



# VPDs Trends and Control and Strategies for Control and Prevention

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Overview, epidemiological updates, public health response, and key takeaways for the following:



Pertussis



Varicella



Measles

# Pertussis

# Key clinical and epidemiologic facts

**Pathogen:** *Bordetella pertussis* (1 of 10 *Bordetella* species); toxin-mediated respiratory illness.

**Transmission:** Primarily via respiratory droplets during close, face-to-face contact.

**Incubation:** Typically 7–10 days (range: 4–21 days).

**Infectious period:** First 3 weeks of cough or first 5 days after starting appropriate antibiotics.

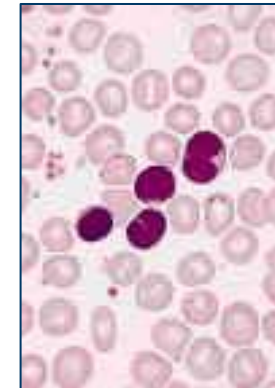
## **Symptoms and presentation:**

- Not just a childhood illness—often milder in vaccinated people, adolescents, and adults.
- Infants may present with apnea (cough may be absent).
- Commonly misdiagnosed as bronchitis or asthma.
- Illness progresses through catarrhal, paroxysmal, and convalescent stages.

## **Complications:**

- Rare in healthy, vaccinated people.
- Secondary bacterial pneumonia is most common.
- Infants and immunocompromised individuals are at highest risk for severe illness and death.

*Waters et al, (2015); CDC, (2015); Mink et al, (1992)*

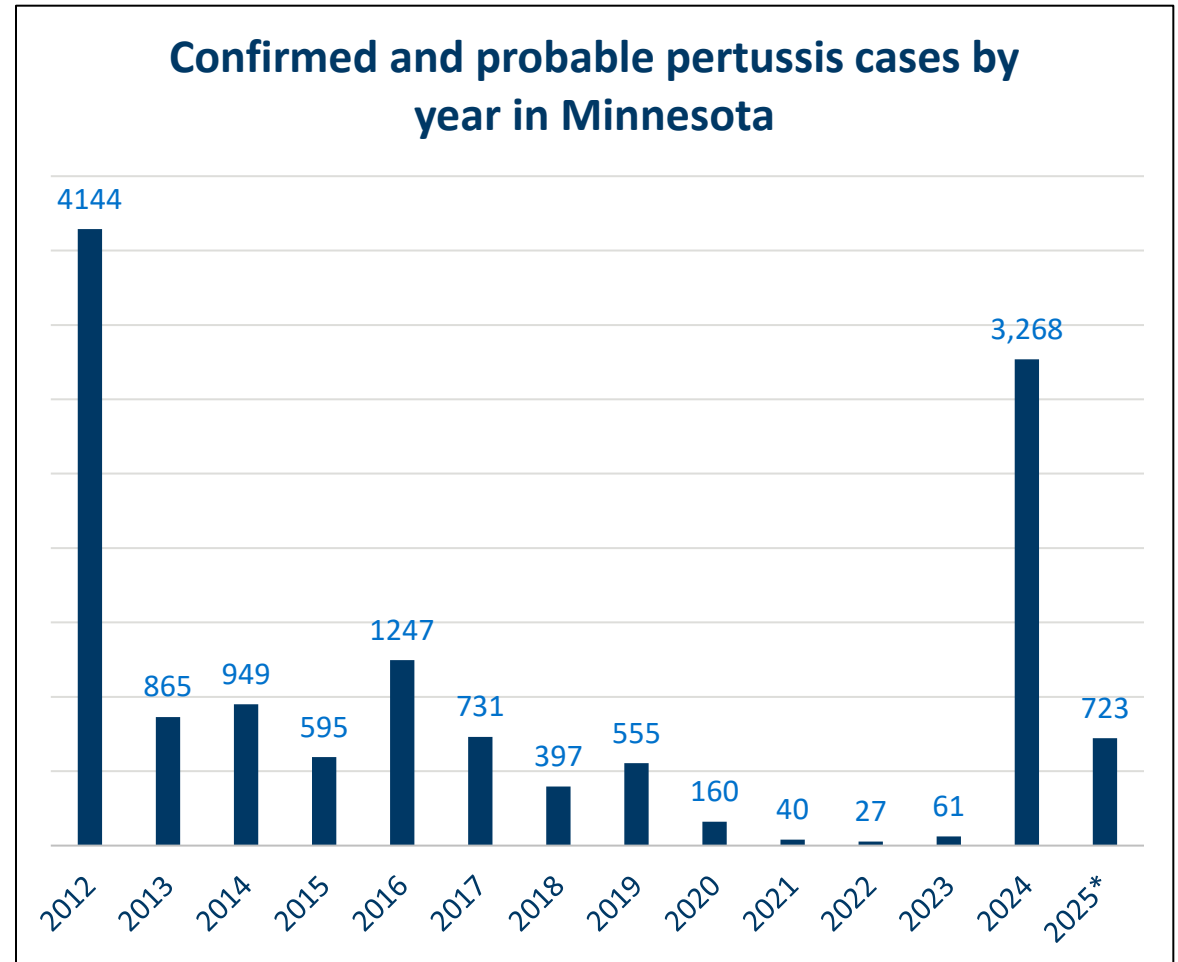


# Pertussis trends in 2024 and 2025

(\*preliminary as of 04/24/2025)

Pertussis cases in Minnesota in 2024 and 2025 (preliminary):

