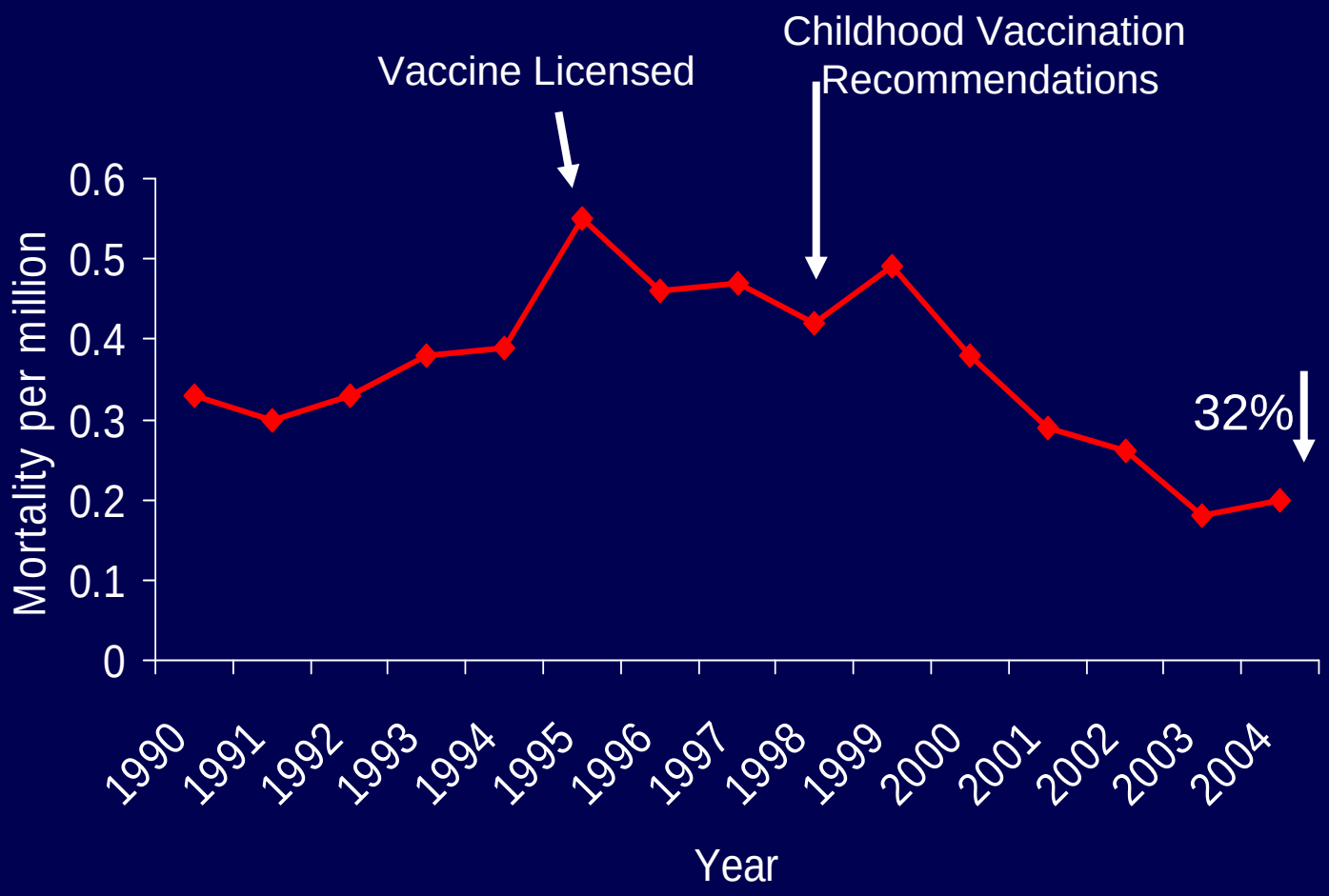
Source: Zhou et al. Vaccine 2007.

