Measles:

A TEPHI LIVE FORUM

Friday, March 7, 2025

TEPHI TEXAS EPIDEMIC PUBLIC HEALTH INSTITUTE

TEPHI Mission

We are committed to keeping Texans safe and the economy strong by strengthening the capacity and resiliency of all Texas communities to respond to future infectious disease outbreaks.

Four Pillars

Early Detection

Training

Public Health Reserve Network

Public Health Communications

Collaborations Are Key

Focus on establishing & cultivating partnerships

- Governmental Agencies
- Regional & state-wide organizations
- Professional associations
- Business entities
- Academic institutions
- Community organizations

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Our Panelists

Luis Ostrosky-Zeichner, MD

Physician, Infectious Disease Specialist, Professor
UTHealth Houston McGovern Medical School and
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Our Panelists

Pedro “Tony” Piedra, MD

Pediatrician, Infectious Disease Specialist, Professor
Baylor College of Medicine and
Texas Children’s Hospital

Our Panelists

Catherine “Cathy” Troisi, PhD, MS

Infectious Disease Epidemiologist, Professor
UTHealth Houston School of Public Health
Departments of Management, Policy and Community Health & Epidemiology

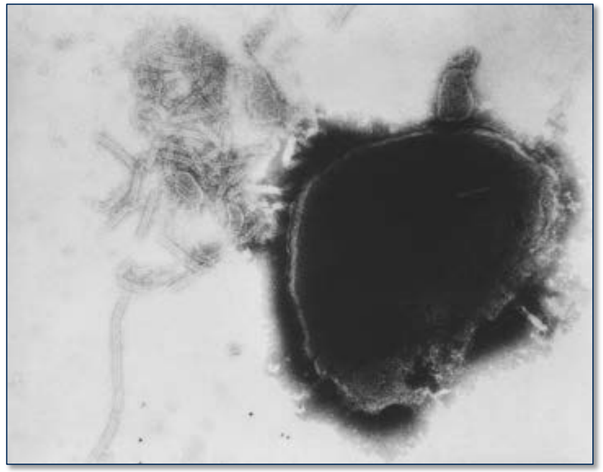
Measles 101

Tony Piedra, MD

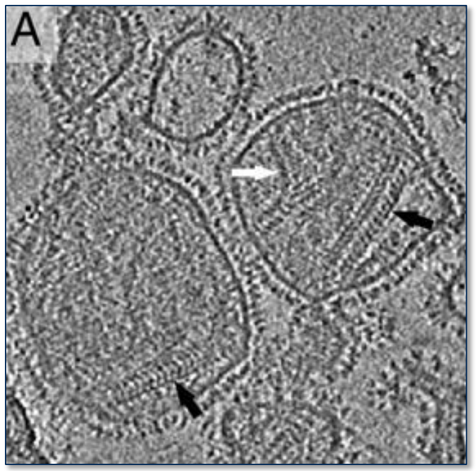
UTHealth Houston | TEPHI TEXAS EPIDEMIC PUBLIC HEALTH INSTITUTE

What is it?

- Infection caused by a virus
  - Enveloped single-stranded RNA virus
  - Paramyxovirus family
- Spreads easily through the air
- Extremely contagious
- Can be serious and even fatal, especially in small children
- Preventable



Paramyxovirus Virion Under Transmission, Electron Microscope. The image displays the viral nucleocapsid of a paramyxovirus virion as visualized under a transmission electron microscope. Fred Murphy, MD, Public Health Image Library, Public Domain, Centers for Disease Control and Prevention



Liljeroos L, Huiskonen JT, Ora A, Susi P, Butcher SJ. Electron cryotomography of measles virus reveals how matrix protein coats the ribonucleocapsid within intact virions. Proc Natl Acad Sci U S A. 2011 Nov 1;108(44):18085-90. doi: 10.1073/pnas.1105770108. Epub 2011 Oct 24. PMID: 22025713; PMCID: PMC3207687. (Figure 2A)

