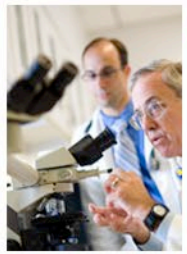
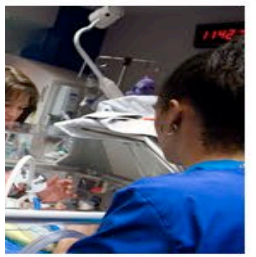






Shots & Giggles

Elizabeth Elliott

Associate Professor
Baylor College of Medicine

AAPA We Are Family Conference
January 2025

thanks to Julie Boom, MD, for help with the content of this presentation

Pediatrics

- Non-Declaration Statement: I have no relevant relationships with ineligible companies to disclose within the past 24 months. (Note: Ineligible companies are defined as those whose primary business is producing, marketing, selling, re-selling, or distributing healthcare products used by or on patients.)

Objectives

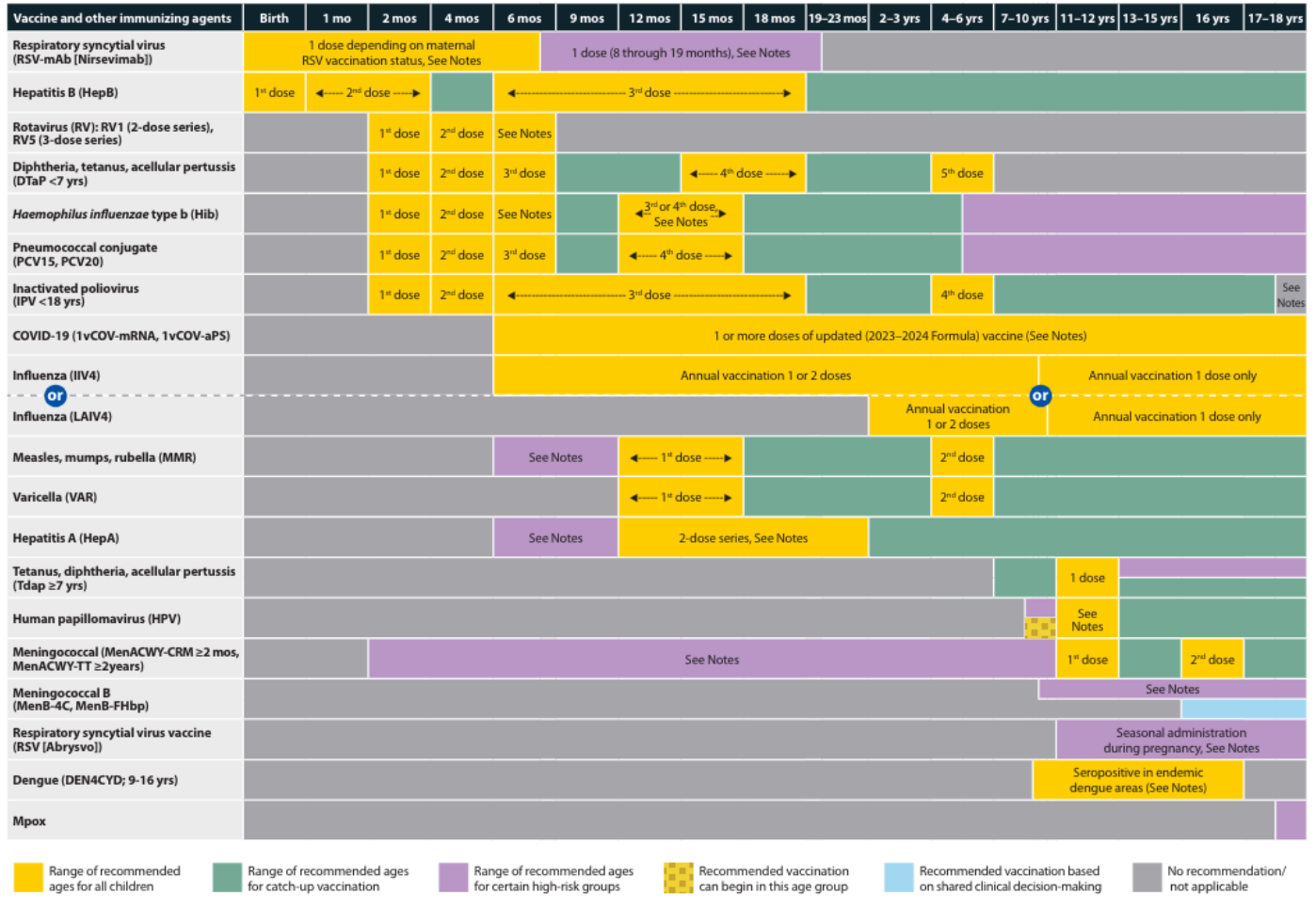
- Review the diseases which we can prevent with pediatric vaccinations.

- Review the recommended pediatric vaccination schedule.

- Review common myths encountered in clinical practice and best practices for patient/parent engagement in the vaccination process.

Table 1 Recommended Child and Adolescent Immunization Schedule for Ages 18 Years or Younger, United States, 2024

These recommendations must be read with the notes that follow. For those who fall behind or start late, provide catch-up vaccination at the earliest opportunity as indicated by the green bars.
To determine minimum intervals between doses, see the catch-up schedule (Table 2).



Vaccine Preventable Diseases

Hepatitis B

- Transmission
  - -Blood, bodily fluids
- Clinical features
  - -Incubation period 60-150 days (average 90 days)
  - -Nonspecific prodrome – malaise, fever, headache, myalgia – later get jaundice, hepatomegaly
  - -At least 50% of infections asymptomatic
- Complications
  - -Fulminant hepatitis
  - -Cirrhosis
  - -Hepatocellular carcinoma
  - -Hospitalization
  - -Death
- Vaccine recommended at birth, 1-2 months, and 6-18 months

http://www.cdc.gov/vaccines/pubs/pinkbook/pink-slides.htm

What is the risk for infants?

24,000 HBV-infected women give birth annually in the U.S.

Willis, B.C. et al. *Pediatrics* 125, 704-711 (2010)
CDC *MMWR* 2008. 57(RR-8): 1-20

Once infected, approximately 90% of infants will develop chronic hepatitis B

Once chronically infected,

approximately 25% will die from cirrhosis or liver cancer

Willis, B.C. et al. *Pediatrics* 125, 704-711 (2010)
CDC *MMWR* 2008. 57(RR-8): 1-20

Administration of hepatitis B vaccine within 24 hours of birth is 70-90% effective in preventing transmission in exposed infants

When given with HBIG, it is 85-95% effective

Willis, B.C. et al. *Pediatrics* 125, 704-711 (2010)
André, F.E. et al. *J Med Virol* 44 (2), 144-151 (1994)
CDC *MMWR* 2005. 54 (RR-16): 1-23

Diphtheria

- Transmission
  - -Respiratory, skin
- Clinical features
  - -Incubation period 2-5 days (range 1-10 days)
  - -May involve any mucous membrane
  - -Classified based on site of infection
    - (ie, anterior nasal, pharyngeal , tonsillar, etc.)
- Complications
  - -Most common are myocarditis and neuritis
  - -Death occurs in 5-10%
- Since 2000, only 5 cases have been reported in the U.S.
- Vaccine recommended at 2 months, 4 months, and 6 months, and 15-18 months. Boost at 4-6 years and 11-12 years

