2026 MEASLES OUTBREAK:

HOW DID WE GET HERE

AND

HOW DO WE GET OUT OF THIS?

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MAY 20, 2026

NORTH DAKOTA STATE UNIVERSITY CENTER FOR IMMUNIZATION RESEARCH AND EDUCATION--CIRE

DISCLOSURE

- Patricia Stinchfield has no relevant financial relationships with ineligible companies to disclose

OBJECTIVES

At the completion of this presentation, the learners will be able to:

1. Identify the current US measles epidemiological hot spots including state-based vaccination rates

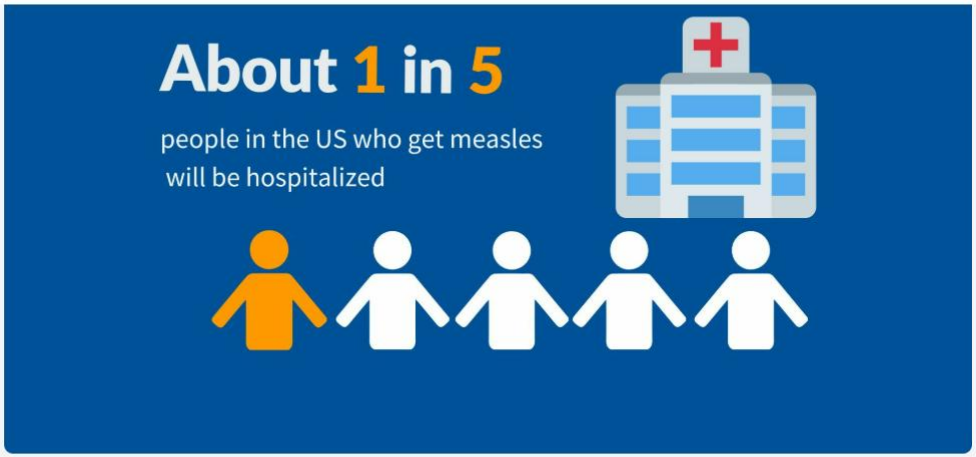
2. Review the clinical presentation and medical management of measles including the use of Vitamin A

3. Discuss measles post-exposure prophylaxis including the proper use of immune globulin

4. List the important infection control measures that must be in place to reduce the spread of measles in healthcare settings

5. Outline resources for combatting vaccine mis- and disinformation

National Foundation for Infectious Diseases
Infectious Diseases
Immunization
Handwashing
Resources



Bethesda, MD (May 12, 2026)—The National Foundation for Infectious Diseases (NFID)—in partnership with the Infectious Diseases Society of America (IDSA)—convened 15 leading medical and professional societies for a Measles Summit, held May 7–8 in San Diego. The summit brought together frontline clinicians and

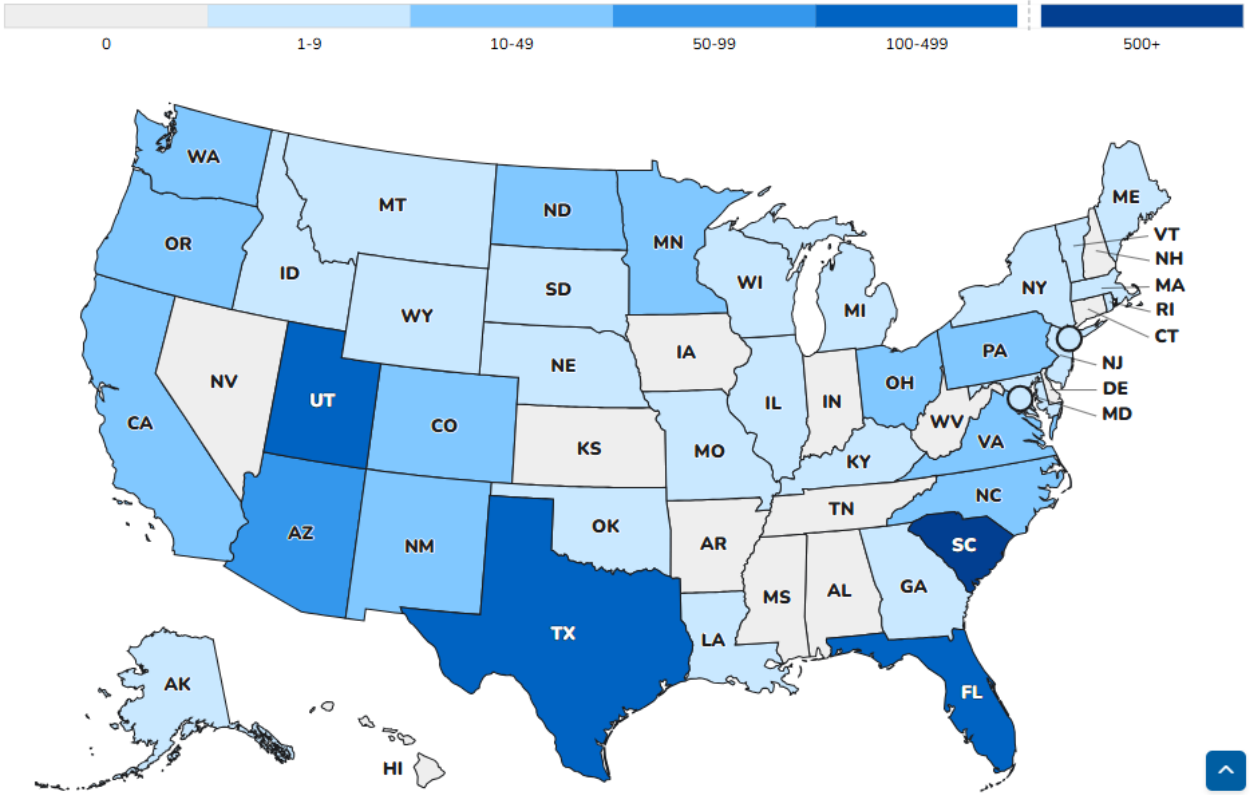
- NFID.org

MEASLES EPIDEMIOLOGY

Map of measles cases among U.S. residents

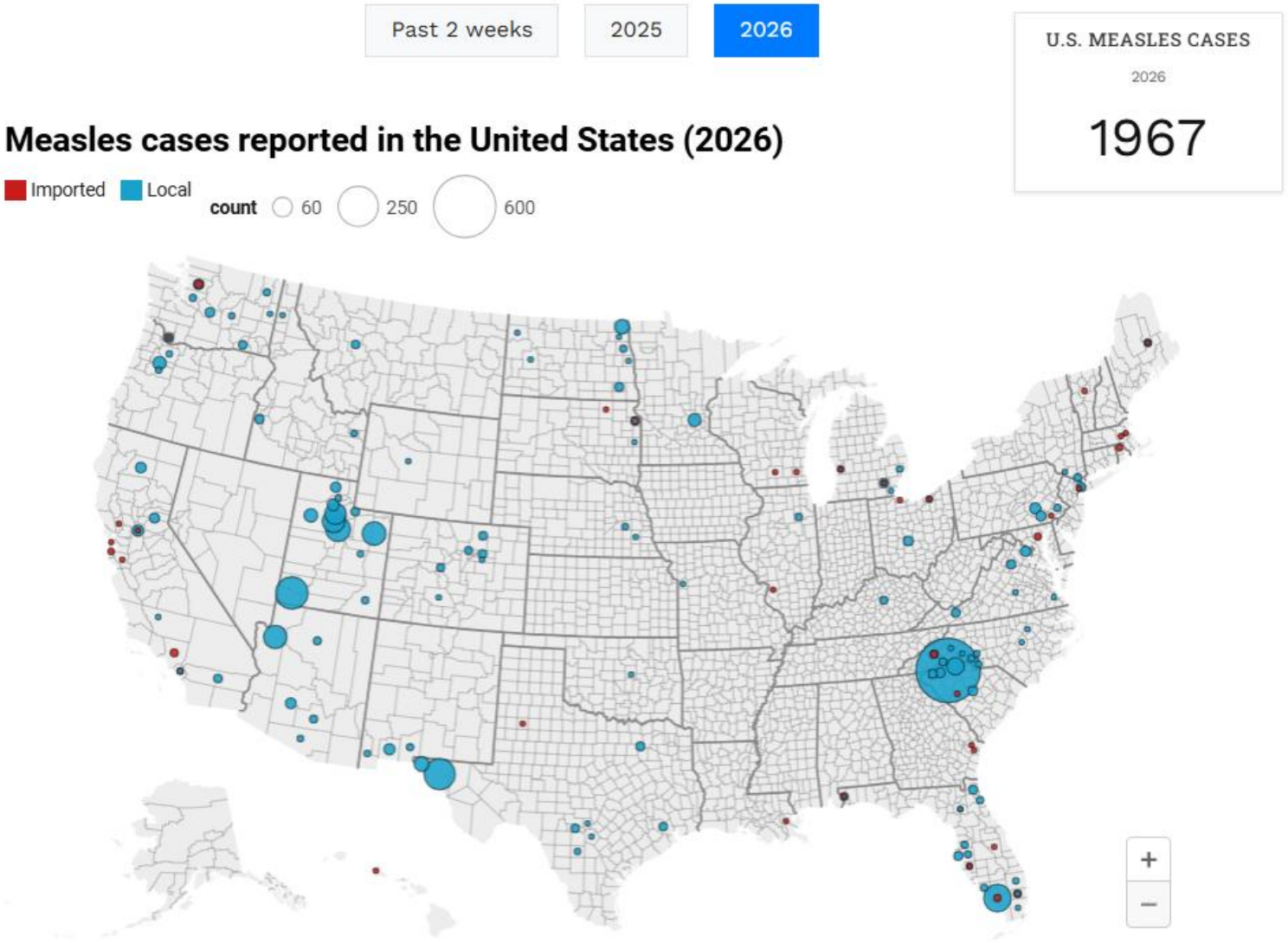
as of May 7, 2026

2026 2025 2024



CDC website. Accessed 5.12.26 https://www.cdc.gov/measles/data-research/index.html

