Do NOT PASS GO without your Immunizations: Promotion strategies in Indigenous Communities and beyond

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Financial Disclosure

- Diana Hu, faculty for this CE activity, has no relevant financial relationship(s) with ineligible companies to disclose.
- None of the planners for this activity have relevant financial relationships to disclose with ineligible companies.
- The Arizona Alliance for Community Health Centers is accredited by the Arizona Medical Association to provide medical education for physicians.
- The Arizona Alliance for Community Health Centers designated the 2025 Arizona Immunization Conference educational activity for a maximum of 11 hours AMA PRA Category 1 Credits Physicians should only claim credit commensurate with the extent of their participation in the activity.
- The Arizona Pharmacy Association is accredited by the Accreditation Council for Pharmacy Education (ACPE) as a provider of continuing pharmacy education.

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Acknowledgement

- Arizona is the home to 23 Indigenous tribes and we recognize the contributions of these people to the past and current stewardship of the land and waterways and the cultural heritage of our state

- I have been privileged to serve the Navajo, Hopi, and San Juan Paiute people during my career in Indigenous health on the Navajo Nation.

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Objectives

- Attendees will recognize the impact of immunizations on communicable diseases in Indigenous communities
- Attendees will be able to cite factors that may impact epidemiology of infectious diseases and the delivery of vaccinations to rural patients and communities
- Attendees will be able to develop strategies to improve vaccine delivery that can be applied in their own practice

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Why vaccines?

- Childhood vaccines prevent 2-3 million childhood deaths worldwide annually
  - Over 50% reduction in global infant mortality in the last century associated with three major contributors: clean water, improved sanitation, and childhood vaccination
  - Substantial reduction in morbidity from vaccine preventable diseases in resource high countries
- Disease specific targets
  - Control elimination- eradication of a pathogen

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Maximum and Current Morbidity of Selected Vaccine Preventable Diseases

	Maximum cases	2000	Percent change
Diphtheria	206,939	1	-99.9
Measles	894,134	86	-99.9
Mumps	152,209	338	-99.7
Pertussis	265,269	7,867	-97.0
Polio (paralytic)	21,269	0	100.0
Rubella	57,686	176	-99.7
CRS	20,000	2*	-99.9
Tetanus	1,560	35	-97.8
Invasive HIB	20,000	293	-98.5

*1996 provisional data

CENTERS FOR DISEASE CONTROL AND PREVENTION

2016 data

What happens when vaccination declines…

Table 1. Number of Reported Cases of Measles, 2015–2020, United States

Year	Number of Cases
2015	188
2016	86
2017	120
2018[a]	375
2019[a]	1,282
2020[b]	13

[a] From October 2018 through July 2019, outbreaks of measles in New York City and New York state accounted for 1,101 (75%) of the 1,459 reported cases in the United States. Most of the cases occurred in children who were not vaccinated against measles.
[b] Through November 30, 2020.

Source: Centers for Disease Control and Prevention.

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Measles… not going the right direction…

TABLE. Epidemiologic and laboratory characteristics of reported measles cases — United States, January 1, 2020–March 28, 2024

Characteristic	No. (%), by year						
	Total	2020	2021	2022	2023	2020–2023	2024
Total measles cases	**338**	**13**	**49**	**121**	**58**	**241**	**97**
Age group							
0–5 mos	**10 (3)**	0 (—)	5 (10)	0 (—)	0 (—)	5 (2)	5 (5)
6–11 mos	**57 (17)**	0 (—)	11 (22)	26 (21)	6 (10)	43 (18)	14 (14)
12–15 mos	**29 (9)**	1 (8)	5 (10)	13 (11)	3 (5)	22 (9)	7 (7)
16 mos–4 yrs	**106 (31)**	2 (15)	13 (27)	52 (43)	15 (26)	82 (34)	24 (25)
5–19 yrs	**85 (25)**	2 (15)	12 (24)	29 (24)	20 (34)	63 (26)	22 (23)
20–49 yrs	**47 (14)**	8 (62)	3 (6)	1 (1)	14 (24)	26 (11)	21 (22)
≥50 yrs	**4 (1)**	0 (—)	0 (—)	0 (—)	0 (—)	0 (—)	4 (4)
Vaccination status							
Unvaccinated	**230 (68)**	5 (38)	8 (16)	118 (98)	42 (72)	173 (72)	57 (59)
Unknown	**79 (23)**	5 (38)	40 (82)	1 (1)	10 (17)	56 (23)	23 (24)
Vaccinated, 1 dose	**17 (5)**	0 (—)	0 (—)	1 (1)	4 (7)	5 (2)	12 (12)
Vaccinated, 2 doses	**12 (4)**	3 (23)	1 (2)	1 (1)	2 (3)	7 (3)	5 (5)
Import-associated cases	**326 (96)**	12 (92)	48 (98)	121 (100)	53 (91)	234 (97)	60 (94)
International importation*	**93 (28)**	7 (54)	21 (43)	23 (19)	23 (40)	74 (31)	19 (20)
Import-linked†	**65 (19)**	4 (31)	18 (37)	11 (9)	19 (33)	52 (22)	13 (13)
Imported-virus or imported-virus–linked§	**168 (50)**	1 (8)	9 (18)	87 (72)	11 (19)	108 (45)	60 (62)
Unknown source cases¶	**12 (4)**	1 (8)	1 (2)	0 (—)	5 (9)	7 (3)	5 (5)