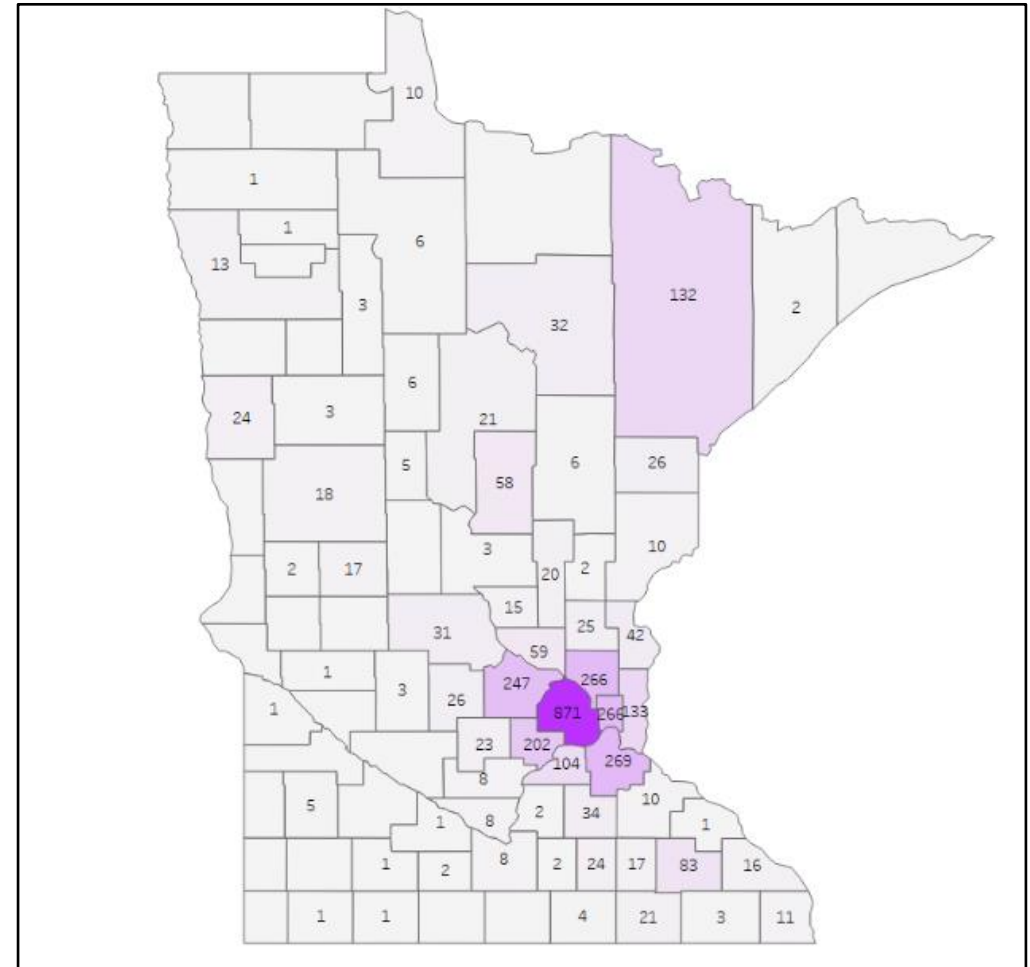
- 3,268 confirmed and probable cases reported.
- 53 times more than in 2023, when only 61 cases were reported for the entire year.



# 2024: Pertussis Impact across Minnesota

*(updated though 01/31/2025)*

- Pertussis cases were widespread across Minnesota.
- 64 counties in Minnesota had been affected.
- The highest concentration of cases was in the seven-county metro area.



# 2024: Pertussis demographics, clinical outcomes, and vaccination status

(updated though 1/31/2025)

**Age range:** 18 days to 92 years.

- Mean age: 16 years.
- Median age: 14 years.

**Clinical outcomes:**

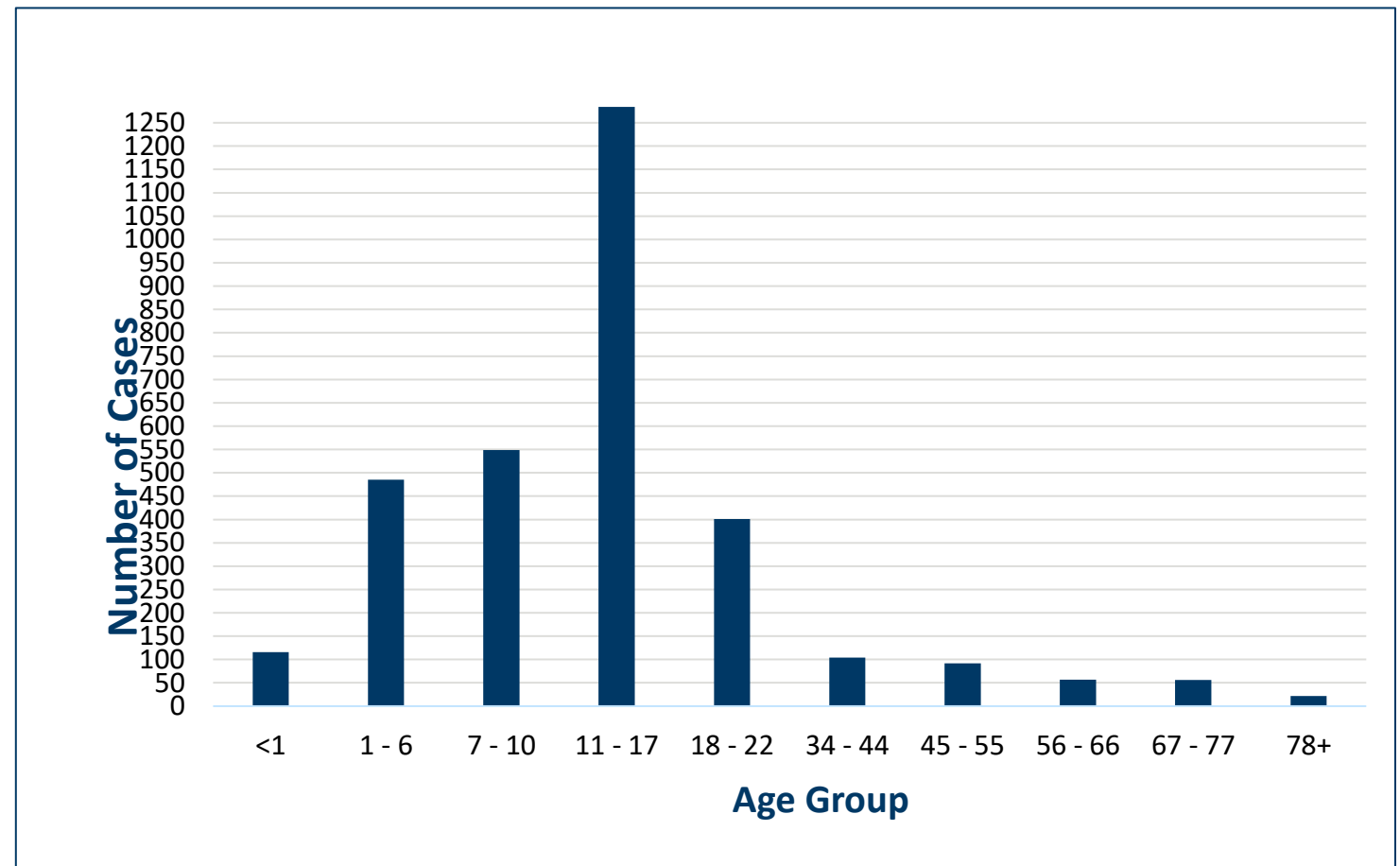
- 3.4% (n=113) diagnosed with pneumonia.
- 1.4% (n=43) hospitalized.