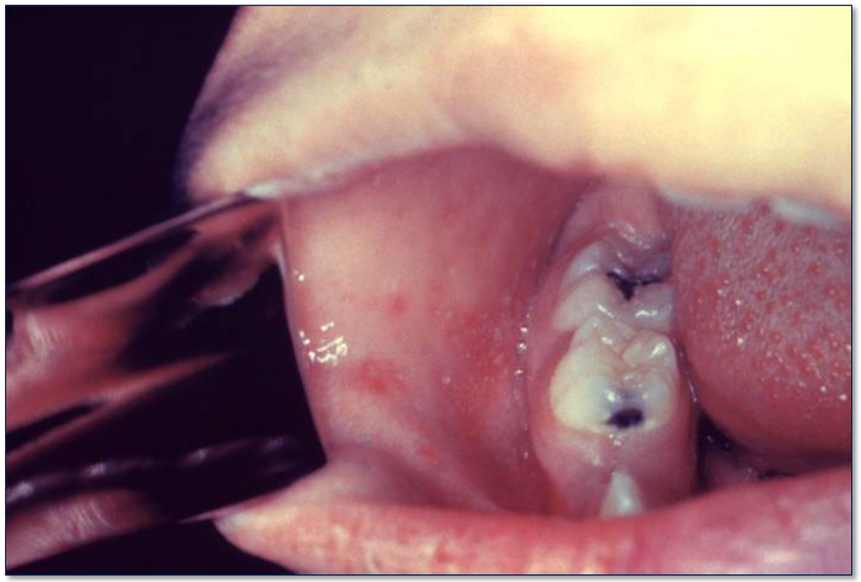
Transmission

- Spreads
  - When an infected person coughs or sneezes
  - Contact with air droplets
- Highly contagious
  - Infected person can spread measles for about **8 days**
  - Including *before* the rash appears

Measles viruses can survive for **up to 2 hours** in air, even after an infected person leaves the area

Infection Occurs in Stages

- Incubation in first 7-14 days
  - Measles virus spreads in the body
  - No signs or symptoms
  - Infected people can transmit measles in this stage
- First symptoms show in next 2-3 days
  - Fever
  - Cough
  - Sore throat
  - Runny nose
  - Red watery eyes
  - Tiny white spots appear inside the mouth
- Acute illness & rash occur in next 3-7 days
  - Fever spikes
  - Rash appears
    - Tightly clustered red splotchy spots that are mostly flat
    - Starts at the hairline and spreads down
- Recovery
  - Rash gradually fades or may darken or peel
  - Cough may linger



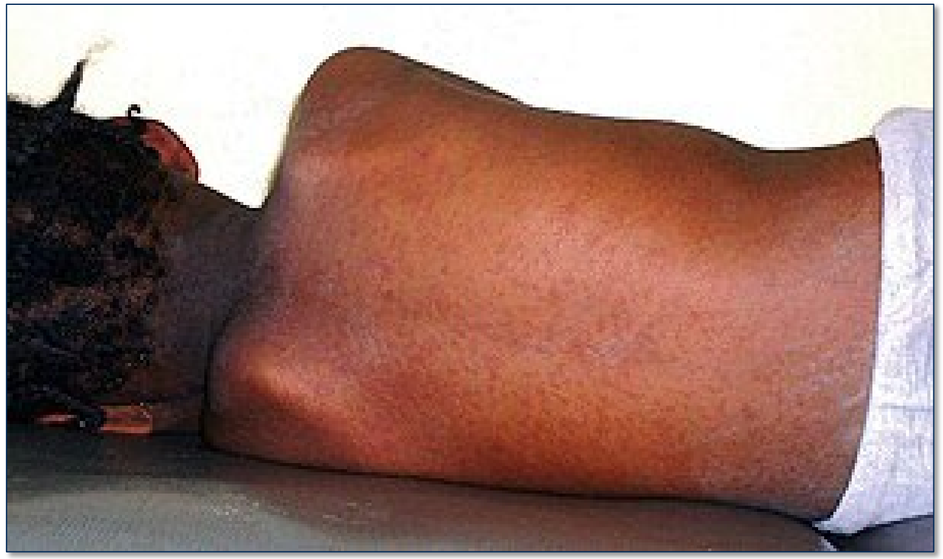
Koplik Spots, Measles StatPearls Publishing LLC. NCBI Bookshelf. https://www.ncbi.nlm.nih.gov/books/NBK448068/figure/article-24807.image.f2/?report=objectonly