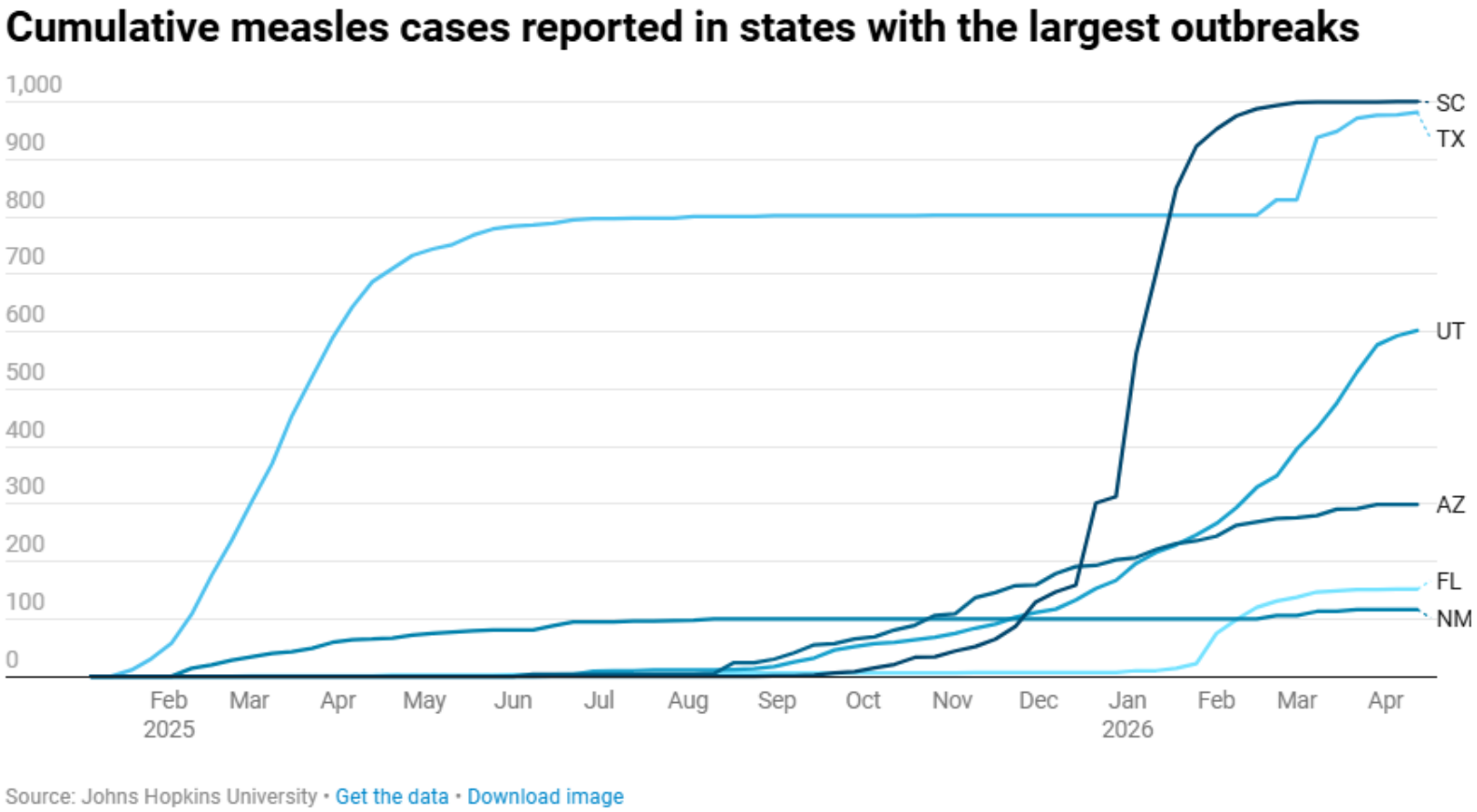
MEASLES EPIDEMIOLOGY



Johns Hopkins Measles Tracker. Accessed 5.12.26. Data from 5.8.26
https://publichealth.jhu.edu/ivac/resources/us-measles-tracker

MEASLES EPIDEMIOLOGY

Cumulative Cases by State | Weekly Cases by State



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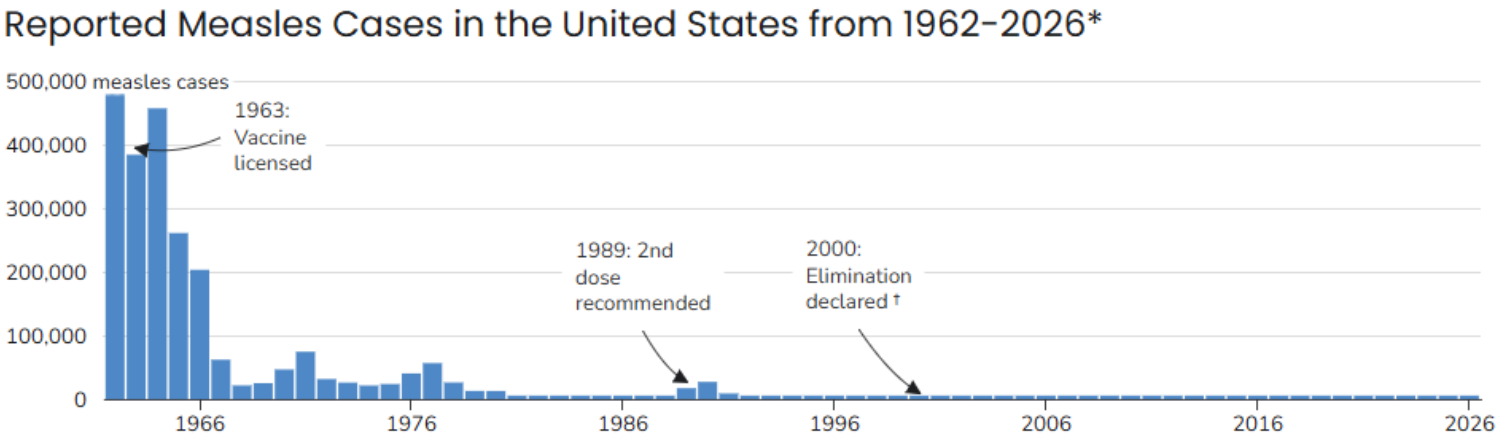
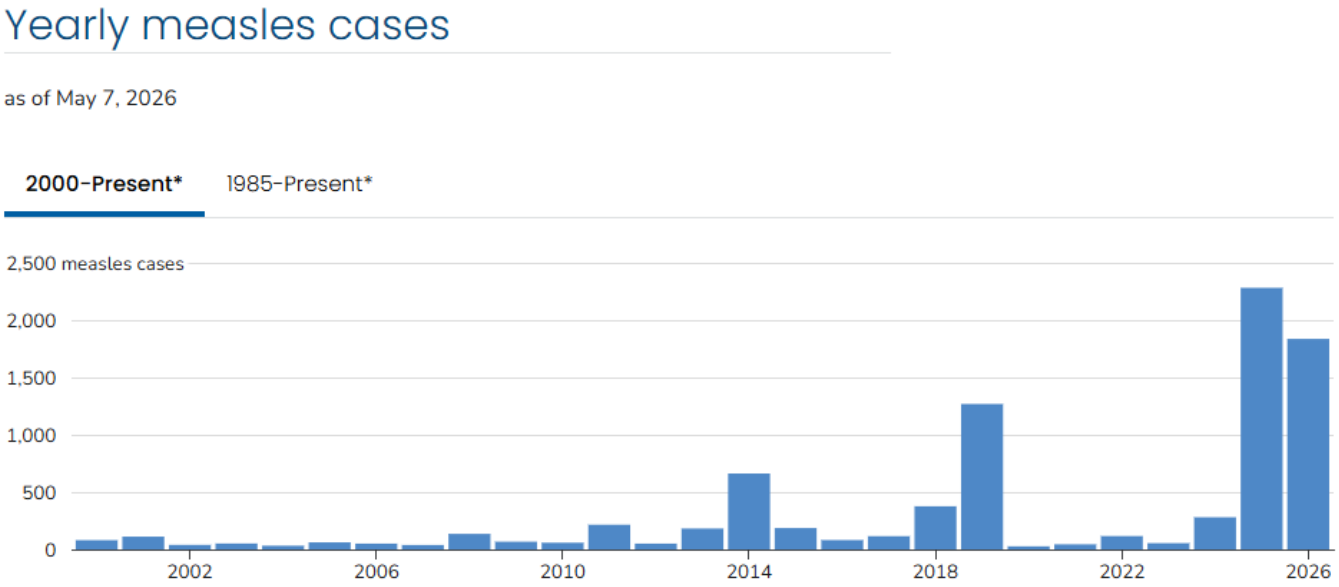
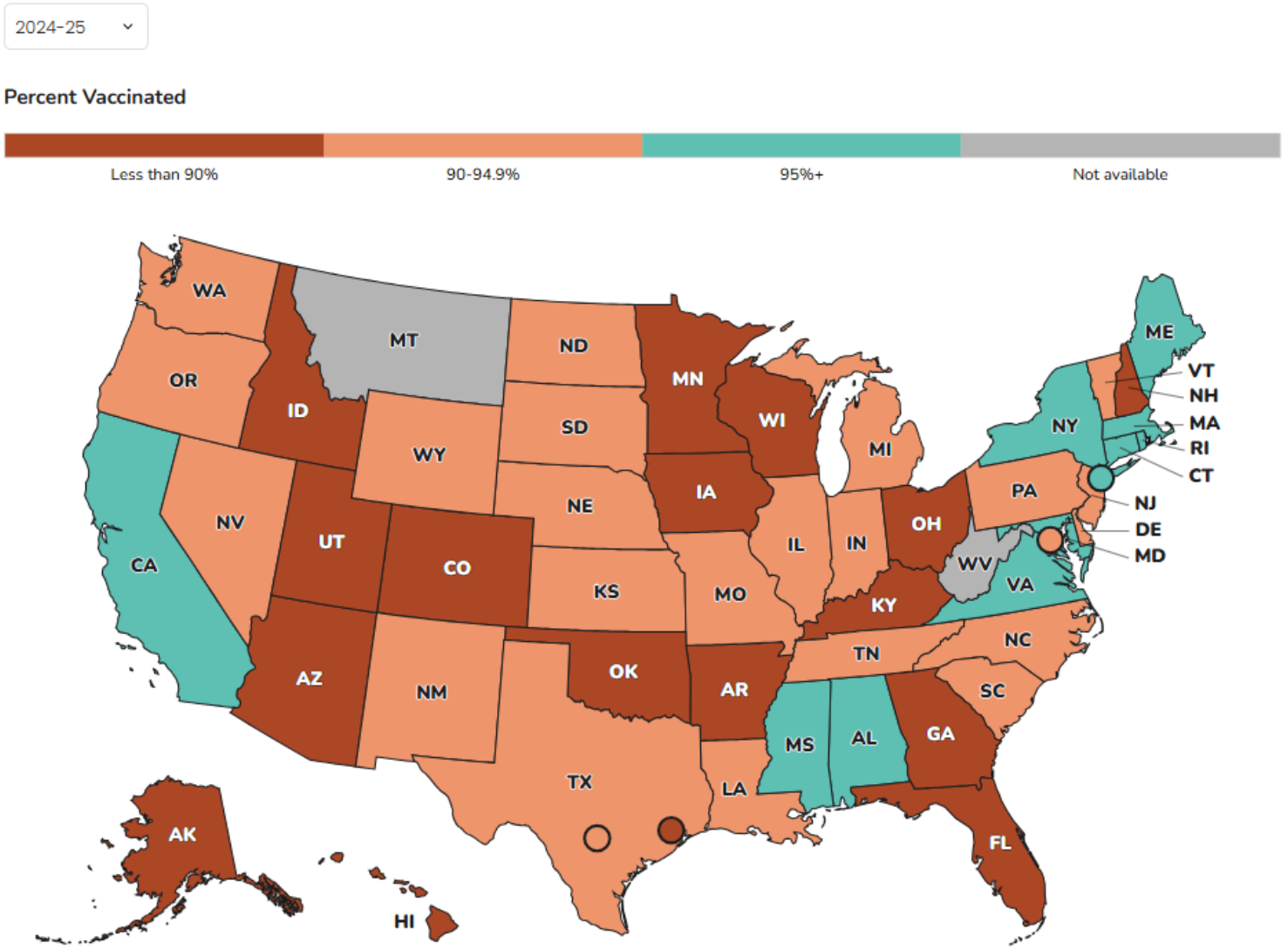
MEASLES EPIDEMIOLOGY