Courtesy of Centers for Disease Control and Prevention

Tetanus

Courtesy of Centers for Disease Control and Prevention

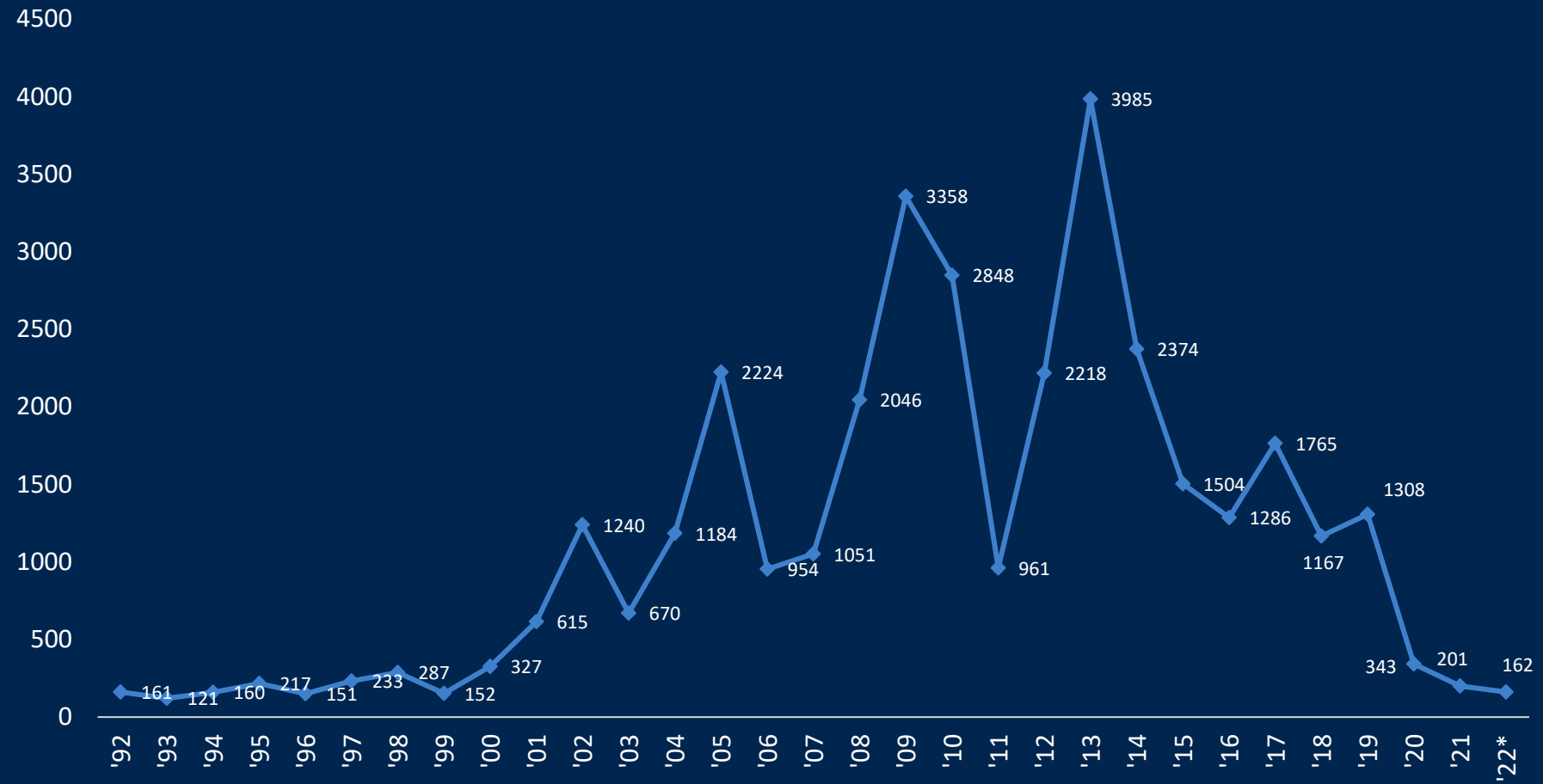
- Transmission
  - -Contaminated wounds, tissue injury
- Clinical features
  - -Incubation period of 8 days (range 3-21 days)
  - -Generalized tetanus: descending symptoms of trismus (lockjaw), difficulty swallowing, muscle rigidity, spasms
- Complications
  - -Laryngospasm, fractures, hypertension, nosocomial infection, pulmonary embolism , aspiration pneumonia, death
- In 2012, 37 cases were reported in the U.S.
- Vaccine recommended at 2 months, 4 months, and 6 months, and 15-18 months. Boost at 4-6 years and 11-12 years.

Pertussis

- Transmission
  - -Respiratory droplets
- Clinical features
  - - Incubation period 7-10 days (range 4-21 days)
  - - Insidious onset, similar to URI with nonspecific cough
  - - Illness progresses to include fits of rapid coughing with high pitched “whoop”, vomiting, exhaustion after cough episode
  - - Fever usually minimal throughout course of illness
- Complications
  - - Pneumonia, seizures, encephalopathy, hospitalization, death
- Vaccine recommended at 2 months, 4 months, and 6 months, and 15-18 months. Boost at 4-6 years and 11-12 years.

http://www.cdc.gov/vaccines/pubs/pinkbook/pink-slides.htm

Cases of Pertussis in Texas 1992-2022*



*2022 data are provisional
https://www.cdc.gov/pertussis/surv-reporting.html

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Rotavirus

- Transmission
  - Fecal-oral, fomites
- Clinical features
  - Short incubation period (usually less than 48 hours)
  - First infection after age 3 months generally most severe
  - May be asymptomatic or result in severe dehydrating diarrhea with fever and vomiting
  - Gastrointestinal symptoms generally resolve in 3 to 7 days
- Complications
  - Severe diarrhea, dehydration, electrolyte imbalance, immunodeficient children may have more severe or persistent disease
- Vaccine recommended at 2, 4, and 6 months

