Speaker handouts and presentations from the 11th International Meeting on Indigenous Health posted to the conference website are intended for educational use only.

These conference handouts and presentations may not be distributed, reproduced or cited in other presentations, publications or linked online without written permission from the speaker and the CPS.

CPS Education Department
Tel.: 613-526-9397, ext 263
education@cps.ca

Faculty/Presenter Disclosure

I have no financial relationships with the manufacturer(s) of any commercial product(s) and/or provider(s) of commercial services discussed in this CME activity.

I do not intend to discuss an unapproved/investigative use of a commercial product/device in my presentation.

Acknowledgements

- Navajo Nation community members
- Navajo Epidemiology Center
- IHS and Tribal Health Organization clinical and laboratory partners
- Arizona & New Mexico Departments of Health
- Arctic Investigations Program, Centers for Disease Control and Prevention
- IRBs of the Navajo Nation and JHSPH
- CIH faculty and staff

Land Acknowledgement

As we gather from places across the globe, we honor and recognize Indigenous peoples of the places where this meeting is being held, where the work is conducted and of our homelands.

The History, Impact, and Evaluation of Recommended Vaccination Uptake among Indigenous Children in the Southwest Region of the United States

Chelsea Kettering, Johns Hopkins Center for Indigenous Health

CENTER FOR INDIGENOUS HEALTH

Learning Objectives

1. Describe the importance of vaccination in protecting against severe and preventable infectious disease and reducing health disparities/inequities
2. Understand facilitators and barriers to vaccine acceptance and deliver that are present in Navajo Nation and how to enumerate those things in their own communities
3. Tailor strategies for improving vaccine uptake to their own unique settings

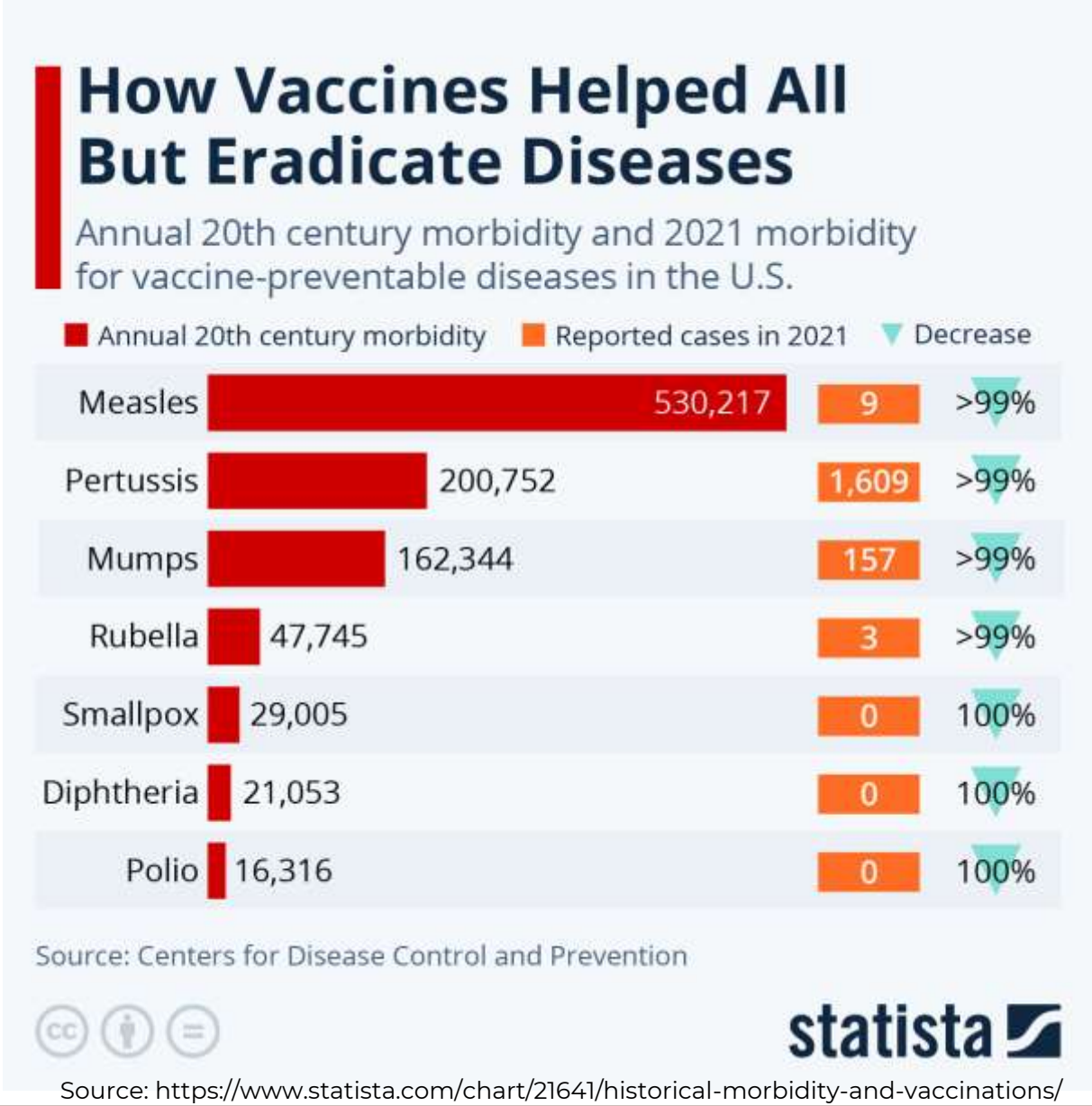
Background on Navajo Nation

- 390,000 enrolled members, with 170,000 residing on the Navajo Nation
- Navajo Nation has 110 chapters within 5 agencies and is roughly the size of West Virginia
- Existing partnerships of health care settings and organizations with Navajo communities

Navajo on US map source: https://link.springer.com/chapter/10.1007/978-3-030-84625-1_20

What are vaccines?

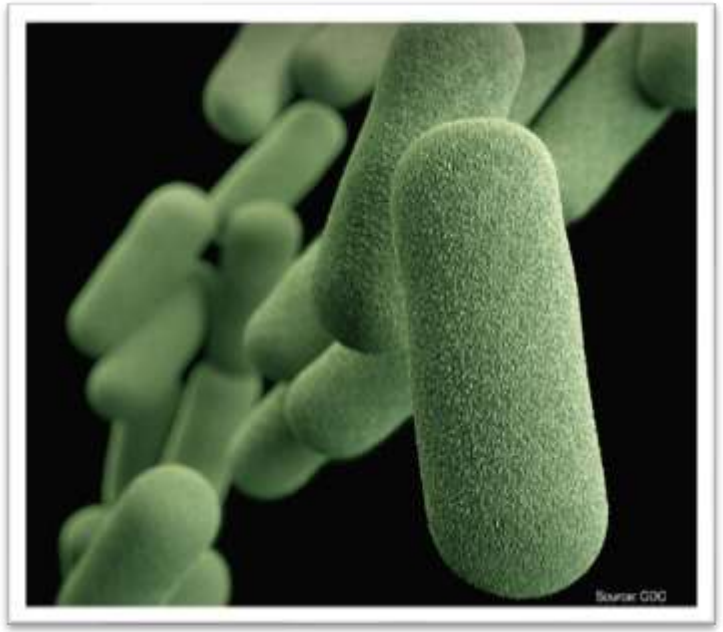
- Normally a shot (injection)
  - Can also be pills, nose sprays, or liquids
- Teach your body how to defend against a disease
- Safe and effective