CDC website accessed 5.12.26 https://www.cdc.gov/measles/dataresearch/index.html

MEASLES EPIDEMIOLOGY: MMR VACCINATION RATES BY STATE



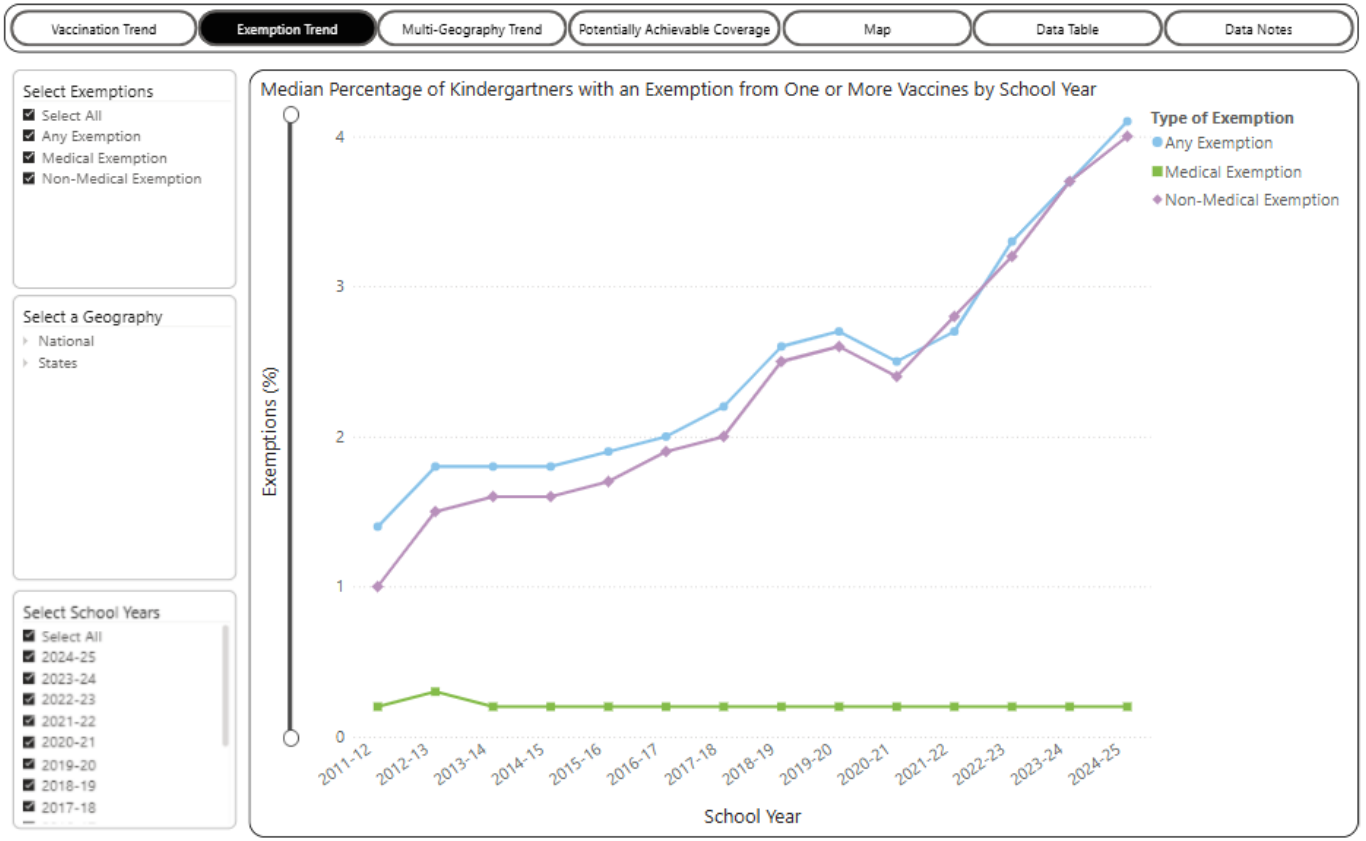
CDC website accessed 5.12.26 https://www.cdc.gov/measles/dataresearch/index.html

MEASLES EPIDEMIOLOGY

See additional data on measles cases in 2025 in the United States: Measles Cases and Outbreaks | CDC.

SchoolVaxView Interactive!

User Quick Guide PDF | Download Data Table | Email VaxView@cdc.gov with questions



CDC website access 5.12.26https://www.cdc.gov/schoolvaxview/data/index.html

TRENDS IN 2026

- Complications:
  - Diarrhea 16%
  - OM 5%
  - Pneumonia 4%
  - Encephalitis 0.2%
  - Immune amnesia 11%-73% loss of antibody in unvaccinated, especially in youngest and sickest
  - Deaths 0.1%
  - SSPE-Subacute Sclerosing Pan Encephalitis 1 in 600 under age 1 year
- Older non-vaccinated kids
- 92% unvaccinated
- Key takeaways. Epidemic has shifted across the Americas. Outbreak trends are concerning--more and larger outbreaks, less imported cases. Less geographically contained. Less public trust.
- Measles anywhere is a risk everywhere. Need to increase vaccine coverage

WHAT WORKS TO REDUCE OUTBREAKS? INCREASE MMR RATES

- Vaccinate on schedule
- Reduce exemptions
- Support school entry requirements
- Clinic practices like reminder/recall text messages
- Every visit is a vaccine visit
- Easy access-nurse only visit, walk in vaccine visit
- Enhance the role of the school nurse
- Listen first in vaccine communications
- Use “presumptive” communication

Stinchfield P, Almeida K. Improving Vaccination Rates in the Clinical Setting. Pediatric Annals. 2023;52(3):e89-e95. doi:10.3928/19382359-20230119-02

A CHILD COMES TO THE ED…

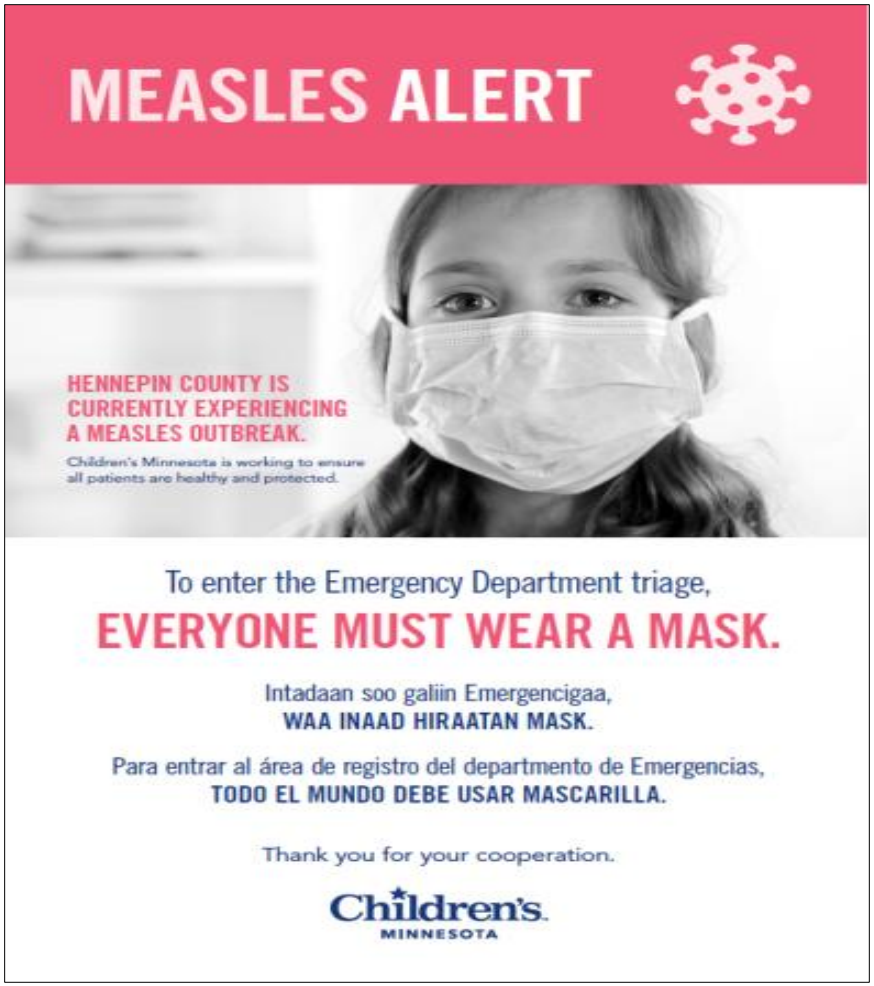
- 2 years old
- 4 day history of fever
- Rash that started the day prior
- Cough and congestion
- No travel history
- No MMR
- Diagnosed with otitis media 5 days prior and started on amoxicillin
- Hospitalist believes this is likely a rash from the amoxicillin and suspicion for measles is low

Image removed at speaker's request to protect child's privacy.

- All photos used with written parental permission for educational purposes only, not for reuse by any other presenter.

MANAGEMENT OF ED PATIENTS

- Updated ED screening tool to be more inclusive of patients **without a history of travel**
- Added state **vaccine registry** to EMR, required check at triage
- Implemented **universal masking** of all patients/family
- Implemented patient assessment upon entrance to the ED by a **pivot nurse** to determine level of care needed
- **Immediately roomed** patients to AII room that met screening criteria



CHECK IN SCREENING PROCESS

MEASLES

ED TRIAGE MEASLES SCREENING

1. Has your child or an ill caregiver traveled outside of the US in the last month and does the child have any symptoms of illness? *
2. Has your child been exposed to measles?
3. Does your child have a fever and a rash?

   * If the answer to **1, 2,** or **3** is "yes," **immediately room in an airborne infection isolation (AII) room and implement airborne precautions. Triage and further assessment should occur in the AII room.**

   * If the answer to **1, 2,** and **3** is "no," **continue to the questions below.**
4. Does your child have at least one documented dose of MMR at least one month ago? †

   † Check MIIC
   † If the answer to **4** is "yes," continue with the usual ED triage process. This patient may wait in the lobby.
   † If the answer to **4** is "no," continue with the question below.
5. Does your child have any of the following symptoms: fever; runny nose; congestion; red, watery eyes; cough; or rash? ‡

   ‡ If the answer to **5** is "no," continue with the usual ED triage process. This patient may wait in the lobby.
   ‡ If the answer to **5** is "yes," immediately room in an airborne infection isolation (AII) room and implement airborne precautions. Triage and further assessment should occur in the AII room.

MEASLES CASES – MN 2017 OUTBREAK

State:

- 75 total cases
  - 66 in Hennepin County
  - 68 confirmed unvaccinated
    - (2) 1 MMR
    - (3) 2 MMR
    - (2) Unknown
  - 71 in children
  - 61 Somali Minnesotan

Children's:

- 53 cared for at Children's
  - Median age 3 yrs (range 10 mos-14 yrs)
- **21 children hospitalized** 100% at Children's
  - One child re-hospitalized for pneumonia for 22 hospitalizations
  - Average length of stay 4 days (range 2 d-17 d)