2024 -285 cases total. 1st quarter 2025- 338 cases as of March 6, 2025

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American Indian/Alaska Native people are/were at increased risk for:

- Haemophilus Influenzae type B (Hib)
  - - 4-15x pre-vaccine era, 16% affected cases with permanent sequelae
- Streptococcus Pneumoniae
  - 5-24x pre-vaccine era
- Hepatitis B-
  - 3% of Alaska Natives affected annually, 13% overall prevalence pre vaccine era
- Hepatitis A-
  - 33x pre-vaccine era (AZ, SD data)
- Influenza
  - H1N1 4x higher mortality

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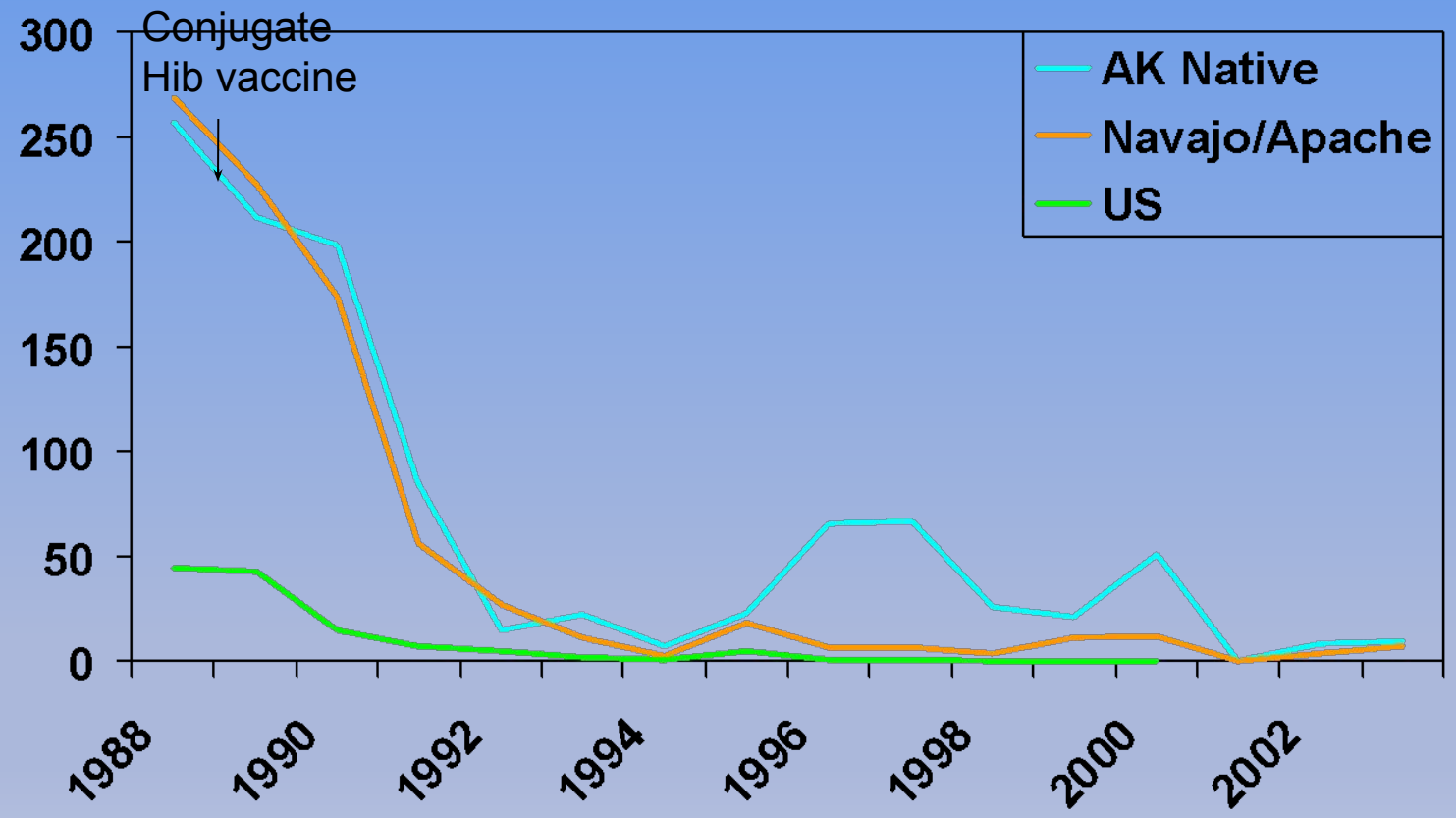
Decline in Hib Disease:

US, Navajo/ Apache, AK Native,1988-2003



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

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Decline in Pneumococcal disease after PCV7 introduction