Source: https://www.statista.com/chart/21641/historical-morbidity-and-vaccinations/

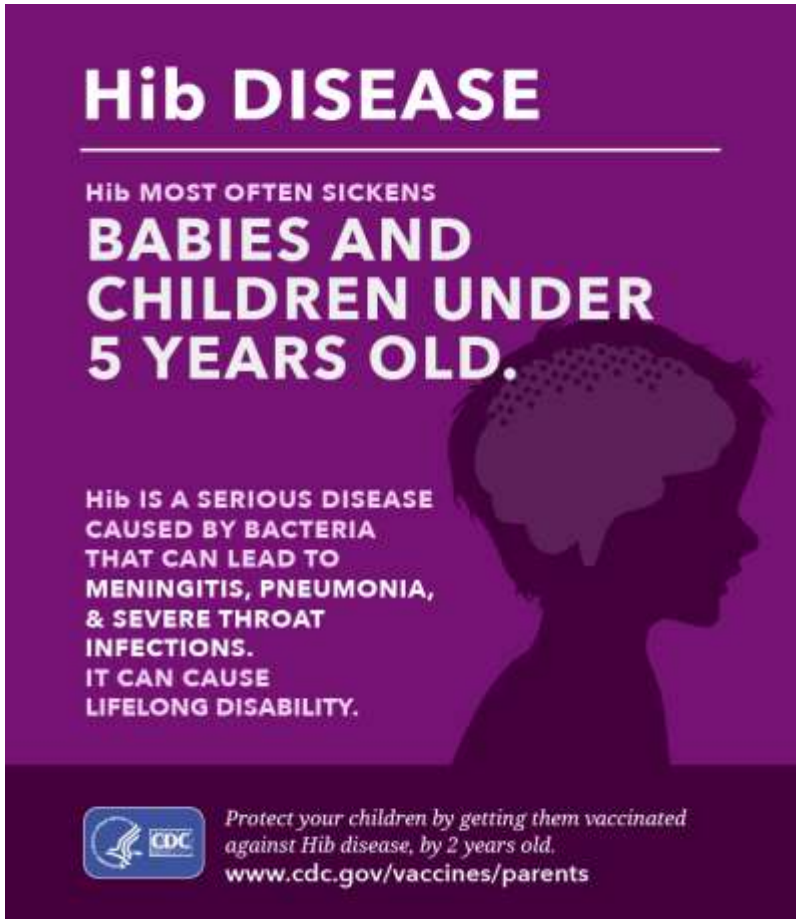
Haemophilus influenzae

- Bacteria or “germ”
- Usually spread by coughing or sneezing



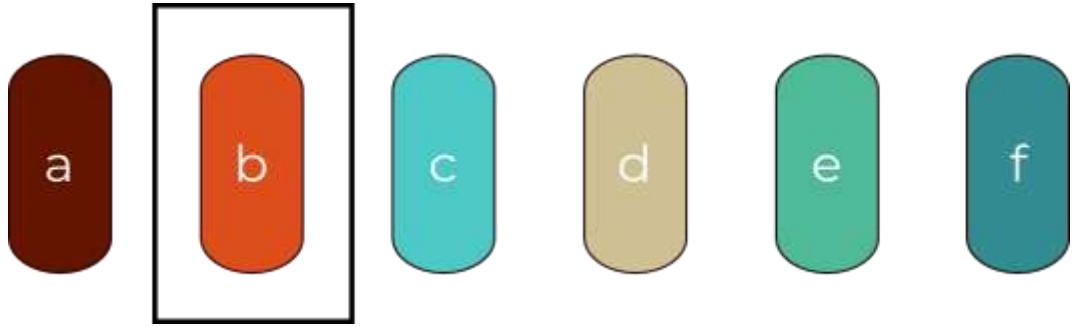
- Can cause mild or severe disease:
  - Ear infections
  - Lung infections (pneumonia)
  - Brain infections (meningitis)
  - Swelling of the throat (epiglottitis)
- Does not cause the flu
- Treatable with antibiotics

Haemophilus influenzae type b (Hib) vaccine summary



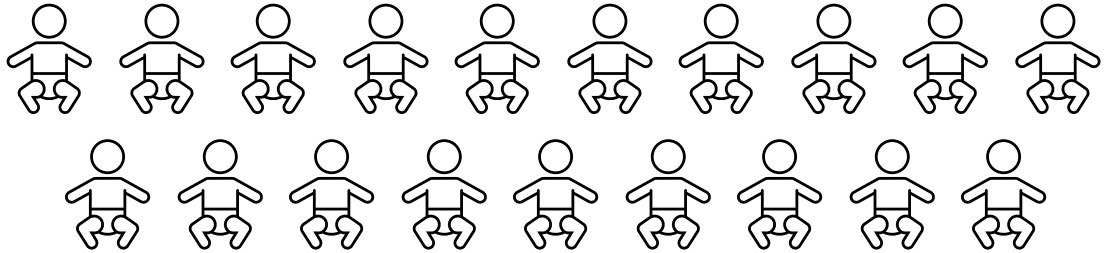
Source: https://stacks.cdc.gov/view/cdc/46840

- Routine childhood immunization
  - Introduced in the early 1990s
- Protects against *H. influenzae* type b (Hib)



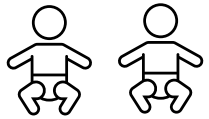
Hib vaccine impact in Navajo Nation

1988-1990: An average of 19 Navajo children <5 years old became sick with severe Hib disease each year



This rate of disease was **4-5x higher** than what the general U.S. experienced

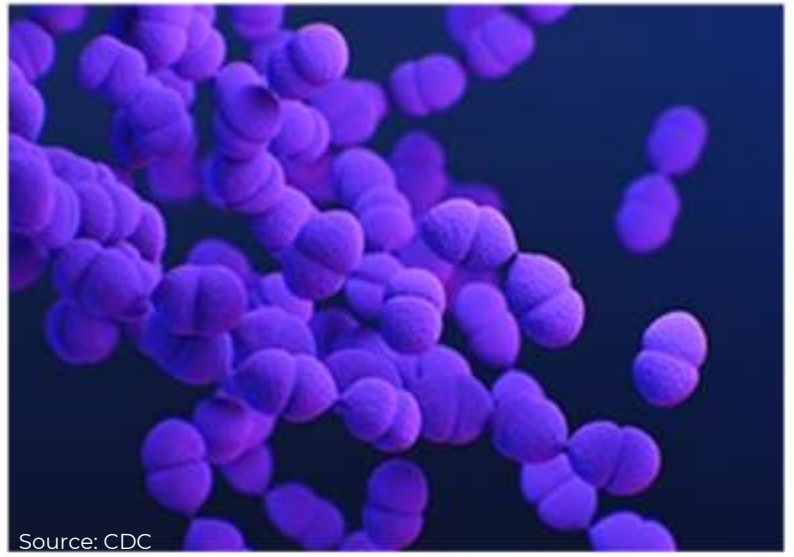
1990s: The introduction of the **Hib vaccine** led to a **90% decrease** in severe Hib disease on Navajo Nation