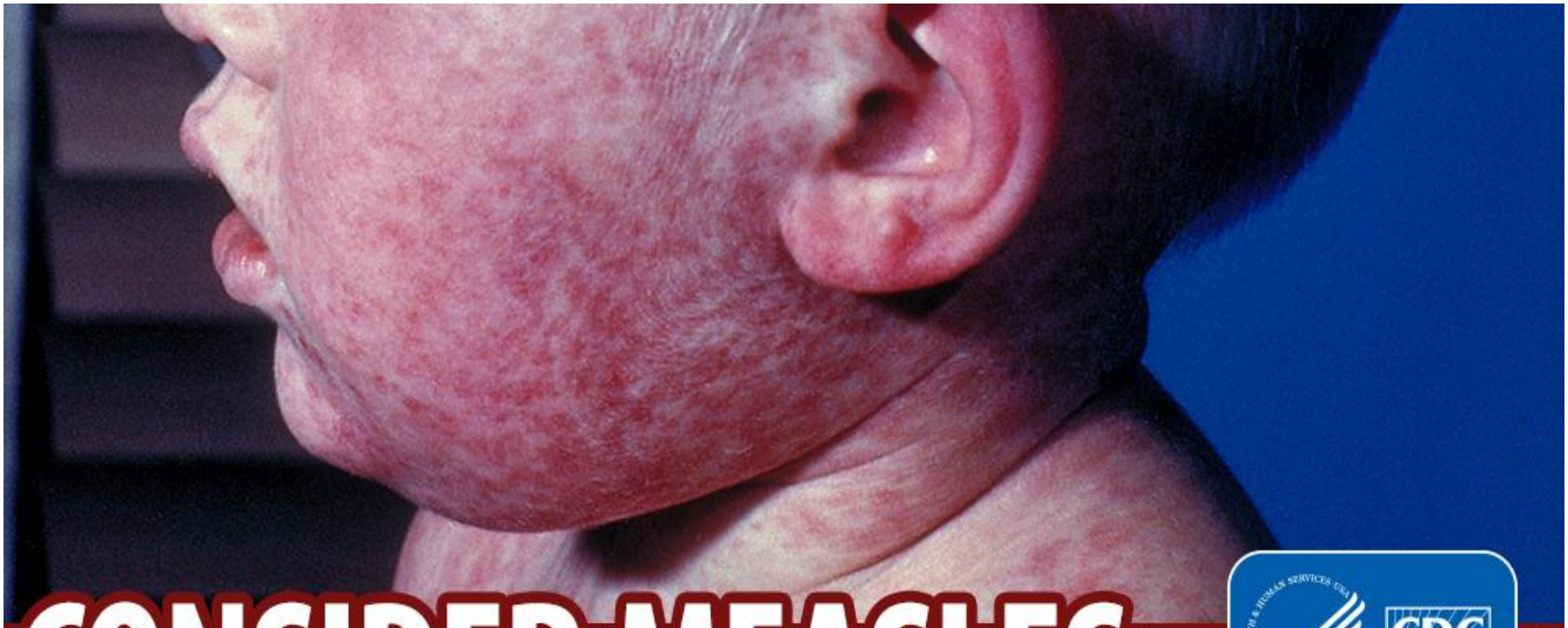
- Source: Children's Minnesota marketing department

COULD THIS BE MEASLES?

Amoxicillin
Allergy Rash

Measles Rash

Strep Rash



CONSIDER MEASLES

in patients presenting with febrile rash illness and clinically compatible measles symptoms (cough, coryza, and conjunctivitis)

Ask patients about recent travel internationally or to domestic venues frequented by international travelers, as well as a history of measles in the community.

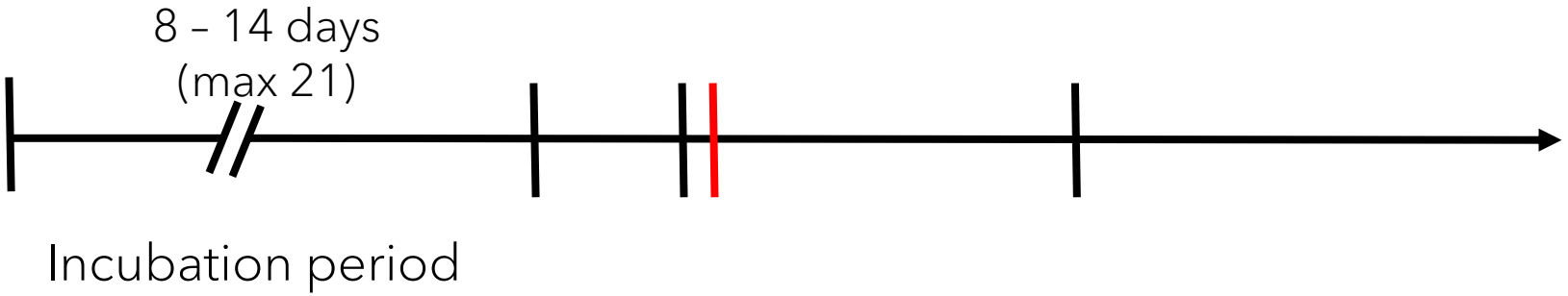
www.cdc.gov/measles/hcp/index.html

FEVER, THE 3 C'S AND RASH--

Image removed at speaker's request to protect child's privacy.

MEASLES CLINICAL SYMPTOMS

Exposure



- Photo credit, Dr. Aaron DeVries, Patsy Stinchfield, PNP

MEASLES CLINICAL SYMPTOMS

Exposure

8 – 14 days
(max 21)

2 – 4 days

Incubation period

Prodrome:

Fever
Cough
Coryza
Conjunctivitis

MEASLES CLINICAL SYMPTOMS

Exposure

8 – 14 days
(max 21)

2 – 4 days

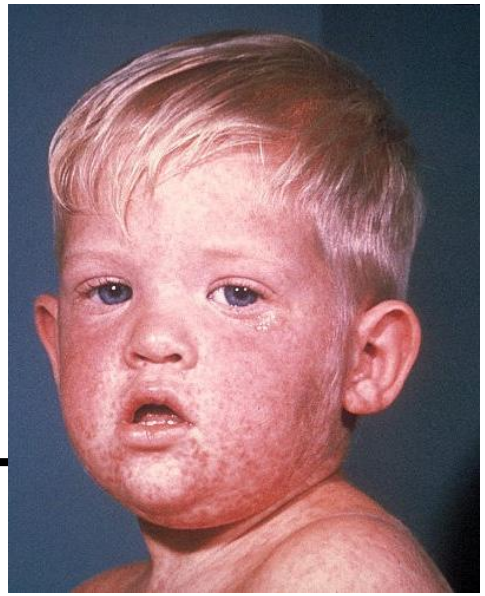
Incubation period

Prodrome:

Fever
Cough
Coryza
Conjunctivitis

Koplic
Spots

MEASLES CLINICAL SYMPTOMS



Exposure

8 – 14 days (max 21)

2 – 4 days

4-7 days

Incubation period

Prodrome:

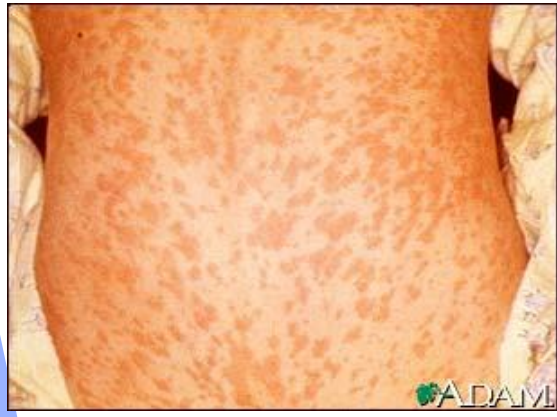
Fever
Cough
Coryza
Conjunctivitis

Koplic Spots

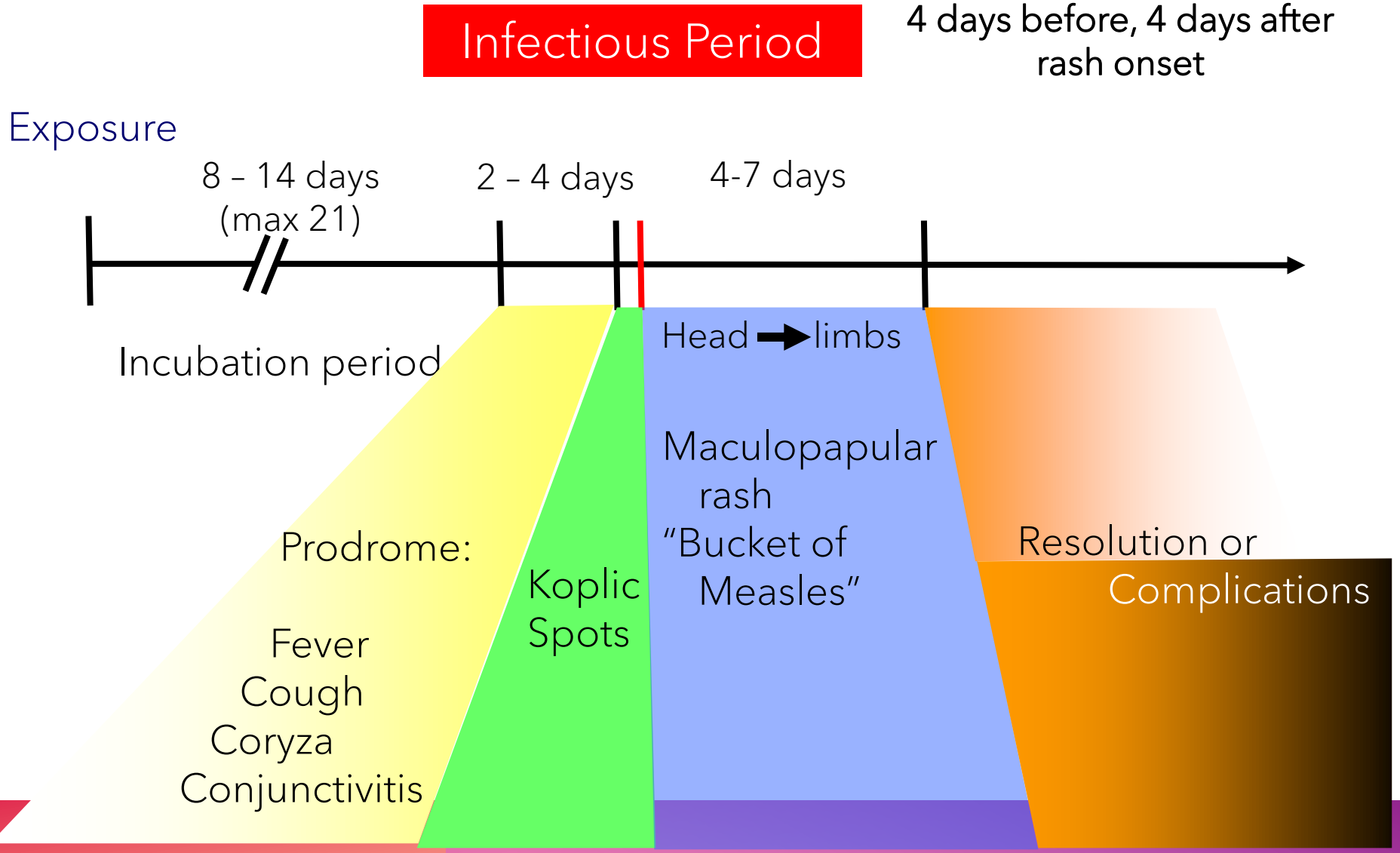
Head → limbs

Maculopapular rash

"Bucket of Measles poured over the head"