From: **Invasive Pneumococcal Disease a Decade after Pneumococcal Conjugate Vaccine Use in an American Indian Population at High Risk for Disease**

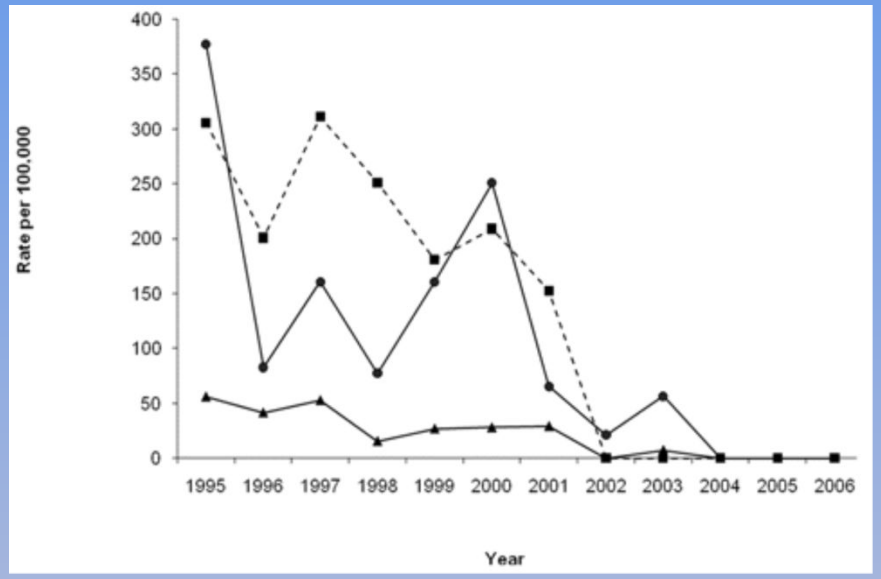

Figure Legend:

Rates of vaccine serotype invasive pneumococcal disease among Navajo children. Rates include imputed data for cases without serotype data. Solid line with circles, age of <1 year; dotted line with squares, age of 1 to <2 years; solid line with triangles, age of 2 to <5 years.

Clin Infect Dis. 2010;50(9):1238-1246. doi:10.1086/651680

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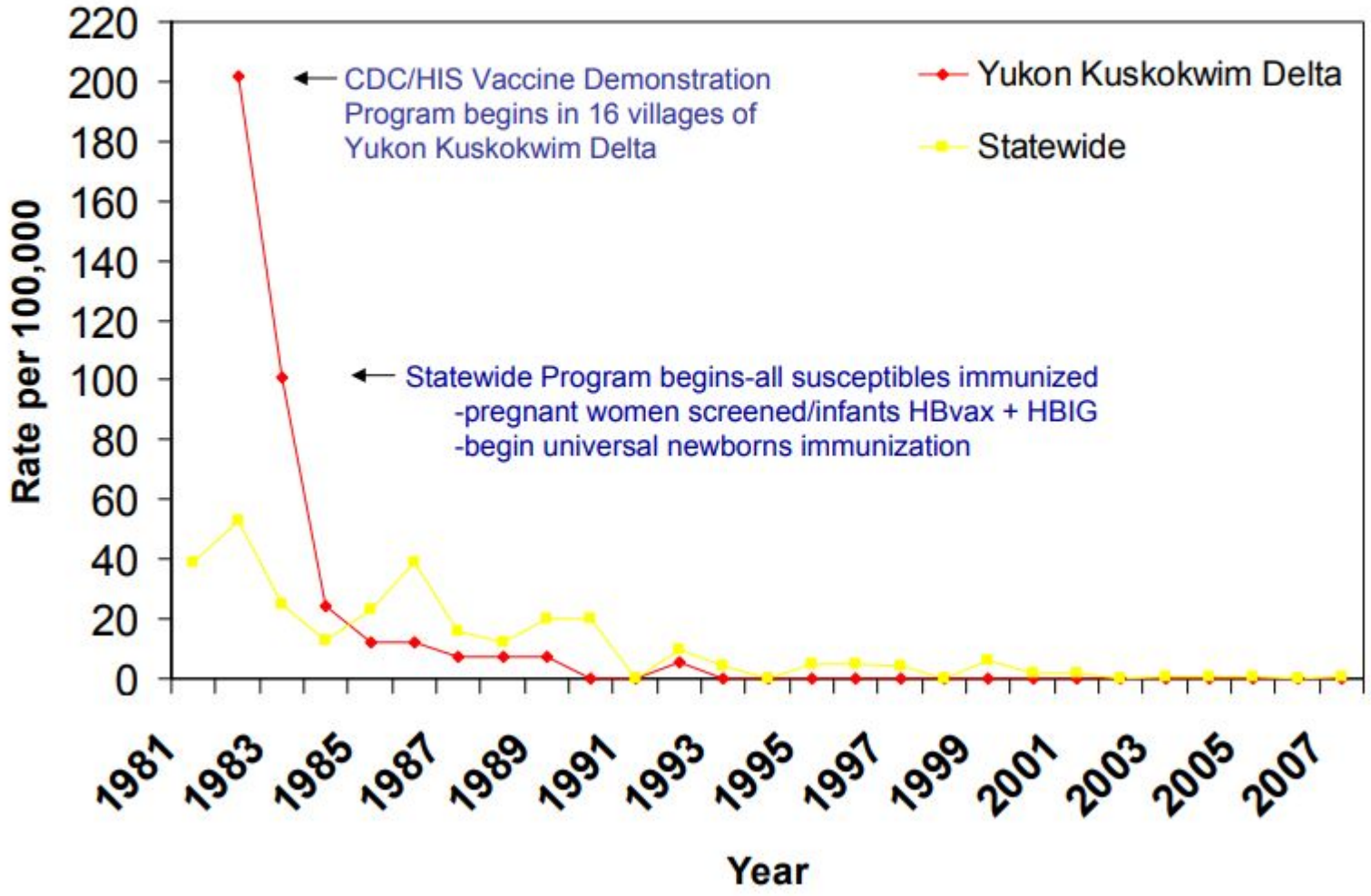
Incidence Symptomatic Hepatitis B in AK Natives 1981- 2003