**Infant cases:**

- 3.5% (n=116) were infants (<1 year).

**Vaccination status:**

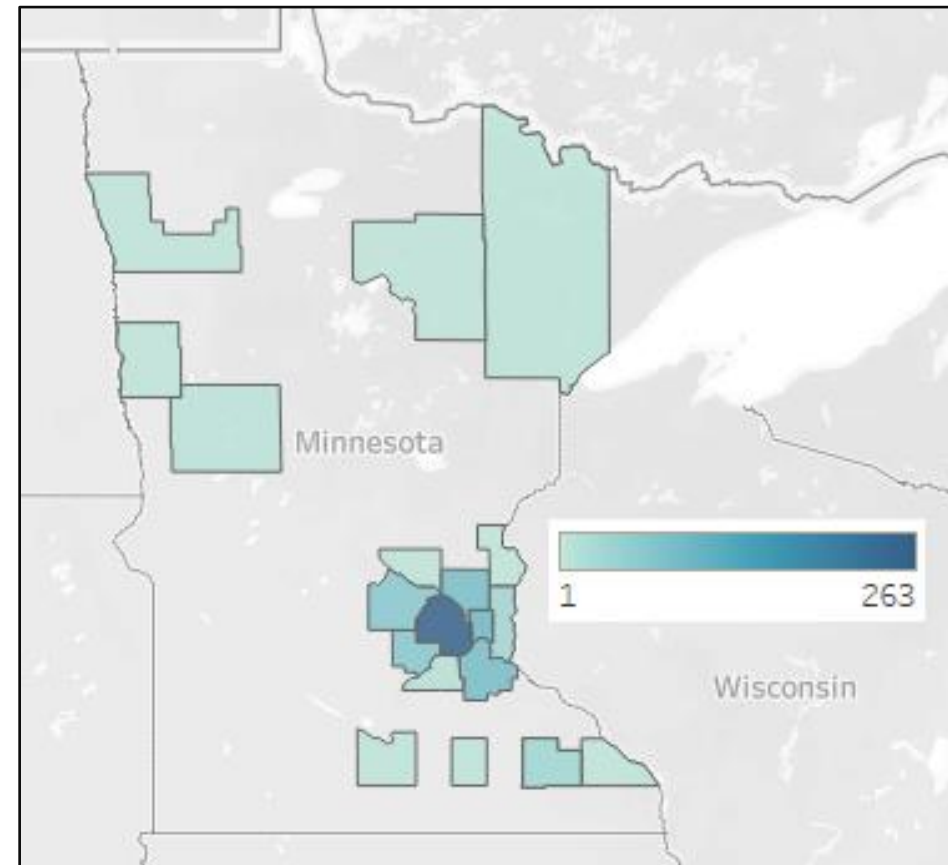
- 72.2% (n=2,248) had received at least one pertussis containing vaccine (among cases where vaccine status is known).



# 2024: Pertussis outbreaks

(updated though 1/31/2025)