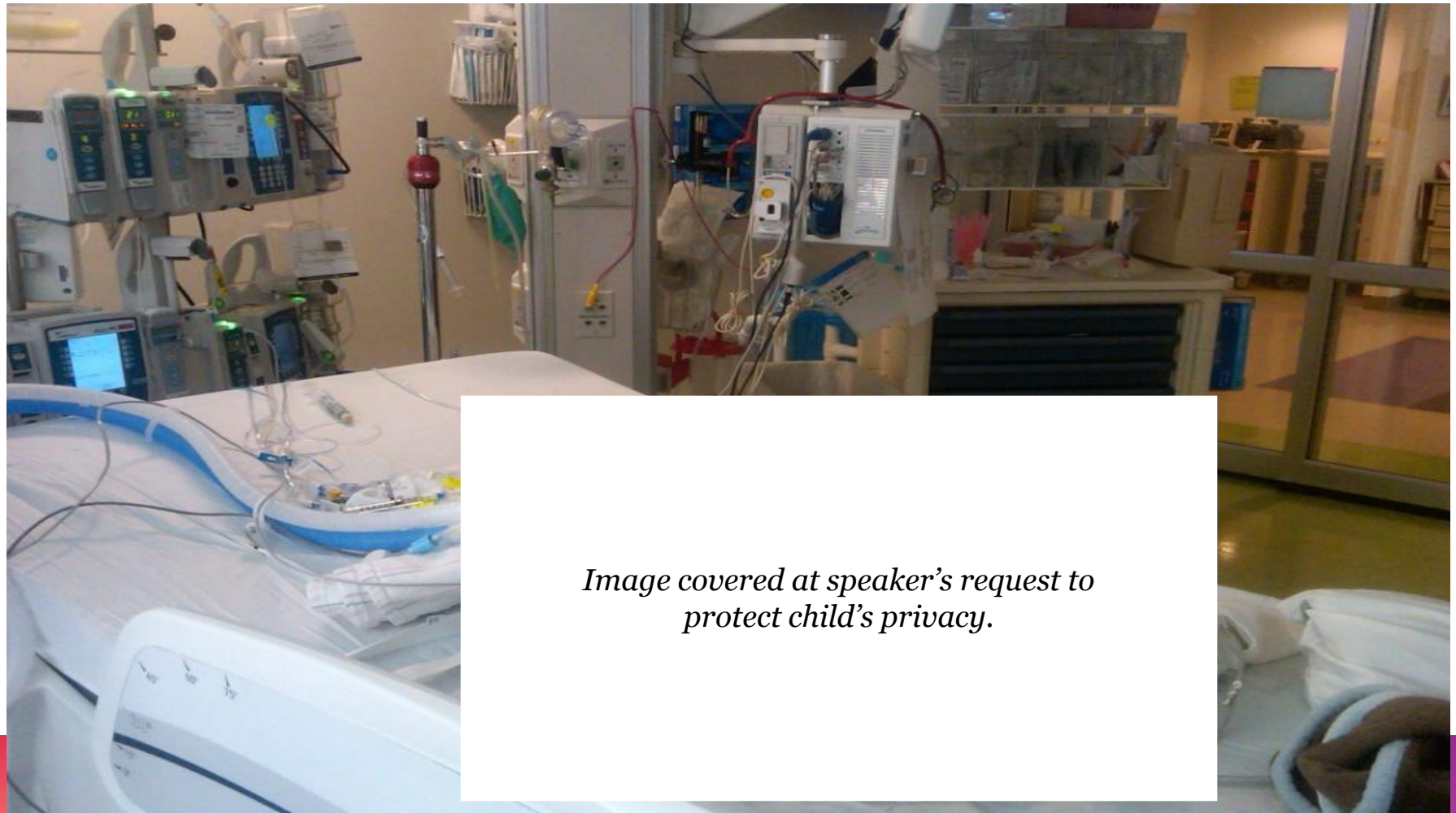


MEASLES CLINICAL SYMPTOMS



MEASLES CASES CHILDREN'S MINNESOTA

- Index case below who survived 15 days on a ventilator in PICU. Mom requests his picture shown.



CLINICAL GUIDELINE

MEASLES: SYMPTOMATIC PATIENT

(Age < 25 years)

Children's MINNESOTA

Aim: To standardize management of patients with suspected/confirmed measles infection.

Patient with confirmed measles OR symptoms suspicious for measles
(see testing algorithm pages 5-6 for detail of whom to test)

- Mask patient + others present (e.g., caregiver, siblings)
- Isolate in an airborne infection isolation room (AIIR; negative pressure). If AIIR is not available, isolate in private room with door closed; patient (+ others) should remain masked.
- Order Airborne Precautions
- Notify Infection Prevention and Control (Amion or 952-260-9021 if at Children's MN); available 24/7

Obtain history and perform exam
Vaccine status (specify MMR), contacts/exposures (note A), travel history. Signs/symptoms (including date of rash onset), vital signs, hydration, respiratory status. Consider also alternate etiologies for illness (note B).
Assess level of illness (note C)

Mild
Symptomatic but not needing hospitalization for support.

- Obtain labs: "Measles for Suspected Disease (Rubeola) to MDH" in Cerner, "MEASLES PCR to MDH (UMSP)" in eCW.
- Give vitamin A (Appendix A, p 8-10).
- Evaluate/treat suspected coinfections based on symptoms (note D).

Discuss with parent/caregiver the need for exclusion from school/daycare for other household members who have not received at least one MMR. See follow-up notes on page 4.

Moderate/Severe
Signs or symptoms requiring hospital admission.
Refer to Children's Minnesota ED for evaluation if in clinic (612-343-2121).

- Consider ID consult if questions about clinical management. Other specialists if indicated (e.g., ophthalmology if significant eye findings beyond conjunctivitis).
- Obtain labs: "Measles for Suspected Disease (Rubeola) to MDH," CBC+diff, CRP, CMP, and serum to save (≥ 3 mL).
- Give vitamin A (Appendix A, p 8-10).
- Hydrate with IV fluids if indicated and/or consider NG tube if oral lesions preventing PO intake.
- 2-view CXR if respiratory symptoms to evaluate for infiltrate.
- Evaluate/treat suspected coinfections per symptoms (note D)
- Antibiotics per suspected sepsis orderset if sepsis is present.

MEASLES SIGNS/SYMPTOMS

- **Prodrome (~2–4 days)**: fever, malaise, and anorexia, followed by conjunctivitis, coryza, and cough.
- **Enanthem (~48 hr before rash, NOT seen in all patients)**: Koplik spots which are 1–3 mm white/gray/bluish elevations with an erythematous base ("grains of salt on a red background") on buccal mucosa or palate.
- **Exanthem (2–4 days after fever)**: erythematous, maculopapular, blanching rash, which classically begins on the face and spreads down. Begin as blanching then don't blanch. Rash may not appear in immunocompromised patients.

** Fever beyond the third to fourth day of rash may suggest a measles-associated complication (note D).*

EXCLUSION GUIDELINES

Patients **excluded** from this guideline:

- Pregnant patients

NOTES A-D
See page 2

MEASLES: SYMPTOMATIC PATIENT

(Age < 25 years)

Aim: To standardize management of patients with suspected/confirmed measles infection.

NOTE A

Contact/exposure factors: Incubation period for measles is 6 to 21 days (median 13 days). Period of contagiousness is ~5 days before the appearance of rash to ~4 days afterward.

NOTE B

Differential diagnosis of measles: Broad, includes for example viruses (enteroviruses, adenovirus, COVID-19, etc), Rocky Mountain Spotted Fever, scarlet fever, toxic shock, meningococcemia, HSP, Kawasaki Disease, mono, MIS-C, etc.

NOTE C

Severity of illness levels

- **Mild:** No respiratory distress or oxygen requirement; able to self-hydrate (may be after initial fluid support).
- **Moderate:** Requiring ongoing IVF support OR requiring respiratory support including low flow nasal cannula for hypoxia or HFNC for increased WOB.
- **Severe:** Hypoxia or work of breathing requiring non-invasive or invasive ventilation or concern that patient status is worsening on high flow nasal cannula OR SIRS/Sepsis/Shock OR rapidly worsening.

NOTE D

Acute complications from measles

- **GI:** Diarrhea and stomatitis are common and may lead to poor PO and dehydration.
- **Neuro:** Encephalitis (~ day 5), acute disseminated encephalomyelitis (~week 2).
- **ENT/Resp:** Otitis media, tracheitis, croup, and respiratory distress are well-described. Measles pneumonia may cause symptoms and radiographic findings that overlap with bacterial pneumonia. However, co-infections may occur including with Strep pneumoniae, Strep pyogenes, H. influenzae, Staph aureus and viruses. Use antibiotics if strong suspicion for a pneumonic bacterial process due to both clinical exam and imaging findings. Utilize age appropriate guideline for work up and empiric treatment of suspected bacterial pneumonia ("Fever without obvious source infant 1-60 days," "Community acquired pneumonia guideline," or "Empiric antibiotic recs for patients ≥18 and <25 years old with common infections"). CXR findings for measles includes: mixed reticular opacities, air space consolidation, and hilar lymph node enlargement.
- **Ophthalmology:** Purulent conjunctivitis, keratitis, xerophthalmia (risk of blindness). Evaluate for pain, photophobia, erosion, or opacity.

See Appendix A page 8-10 for Vitamin A dosing and administration

National Foundation for Infectious Diseases

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Home / Publications / Call to Action Vitamin A for the Management of Measles in the US (March 2020)

Call to Action Vitamin A for the Management of Measles in the US (March 2020)

Call to Action on the use of vitamin A for measles management in the US

View Publication

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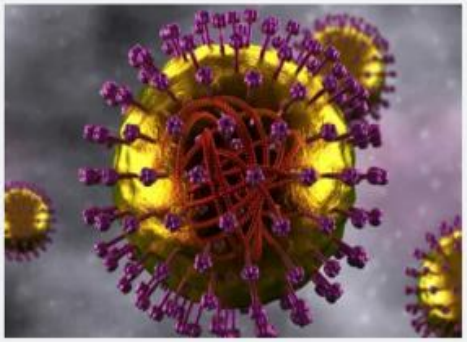
Learn More about Measles



Aim: To provide guidance on the administration of vitamin A capsules to patients unable to swallow capsules

APPENDIX A:

Vitamin A for the Treatment of Measles: Dosing and Administration Instructions for Pharmacy/Providers

Vitamin A is recommended for all patients with measles regardless of nutritional status or country of origin (unless extreme vitamin A supplementation has recently been given). As measles can decrease serum vitamin A (retinol) levels, checking levels before treatment is not recommended. When given at the recommended doses, vitamin A may help reduce the severity of illness in patients with measles. It will not prevent or cure measles. Vitamin A may be prescribed **daily for up to 2 days*** for supplementation.

Dose is dependent on age and given **enterally.** See dosing guidelines below. *Unfortunately, vitamin A is only available in softgel capsules. Prescribe and administer as follows (see following pages as well).*

	Patient is being admitted	Patient is not being admitted
Able to swallow pills (note this may be up to 20 capsules to achieve required dose)	*Prescribe two doses per dosing guidelines below*	*Prescribe two doses per dosing guidelines below*
Unable to swallow pills	*Prescribe two doses per dosing guidelines below. -Administer using syringe technique described below*	*Prescribe one dose per dosing guidelines below. -Administer one dose in clinic/ED using syringe technique described below*

Dosing:

Infants < 6 months: 50,000 units/day (15,000 mcg RAE/day) enteral for 2 days

Infants 6 to 11 months: 100,000 units/day (30,000 mcg RAE/day) enteral 2 days

Infants ≥ 12 months and children: 200,000 units/day (60,000 mcg RAE/day) enteral for 2 days

* If severe malnutrition or ophthalmologic evidence of vitamin A deficiency is present, administer a third dose 2–4 weeks after the 2nd dose.