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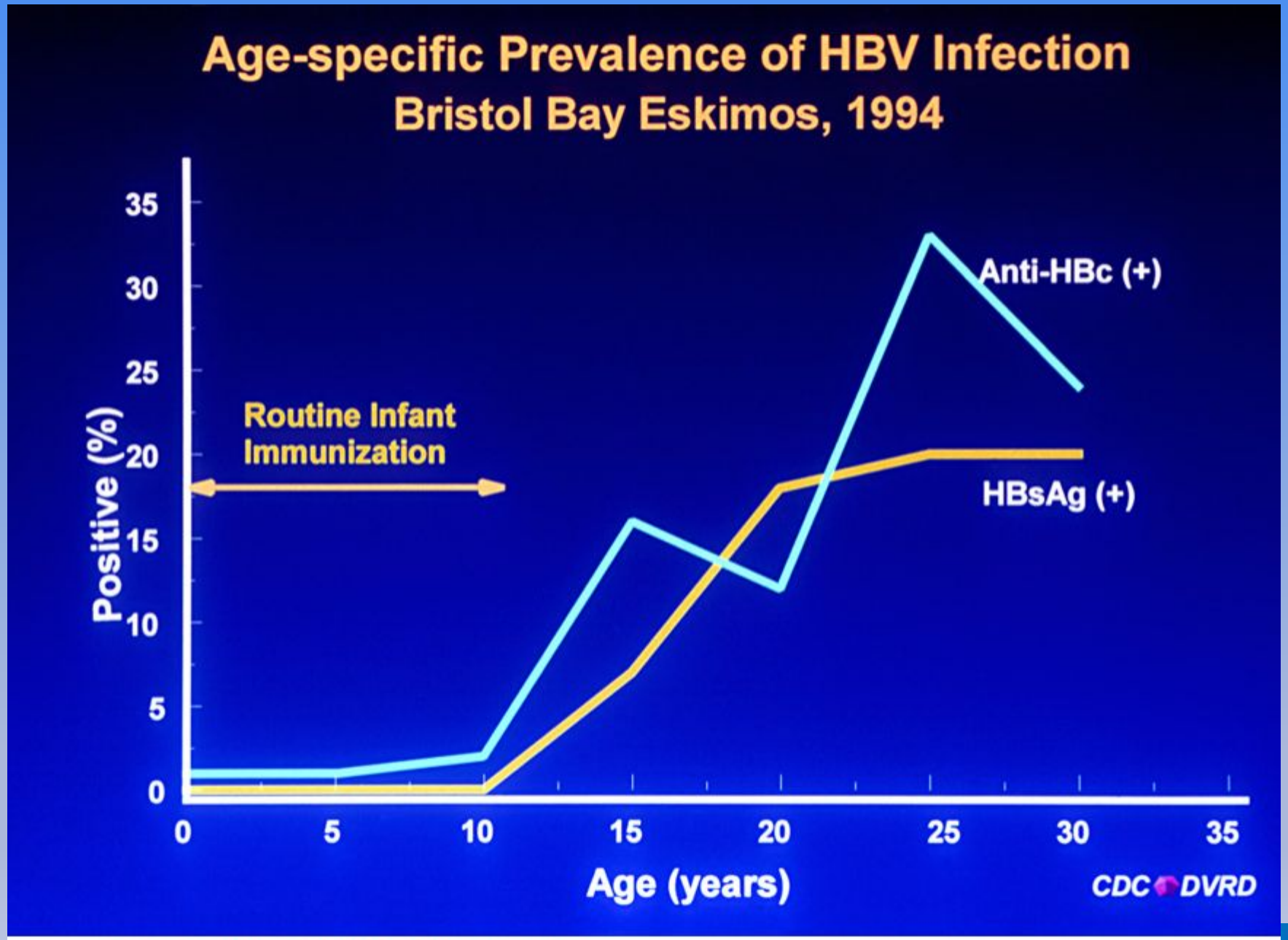