https://www.mayoclinic.org/diseases-conditions/measles/symptoms-causes/syc-20374857

https://www.cdc.gov/measles/signs-symptoms/index.html

Clinical Presentation

A



B

C

D

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Image A: Photographer: M. Blyth 2002. https://commons.wikimedia.org/wiki/File:Measles_in_African_Child_3.JPG

Images B-E: A Colour Atlas of Infectious Diseases. Eds RTD Emond & HAK Rowland, 1987, page 283

Diagnosis

Clinical diagnosis	Based on clinical presentation; lab confirmation also needed
Virus isolation	Nasal wash, throat swab and tracheal aspirate, conjunctiva, or blood or urine in febrile phase
Serology	Paired sera (acute and convalescent): Significant increase or positive virus-specific IgM antibody
RT-PCR Reverse transcription polymerase chain reaction	Preferred: Nasal, nasopharyngeal, or throat sample

Complications

Ear infections: ~1 in 10 infected children, can lead to permanent hearing loss

Diarrhea: Just less than 1 in 10 infected people

Vision loss: From keratitis or corneal scarring, retinopathy (rare), or optic neuritis (rare)

Pneumonia: 1 in every 20 infected children (most common cause of death in young children)

Encephalitis: 1 in every 1,000 infected children

Death: 1-3 of every 1,000 infected children (from respiratory or neurologic complications)

During pregnancy: Pre-term or low birth weight baby

Long term: Subacute sclerosing panencephalitis (SSPE) - very rare but often fatal

- Develops 7-10 years after measles infection
- Occurs in 7-11 out of every 100,000 measles cases

https://www.cdc.gov/measles/signs-symptoms/index.html

Cohen BE, Durstenfeld A, Roehm PC. Viral causes of hearing loss: a review for hearing health professionals. *Trends Hear*. 2014;18:2331216514541361. Published 2014 Jul 29.

Niedermeyer, H. P., & Arnold, W. (2008). Otosclerosis and measles virus–association or causation?. *ORL*, *70*(1), 63-70.

Dang S. 6 Ways Measles Can Harm Eyes and Vision. American Academy of Ophthalmology. 2025 Feb 2025.

Prevention

- Best protection: Vaccination
  - MMR (Measles, Mumps, & Rubella): 2 doses
    - 1 dose is ~93% effective
    - 2 doses are ~97% effective
  - MMRV (Measles, Mumps, Rubella, & Varicella)

- Post-exposure prophylaxis
  - MMR vaccine within 72 hours of initial measles exposure or
  - Immunoglobulin within 6 days of exposure

Children

Dose 1: 12-15 months
Dose 2: 4-6 years

Adults

Recommendations based on **evidence of immunity**, which includes:

- Born before 1957 (presumed immune)
- Documented receipt of MMR vaccine
- Lab evidence of immunity or disease

No evidence of immunity: 1 dose*

* Does not apply to healthcare providers, pregnant women, severely immunocompromised individuals, or other special situations.

https://www.cdc.gov/measles/vaccines/index.html

https://www.cdc.gov/vaccines/hcp/imz-schedules/adult-notes.html#note-mmr

Tunis MC, Salvadori MI, Dubey V, Baclic O; National Advisory Committee on Immunization (NACI)*. Updated NACI recommendations for measles post-exposure prophylaxis. *Can Commun Dis Rep*. 2018;44(9):226-230. Published 2018 Sep 6. doi:10.14745/ccdr.v44i09a07