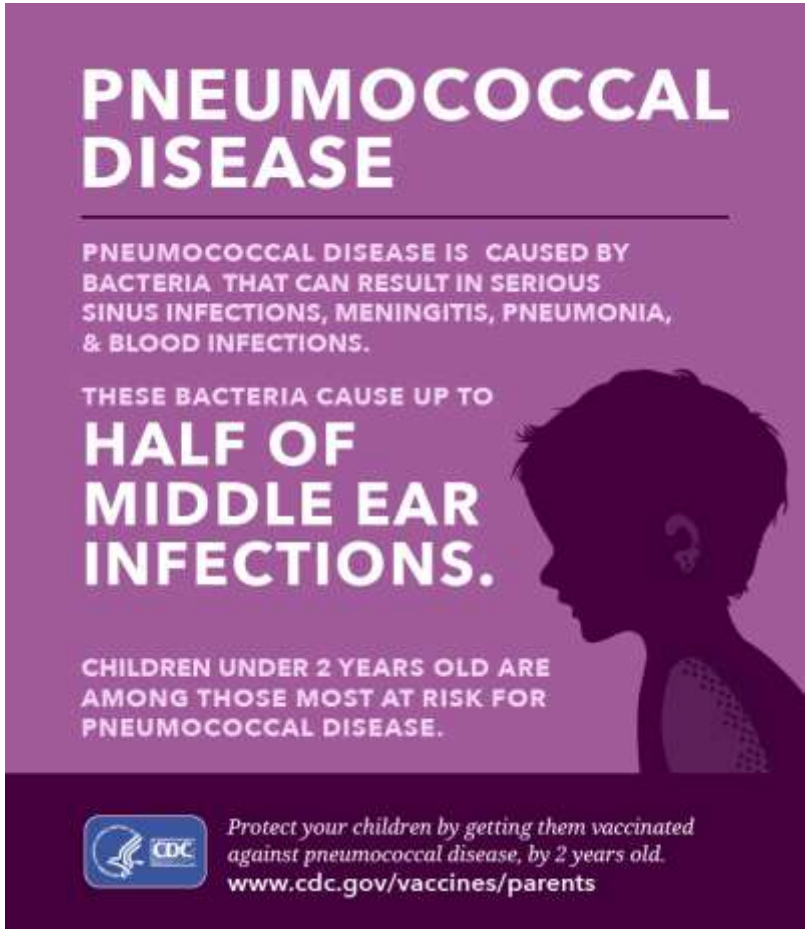
2017-2024: no Navajo children have experienced severe Hib disease

Streptococcus pneumoniae

- Bacteria or “germ”
- Usually spread by coughing or sneezing
- Can cause mild or severe (invasive) infections:
  - Ear (otitis)
  - Sinus (sinusitis)
  - Lung (pneumonia)
  - Brain (meningitis)
  - Blood (bacteremia or sepsis)
- Treatable with antibiotics



Pneumococcal conjugate vaccine (PCV) summary



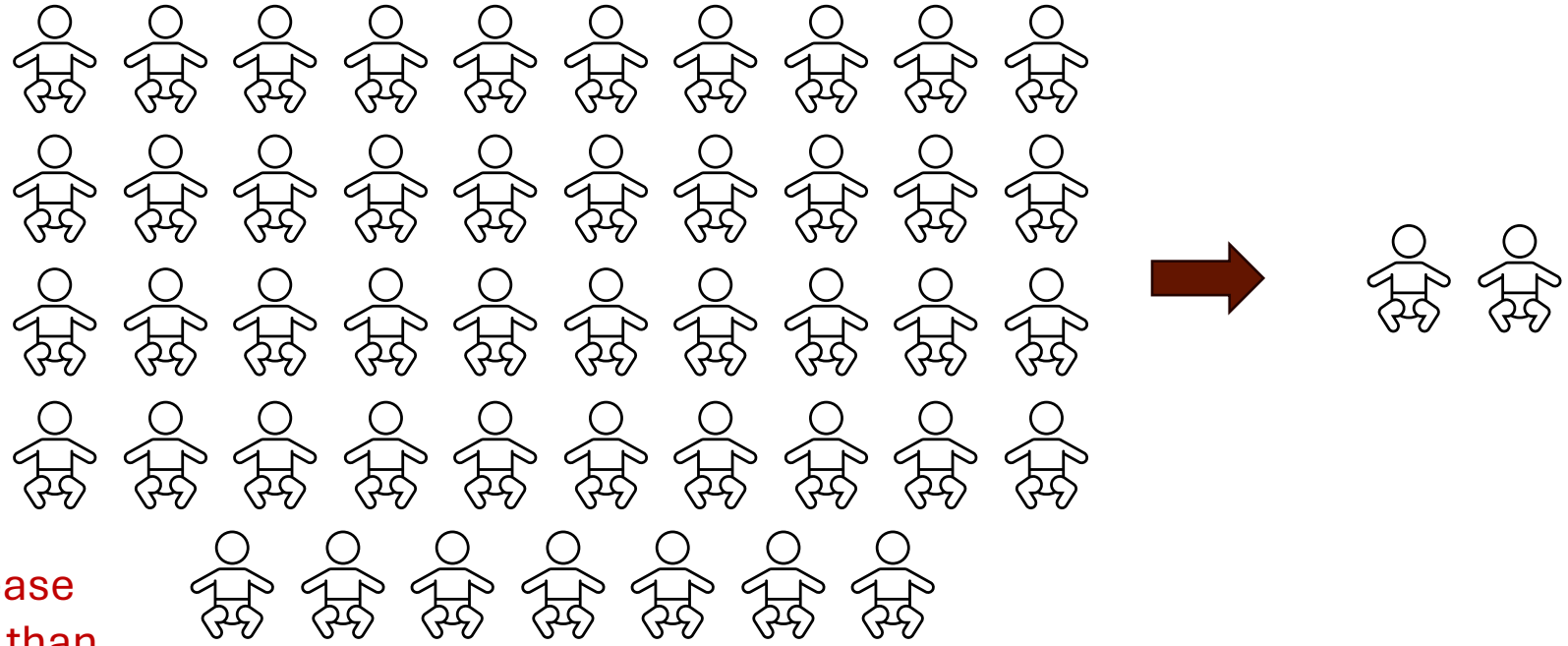
Source: https://stacks.cdc.gov/view/cdc/46547

- Routine childhood immunization
  - First introduced in 2000
  - Protects against serotypes of *S. pneumoniae* that previously caused the most severe disease or were most common

PCV vaccine impact in Navajo Nation

Led to a huge reduction in invasive pneumococcal disease among Navajo children <5 years old