Conversion factors *(All calculations based on the prescribing and utilization of vitamin A 10,000 international units/capsule. Please adjust calculation if different strength of capsule is prescribed. Vitamin A 10,000 international units/capsule is the only strength available at Children's Minnesota inpatient pharmacy.)*

1 capsule = 3,000 mcg = 10,000 units

Calculation for number of capsules needed:

$$Number\ of\ capsules = \frac{Desired\ Dose\ (mcg)}{3000\ mcg/capsule}$$

Example:

1-year-old patient: 200,000 units/day (60,000 mcg)

$$Number\ of\ capsules = \frac{60{,}000\ mcg}{3{,}000\ mcg} = 20\ \text{Capsules}$$

VITAMIN A MANAGEMENT – STRATEGIES

Capsules

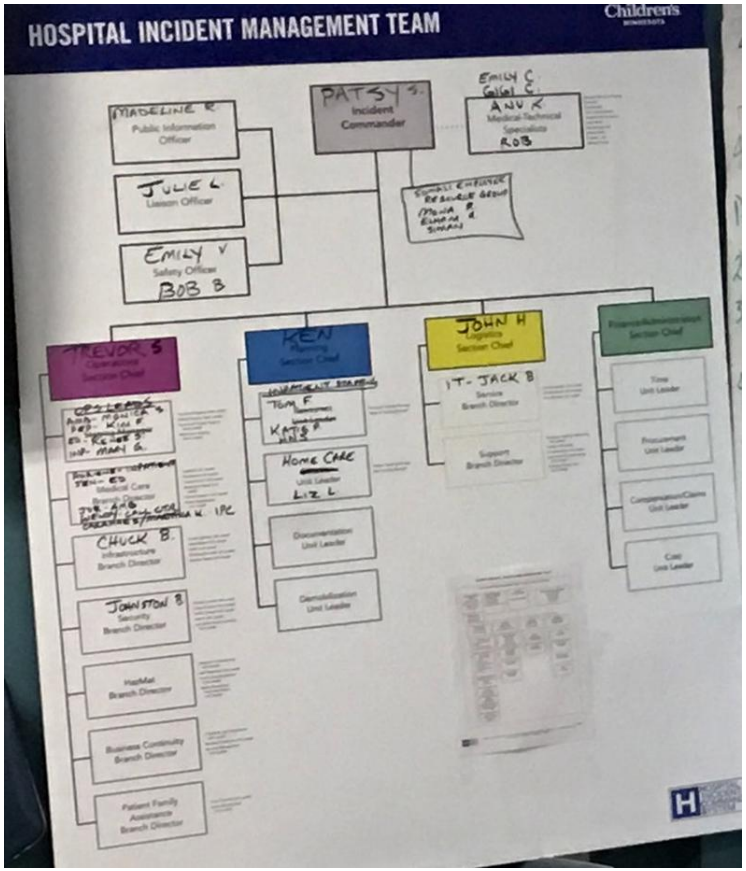
Pros	Cons
Cost	Time consuming!
Available from certified wholesaler	Not FDA approved
Flavor?	Flavor?

Liquid

Pros	Cons
Flavor	Must purchase online – Hospital policies that disallow?
Timeliness	How was it stored?
	Not FDA approved
	Larger volume

HOW DOES HICS HELP IN A MEASLES OUTBREAK?

- ✓Adds organization to a chaotic situation
- ✓Clarifies leadership structure
- ✓Fosters clear communication, internally and externally
- ✓Ensures event documentation
- ✓Fully engages responders
- ✓Allows clinicians to be clinicians
- ✓Garners internal resources quickly
- ✓Sets as an organizational priority
- ✓Defines clear accountability
- ✓Declares “this is not business as usual people!”



MEASLES TRIAGE AND TESTING DECISION GRID

INFECTION PREVENTION AND CONTROL

Children's MINNESOTA

5/2/2017 CHILDREN'S MEASLES TRIAGE AND TESTING DECISION GRID PAGE 1 of 2

Page Infection Prevention 651-629-4444 with all suspected cases immediately.

Rash is generally first seen 14 days from exposure (range 7-18 days but as far out as 21 days).
Most contagious period is 4 days before rash onset to 4 days after rash onset.
Immunocompromised patients are contagious for duration of illness.

SUSPECT CASE DEFINITIONS

FIRST: Determine if patient has a known exposure.

There is a measles outbreak in the community.

- Consider patient a KNOWN EXPOSURE if patient/family reports being notified by a healthcare facility or health department that they were exposed to a confirmed measles case.
- Have a HIGH LEVEL OF SUSPICION for measles if patient/family reports being notified by a daycare or other facility of measles at that location.
- Measles as a potential differential diagnosis should be assessed for any patient with a fever and history of international travel in the past 30 days.

SECOND: Determine if patient meets symptom criteria.

If known exposure or high level of suspicion:	If NO known exposure or NOT high level of suspicion:	
Suspect and test for measles if patient has: • Fever **AND** • Rash **OR** Cough **OR** Coryza **OR** Conjunctivitis	Patient has no history of international travel in the past 30 days	Patient has history of international travel within the past 30 days
	Suspect and test for measles if patient has: • Rash **AND** • Fever **AND** at least one of Cough **OR** coryza **OR** conjunctivitis	Suspect and test for measles if patient has: • Rash **AND** • Fever If patient has received 2 doses of MMR vaccine, follow criteria for patients with no history of travel.

FOR PATIENTS MEETING SUSPECT CASE DEFINTION: SEE PAGE 2.

MEASLES TESTING ALGORITHM

Children's MINNESOTA

Aim: To guide appropriate testing for measles.

Does the patient have:
1. **Fever AND known exposure[3] (notified by childcare/school, public health)**

Yes → **IMMEDIATELY ENSURE THE FOLLOWING, IF NOT YET COMPLETED:**
- Mask patient (family members with symptoms should mask)
- Isolate in an airborne infection isolation room[6] (AIIR; negative pressure)
  - If AIIR is not available, isolate in private room with door closed; patient should remain masked
- Order Airborne Precautions
- Notify Infection Prevention and Control (952-260-9021); available 24/7
- Order measles test[7]

No ↓

Does the patient have:
1. Fever[1] **AND** rash[2]
   AND
2. Cough **OR** coryza **OR** conjunctivitis

Yes →
1. Does the patient have at least one risk factor for measles?
   a. Known exposure to measles[3]
   b. History of international travel[4] within the previous 30 days
   c. History of domestic travel to areas of concern[5] within the previous 30 days
   d. History of domestic travel through an international airport within the previous 30 days
   e. Contact with an international visitor

OR

2. Is there a high degree of clinical suspicion for measles?

Yes → Assess Measles, Mumps and Rubella (MMR) immunization status.

- **Any** *documented* doses of MMR. → Determine *date* of most recent MMR.
  - MMR administered 10-14 days prior to symptom onset → Does patient appear toxic?
    - Yes → **IMMEDIATELY ENSURE THE FOLLOWING, IF NOT YET COMPLETED:** (see above)
    - No → **Do not test.** Timeline and symptoms are consistent with vaccine-associated rash illness.
  - MMR administered <10 days or >14 days prior to symptom onset → **IMMEDIATELY ENSURE THE FOLLOWING, IF NOT YET COMPLETED:** (see above)
- **0** *documented* doses of MMR. → **IMMEDIATELY ENSURE THE FOLLOWING, IF NOT YET COMPLETED:** (see above)

No ↓

Do not test.
Patient does not meet measles case definitions. For patients with a history of international travel, continue to assess for other travel-associated infectious diseases.

NOTES 1–7
See page 6

LAB TESTING GUIDELINE

MEASLES TESTING ALGORITHM

Children's MINNESOTA

Aim: To guide appropriate testing for measles.

NOTE 1
- Fever must be present at the same time as the rash, even if fever is subjective.

NOTE 2
- Rash should start on the head or neck, if rash origin is known.

NOTE 3
- Consider the patient to have a known exposure if the patient/family reports being notified by a healthcare facility or health department that they were exposed to a confirmed measles case. Consider the patient to have a possible exposure if the patient/family reports contact with a measles case.

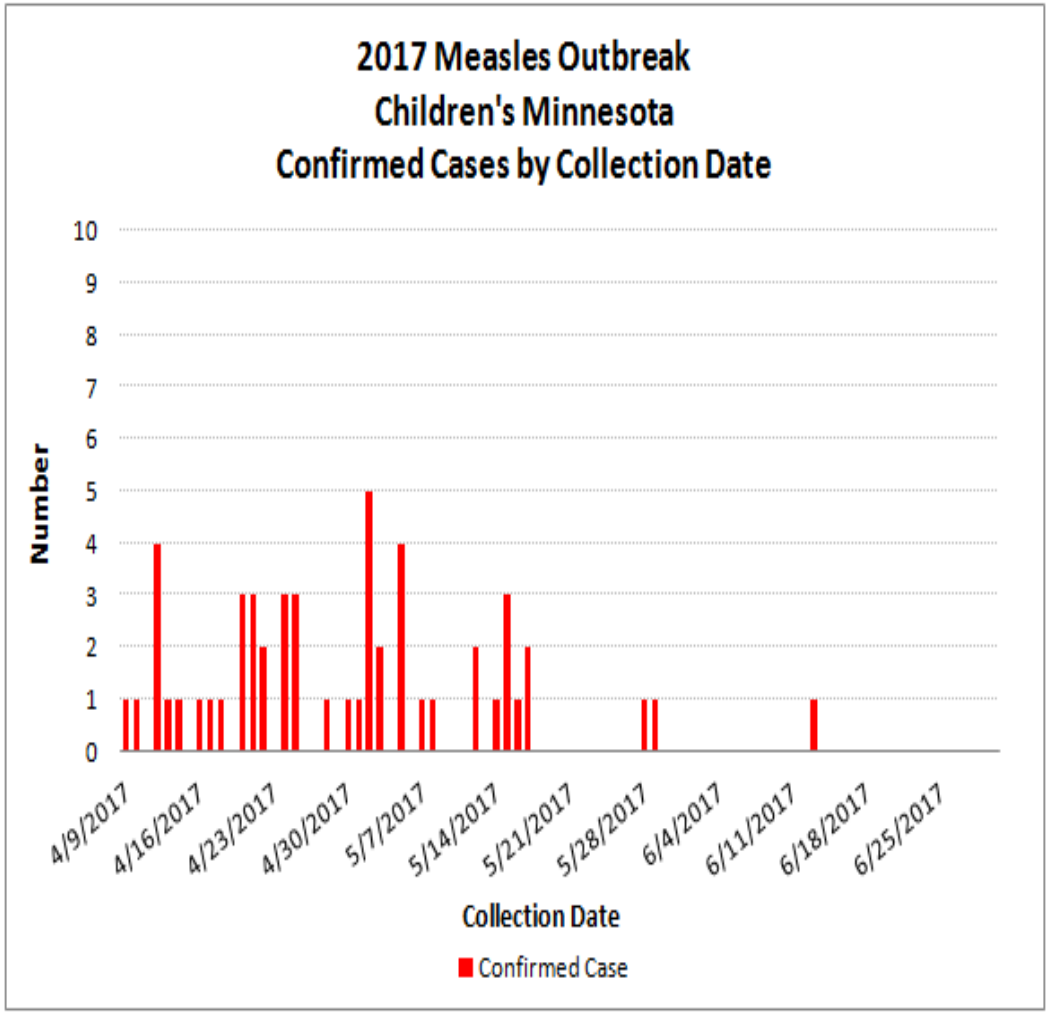
NOTE 4
- Whether or not a patient meets a measles case definition, follow Screening for Travel-Associated Infectious Diseases for all patients with a history of international travel within the past 30 days.

NOTE 5
- Consult with Infection Prevention and Control (Amion or 952-260-9021, if at Children's MN; available 24/7) or compare patient's reported domestic travel to locations of current U.S. measles cases and outbreaks.

NOTE 6
- To determine locations of airborne infection isolation rooms (AIIRs; negative pressure), refer to Airborne Infection Isolation (AII) and Protective Environment (PE) Patient Rooms.
- If an AIIR is not immediately available, place the patient (and those accompanying the patient, e.g., caregiver, siblings) in a regular room. The patient and any others with symptoms should mask. Place a portable HEPA filter unit (obtained from MESA) inside the room, and keep the door closed. Make arrangements to move the patient to an AIIR as soon as possible.