http://www.cdc.gov/vaccines/pubs/pinkbook/pink-slides.htm

Polio

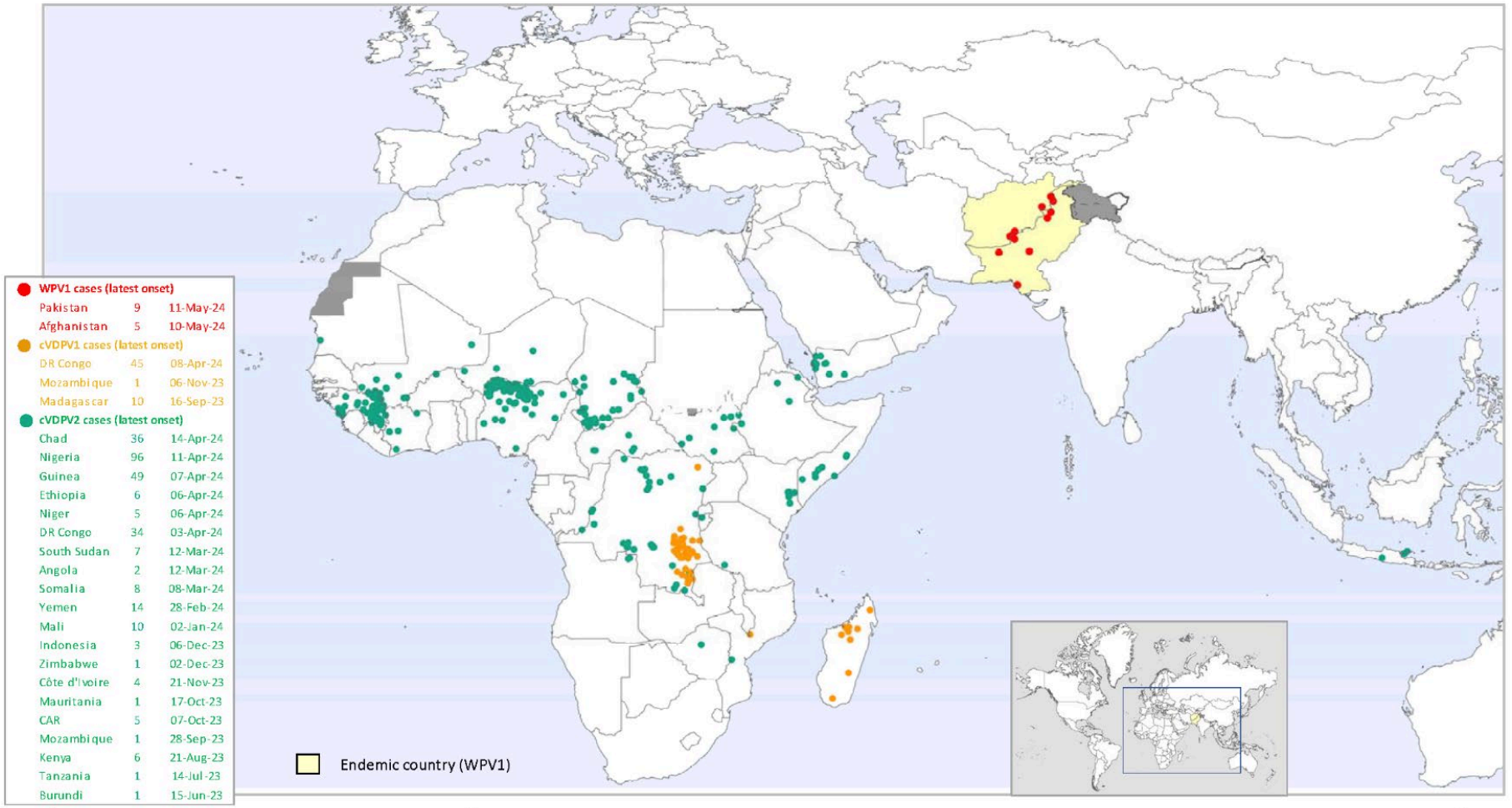
- Transmission
  - -Fecal-oral, oral-oral possible
- Clinical features
  - -Incubation period 6-20 days (range 3-35 days)
  - -May be asymptomatic or as minor as sore throat ,fever, GI disturbances, or influenza-like illness
  - -Flaccid paralysis
  - -Paralytic polio
- Complications
  - -paralysis, death
- Vaccine recommended at 2, 4, 6-18 months. Boost at 4-6 years

Courtesy of Centers for Disease Control and Prevention

http://www.cdc.gov/vaccines/pubs/pinkbook/pink-slides.htm

Global WPV1 & cVDPV Cases[1], Previous 12 Months[2]

World Health Organization



[1]Excludes viruses detected from environmental surveillance; [2]Onset of paralysis: 05 Jun. 2023 to 04 Jun. 2024

Data in WHO HQ as of 04 Jun. 2024

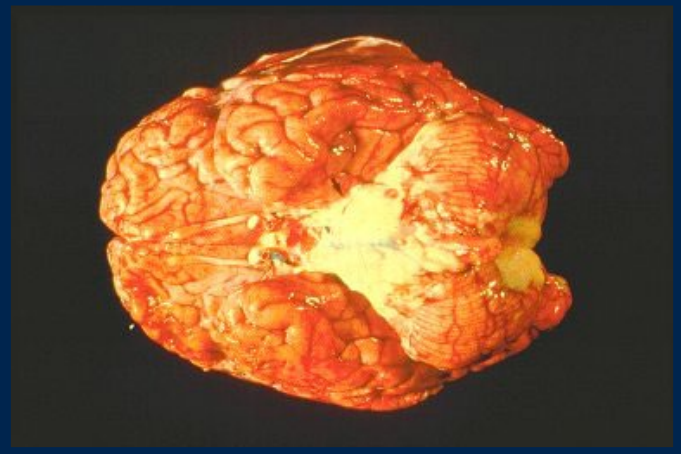
http:///https://polioeradication.org/polio-today/polio-now/polio-now

Haemophilus influenzae type b (Hib)

- Transmission
  - -Respiratory droplet
- Clinical features
  - -Meningitis (fever, decreased mental status, stiff neck), Epiglottis (airway obstruction), cellulitis, septic arthritis, pneumonia, osteomyelitis, pericarditis
- Complications
  - -Hearing impairment, neurological impairments, death
- Vaccine recommended at 2, 4, 6, and 12-15 months

http://www.cdc.gov/vaccines/pubs/pinkbook/pink-slides.htm

Pneumococcal (PCV)



Courtesy of Centers for Disease Control and Prevention

- Transmission
  - -Respiratory, autoinoculation
- Clinical features
  - -Abrupt onset, fever, shaking chills, pleuritic chest pain, productive cough, dyspnea, tachypnea, hypoxia
- Complications
  - -Pneumonia, bacteremia, and meningitis
- Vaccine recommended at 2, 4, 6, and 12-15 months

http://www.cdc.gov/vaccines/pubs/pinkbook/pink-slides.htm

Measles (MMR)

- Transmission

  -Respiratory, airborne

- Clinical features: cough, coryza, Koplik spots

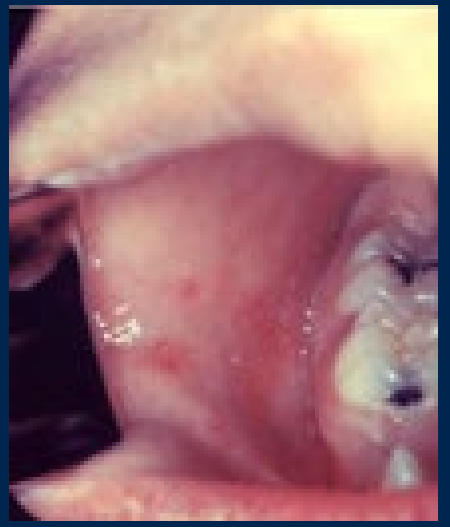
  -Incubation 10-12 days (measles), 14-18 days (mumps), 14 days (rubella)

  -Fever, runny nose, cough, rash, parotitis, myalgia, headache

- Complications

  -Pneumonia, hearing loss, encephalitis, seizures, orchitis, pancreatitis, arthritis, death