Yearly average

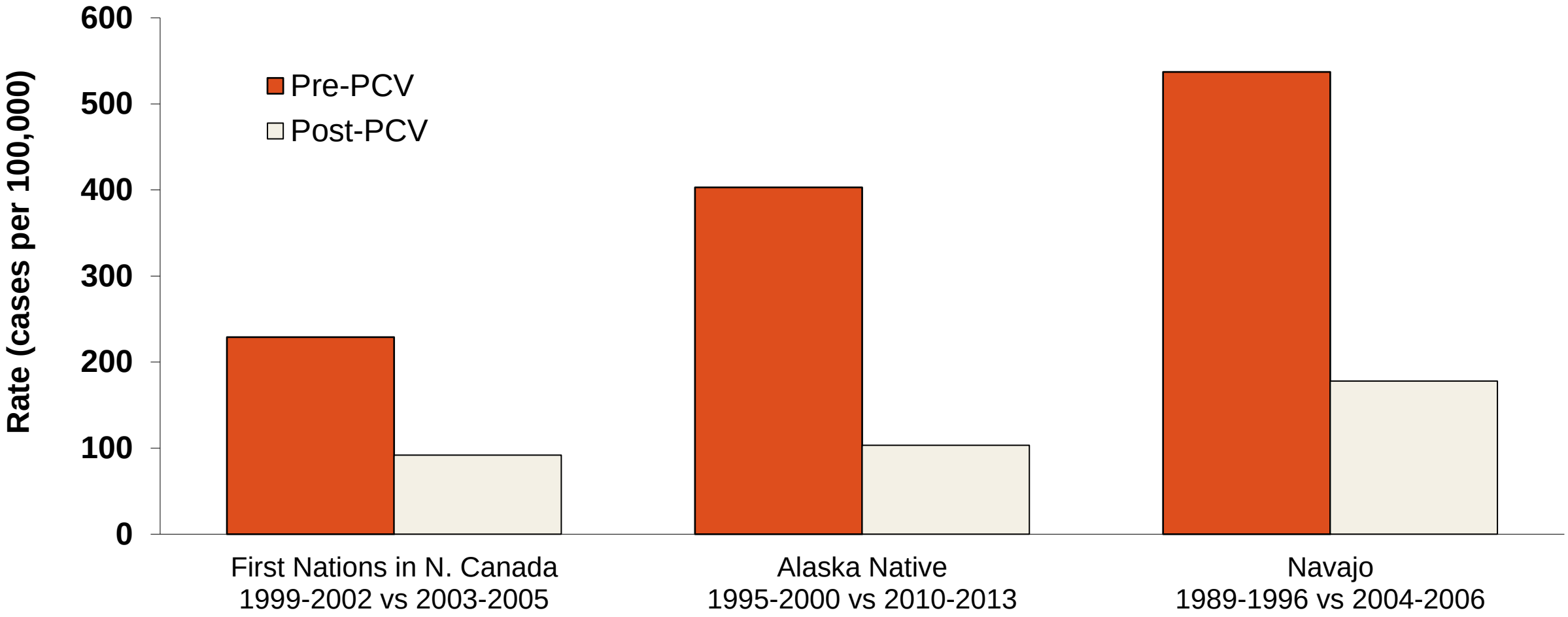


1997-1999

2022-2024

This rate of disease was >**2x higher** than what the general U.S. experienced

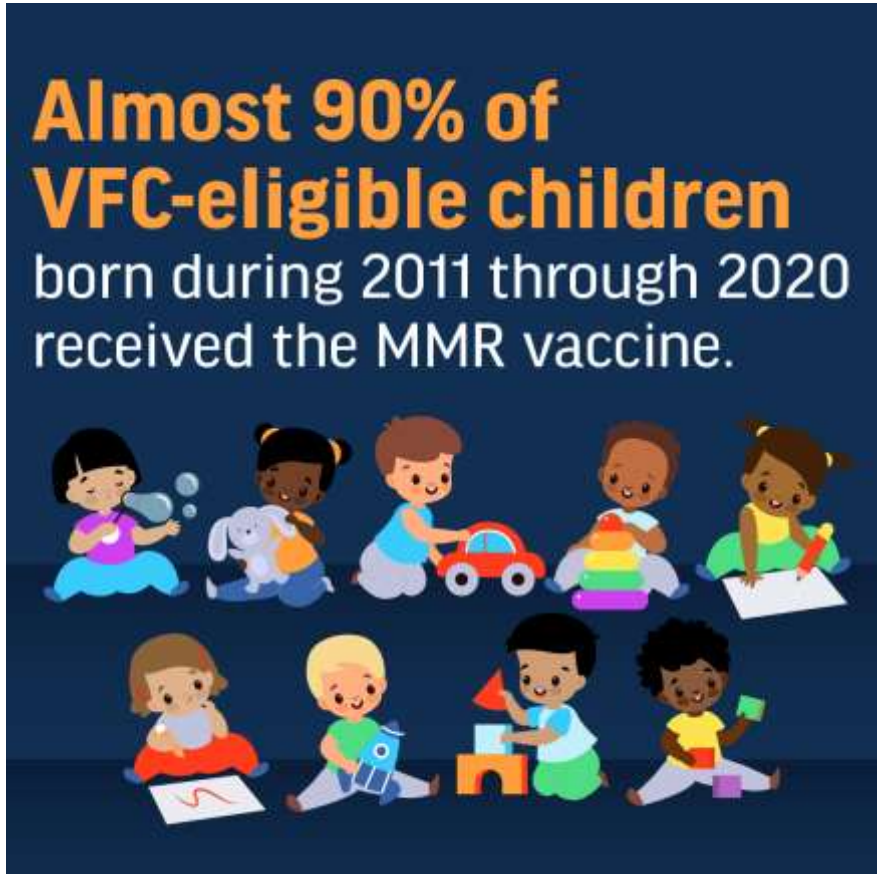
Invasive Pneumococcal Disease, Children <2 years, pre- and post- PCV



References: Bruce et al, EID 2008
Singleton et al, JAMA 2007
Bruce et al, Vaccine 2015
O'Brien et al, Am J Epi 2004
Weatherholtz et al, CID 2010