J Infect Dis 2000;181:413-418

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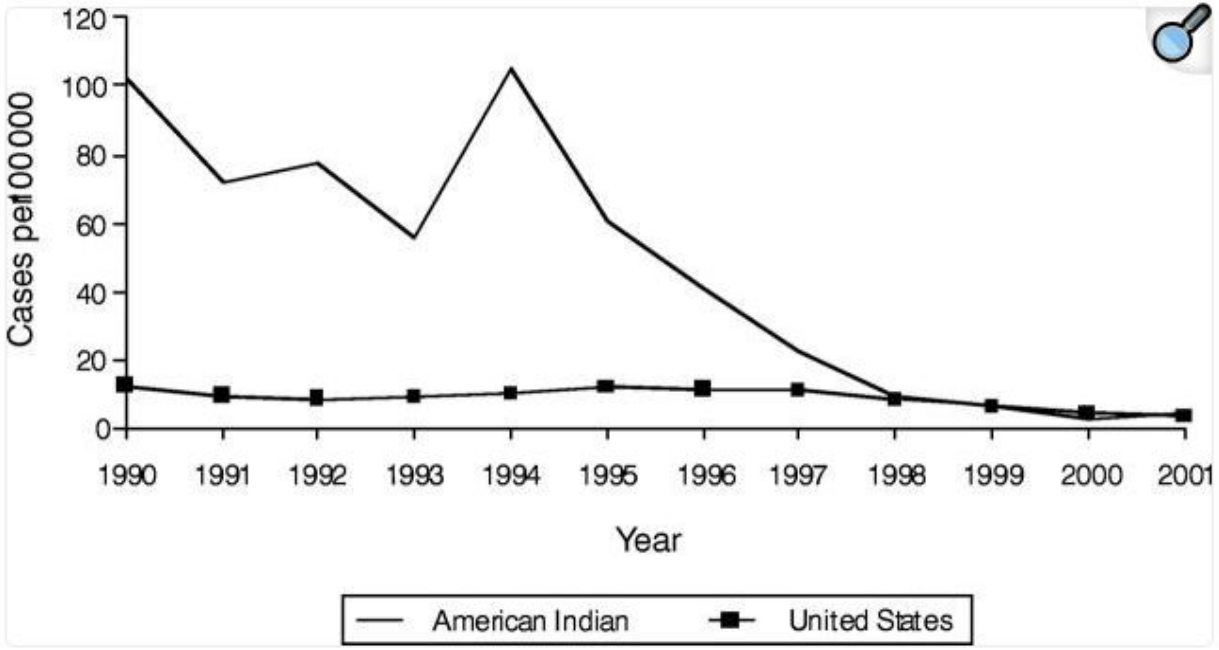
Decline in Hepatitis A, Navajo 1990-2001

FIGURE 1—



Hepatitis A incidence: American Indians/Alaska Natives and the general United States population, 1990–2001.

Bialek, et al AJPH 2004 Jun : 94(6) 996-1001

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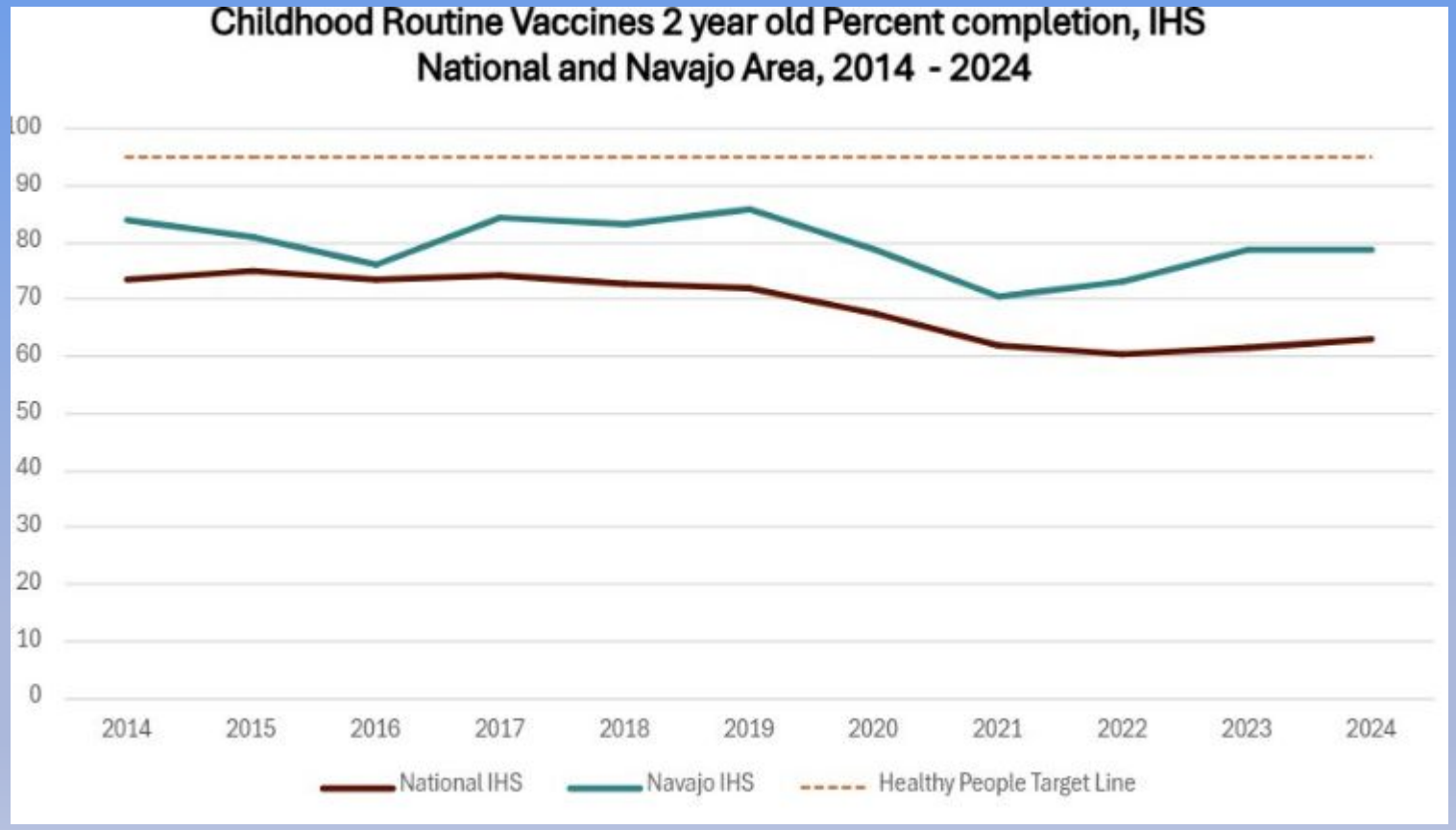
Recent trends in childhood vaccination on Navajo Nation