Situation Report

Cathy Troisi, PhD, MS

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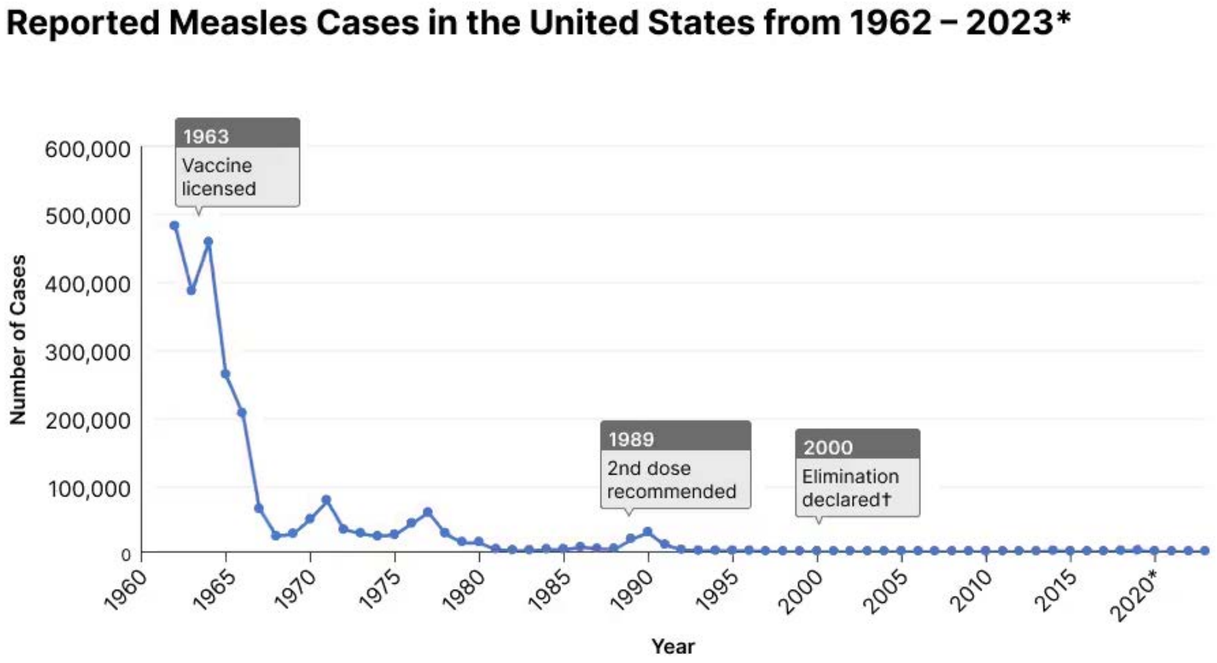
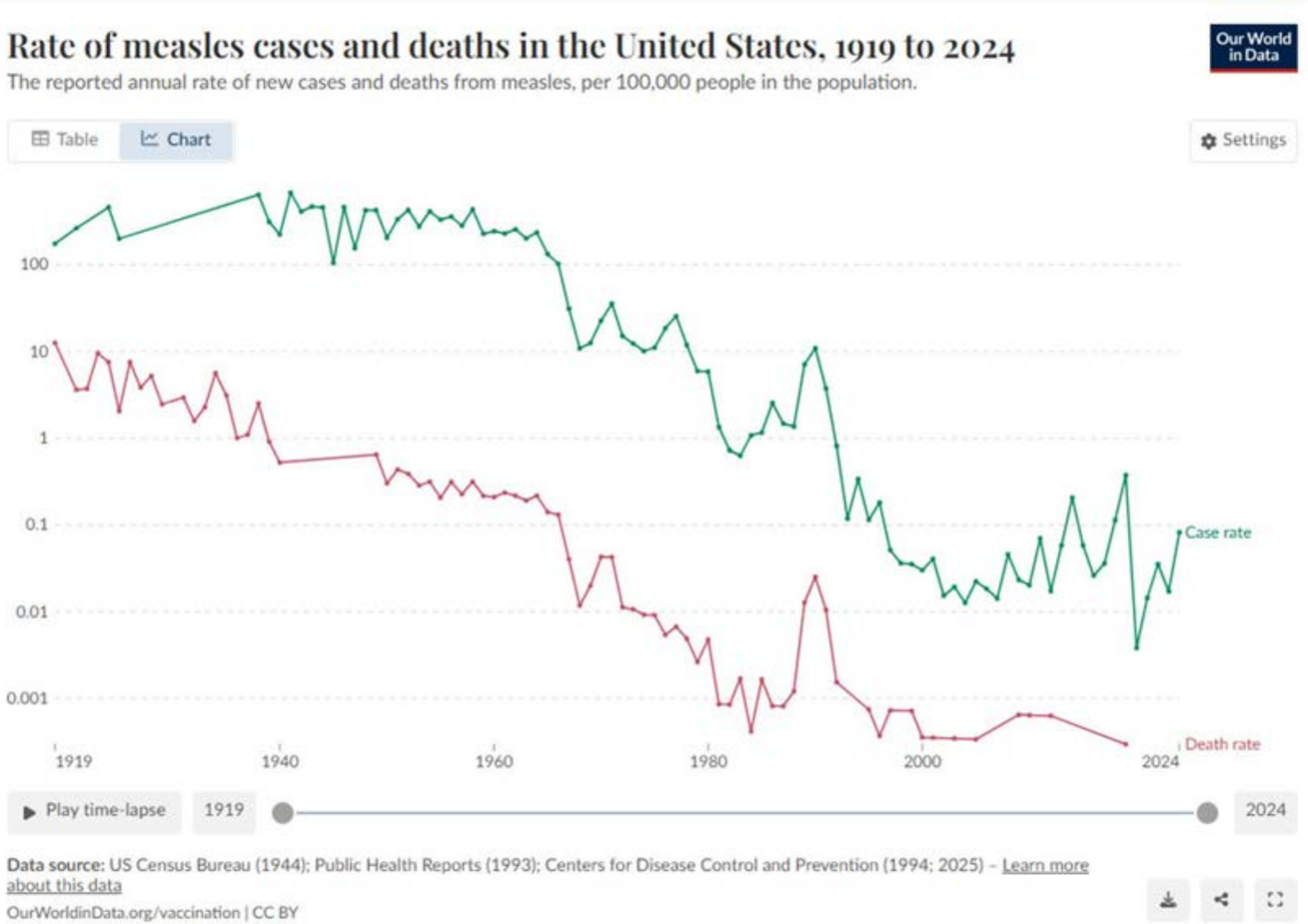
Measles – Historical Context