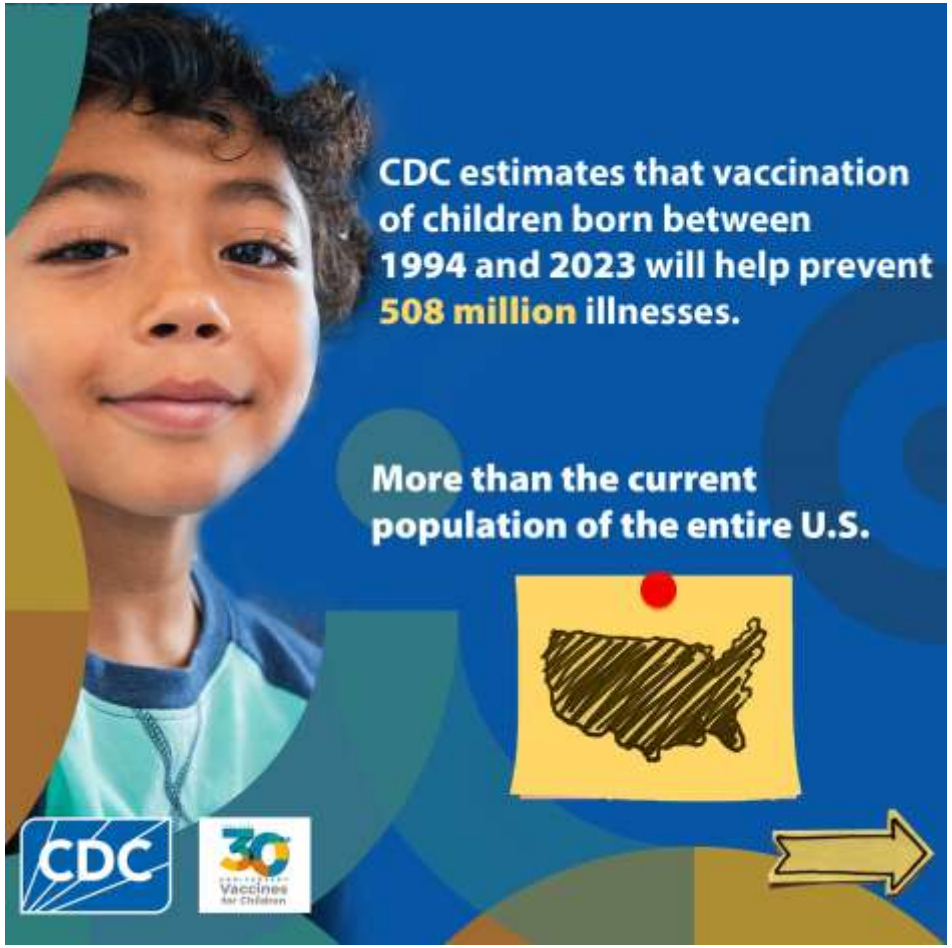
Vaccines for Children (VFC) program

- Government funded, operational beginning October 1994
- Provides vaccines to infants, children, and teenagers for families that cannot afford vaccinations
  - Offers vaccines for 19 preventable diseases
- Has benefitted 40 million U.S. children



https://www.cdc.gov/vitalsigns/vaccines-for-children/index.html

VFC: Cost and Estimated Impact



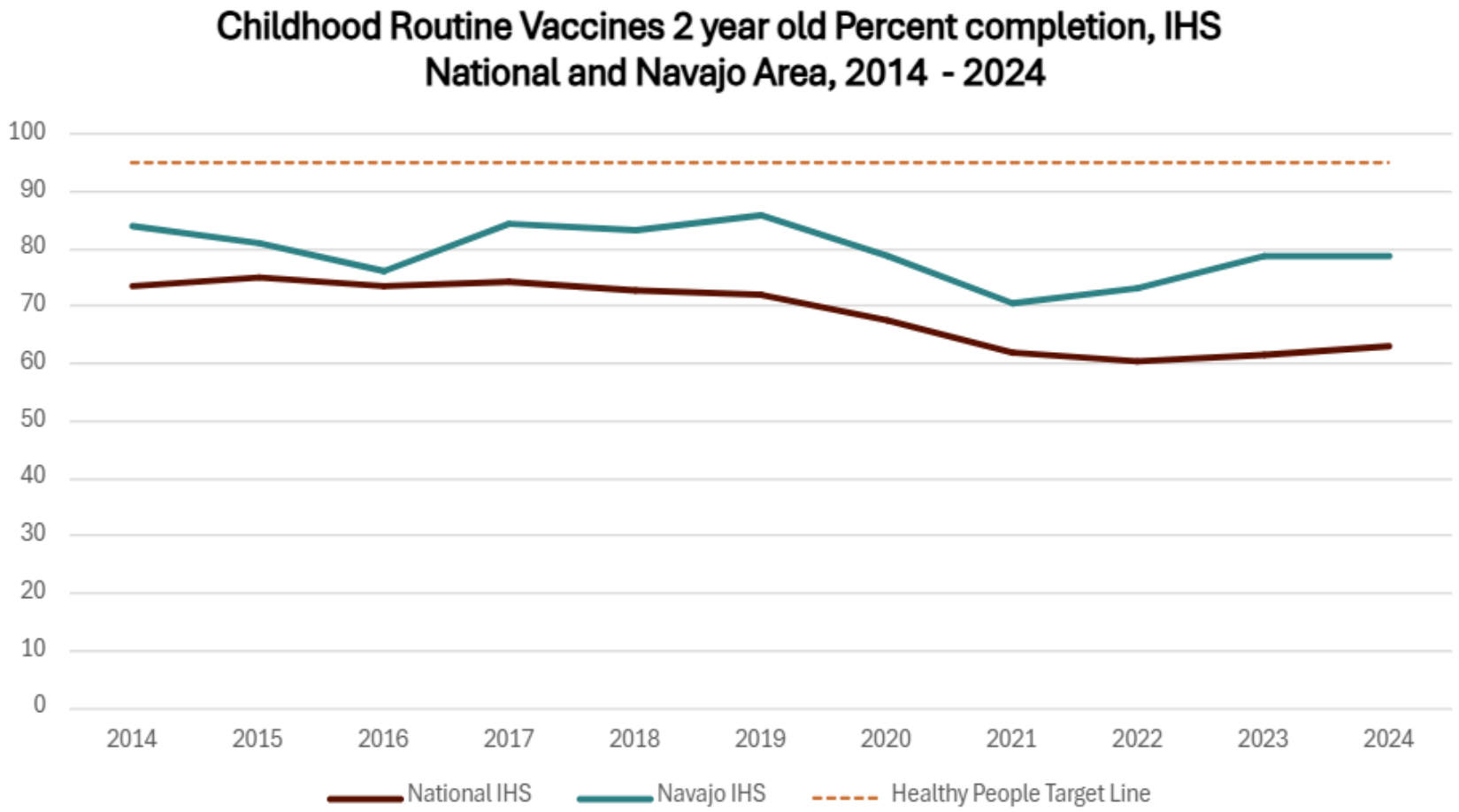
- All Indigenous children are categorically eligible for **FREE** vaccination for all ACIP recommended vaccines from VFC program providers