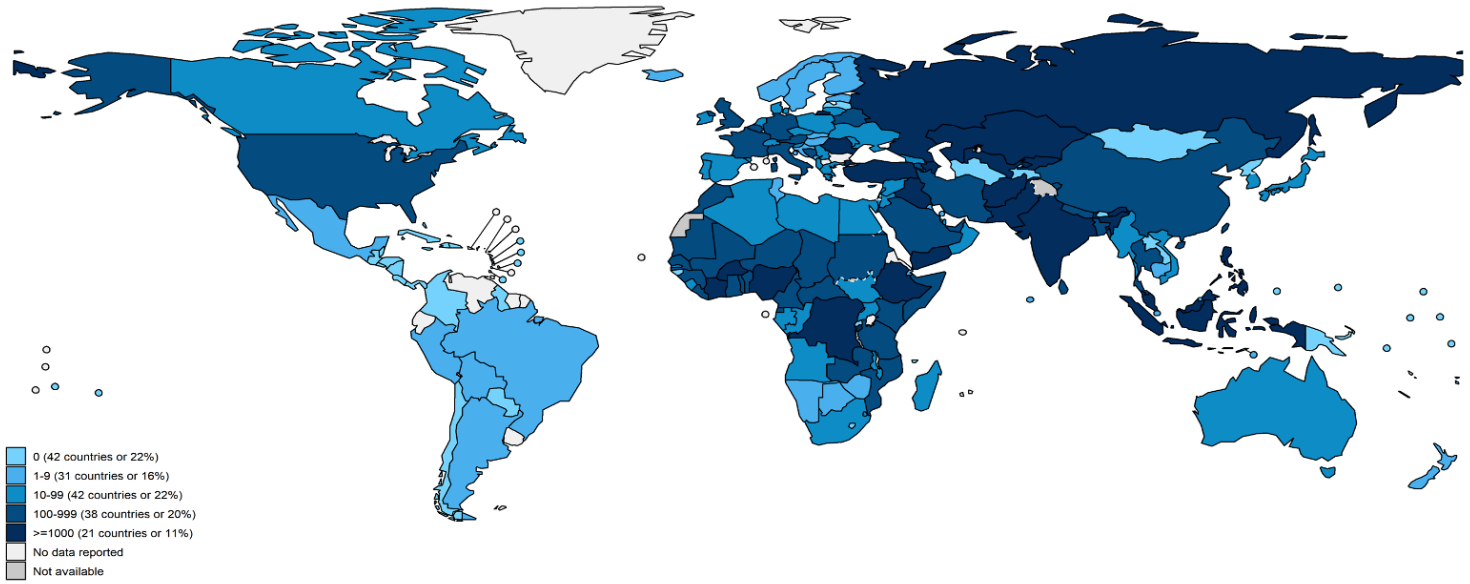
- Vaccine recommended at 12 months, boost at 4-6 years



Courtesy of Centers for Disease Control and Prevention

http://www.cdc.gov/vaccines/pubs/pinkbook/pink-slides.htm

Number of Reported Measles Cases (Last 6 months)



Country	Cases*
Azerbaijan	28,787
Kazakhstan	28,660
Iraq	25,429
India**	15,183
Kyrgyzstan	11,723
Russian Federation	11,537
Pakistan	8,648
Yemen	8,558
Burkina Faso	4,810
Nigeria	4,701

World Health Organization

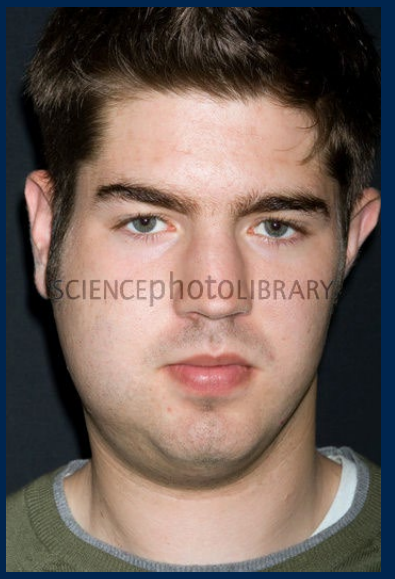
Map production: World Health Organization, 2024. All rights reserved
Data source: IVB Database

Disclaimer: The boundaries and names shown and the designations used on this map do notimply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted and dashed lines on maps represent approximate border lines for which there may not yet be full agreement.

0 875 1750 3500 Kilometers

Notes: Based on data received 2024-05 - Surveillance data from 2023-10 to 2024-03 - * Countries with highest number of cases for the period - **WHO classifies all suspected measles cases reported from India as measles clinically compatible if a specimen was not collected as per the algorithm for classification of suspected measles in the WHO VPD Surveillance Standards. Thus numbers might be different between what WHO reports and what India reports.

Mumps



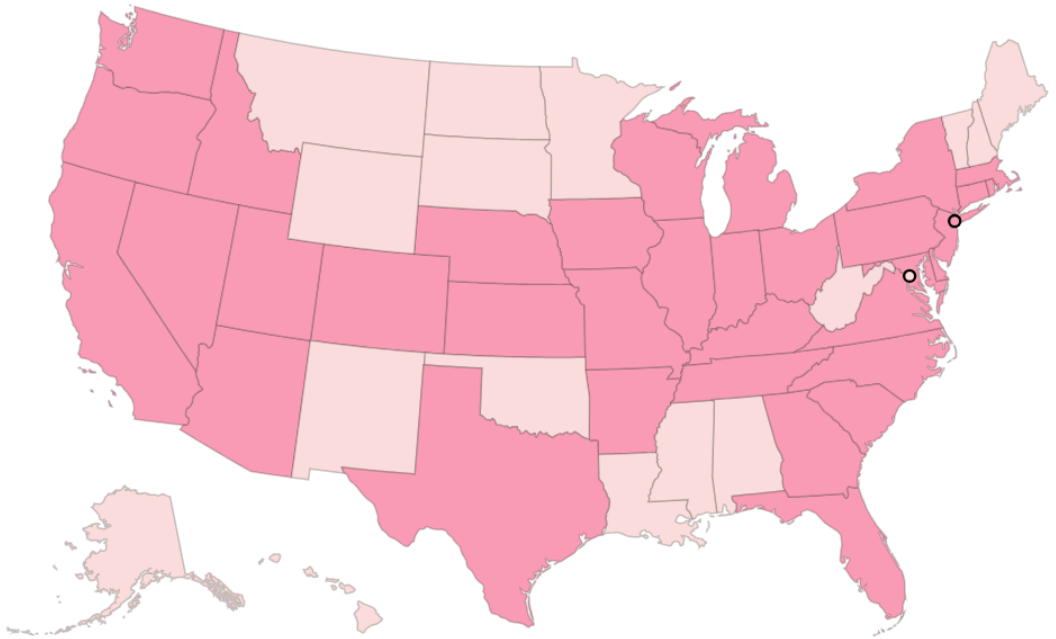
Courtesy of Centers for Disease Control and Prevention

- Transmission
  - -Respiratory droplet
- Clinical features
  - -virus replicates in nasopharynx &l lymph nodes.
  - -After 12 to 25 days a viremia occurs, which lasts from 3 to 5 days.
  - - During the viremia, the virus spreads to multiple tissues, including the meninges, salivary glands, pancreas, testes, and ovaries.
  - -Parotitis occurs 16-18 days after exposure in 31-65%; may be unilateral or bilateral
- Complications : orchitis (3-10%), pancreatitis, deafness
- Vaccine recommended at 12 months, boost at 4-6 years

http://www.cdc.gov/vaccines/pubs/pinkbook/pink-slides.htm

Reported US Mumps Cases by Jurisdiction and Year*

Reported Mumps Cases, 2024



Territories **PR**

Legend

- No reported cases
- Reported mumps cases

https://www.cdc.gov/mumps/outbreaks.html

Varicella

- Transmission
  - -Airborne droplet, direct contact with lesions
- Clinical features
  - -Incubation period 14-16 days
  - -Rash generally appears first to head, most concentrated to trunk
  - -Successive crops over several days with varying stages of development
- Complications
  - -Bacterial infection, pneumonia, CNS manifestations, Reye syndrome, death
- Vaccine recommended at 12 months, boost at 4-6 years