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Barriers to vaccination- especially in rural areas

- Access to care
  - Geography
  - Providers with vaccine services
- Limited resources
  - Cost of vaccination/lack of insurance
    - Routine US childhood vaccine schedule is >$1200 per child vaccine costs ONLY
  - Time
- Patient centered barriers
  - Safety concerns
  - Perceived lack of need
  - Misinformation about vaccines
  - Lack of provider recommendation

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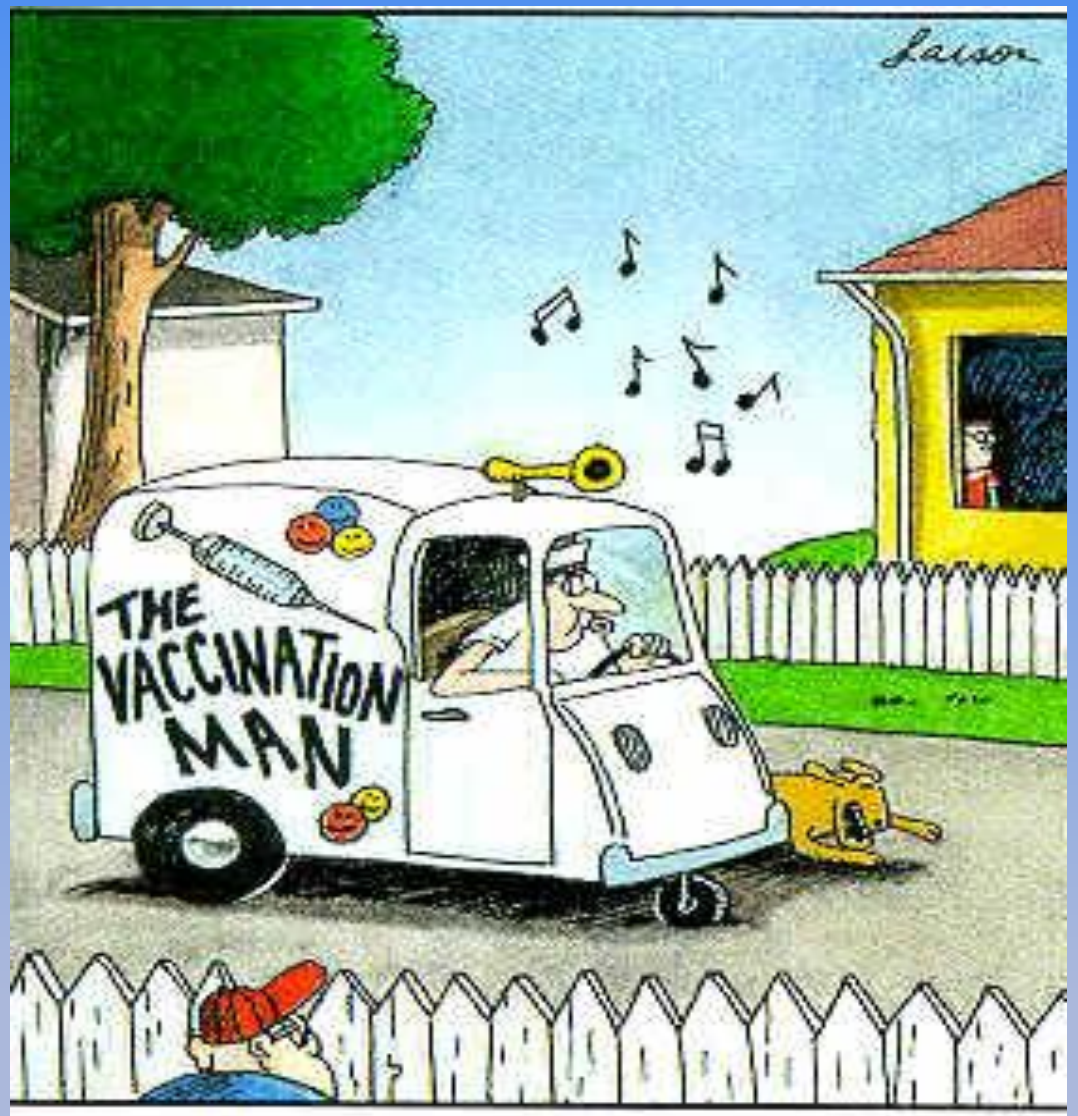