- Saves **MILLIONS** of $$ for our health care providers (US vaccine cost per child up to age 6 is $1200)

https://cdc.gov/vaccines-for-children/about/index.html

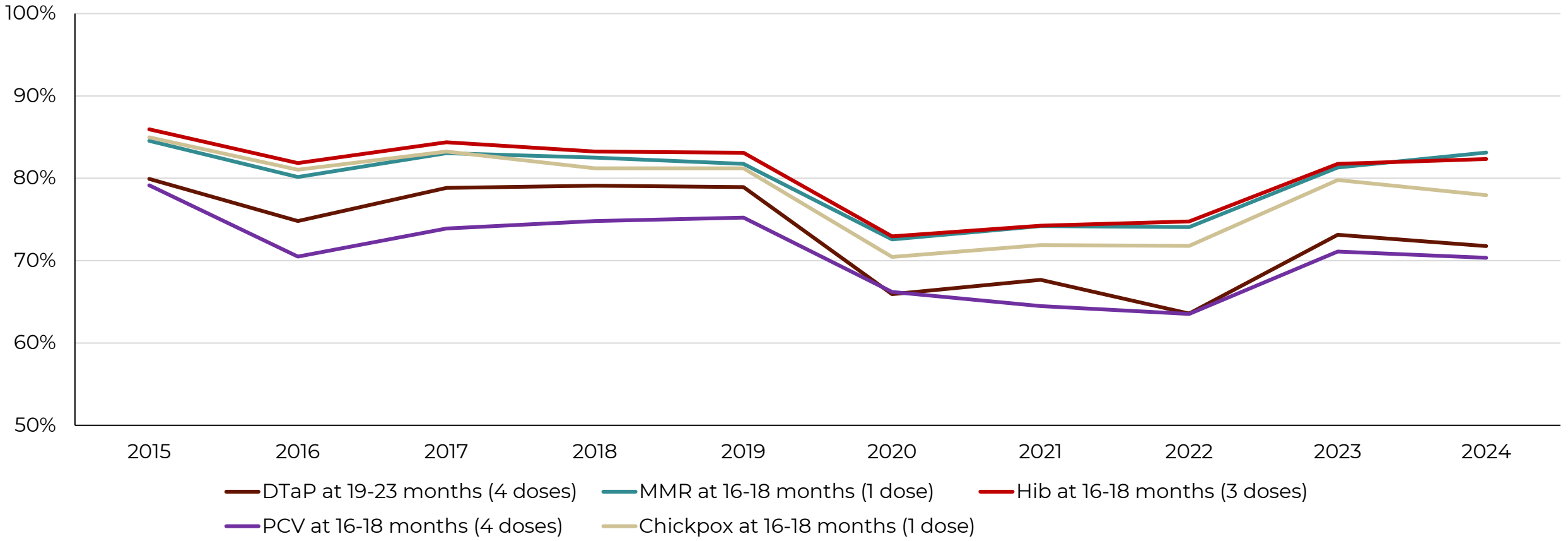
Decline in Pediatric Vaccines

- Data from Indian Health Service (IHS)
- Line chart includes combined 7-vaccine series completion (DTaP, Polio, Hib, HepB, PCV, MMR, Var)
- Coverage was between 66-70% among U.S. children with birth years between 2011-2021



National Immunization Reporting System Reports, Accessed February 2025
CDC ChildVaxView, Accessed March 2025

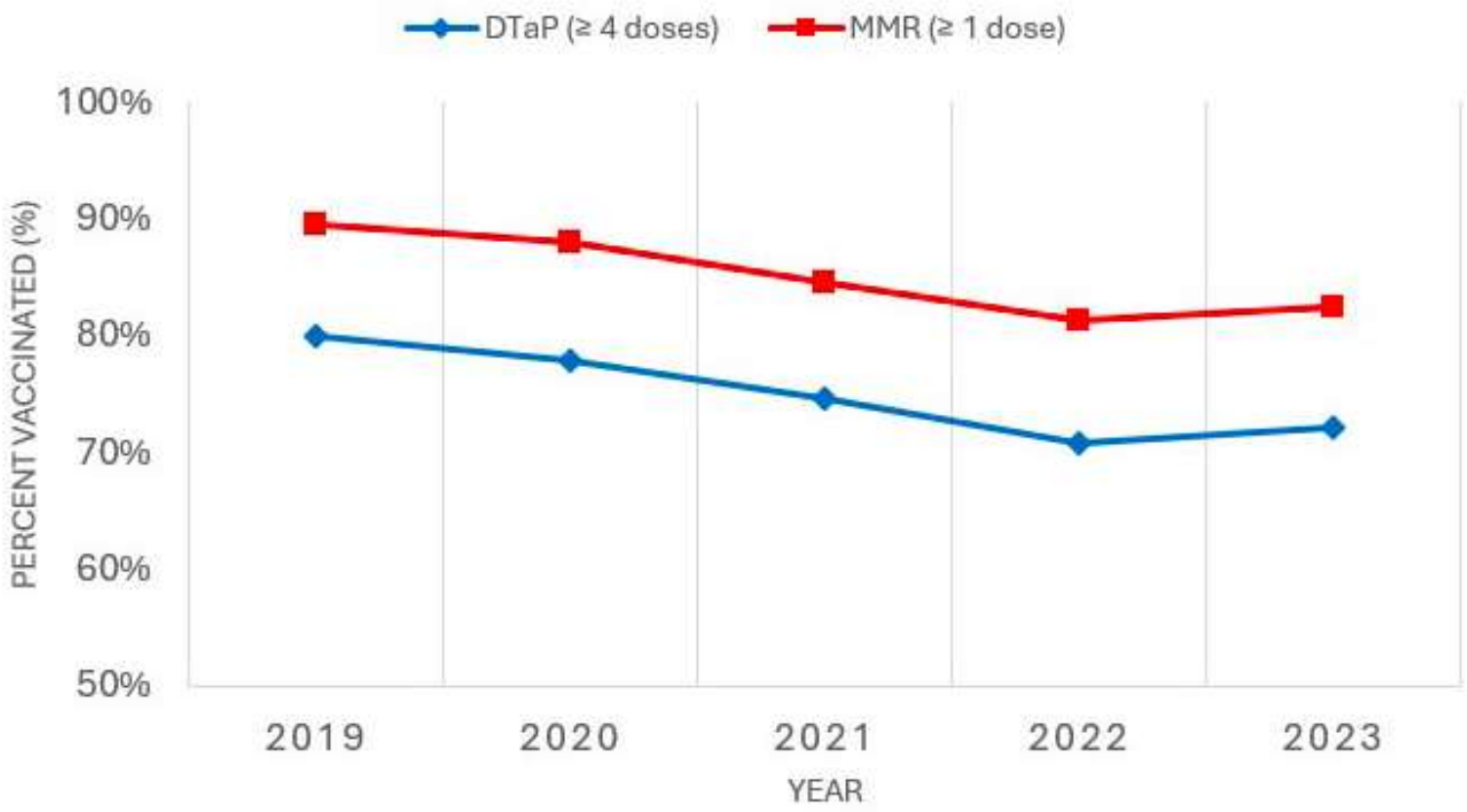
Childhood vaccine coverage in Navajo Nation, yearly average



Source: National Immunization Reporting System. Quarterly Immunization Coverage Reports. Available at: https://www.ihs.gov/NonMedicalPrograms/ihpes/immunizations/index.cfm?module=immunizations&option=reports. Accessed March 3, 2025

What are the vaccine trends in Canada?

