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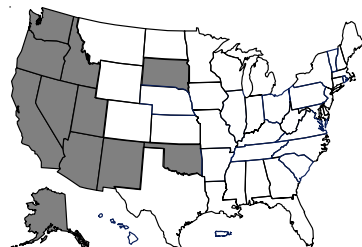
## HEPATITIS VACCINATION GETS AN "A"

ONLY SEVEN YEARS after the recommendation for universal childhood vaccination against hepatitis A, the once volatile disease has nearly vanished in Oregon: its incidence fell from 44 cases per 100,000 persons in 1996 to 1.8 during 2002–2004. In this issue of the *CD Summary*, we examine the relationship between universal vaccination and the precipitous decline in hepatitis A, and explore its changing epidemiology.

### UNIVERSAL HEPATITIS A VACCINATION

The hepatitis A vaccine was welcomed with enthusiasm upon its introduction in 1995. Western states had long sustained substantially higher rates of Hepatitis A than the remainder of the United States (Figure 1), and Oregon

Figure 1. States with Hepatitis A Rates  $\geq$  Twice U.S. Average During 1987–1997

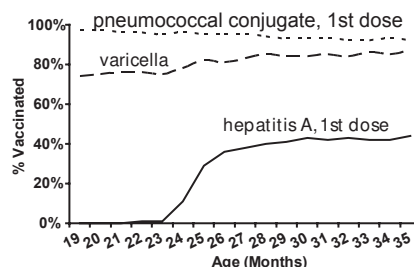


was in the middle of a massive statewide epidemic. Historically high-risk groups such as injection drug users, children in day-care and daycare employees, travelers to high-endemicity countries, men who have sex with men, and children living in communities with high rates of disease were targeted for immunization.<sup>1</sup> In 1999, after it became evident that many hepatitis A cases lacked known risk factors,

the Advisory Committee on Immunization Practices (ACIP) recommended that all children over 2 years of age living in the 11 (mostly Western) states with average incidences consistently (during 1987–97) exceeding twice the US average of 10 cases/100,000 residents be vaccinated.<sup>2</sup> This "elite" group of states includes our own.

In Oregon, hepatitis A vaccination with the 2-dose series was recommended for all children aged  $\geq 2$  years, but it has not been required for school entry. Data from Oregon's immunization registry indicated that by the end of 2004, 44% of children aged 35 months had received at least

Figure 2. Selected Vaccination Rates Among Children by Age — Oregon, December 2004.



one hepatitis A vaccination, compared to only 1.4% of children in states without universal hepatitis A vaccination.<sup>3</sup> While 44% may seem paltry when compared to rates of vaccination against pneumococcus (92%) and varicella (87%) (Figure 2), even this relatively modest rate of hepatitis A vaccination may have led to declining disease.

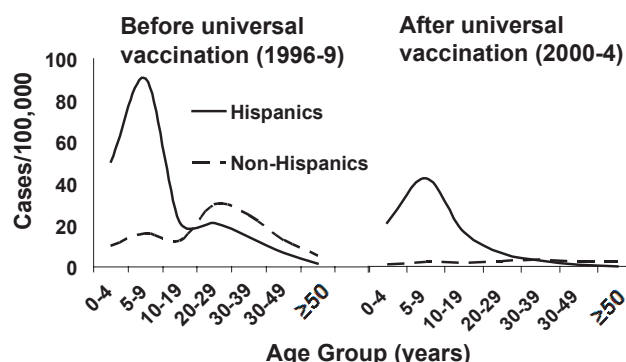
### HEPATITIS INCIDENCE IN OREGON

Traditionally, hepatitis A outbreaks occur every 7–10 years in the U.S, but the outbreak expected somewhere during 2002–2005 never materialized in Oregon or in the U.S. at large. To the contrary, by the end of 2003, rates in the 11 states with universal hepatitis A vaccination had actually fallen *below* those of states with traditionally lower rates (where, therefore, the vaccine hadn't been routinely recommended).<sup>4</sup> Noting this, the ACIP recently extended the recommendation to all states, and lowered the age for vaccination to 1 year.<sup>5</sup>

To understand the changing epidemiology of hepatitis A in Oregon, we compared hepatitis A incidence by age for a 4-year baseline period of 1996–99 with the period after universal hepatitis A vaccination, 2000 through September 2004.

Before universal vaccination, reported hepatitis A incidence was highest (25/100,000) in people aged 20–39 years, and a lesser incidence peak (20/100,000) was seen in children aged 5–9. (Figure 3.) After routine vaccination

Figure 3. Hepatitis A Incidence by Age and Hispanic Ethnicity — Oregon, 1996–1999 and 2000–2004.





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**Table 1. Hepatitis A Risk Factors by Hispanic Ethnicity — Oregon, 2000–2004.**

Factor	Hispanic (N=116) n (%)	Non-Hisp. (N=336) n (%)	RR (95% CI)
Contact with another case	8 (7)	20 (6)	1.2 (0.5-2.6)
Day care	10 (9)	16 (5)	1.8 (0.8-3.9)
Foreign travel	50 (43)	71 (21)	2.0 (1.5-2.7)
Parent of diapered child	22 (19)	22 (7)	2.9 (1.7-5.0)
Drug use	3 (3)	38 (11)	0.2 (0.1-0.7)
Male sex with male	3 (3)	10 (3)	0.9 (0.2-3.1)

of 2-year olds was recommended, incidence declined in all age groups. While the elevated incidence in adults aged 20–39 years evaporated, a lesser peak (5/100,000) in children aged 5–9 years persisted. Interestingly, after 1999 the incidence in Hispanics did not decline nearly as much as it did among non-Hispanics. In both periods Hispanics aged 5–9 years suffered the highest incidence.

#### CURRENT RISK FACTORS

In developing countries like Mexico, hepatitis A incidence is typically highest in young children; hepatitis A vaccination is uncommon, and children may be exposed early and often. As cases among non-Hispanics disappear, the higher incidence among Hispanic children (Figure 3) looms larger in the epidemiology of what's left of hepatitis A in Oregon. Travel to countries where hepatitis A is highly endemic has long been recognized as a risk for acquiring infection. During the

universal hepatitis A vaccination era, Hispanics with reported cases of hepatitis A in Oregon were twice as likely as their non-Hispanic counterparts to report foreign travel during the likely exposure period and 3 times as likely to be the parent of a child still in diapers (Table 1).

#### OREGON VACCINATION RATES

In Oregon, we analyzed hepatitis A disease and immunization rates by census tract and found that during 2000–2004, incidence was *highest* in areas where vaccination rates were highest. We do not interpret this to indicate lack of vaccine effectiveness; rather, this likely reflects appropriate emphasis on vaccination in areas where rates are highest. Nationally, CDC investigators found that vaccine coverage is highest among children at higher risk such as Hispanics, American Indians and those living in urban areas.<sup>4</sup>

#### WHAT NOW?

What, if anything, is to be done to further reduce hepatitis A in

Oregon? We have already begun to sequence DNA from Oregon cases; these data will help further explore and confirm epidemiologic associations. If our hypotheses about imported disease are true, further reductions in hepatitis A might be achieved by additionally targeting Hispanic children who have recently immigrated from or travel frequently to Mexico and non-Hispanics living in areas populated by larger proportions of Hispanics. Investment in improved sanitation and vaccination campaigns in developing countries like Mexico may ultimately produce domestic returns in the form of further reductions in hepatitis A in the U.S.

#### REFERENCES

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