Courtesy of Centers for Disease Control and Prevention

Hepatitis A

- Transmission
  - -Fecal-oral
- Clinical features
  - -Incubation period 28 days (range 15-50 days)
  - -Abrupt onset of fever, malaise, anorexia, nausea, abdominal discomfort, dark urine, jaundice
  - -Children < 6 yrs generally asymptomatic, older children and adults usually symptomatic
- Complications
  - -Rarely fulminant Hepatitis A, liver failure
- Vaccine recommended at 12 and 18 months

http://www.cdc.gov/vaccines/pubs/pinkbook/pink-slides.htm

Meningococcal (MCV4)

- Transmission
  - -Respiratory droplets
- Clinical features
  - -Incubation period 3-4 days (range 2-10 days)
  - -Meningitis (fever, headache, stiff neck, nausea, vomiting, photophobia, altered mental status)
  - -Meningococcal sepsis (fever, petechial or purpuric rash, hypotension, organ failure
- Complications
  - -Brain damage, hearing loss, hydrocephalus, myocarditis, seizures
- Vaccine recommended at 11-12 years of age, boost at 16 years

http://www.cdc.gov/vaccines/pubs/pinkbook/pink-slides.htm

Human Papillomavirus (HPV)

- Transmission
  - -Direct contact, usually sexual
- Clinical features
  - -May be asymptomatic
  - -Anogenital warts, recurrent respiratory papillomatosis
  - -Cervical cancer precursors (cervical intraepithelial neoplasia)
  - -Cancer (cervical, anal, vaginal, vulvar, penile, and increasing head and neck cancer)
- Complications
  - -Cancer
- Vaccine recommended at 11-12 years of age

http://www.cdc.gov/vaccines/pubs/pinkbook/pink-slides.htm

Dosing Schedules depend on age at initiation

- Initiating vaccination before 15th birthday
  - Recommended: 2 doses of HPV vaccine
  - The 2nd dose should be given 6–12 months after the first (0, 6–12 month schedule)
  - Minimum interval: 5 months
- Initiating vaccination on or after 15th birthday
  - Recommended: 3 doses of HPV vaccine (0, 1-2, 6 mo)
  - Minimum intervals: In 3-dose schedule,
    - 4 weeks between the 1st and 2nd dose,
    - 12 weeks between the 2nd and 3rd dose, &
    - 5 mos between the 1st and 3rd dose

October 2016: ACIP vote and approved by CDC

Vaccine Myths and Hesitancy

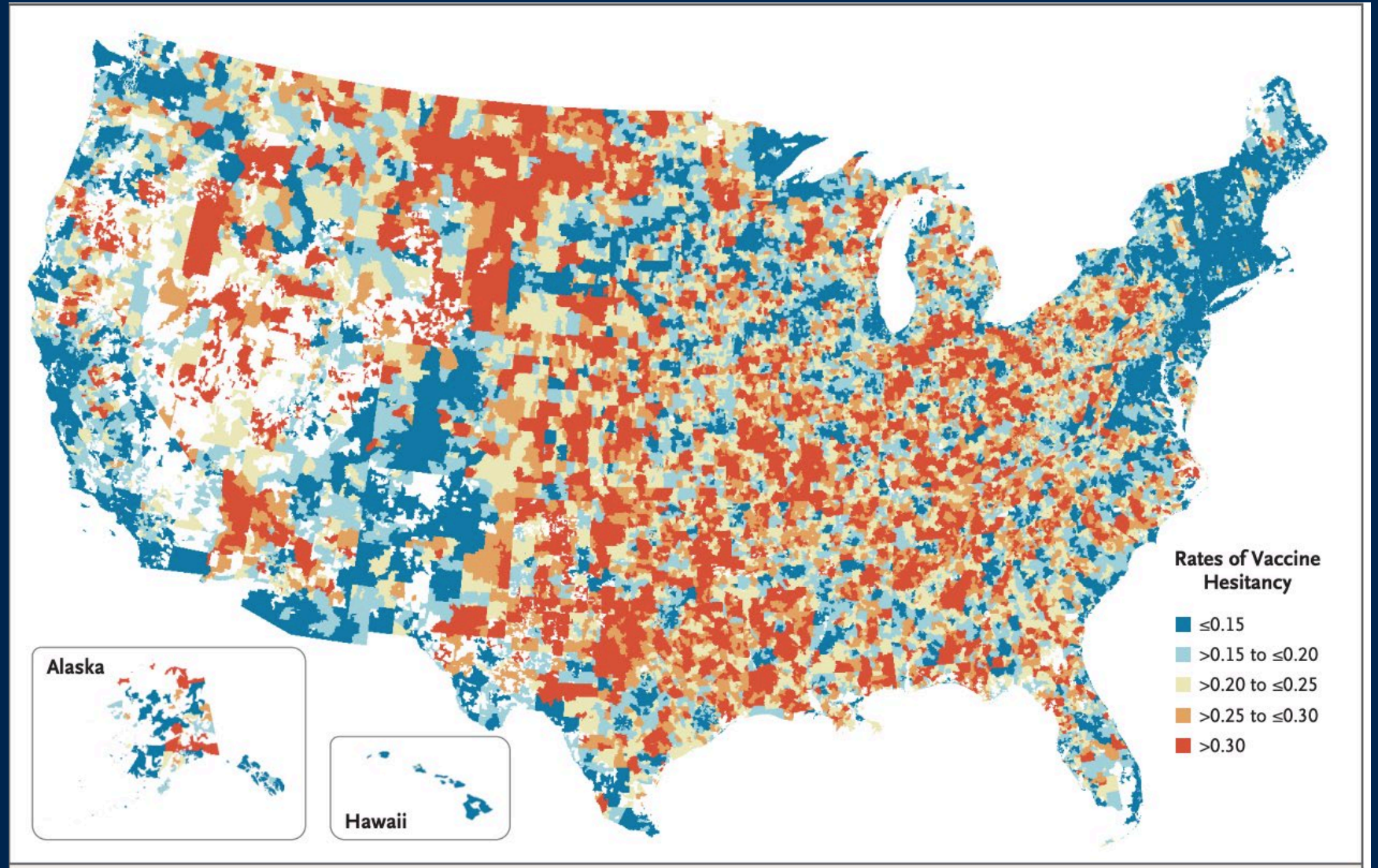


Figure 2. Rates of Vaccine Hesitancy across U.S. ZIP Codes, December 2021.

The data are based on responses to the U.S. Covid-19 Trends and Impacts Survey.[74]

Larson HJ, The Vaccine-Hesitant Moment. N Engl J Med. 2022 Jul 7;387(1):58-65. doi: 10.1056/NEJMra2106441. Epub 2022 Jun 29. PMID: 35767527; PMCID: PMC9258752.