Figure 1. Coverage for measles, mumps and rubella (MMR) and diphtheria, tetanus and acellular pertussis vaccines (DTaP) in 2-year-old children in Alberta, Saskatchewan, Manitoba, New Brunswick and Yukon



79% average for MMR

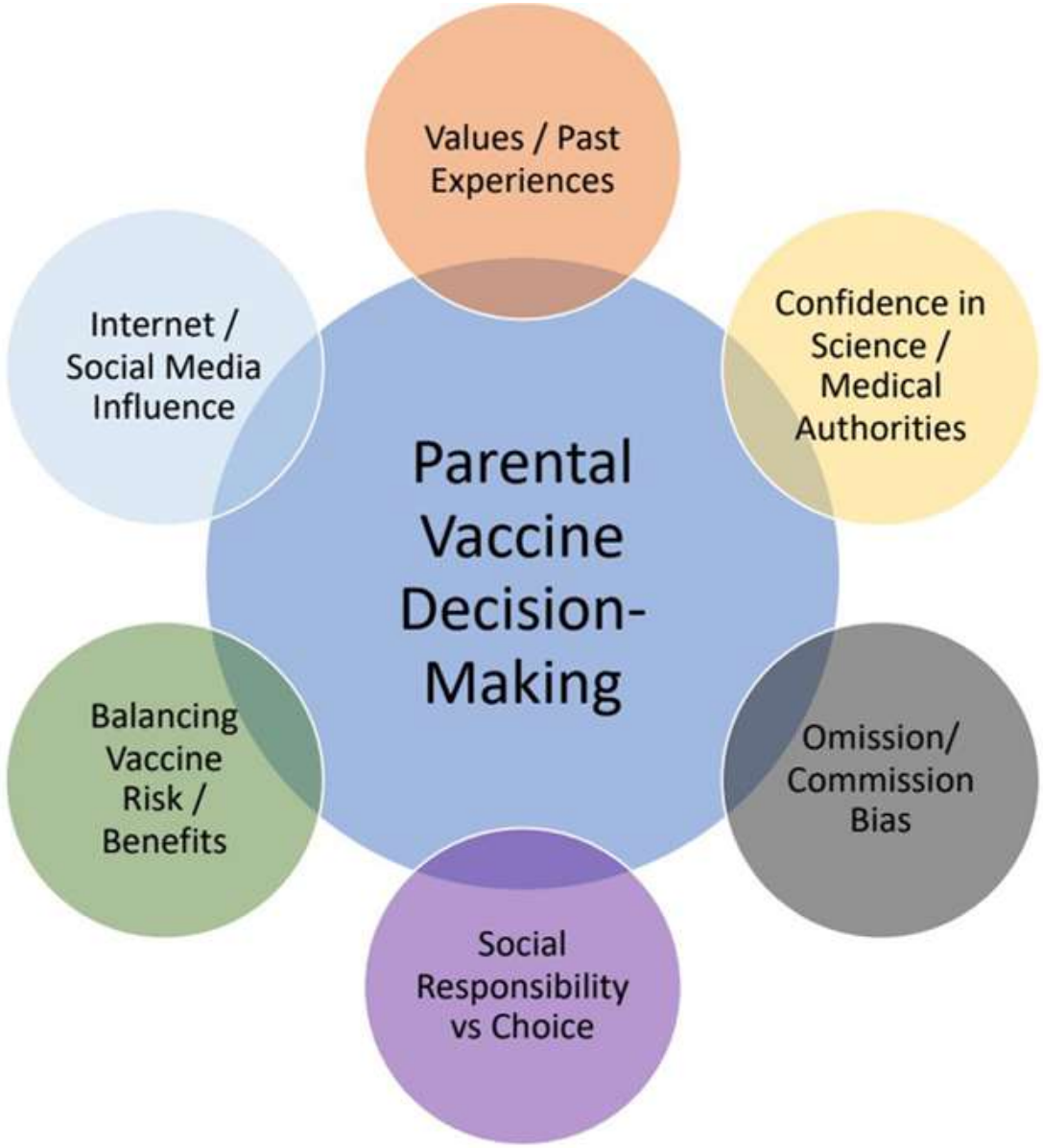
75% average for DTaP

Public Health Agency of Canada, Vaccination Coverage in Canada, *Accessed March 2025*

Vaccine Hesitancy

Falling vaccination rates

Explore underlying causes



Lafnitzegger & Gaviria-Agudelo, 2022 *AIP*

Insights from Health Care Workers

- Misinformation & public perception
- Vaccine hesitancy in parents
- Impact of historical trauma on AI/AN communities
- Provider shortages & patient interaction
- Parental consent barriers

Insights from Community Members

- Vaccine information sources
- Barriers to access
- Historical trauma in AI/AN communities
- Misunderstandings on vaccines
- Vaccine protection
- Perception of risk

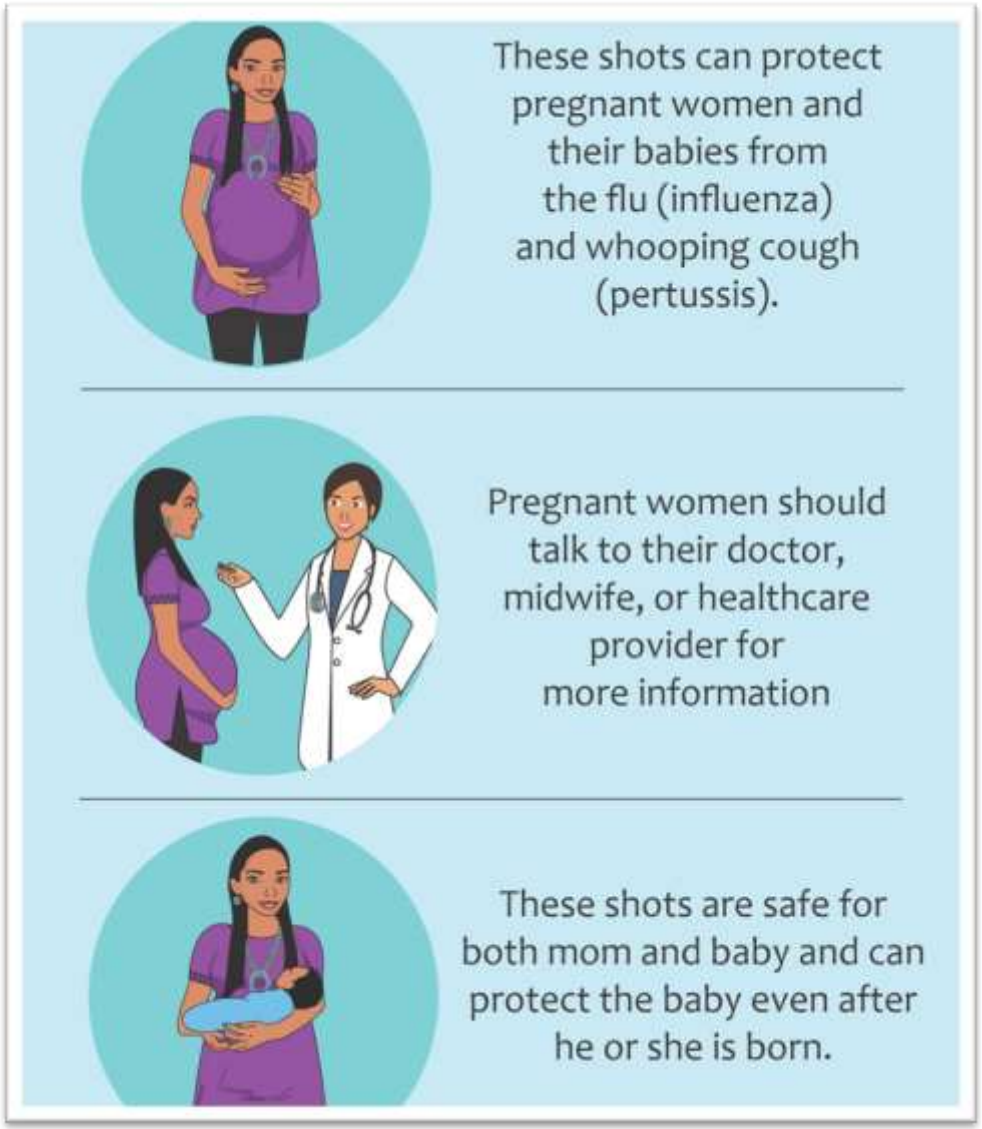
Lessons learned from the COVID-19 pandemic