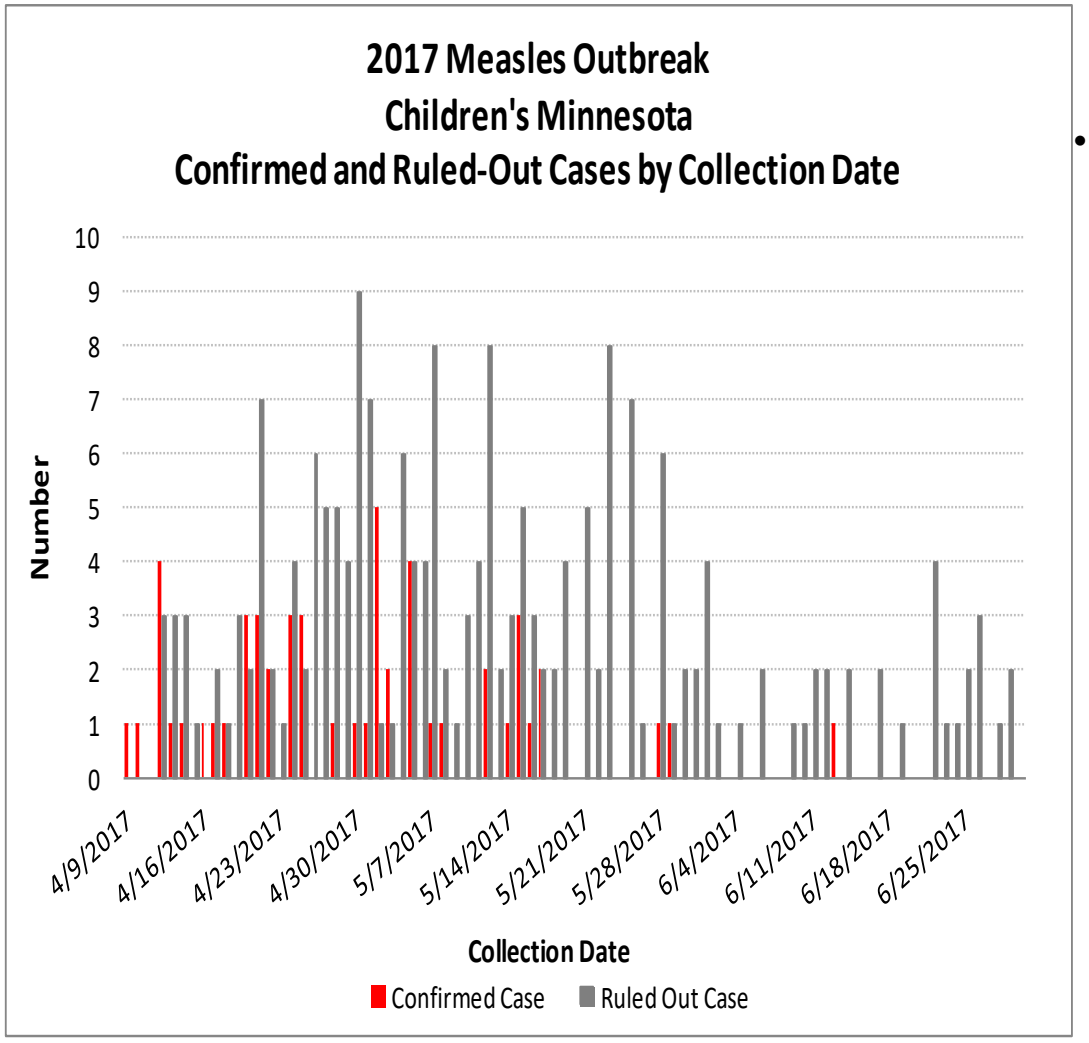
NOTE 7
- Refer to the "Measles Lab Testing Instructions" and order "Measles for Suspected Disease (Rubeola) to MDH"

MEASLES – CONFIRMED CASES



- 41 tested and confirmed at Children's

MEASLES – RULED OUT CASES



- 234 tested and ruled out

Confirm the diagnosis!

MEASLES

INFECTION PREVENTION & CONTROL

KEY POINTS

- Response must be fast, uncompromising and multi-factorial strategies
- Public-private partnership is critical and should be pre-established
- Ro of 12-18 is beyond normal infection prevention measures
- Contact/droplet +Airborne transmission requires All rooms, N95 masks
- Stays aloft for 2 hours in usual air exchange rooms. May be 1 hour in hospital ER's
- Prevention measures are vaccination, no exceptions in staff, rapid identification and prompt isolation
- Timely communication underlies all interventions. Right message by right messenger

Limavady A, Tu IT, Bedford H. Guarding the gatekeepers: a comprehensive approach to control nosocomial measles. Infection. 2024 Aug;52(4):1195-1206. doi: 10.1007/s15010-024-02186-0. Epub 2024 Feb 14. PMID: 38353874; PMCID: PMC11289298

WHAT STOPS A MEASLES OUTBREAK?

1. High community MMR vaccination rate
2. Immediate airborne isolation
3. Rapid identification and exclusion of susceptible contacts
4. Prompt post-exposure prophylaxis. (MMR within 72 hours, Ig within 6 days)
5. Frontline worker high vaccination rates

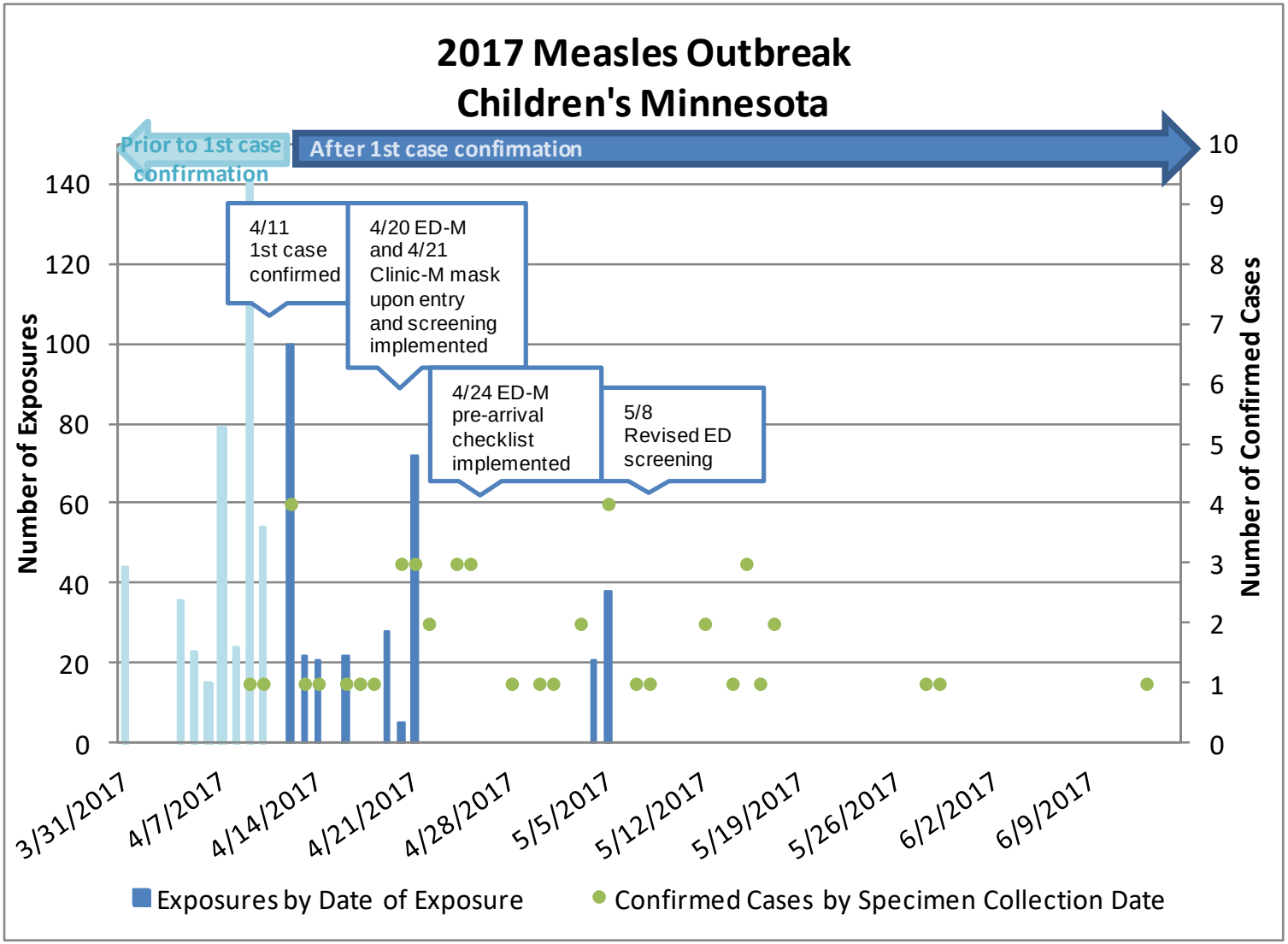
Naureckas Li C, Kaplan SL, Edwards KM, Marshall GS, Parker S, Mary Healy C. What's Old Is New Again: Measles. Pediatrics. 2025 Jun 1;155(6):e2025071332. doi: 10.1542/peds.2025-071332. PMID: 40211105.

CHILDREN'S MEASLES – EXPOSURES

Children's:

- 745 total exposures
  - ED-M (638)
  - Clinic-M (64)
  - 7th-M Med/Surg (20)
  - 7th-M Hem/Onc (23) most received IVIG
- 173 PEP eligible
  - 138 PEP given (80%)
- 489 letters sent