Characteristic	Pediatric Hesitancy 2010	Pediatric Hesitancy 2021
Race/ethnicity	White, non-Hispanic	Any
Insurance	Private	Public
Age	Mother ≥ 30 yr	Younger
Education	Some college/college degree	Lower
Income	Medium - high	Lower
Trust	Low	Low

Smith PJ. et al. *Public Health Reports*. 126, 135-146 (2011)

Reuben R, Aitken D, Freedman JL, Einstein G (2020) Mistrust of the medical profession and higher disgust sensitivity predict parental vaccine hesitancy. PLoS ONE 15(9): e0237755. https://doi.org/10.1371/journal.pone.0237755

Common Vaccine Myths

- We give too many vaccines to young children – their bodies can't handle it.
- The ingredients in vaccines are not safe.
- Vaccines cause serious diseases.

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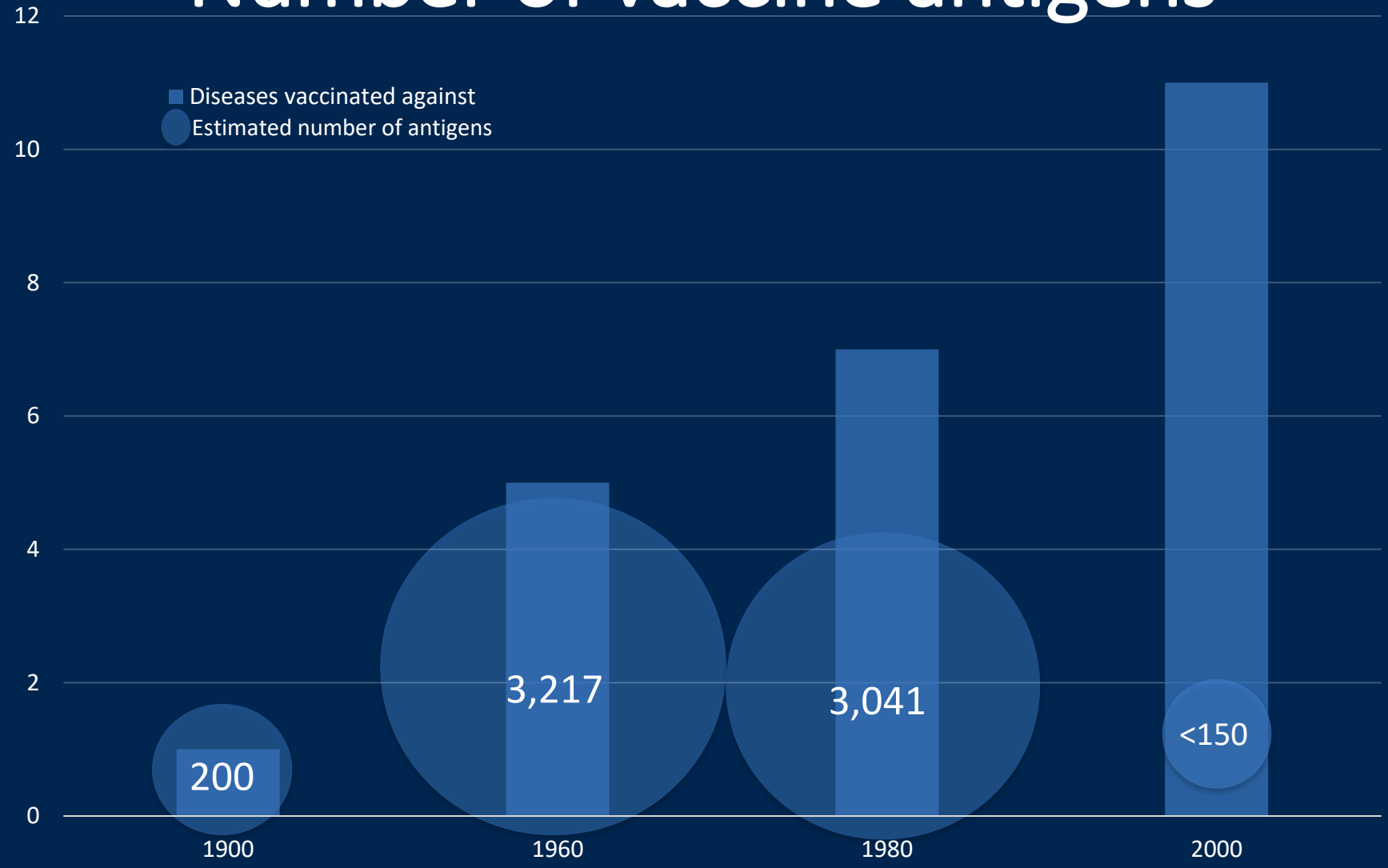
Number of vaccine antigens



Evaluating the whole U.S. childhood immunization schedule:

Institute of Medicine finds no evidence that the immunization schedule is unsafe or that the schedule is linked to:

- Autoimmune disease
- Asthma
- Developmental disorder
- Learning disorder
- Seizures
- ADHD

http://www.nap.edu/catalog.php?record_id=13563

Myth: vaccine ingredients are harmful

What?

Ingredients include antibiotics, gelatin, aluminum, egg protein, formaldehyde.

Why?

Antibiotics prevent vaccine contamination

Gelatin acts as a stabilizing agent

Aluminum is an adjuvant which stimulates immune response

Formaldehyde and egg protein are used in vaccine production

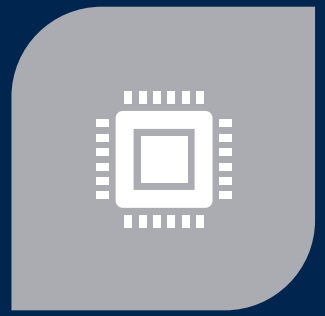
Offit, P.A. *et al. Vaccines and Your Child: Separating Fact from Fiction*. New York City, New York: Columbia University Press; 2011.

How to recognize a vaccine myth

DOES THE INFORMATION SOUND IMPROBABLE TO YOU?

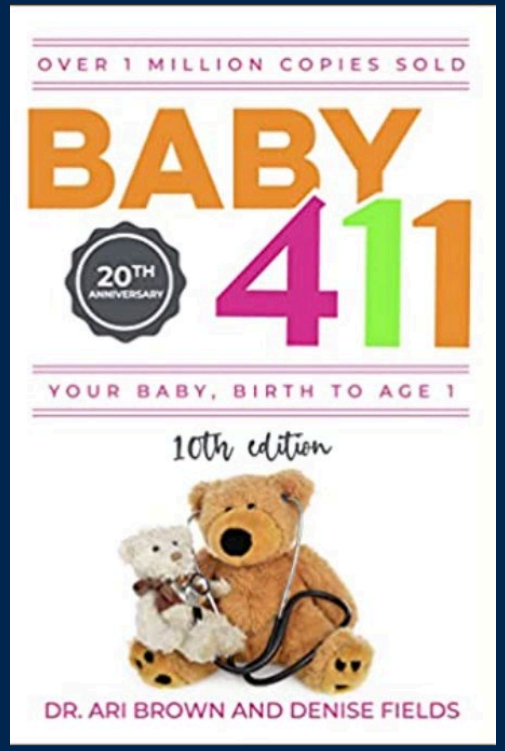
DOES THE INFORMATION SEEM UNUSUALLY SCARY?