- Motivate people (Diné - K'e concept)
- Change views on vaccines
- Appealing to community values

Identify the focus within your community

Culturally-tailored Strategies

- Adapt messaging from verifiable sources into the local Indigenous language.
- Generate visuals.
- Build trust.



Navajo Epidemiology Center (2025) and Johns Hopkins Center for Indigenous Health (2024)

Best Practices for Improving Vaccine Uptake

- Patient screening at each visit
- Standing orders
- Reminders
- Strong provider recommendations
  - Presumptive approach
- Improved and extended access

How should we communicate about vaccines?

- **Trust**
  - Build, maintain, and restore trust by being present, consistent, and humble in communication, including about side effects.
- **Announce early**
  - Share information early (e.g., during pregnancy or at a 2-week well-child visit) so patients know what to expect.
- **Transparency**
  - Keep trust by providing clear and timely information.
- **Listening**
  - Understand community concerns and risk perceptions to communicate effectively. Collaborate with the community to shape messages and strategies.

Key Takeaways

- Vaccines are an important tool to reduce diseases in children
- Vaccine coverage in children has declined in recent years for a variety of reasons
- People in this room are critical to improving vaccine coverage
- Best practices help to increase vaccine uptake among Indigenous communities

Taking this back to your community

- What opportunities do you see in your community?
- Are there innovative resources available in your community (teachers, political leaders, etc.)?
- What are the focuses of the community you serve?

Thank you!

There is a lot of great work happening in this space. Please check these resources for more information.

Visual Stories — NNACoE

We utilize film as a powerful tool to tell Indigenous stories and communicate important information to tribal people.

https://www.nnacoe.org

VaxUp: Supporting Vaccine Confidence in Two Service Units in the Navajo Nation - Johns

We are currently conducting a study in partnership with the Tuba City Regional Health Care Corporation (CRHCC) and Northern Navajo Medical Center (NNMC) to explore factors contributing to low vacci...

https://cih.jhu.edu

Naalniih Naalkaah Reports

https://nec.navajo-nsn.gov/

URBANINDIANHEALTHINSTITUTE

Report on New Mexico Navajo Mothers and Their Infants 2012-2018

Navajo Nation Active Bacterial Surveillance Report November 8, 2024

CENTER FOR INDIGENOUS HEALTH

Resource Library - Johns Hopkins Center for Indigenous Health

A post on Johns Hopkins Center for Indigenous Health provided by: https://cih.jhu.edu

https://cih.jhu.edu

References

- Bennet E, Paddock,E. (2022). Navajo nation map image. doi: 10.1007/978-3-030-84625-1_20
- Richter, F. (2022). How vaccines helped all but eradicate diseases. Statista. https://statista.com/chart/21641/historical-morbidity-and-vaccinations/
- Centers for Disease Control and Prevention. (Accessed December 2024). CDC Stacks Public Health Publications. https://stacks.cdc.gov/view/cdc/46840
- Indian Health Service. (Accessed March 2025). National Immunization Reporting System – NPIRS Program. https://www.ihs.gov/NonMedicalPrograms/ihpes/imunizations/index.cfm?module=immunizations&option=reports
- Johns Hopkins Center for Indigenous Health. (Accessed January 2025). Resource Library. https://cih.jhu.edu/knowledge-center/resources/what-we-do/dyk-maternal-immunization-navajo-nation
- Navajo Epidemiology Center. (Accessed February 2025). Projects and Reports. https://nec.navajo-nsn.gov/Projects-Reports/Infectious-Disease
- Centers for Disease Control and Prevention. (Accessed February 2025). Vaccines for Children program. https://cdc.gov/vaccines-for-children/about/index.html
- National Center for Immunization and Respiratory Diseases, Immunization Services Division. (Accessed February 2025). VFC Operations Guide. https://www.cdc.gov/vaccines-for-children/media/pdfs/2024/08/vfc-ops-guide_version-4.0_july-2024_low-res-508-rev-2.pdf
- World Health Organization. (2008). World Health Organization Outbreak Communication Planning Guide. https://www.afro.who.int/sites/default/files/2017-06/outbreak_com_plan_guide.pdf
- O'Brien KL, Shaw J, Weatherholtz R, et al. Epidemiology of invasive *Streptococcus pneumoniae* among Navajo children in the era before use of conjugate pneumococcal vaccines, 1989-1996. Am J Epidemiol. 2004. 160(3):270-8.
- Weatherholtz R, Millar EV, Moulton LH, et al. Invasive pneumococcal disease a decade after pneumococcal conjugate vaccine use in an American Indian population at high risk for disease. *Clin Infect Dis*. 2010;50(9):1238-1246. doi:10.1086/651680
- Singleton RJ, Hennessy TW, Bulkow LR, et al. Invasive pneumococcal disease caused by nonvaccine serotypes among Alaska native children with high levels of 7-valent pneumococcal conjugate vaccine coverage. *JAMA*. 2007;297(16):1784-1792. doi:10.1001/jama.297.16.1784
- Bruce MG, Singleton R, Bulkow L, et al. Impact of the 13-valent pneumococcal conjugate vaccine (pcv13) on invasive pneumococcal disease and carriage in Alaska. *Vaccine*. 2015;33(38):4813-4819. doi:10.1016/j.vaccine.2015.07.080
- Bruce MG, Deeks SL, Zulz T, et al. International Circumpolar Surveillance System for Invasive Pneumococcal Disease, 1999–2005. *Emerging Infectious Diseases*. 2008;14(1):25-33. doi:10.3201/eid1401.071315.
- Lafnitzegger A, Gaviria-Aguldelo C. Vaccine Hesitancy in Pediatrics. *Advances in Pediatrics*. 2022;69:163-176. doi:10.1016/j.yapd.2022.03.01065-3101/22
- Public Health Agency of Canada. (Accessed March 2025). Vaccination Coverage in Canada. Canada.ca/en/public-health/services/immunization-vaccines/vaccination-coverage.html