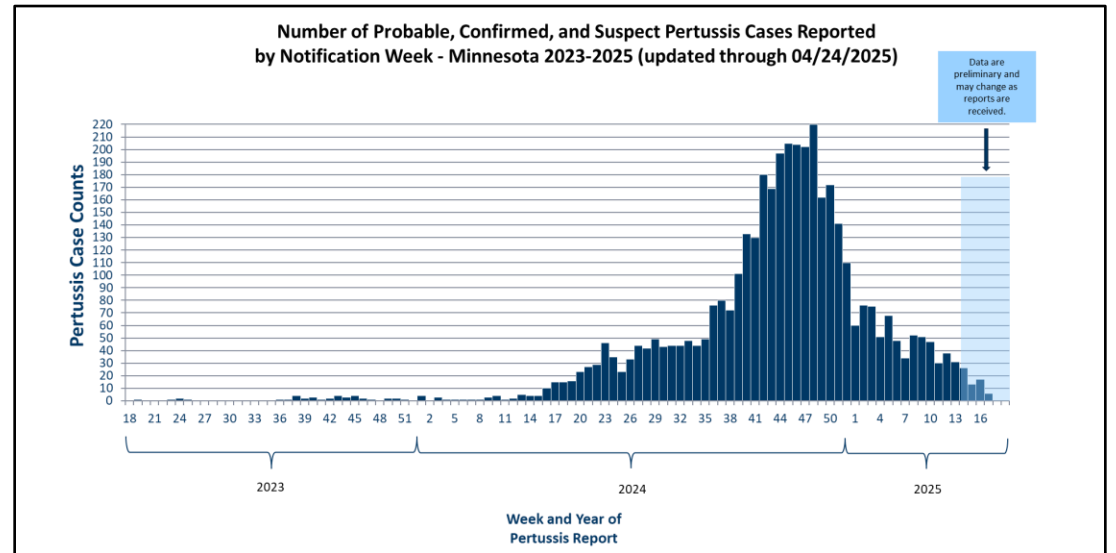
- **Outbreak Impact:** 19 counties reported outbreaks.
- **Total Cases:** 806 cases were linked to outbreaks.
- **Educational Settings:** 66% (n=538) of outbreak-related cases occurred in schools and higher education institutions.





# 2025: Pertussis impact across Minnesota

- A total of 723 confirmed and probable cases have been reported across the state.
- 26 counties have been impacted.
- The median age of those affected is 11 years, highlighting the impact on school-aged children.
- Infants account for 4% (n=35) of cases—an especially vulnerable group.
- Pneumonia has developed in 1.4% (n=10) of cases, indicating some severe outcomes.



# Importance of testing

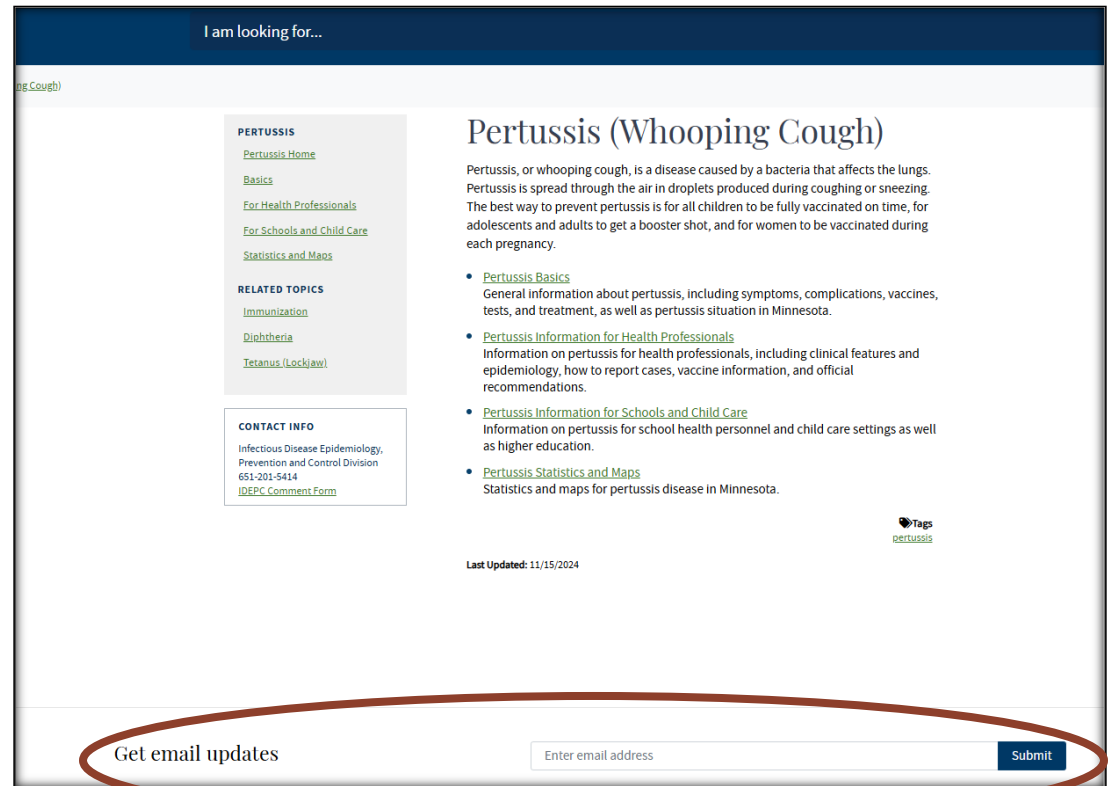
- Starts a chain of events that can be very important in outbreak control.
- Confirms a patient diagnosis for treatment, so that appropriate treatment for the cough illness is given.
- Ensures that appropriate follow-up for close contacts and subsequent post-exposure prophylaxis can occur.

# Reporting

- Pertussis is a reportable disease in Minnesota.
- Lab-confirmed and clinically diagnosed cases should be reported within one working day.
  - In some situations, MDH may also ask for suspect cases to be reported especially in the context of controlling an outbreak.
- Most pertussis cases are reported by Electronic Laboratory Reporting (ELR).
  - Most commonly polymerase chain reaction (PCR), occasionally serology.
  - PCR is highly sensitive and specific; serology is trickier and requires context.
- Cases that are clinically diagnosed and not lab confirmed will not be reported through ELR, so it is important for healthcare providers to call MDH or fill out our online form to report [Vaccine Preventable Disease \(VPD\) Reporting Form](https://redcap.health.state.mn.us/redcap/surveys/?s=WTLE8NA7FYFFCE8) (<https://redcap.health.state.mn.us/redcap/surveys/?s=WTLE8NA7FYFFCE8>).