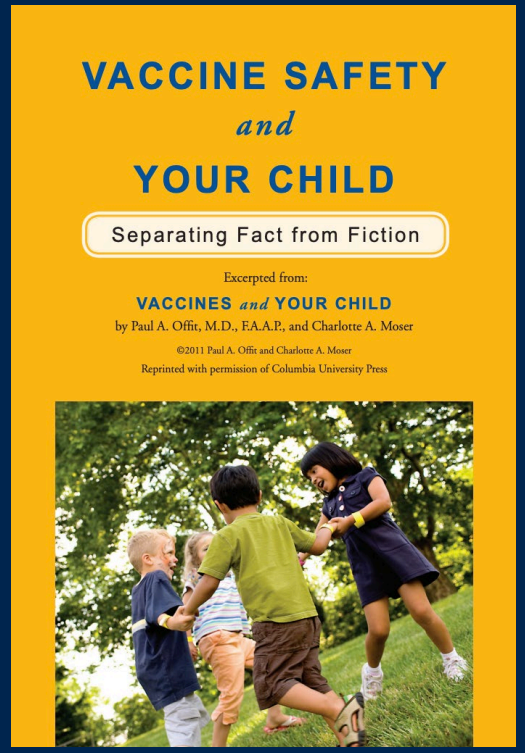
IS THE INFORMATION BEING PRESENTED IN A BALANCED WAY?

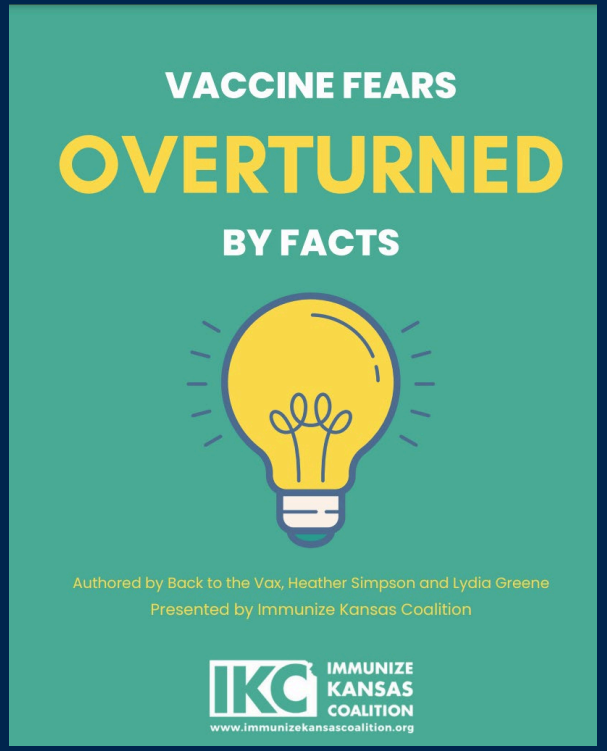


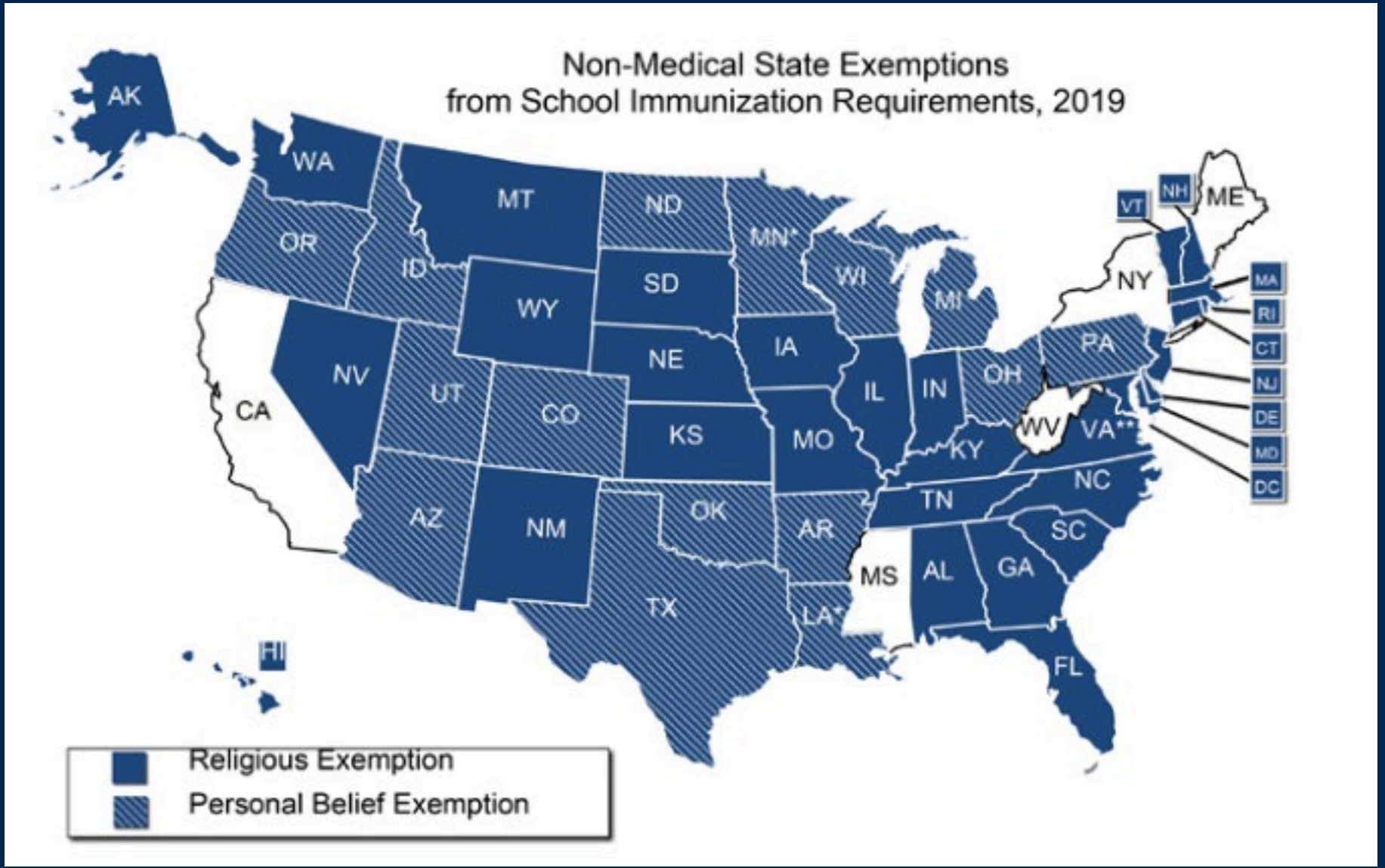
IS THE INFORMATION COMING FROM A RELIABLE, FAMILIAR SOURCE?

