



Impact of Vaccines on American Indian and Alaska Native Health

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Faculty Disclosure

- I have the following financial relationships with the manufacturer(s) of a commercial product and/or provider of commercial services discussed in this CME activity.

Research Support from: Wyeth Vaccines

I do intend to discuss an unapproved/investigative use of a commercial product/device in my presentation.


Vaccine-preventable Disease Rates in AI/AN before and after vaccine

Disease	AI/AN pop.	Rate before Cases/100,000	Rate after Cases/100,000
Hep A	AI/AN <5 yr	187	1.9
Hep B	AN all ages	200	<5
Hib	AN <5 yr	601	5.4
	Navajo/WMA <5	152-250	20.2
Pneumo	AN <5 yr	403	244
	Apache <5 yr	473	120


Singleton, Holve, Groom et al. Arch Ped. 2009, in press

Vaccine-Preventable Disease in Alaska Native children

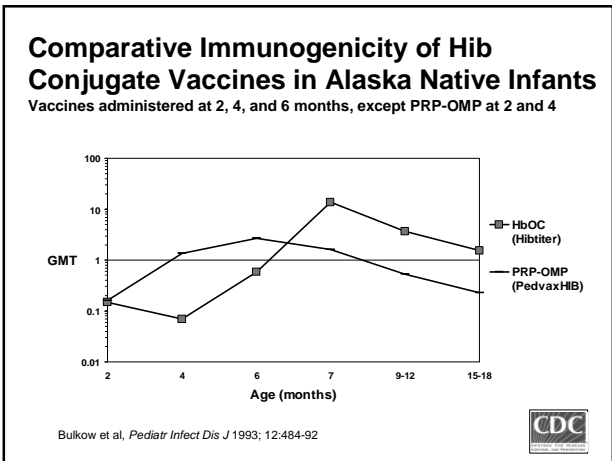
- BEFORE VACCINES:**
 - Hib disease – 40 cases/yr <5 y/o
 - Pneumo disease – 25 cases/yr < 2 y/o
 - Hep A – epidemics with 4,000 cases
 - Hep B – 10% carriers
 - 5% of infants died from Measles/pertussis
- BECAUSE OF VACCINES:**
 - ~ 1 case of Hib per year!
 - Vaccine-type pneumo down 95%
 - No Hep A epidemics since vaccine!
 - No Hep B carriers in children!



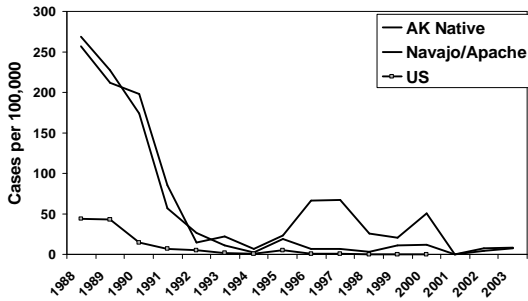
Hib disease



- Unique Aspects in AI/AN**
 - 5-10 times higher rate of disease in SW and AK
 - Younger peak age (4-6 months)
- Unique Recommendations**
 - Prefer PRP-OMP (PedvaxHIB®) because of its ability to produce protective antibodies after 1 dose.
 - American Indian/Alaska Native children prioritized to receive PedvaxHIB in current Hib vaccine shortage



Decline in Hib Disease: US, Navajo/ Apache, AK Native, 1988-2003



Millar EV, et al. Clin Infect Dis 2005; 40:823-30, CDC, AIP-CDC

Warning!

Invasive Hib disease re-emerges

- Alaska:
 - 2001-7: 0-2 Hib cases/year,
 - 2008 - 2 cases of Hib in 6 months
 - **Both children were unvaccinated**
 - 2 month old - brain damage from Hib meningitis
 - Hadn't received first Hib vaccine
 - 14 month old - Hib pneumonia
 - Parent refused all vaccines.
- Minnesota
 - 2009 - 5 cases in children < 3 years
 - Largest number of cases in MN since 1992
 - **3 children unvaccinated (1 death)**
 - 2 parents refused: 1 parent wanted to defer until later
 - 5 month old with 2 doses
 - Fully immunized child; had hypogammaglobulinemia.

Pneumococcus (Pneumo)

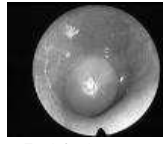
- Main cause of serious infections:
 - Bacterial meningitis
 - Blood infections
 - Pneumonia
- Main cause of Ear Infections



Pneumonia



Brain: meningitis

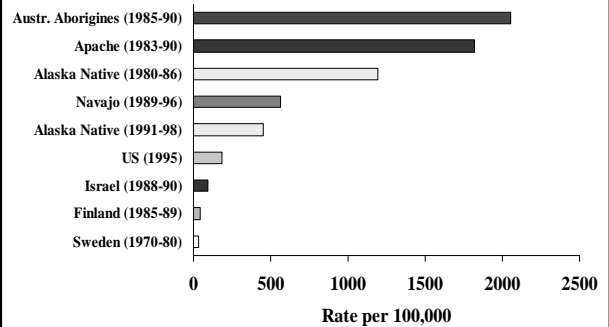


Ear infection

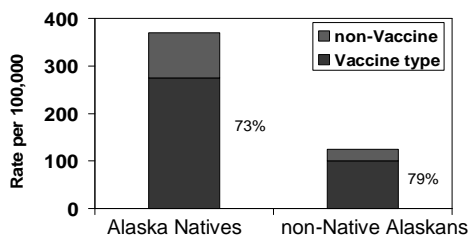


Pneumo bacteria

Invasive Pneumococcal Disease Rates, Children < 2 years old

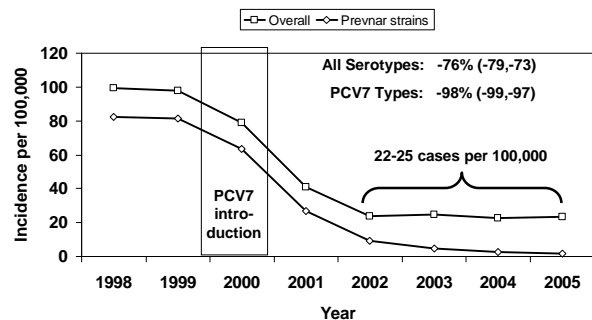


Invasive Pneumococcal Disease Alaskan children <2 year olds, Pre-Vaccine, 1995-2000