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



Source: Vogt et al; JID in press

Hepatitis A Vaccine to Control Outbreaks Key Features of Successful Interventions

- Relatively small, well-defined target population
- Most adults already immune
- Rapid vaccination of majority of susceptible population
- Not long term solution unless coupled with ongoing vaccination program

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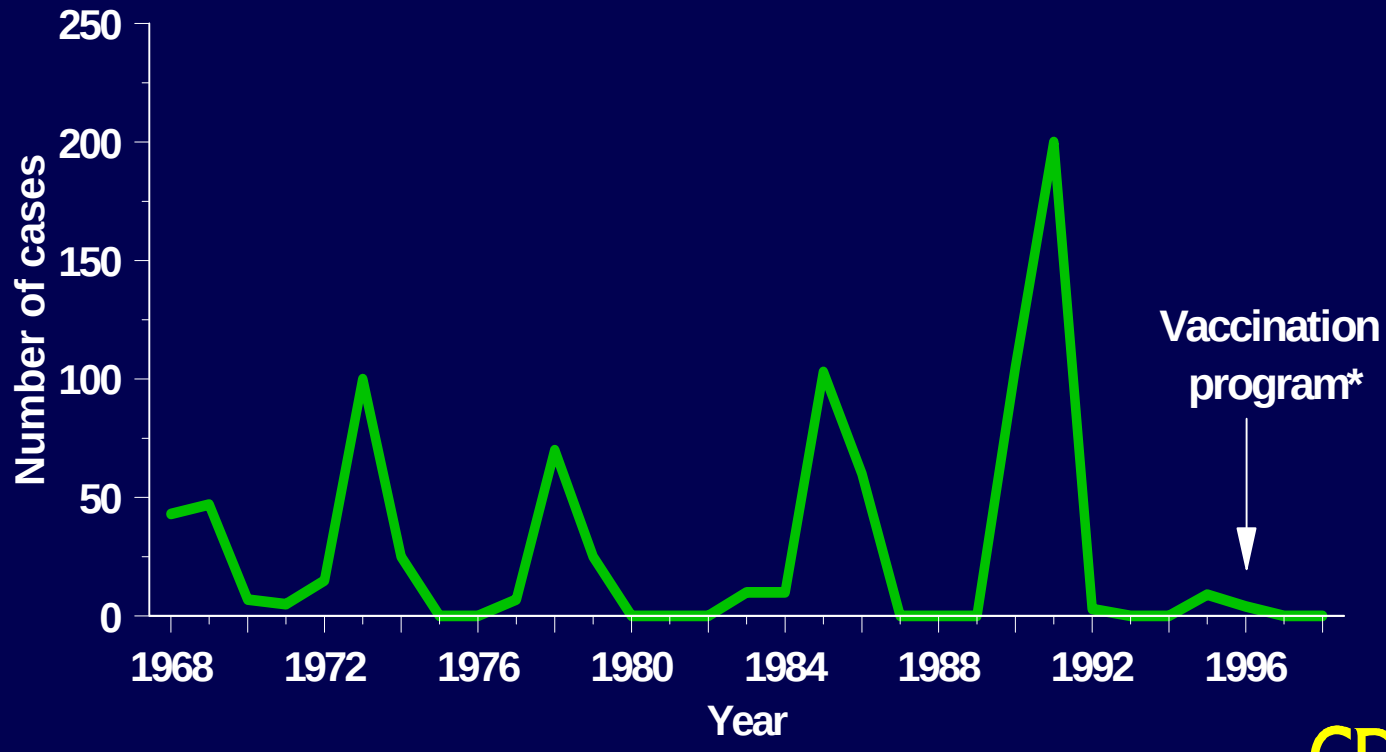
Reported Hepatitis A Cases, by Year

Northern Plains Indian Reservation

South Dakota, 1968-1998



*Estimated first dose coverage (children 2-12 years) = 71%

Source: South Dakota Department of Health

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Impact of Childhood Hepatitis A Vaccination Programs Summary

- Extremely effective in protecting vaccinated individuals
  - Breakthrough infections rare
- Early results indicate considerable public health impact
  - May accelerate with catch-up program but need depends on epidemiology and objectives

CDC

Impact of Childhood Hepatitis A Vaccination Programs Summary

- Impressive reductions with modest vaccination coverage
  - Evidence of considerable out-of-cohort effects among unvaccinated children and adults
    - Pre-existing age-specific prevalence of immunity in population may affect specific pattern and degree
- When epidemiologic pattern is heterogeneous, consider novel strategies
- Need to monitor incidence to assess

Emerging Issues

- Global leadership
  - Need guidance for countries considering implementing programs
- Better surveillance and disease burden data
  - Hepatitis A in context of other public health priorities
  - Consideration of novel vaccination strategies
- Vaccine performance
  - Long term protection
  - Alternate schedules