# MDH communications and collaborations

- MDH Provides updates to healthcare providers on increased activity in MN and the importance of testing and treating early, staying home when sick, and promoting DTaP and Tdap where gaps exist.
  - Consider signing up for our GYS or VPD Gov Deliveries (see image to the right)
- MDH works closely with LPH to support school health professionals in providing materials and response recommendations for pertussis in their schools.
- MDH provides guidance, templates, and extensive resources to assist partners (including LPH) during pertussis outbreaks.



# Promoting awareness

- Two health advisories were issued statewide in response to the pertussis epidemic in Minnesota.
  - May 30, 2024: [Health Advisory: Outbreaks of Pertussis in Minnesota](http://www.health.state.mn.us/communities/ep/han/2024/may30pertussis.pdf)  
([www.health.state.mn.us/communities/ep/han/2024/may30pertussis.pdf](http://www.health.state.mn.us/communities/ep/han/2024/may30pertussis.pdf))
  - December 5, 2024: [Health Advisory: Pertussis Exceeds 2,000 in MN](http://www.health.state.mn.us/communities/ep/han/2024/dec5pertussis.pdf)  
([www.health.state.mn.us/communities/ep/han/2024/dec5pertussis.pdf](http://www.health.state.mn.us/communities/ep/han/2024/dec5pertussis.pdf))
- Shared timely updates on case trends, vaccination recommendations, and testing guidance.
- Provided actionable information for healthcare providers, schools, and local public health.
- Helped ensure consistent messaging and coordinated response across sectors.
- Reinforced the importance of early detection and reporting to prevent further spread.

# Enhanced Pertussis Surveillance Program: Testing resources at no cost

- **Statewide clinic network:** Part of a CDC-funded initiative—Minnesota is one of seven sites nationwide.
- **No-cost testing:** Clinics have access to free testing materials and services, regardless of patient insurance status.
- **Advanced diagnostics:** MDH Public Health Laboratory performs PCR and serology testing for *B. pertussis*, *B. parapertussis*, and *B. holmesii*.
- **Ongoing support:** MDH staff provide education and presentations on pertussis to clinic teams.

# Managing pertussis



Keep in differential diagnosis for persistent coughs.



Consider cough duration when testing.



Treat both patient and close contacts.

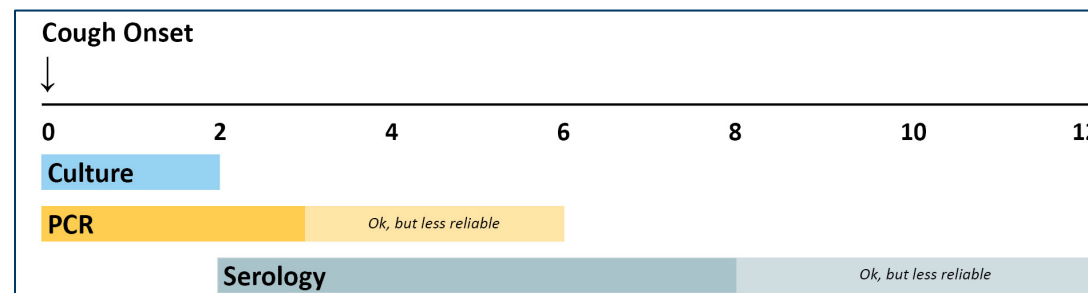


Exclude patient from activities.

- NP swab/wash for **PCR** when cough history is **3 weeks or less**.
- Serum for **IgG** assay when cough history is **3\*-8 weeks**.

\*CDC assay as early as 2 weeks.

[Pertussis Laboratory Testing \(www.health.state.mn.us/diseases/pertussis/hcp/labfacts.html\)](http://www.health.state.mn.us/diseases/pertussis/hcp/labfacts.html)





# Treat the patient and their close contacts

- Prescribing a macrolide (azithro-, erythro-, clarithromycin), or trimethopim/sulfamithoxizole **if the patient's cough history is less than three weeks.**
- Prescribing or recommending same prophylaxis regimen to household like contacts or contacts at high risk for complications.
- [Pertussis Treatment and Prophylaxis \(www.health.state.mn.us/diseases/pertussis/hcp/treatment.html\)](http://www.health.state.mn.us/diseases/pertussis/hcp/treatment.html)



# Stop transmission

- Excluding people with pertussis from school, childcare, work settings, and routine activities until they have:
  - Finished 5 days of an appropriate antibiotic (regardless of course duration of antimicrobial), or
  - Coughed for > 21 days (persons with pertussis may cough longer than 21 days, but they aren't infectious).
- Note: **Asymptomatic** contacts don't need to be excluded:
  - Household members of a pertussis case are often recommended and prescribed antibiotics for prevention of symptoms.
  - Pertussis is not spread until symptoms start.
  - People without symptoms who are taking preventative antibiotics can go to their routine activities.



# Varicella

# Overview of varicella (chickenpox)

**Varicella (chickenpox) caused by primary infection of the varicella zoster virus.**

- Zoster (shingles) caused by the reactivation of the infection.