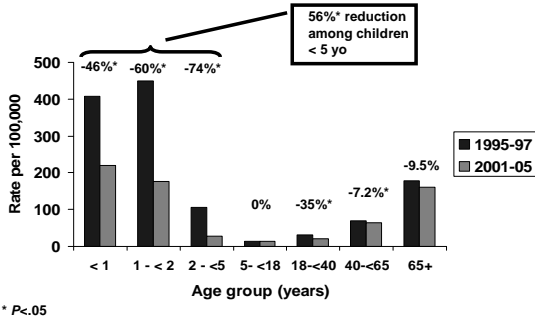
Before Prevnar vaccine, Alaska Native children had a rate of invasive Pneumococcal disease 3 times that of non-Native Alaskan children. Navajo/Apache children experienced similarly higher rates.

Prevnar Vaccine Impact: Decrease in Pneumo Disease in US children

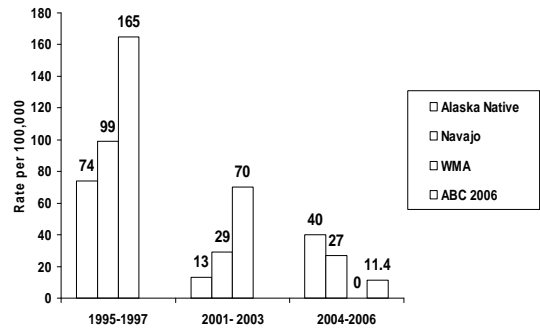


CDC, unpublished data

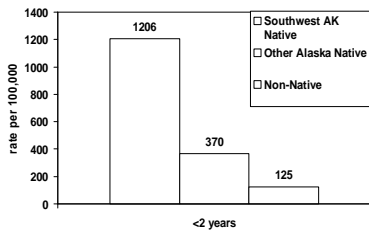
Reduction in Rate of All-Serotype IPD, All Ages, Navajo



IPD Rates, 24-59 months, Alaska Natives, Navajo, WMA and general US population



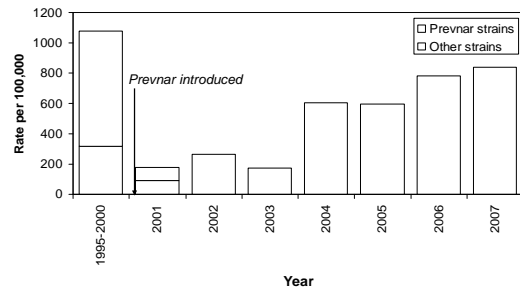
Why focus on Southwest Alaska?



- Pneumo infections in Southwest Alaska children before Prevnar:
 - 5-fold higher than other Alaska Native children
 - 10-fold higher than non-Native Alaskan children

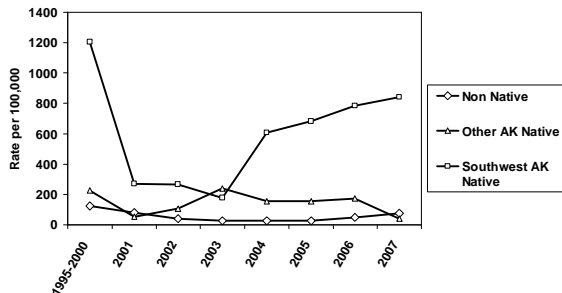
Invasive Pneumococcal Disease Rate

Southwest AK Native Children less than 2 yrs old, by year



Although no vaccine-type disease is occurring, there have been increases in non-vaccine serotype disease since 2004.

Invasive Pneumococcal Disease Rates, Southwest Alaska vs. AK Native vs. non-Native Children,



Factors associated with high invasive pneumococcal disease rates in Southwest Alaska children

- Largest median # of household members of any region
- Lowest per capita income of any region
- Highest proportion of homes with no running water

Pop.	<10% Water	10-80% Water	≥ 80% Water	P value for trend
N cases	26	12	9	P= 0.008
Rate per 100,000	390.9	262.9	146.7	

The effect of lack of water service on IPD rates was significant even when controlling for household size and income level

A new expanded vaccine is anticipated to replace Prevnar®

Prevnar (PCV7)	Prevnar 13 (PCV13)
7 serotypes	13 serotypes

Wyeth has applied for licensure of a 2nd generation pneumococcal conjugate vaccine to replace Prevnar®. This vaccine contains 13 serotypes.

About 3/4s of pneumococcal infections in southwest Alaska are covered by this PCV13 vaccine

SUMMARY

- Vaccines have resulted in near-elimination of certain infectious diseases:
 - Hep A
 - Hep B
- Vaccines have resulted in dramatic decreases in Hib and pneumococcal disease; however, elimination is challenged by
 - Non-vaccine serotypes
 - Asymptomatic carriage of organism