Slowly he would cruise the neighborhood, waiting for that occasional careless child who confused him with another vendor.

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Vaccines for Children program

- 1993 congressional passage- effective Oct 1, 1994
- American Indians/Alaska Natives categorically eligible
- All ACIP recommended vaccines
- Medical Home model
- 2010- 40 million US children received vaccines through the VFC program
  - FY24 > $ 7.2 billion for vaccine supply and program support to states

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What we learned from VaxUp

- Focus group study by JHU with the two health care facilities on Navajo Nation
  - Health care providers
  - Community members
- Process evaluation to improve vaccine delivery and uptake

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Health care providers

- Misinformation and public perception has changed
- Vaccine hesitancy in parents
- Impact of historical trauma on AI/AN patients
  - Trust, experimentation, exploitation
- Provider shortages
- Decreased time in patient interactions
- Consent policies for pediatric patients

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Community members

- Vaccine information sources – where do patients get information
  - Social media, word of mouth, print vs. internet
- Access to vaccines
- Misinformation/misunderstandings about vaccines
- Perception of risk
- Vaccine protection
- Historical trauma and mistrust
- Culturally tailored strategies needed
  - In Indigenous language, with visuals

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Strategies to improve uptake

- Communicate- be humble and consistent in communication, be honest about side effects, be present for conversations about vaccines
- Timely reminders- tell patients early on when they are due so they know what to expect, especially in pregnancy or for well child visits
- Transparency- clear and timely information
- Understand community concerns and risk perceptions
  - Collaborate with the community to shape messages and strategies

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Best practices for improving vaccine uptake

- E3 strategy- IHS initiative
  - Every Patient, Every Encounter, Every vaccine they are eligible for
- Patient Screening at every visit-
  - Non primary care visits
- Standing orders
- Reminders at end of visit and for next visit
- Improved and extended hours access
- Strong provider recommendations
  - Presumptive approach
  - Education of providers and staff on new vaccines and side effects

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A modest success story- Nirsevimab and RSV-preF vaccine- 2023-2024

- Nirsevimab= Beyfortus®
  - Anti RSV monoclonal Ab – passive immunity
  - Single injection for the whole season
  - Studied in populations across the US including on Navajo
  - licensed in 2023 for babies < 8 mo
  - Prevented 90% of SEVERE (hospitalized/medically attended) RSV infections
    - Does not fully prevent ALL RSV infections

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RSV Pre F vaccine story

- RSV PreF vaccine- Abrysvo®
  - Licensed in 2023 for use in pregnancy
  - Initial studies in 18 countries, 7000 pregnancies high and low resource countries
  - Initially used in 24- 36 weeks gestation pregnancies
    - Changed to 32 -36 weeks gestation in US because of slight increased risk of premature birth in BOTH RSV PreF vaccine trials ongoing (GSK Arexvy® vaccine and Abrysvo®)
    - Prevented 57-69% of medically attended/severe RSV disease in the infants
  - Increased risk of Guillain– Barre syndrome in 42 d after vaccination
    - Data only from Medicare records – was seen in population >65y
    - No published data on risk in pregnancy

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From: **RSV Among American Indian and Alaska Native Children: 2019 to 2020**