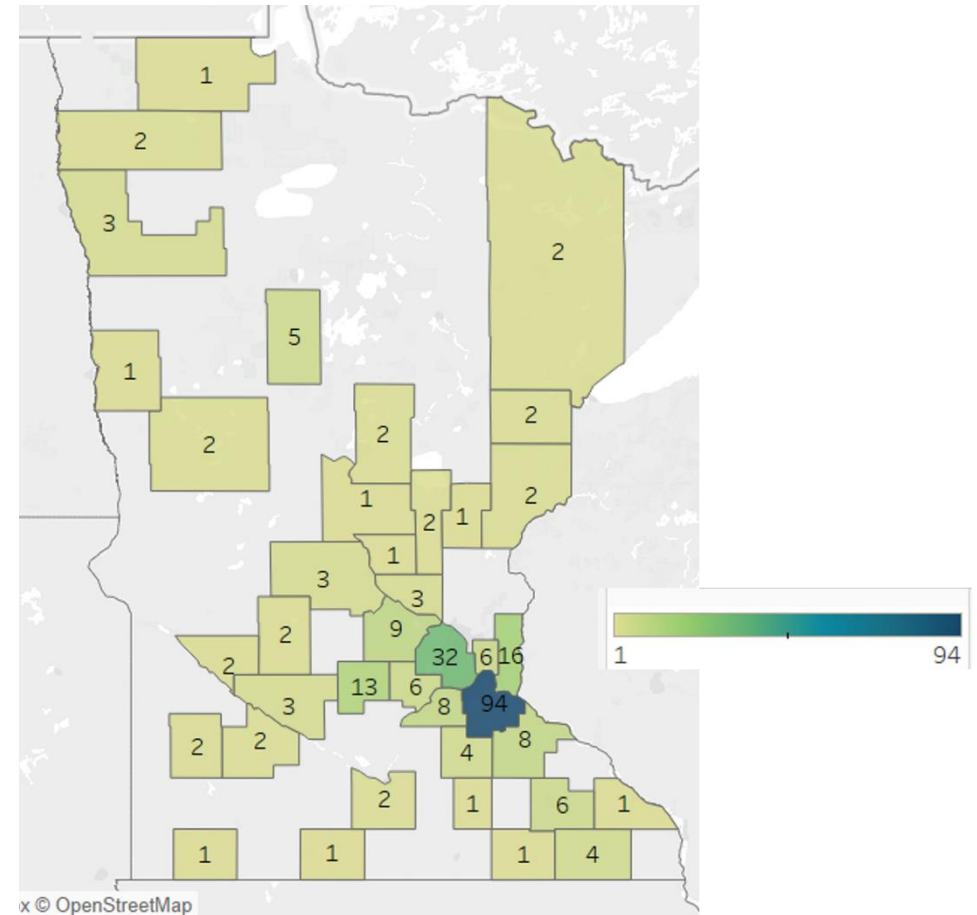
## **Key characteristics:**

- Generally, a mild, self-limiting illness.
- Can be serious in certain populations.
- Rash: Generalized and itchy, lasting 5-7 days.
  - Classic/typical progression: Macules → Papules → Vesicles\* → Crusts\*.
  - \*Note: Breakthrough cases typically present as modified and milder.
  - They may not develop vesicles or crusts and usually have fewer lesions overall
- Mild fever and malaise may occur 1-2 days before rash onset (more common in adults).
- In children, the rash is often the first symptom.



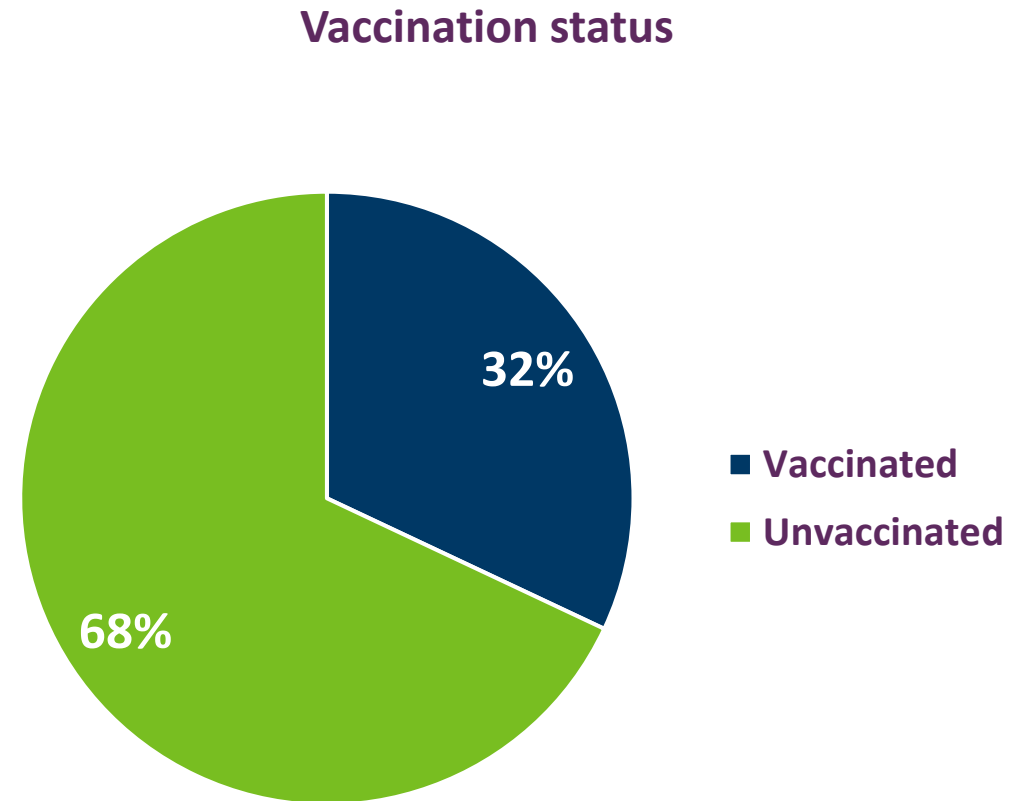
# Varicella trends in Minnesota

- 264 cases reported in Minnesota between 1/1/25 and 4/16/2025.
  - This includes all types of reports: Suspect, probable, confirmed.
  - Some of these end up not being varicella after further investigation.
- The majority (94) were in Dakota County, with Hennepin County (32) and then Washington County (16).