Misinformation Resources



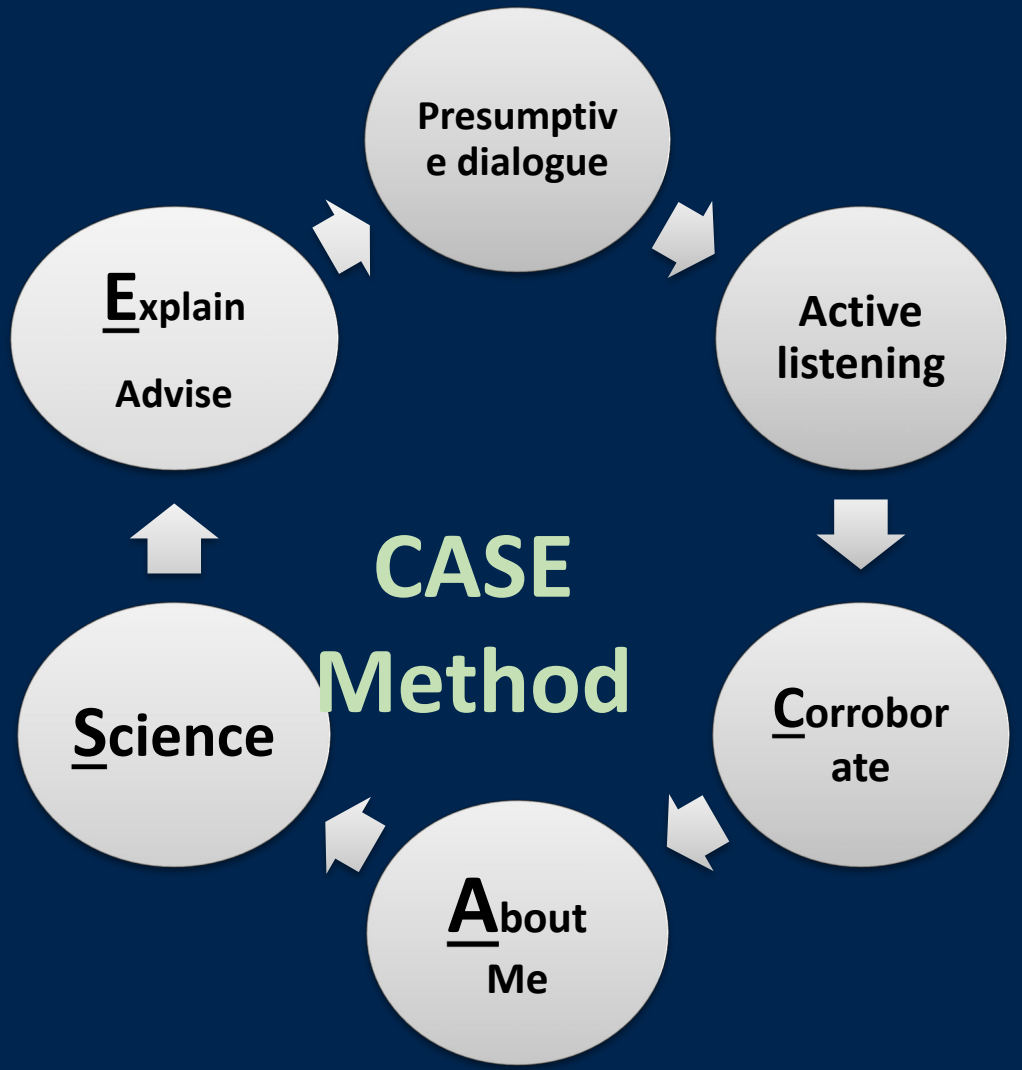






http://www.ncsl.org/research/health/school-immunization-exemption-state-laws.aspx


So, how do you approach vaccine hesitant persons?



Singer A. Autism Science Foundation. Texas Immunization Summit. www.immunizeusa.org/2010-summit-update/
Jacobsen R. et al. The C.A.S.E. approach: guidance for talking to vaccine-hesitant parents. Minn Medicine: 49-50.

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How you start the conversation matters

Use presumptive dialogue for all vaccines esp more frequently refused (ex HPV and flu)

Advantage of presumptive language

Faster, OK with many, avoids long, potentially problematic discussion

"It's time for the flu vaccine today."

"We need to give Tdap, Meningitis and HPV today."

You will likely begin the vaccine hesitant conversation when this has failed

Participatory dialogue

Examples:

"So, have you thought about the flu vaccine this year?"

"Would you like to talk about the flu vaccine today?"

Most vaccine acceptors and hesitant families will become MORE hesitant if this language is used

Opel DJ, et al. Vaccine. 2012;30:1269-1275.

If you experience hesitancy, be an active listener

- Where they got this information?
  - Friend? Family member? Internet research?
- Prior vaccine reactions?
  - When? Which vaccine?
- History of bad health experiences?
- Goals: Hear the parent's concerns
  - Build rapport
  - Demonstrate caring and consideration
  - Regain trust
  - Open the door for intervention

So, how do you corroborate?

- Carefully!
- Say, “I have heard that concern from other parents.”
- Say, “That is a common story that people often share.”

- Don’t say, “Oh, I understand why you would think that.”
- Don’t say, “You’re right. Many people believe that.”

Don’t accidentally confirm their concern as accurate information.

What do I say about me?

- Remember: you are the most important influence in a parent's health care decision
- Explain your background, time and effort spent reviewing scientific materials, knowledge gained through study and experience
  - Say, "I just attended a medical conference and heard an expert, Dr. Healy, speak on this very topic. She explained…"

Purpose: not to brag, but to reassure the parent of your credibility.

What science do I share?

- Keep it relevant to the concerns voiced by the parent
- Offer information at the educational level of the parent
- Stay current
- Be confident and clear
- Leave out topics that don't apply to their child
  - Herd immunity – We live in the "me" generation

Tips for explaining/advising

- This is where you wrap back around to offering the vaccine today!
- This is your best chance to advise the parent on the best choice for their child
- Recognize that the choice will always be theirs, but you are interested in helping them in their efforts
- Translate the science into advice
- Again, be confident and directive, but not polarizing

Attitude type	Don't say	Say
Conspiracy theorist	"CDC recommends…" "AAP recommends…"	"Some parent groups want you to believe vaccine aren't safe and are purposefully exaggerating dangers" (Be kind, don't ostracize, replace misinformation, push the truth)
Fear of medicine	"The shot really doesn't hurt that much"	"Getting sick might result in much more intensive medical interventions… need for ER visit, hospitalization, ICU stay
Nonconformist	"Most of the parents in my practice vaccinate…"	"As a physician grounded in science, I evaluate medical information carefully and always some skepticism; I too want to be sure that the facts are accurate."
Individualist	" Herd immunity…"	"I want your child/family to be healthy….." " It's your decision, but…"

Hornsey MJ, et al. Health Psychology. 2018;37:307-315
Hornsey MJ, Fielding KS. American Psychologist. 2017;72:459-473

Other Options

Show empathy

"I know you are struggling with this decision"

Affirm critical thinking

"It's so important that you are analyzing the risks carefully; that said, you are underestimating the benefit of ___vaccine."

Encourage empowerment

"Please use the resouces I've provided to learn more….."

Utilize trusted messengers (prior disbeliever)

The American Academy of Pediatrics recommends:

- Maintaining relationships with vaccine concerned families when possible.
- Listening carefully and respectfully to parental concerns.
- Don’t get frustrated; we all don’t share the same values.
- Dismissal may be an option, but legal and ethical concerns should be considered.

Take Home Points

- Vaccines are a routine part of well-child-care for the prevention of serious disease and illness.
- Serious disease and illnesses have been eradicated due to routine vaccination.
- Use presumptive language and active listening when speaking with families about vaccines.
- Myths about vaccination are common, but good information sources can help families process questions with your help.

References

Advisory Committee on Immunization Practices (ACIP)

Centers for Disease Control (CDC)

AAP Red Book

Texas Children's Immunization Project - https://www.texaschildrens.org/departments/immunization-project

Questions

elliot@bcm.edu

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