Pediatrics. 2023;152(2). doi:10.1542/peds.2022-060435

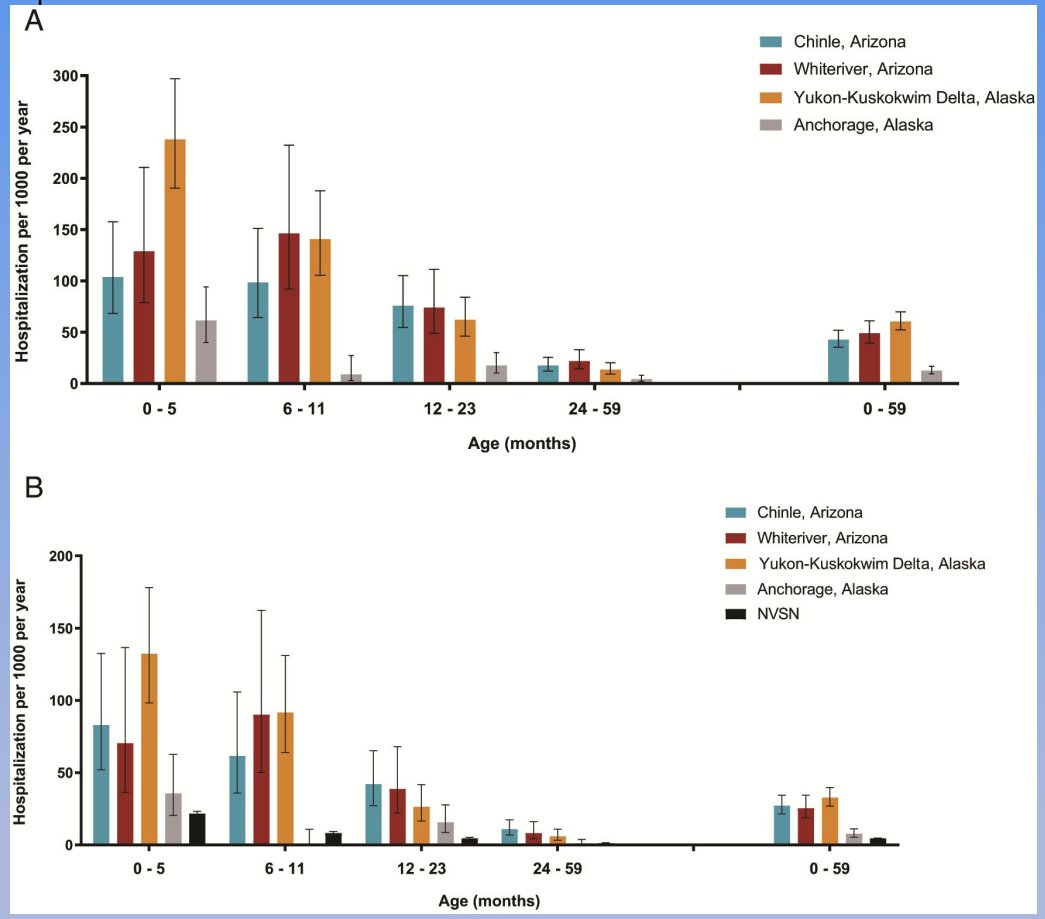

Figure Legend:

Incidence among AI/AN children < 5 years of age of (A) all-cause acute respiratory infection (ARI) hospitalization and (B) RSV-associated ARI hospitalization, November 2019 to May 2020. NVSN for comparison.[9]

Date of Download: 3/10/2025

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RSV disease on Navajo Nation

- Season is similar to AZ- later than East coast
  - Nov- April
- Probably secondary to
  - Larger household size
  - Use of wood stoves/coal burning
  - Lack of running water in some homes.

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2023-2024 Season

- Nirsevimab initially available in limited amounts
  - Not sufficient for second season patients – roll out was initially for youngest patients and gradual roll out up to 8 mo of age by Jan. 2024
- RSV Pre F available Sept. 2023
  - Women's health providers given information on efficacy and safety, recommendation to administer 32-26 weeks gestation.

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We are the public health service….

- And we believe in prevention and vaccines
  - Dec 31 2023 104 babies < 4 mo of age – 100% protected
    - 65 Nirsevimab 29 RSV PreF vaccine in utero
  - Feb 29, 2024 311 babies < 9 mo of age – 86% protected
    - 198 Nirsevimab, 62 RSV Pre F
    - 5 declined 8 missed 30 from elsewhere or lost to follow up

Outcomes

- Feb 29, 2024
  - Admissions resp season – 84
  - RSV admissions- 31
  - Other resp virus admissions-25

  - 2 patients who received RSV PreF in utero or Nirsevimab admitted
    - LOS 2 d (< 9 mo of age)
  - 3 patients admitted who were eligible but did not receive Nirsevimab or RSV Pre F (< 9 mo of age)
  - All other RSV admissions were children not eligible for Nirsevimab
    - Older children - no intubations occurred

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Global outcomes

- MMWR March 7, 2024 limited sample 1036 babies case control
  - 90% effectiveness preventing severe RSV disease
- NEJM Jul 10, 2024 France 1035 infants < 12 mo 690 cases
  - 83% effectiveness against severe disease
- MMWR Nov 14, 2024 Yukon Kuskokwim Delta /Alaska
  - 1591 children < 20 mo
  - 48% received nirsevimab
  - 76% effectiveness all medically attended RSV illness
  - 89% effectiveness hospitalization/severe RSV disease

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Is this the next vaccine preventable illness??

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In summary

- Indigenous and other rural populations have an increased burden of infectious diseases
  - And a higher demonstrated benefit from childhood vaccines in preventing morbidity and mortality
- Strategies tailored to indigenous populations to increase vaccine acceptance are translatable to other populations
  - 3E campaign
- New vaccine development continues to directly affect the health of children globally
  - We must continue to educate and advocate for VACCINE SCIENCE and public education

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