# Varicella trends in Minnesota, 2020-2025

Age group (years)	N	Proportion of total cases
<1	141	13%
1 to 5	348	33%
6 to 14	348	33%
15 to 19	61	6%
20 to 30	77	7%
>31	76	8%
<b>Total</b>	<b>1,051</b>	



# Varicella trends in MN - 2025

- Compared to 2020-2024, an increase in suspect cases has been seen in 2025 already.
- Potential factors:
  - Launch of electronic case reports (eCR) in January 2025: allowing us to identify unreported clinically-diagnosed cases.
  - Declining vaccination rates.
  - Improved reporting via other methods?
  - Increase incidence amplified by pockets of unvaccinated people.

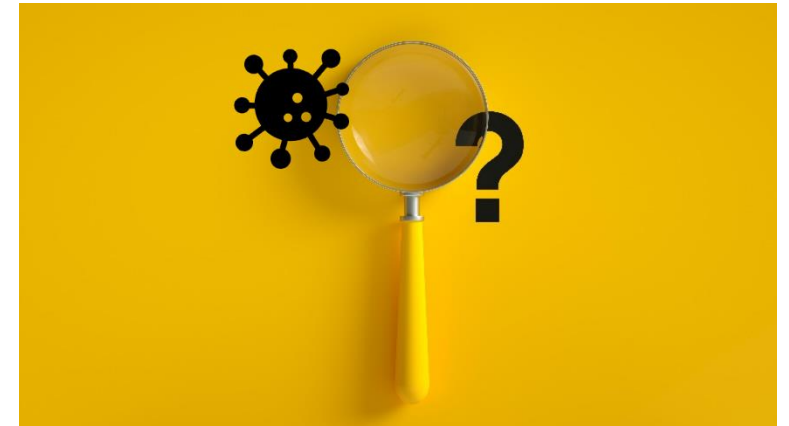
# The importance of lab confirmation for suspect varicella

## Varicella epidemiology has changed:

- Prior to widespread uptake of varicella vaccine in the US, clinical diagnosis based on rash appearance was a reliable and accurate way to identify varicella.
- Factors negatively affecting the reliability of a clinical diagnosis:
  - Breakthrough varicella—modified presentation.
  - Some clinicians unfamiliar with varicella clinical presentation.
  - Increased use of telehealth and virtual visits.

## Benefits of lab confirmation for suspected varicella:

- Allows clinicians to provide appropriate symptom relief options.
- Better facilitates appropriate recommendations for daycare, school, and workplace to limit days of school/daycare/work missed and protect others from exposure.





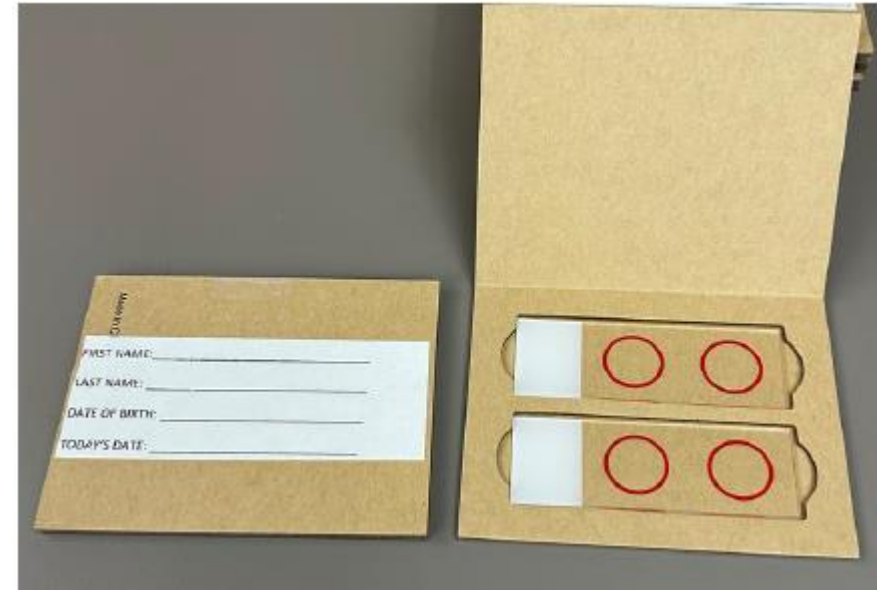
# MDH varicella-zoster (VZV) test kits

- MDH offers varicella-zoster virus (VZV) testing at no cost to:
  - Increase testing rates.
  - Reduce financial and logistical barriers to testing.
  - Improve our ability to manage clusters and outbreaks.
  - Strain-type pediatric shingles specimens for enhanced surveillance.
- We test all specimens for VZV, enterovirus (which causes hand, foot, and mouth disease), and HSV-1 and HSV-2 (herpes simplex virus).
  - We also strain-type to identify wild-type or vaccine-strain VZV.
  - HSV results are for surveillance purposes only, not to share with case.

# Requesting VZV test kits

- Can be sent to local public health, health care providers, schools, childcares, or directly to case.
  - Two-slide mailer.
  - Combined instruction and informed consent document.
    - Translated versions available (Spanish, Hmong, Somali, Ukrainian, Russian).
  - Prepaid padded mailing envelope.
  - Update varicella immunity status in MIIC if positive.