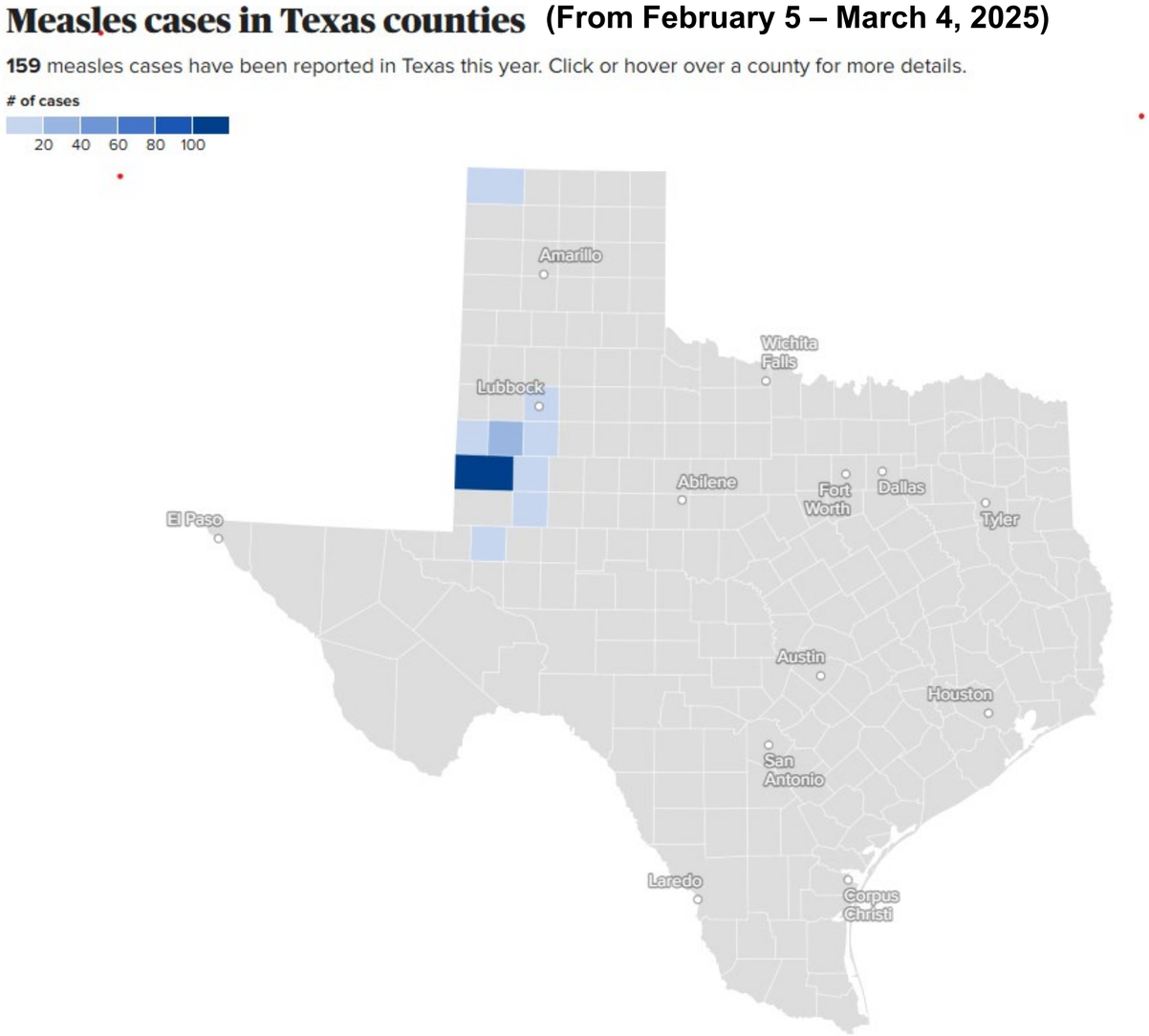
https://www.cdc.gov/measles/data-research/index.html accessed 3/6/25



Measles situation - Texas

(as of March 7, 2025)

- 198 cases of measles in South Plains Region of TX, reported 2/5/25-3/7/25
- More than 4 out of 5 under age 18 years
- 23/159 hospitalized
- One fatality, 6 year old
- 80 unvaccinated out of 85 with known vaccination status
- Concern about exposure in Central Texas due to travel by a measles case
- Updated Tuesdays and Fridays: https://www.dshs.texas.gov/news-alerts/

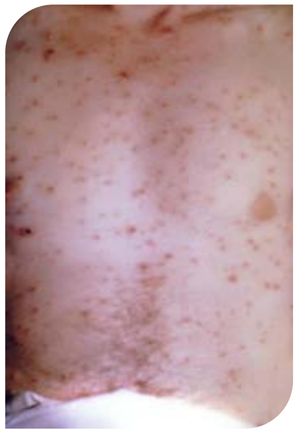


https://www.cbsnews.com/news/measles-outbreak-us-map/ accessed 3/4/35

Measles and other VPDs – 2025

- Ten U.S. jurisdictions reporting measles
  - Alaska
  - California
  - Florida
  - Georgia
  - Kentucky
  - New Jersey
  - New Mexico
    - 30 cases in Lea County, NM
    - Death in an adult reported 3/6
  - New York City
  - Rhode Island
  - Texas