[VPD Test Kit Request Form  
\(https://redcap.health.state.mn.us/redcap/surveys/?s=JLLNAWXPXH  
HFWMNX\)](https://redcap.health.state.mn.us/redcap/surveys/?s=JLLNAWXPXH HFWMNX)





# Measles

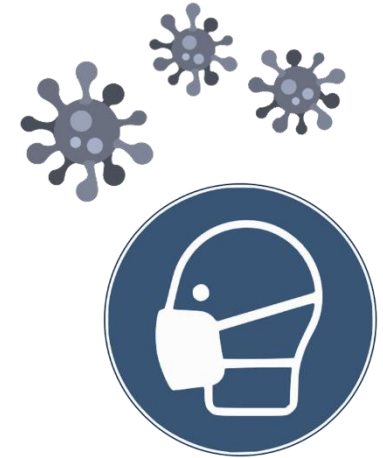
# Measles (rubeola): Overview

- An acute, systemic respiratory illness caused by a virus.
  - Causes high fever, maculopapular rash, “3 C’s”.
  - Cough, Coryza, and Conjunctivitis.
- Vaccine preventable:
  - 93% effective with 1 dose at 12 months.
  - 97% effective after 2 doses.



# Incubation and infectiousness

- **Incubation period:**
  - 10-12 days from exposure to prodrome.
  - 14 days average from exposure to rash onset (7 – 21 days).
- **Infectious period:**
  - 4 days before through 4 days after rash onset date.
- **Spreads through the air via coughing, breathing, sneezing – droplet and airborne spread.**
  - 90% attack rate in susceptible close contacts.



# U.S. measles outbreak(s): 2025

- As of April 17, 2025, the U.S. reported **800** measles cases across **25** jurisdictions, a significant increase from 285 cases in 2024.
- Ten outbreaks have been reported in 2025, with 94% of confirmed cases being outbreak-associated.
- Approximately 96% of cases occurred in unvaccinated people or those with unknown vaccination status.
- 11% of cases were hospitalized.
- The ongoing outbreaks threaten the U.S.'s measles elimination status, achieved in 2000, if continuous transmission persists for over a year.

# Texas-originated outbreak and national spread

- As of April 22, Texas reported 624 measles cases, with Gaines County accounting for 386 cases.
  - The epi-center of the outbreak is West-Central Texas, a very rural area.
  - Outbreak is largely in the Mennonite community and tied to outbreaks in that community in Canada and Mexico.
- The outbreak has extended to at least 24 other states, including New Mexico, Oklahoma, Kansas, and Michigan.
- High MMR exemption rates, mistrust of vaccines, and belief in treatment for measles has fueled the outbreak's severity.



# Public health implications

## Three deaths linked to the TX outbreak

Two in children (girls age 6 and 8)

One in adult; still under investigation

Majority of cases among children and teenagers



Efforts are underway to increase vaccination coverage and combat misinformation, but challenges remain due to funding constraints, high profile persons promoting misinformation, and vaccine hesitancy.



# Minnesota measles update

- As of April 22, MN has reported 2 cases of measles.
- First case was a vaccinated adult from Hennepin County.
  - Reported to MDH by District of Columbia Health.
  - Both domestic and international travel during incubation period.
    - **Was not infectious while in Minnesota.**
- Second case was an unvaccinated infant from Stearns County.
  - Previously diagnosed with measles in Somalia.
  - Sought healthcare for new symptoms and was tested by MDH PHL.
    - **Was not infectious while in Minnesota or in the U.S.**

# Measles: Public health response

- In response to the increase in cases nationally, MDH continues with diligent measles surveillance activities.
  - MDH PHL is assisting states with measles PCR testing.
  - Notifying Minnesotans exposed to people diagnosed with measles from other jurisdictions.
  - Continued outreach efforts to vulnerable communities.
    - Mennonite population in both the U.S. and Canada.
    - Travel continues to be a risk among these communities.

**If you work with Amish/Mennonite communities, increase outreach if possible.**

# Measles: Reporting

- **When should measles be reported?**
  - Immediately reportable! Report right away - when person is first suspected.
  - Report at any suspicion level – extremely low suspicion to high suspicion.
- **Who is required to report?**
  - All licensed health care providers and laboratories.
  - Any person in charge of any institution, school, child care facility, or camp.
- **How should people report suspect measles?**
  - Call the infectious disease reporting line: 651-201-5414 or 1-877-676-5414.

**Please let MDH know if you receive a suspect measles report!**

# Resources: Staying current

- Information about these diseases:
  - [Pertussis \(Whooping Cough\) \(www.health.state.mn.us/diseases/pertussis\)](http://www.health.state.mn.us/diseases/pertussis)
  - [Varicella \(Chickenpox\) \(www.health.state.mn.us/diseases/varicella/index.html\)](http://www.health.state.mn.us/diseases/varicella/index.html)
  - [Measles: Measles \(Rubeola\) \(www.health.state.mn.us/diseases/measles/index.html\)](http://www.health.state.mn.us/diseases/measles/index.html)
- Reporting:
  - REDCap reporting tool: [Vaccine Preventable Disease \(VPD\) Reporting Form \(https://redcap.health.state.mn.us/redcap/surveys/?s=WTLE8NA7FYFFCE8\)](https://redcap.health.state.mn.us/redcap/surveys/?s=WTLE8NA7FYFFCE8)
  - Call the infectious disease reporting line to report measles: 651-201-5414 or 1-877-676-5414.
- Testing:
  - Test kits available: [VPD Test Kit Requests \(https://redcap.health.state.mn.us/redcap/surveys/?s=JLLNAWXPXHHFWMNX\)](https://redcap.health.state.mn.us/redcap/surveys/?s=JLLNAWXPXHHFWMNX)

# Questions?

**Pertussis:** Maria Pacheco at [Maria.Pacheco@state.mn.us](mailto:Maria.Pacheco@state.mn.us)

**Varicella:** Gail Gustavson at [Gail.Gustavson.state.mn.us](mailto:Gail.Gustavson.state.mn.us)

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