Mumps; Immunize.org

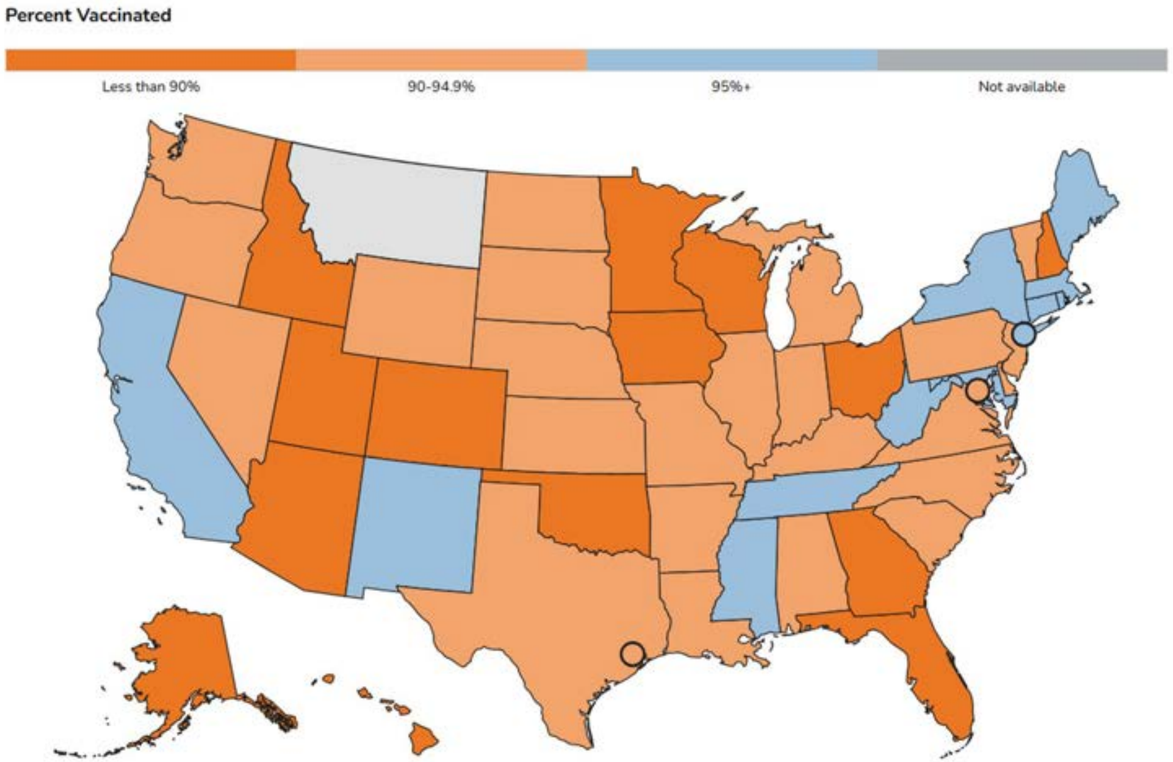


Chickenpox; cdc.gov

- Mumps – 17 jurisdictions – 35 cases
- Chickenpox – SC, PA – 54 cases
- Seasonal Influenza – 98 pediatric deaths (as of 2/21/25 for 2024/25 flu season)

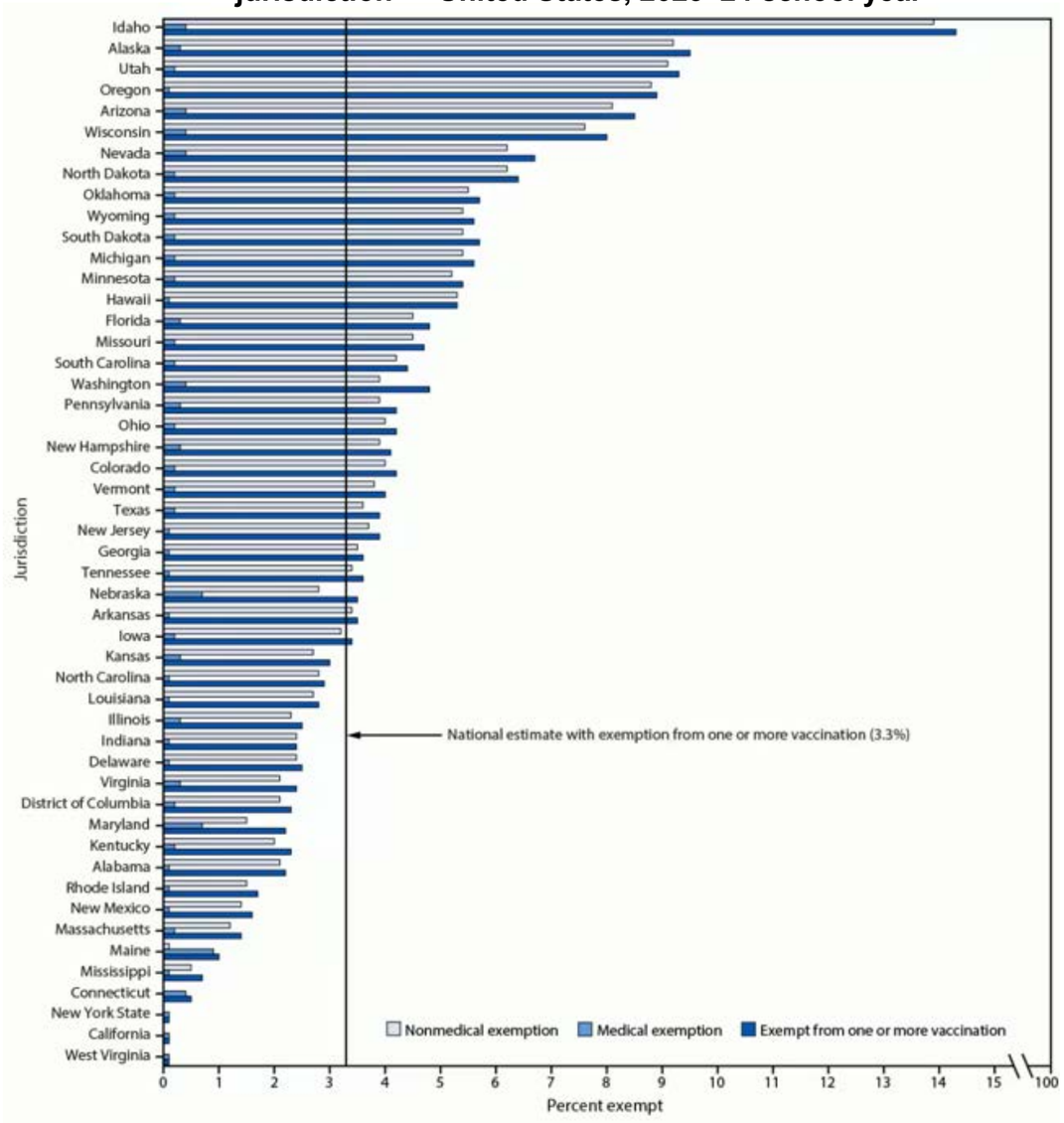
Why are we seeing outbreaks of VPDs?

MMR vaccination rates, 2023-2024



https://www.cdc.gov/measles/data-research/index.html#cdc_data_surveillance_section_6-history-of-measles-cases accessed 3/6/25

Estimated percentage of kindergartners with medical or nonmedical exemptions from one or more vaccinations, by jurisdiction — United States, 2023–24 school year



https://www.cdc.gov/mmwr/volumes/73/wr/mm7341a3.htm accessed 3/6/25

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Questions?

Please enter your questions into the Q&A box

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