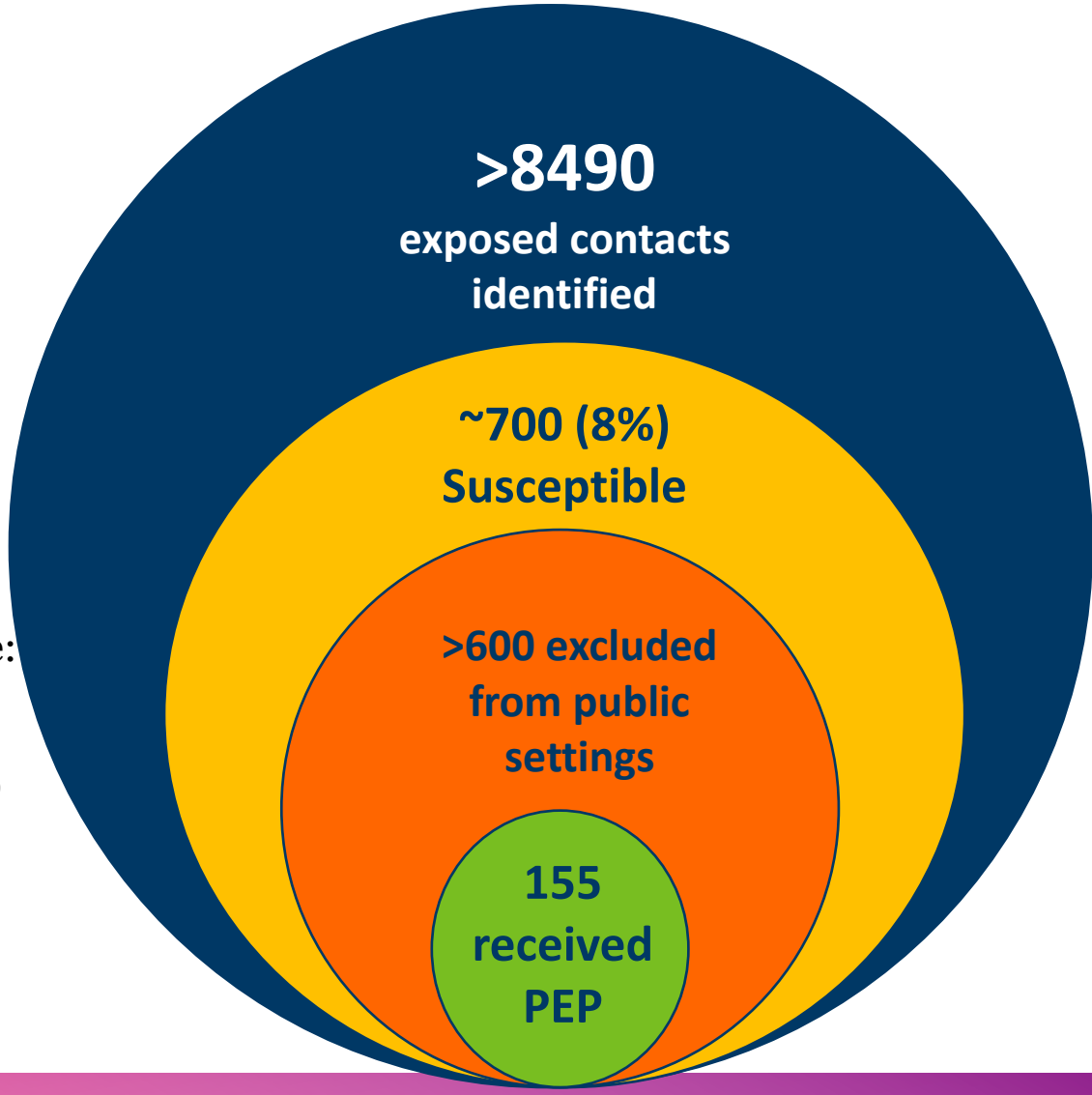
MEASLES – EXPOSURE PREVENTION MEASURES



MAJOR PUBLIC HEALTH INTERVENTION CONTACTS: EXPOSURES AND EXCLUSIONS

CREDIT: KATHY COMO-SABETTI MDH

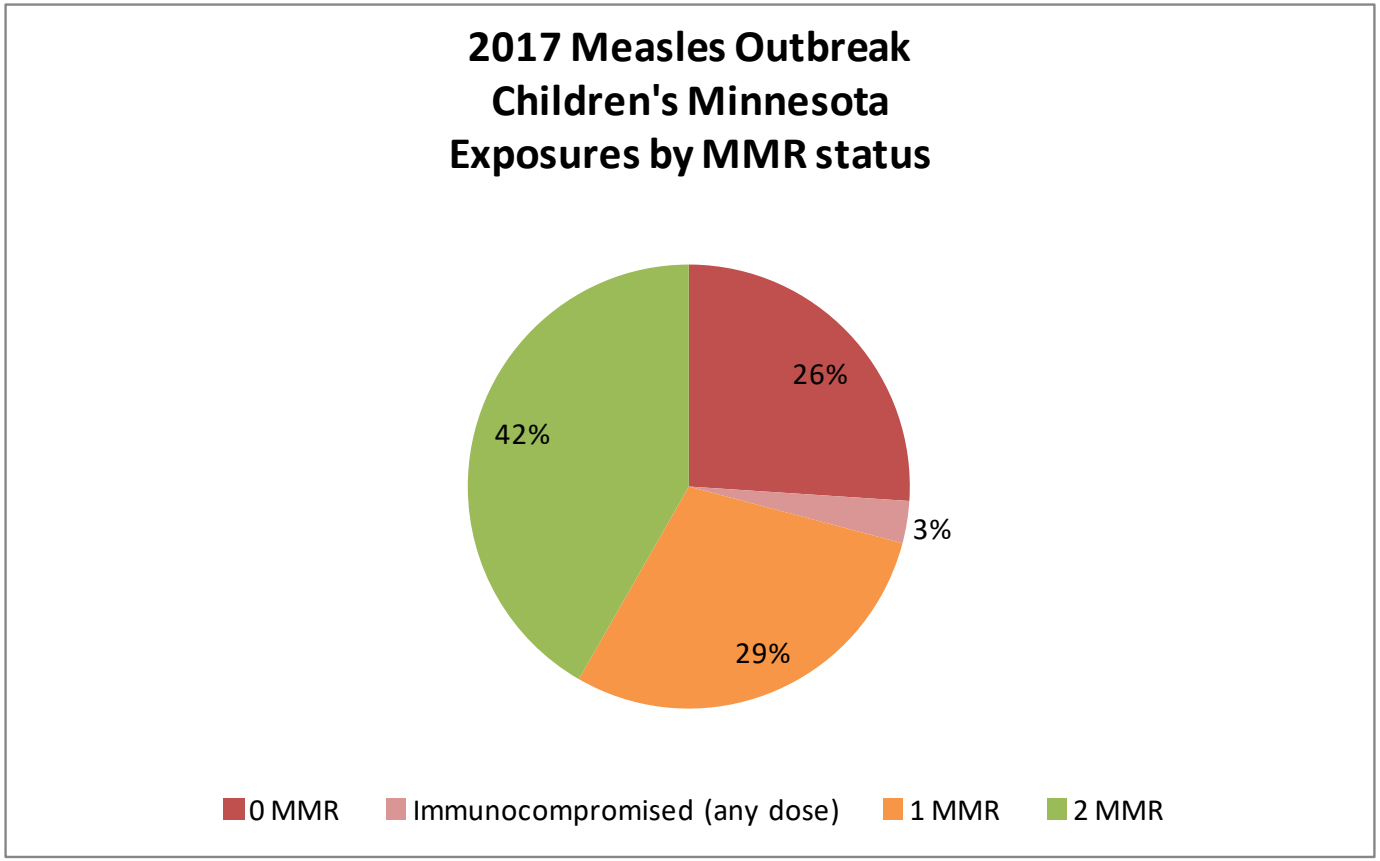
- **Total health care and child care exposures: 8,490**
- **Schools involved : 6**
- **Child care centers involved : 12**
- **Total exclusions associated with this outbreak: 649**
  - Excluded from health care: 63
  - Excluded from school/child care: 507
  - Excluded due to being a case: 79
- **No legal orders were necessary**



IDENTIFYING EXPOSURES

- Exposure definition
  - Visit(s) during contagious period (4 days prior/4 days post rash onset)
  - Not in Airborne Infection Isolation (AII)
  - Exposure timeframe = time not in AII (plus 2 hours)*
- Where was the patient?
  - What department(s) and room(s) was the patient in?
  - What time were they in the waiting room, room a, room b, room c, etc.?
- Who else was in the same area(s) at the same time?
- What is their age and MMR status?
- How quickly can you figure this out?
- Were young siblings in tow, pregnant Mom?
- Any immunocompromised considerations?

MEASLES EXPOSURES–VACCINE STATUS



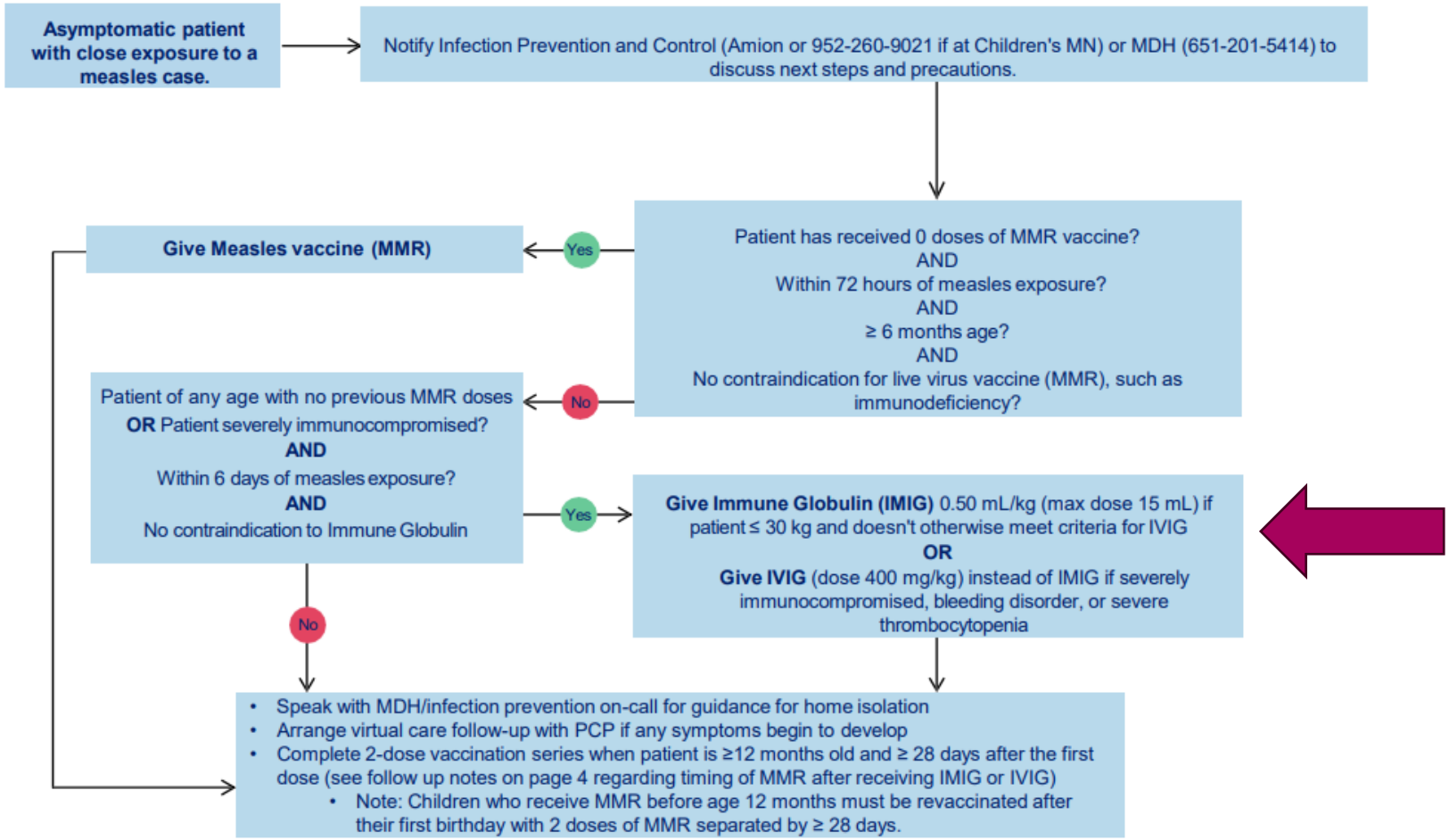
CLINICAL GUIDELINE

MEASLES: ASYMPTOMATIC PATIENT WITH HIGH-RISK EXPOSURE

(Age < 25 years)

Children's MINNESOTA

Aim: To standardize management for asymptomatic patients with measles exposure.



Aim: To standardize management for asymptomatic patients with measles exposure.

FOLLOW-UP NOTES

Follow-up should be with PCP within 1–2 days of diagnosis (if managed as outpatient) or discharge (if hospitalized).

- Consider use of virtual care visits if applicable.
- Assess hydration status. Consider use of Gastroenteritis "Oral Rehydration Therapy" guideline, with patient instructions available on Clinical Guidelines website including in multiple languages.
- Complete 2-dose MMR vaccination series ≥ 28 days after the first dose if not yet completed. See note below regarding timing of MMR after receiving IMIG or IVIG.

Later complications from measles

- **Neuro:** Acute disseminated encephalomyelitis (~ week 2) and subacute sclerosing panencephalitis (SSPE, years later). SSPE is a rare, but fatal degenerative CNS disease characterized by behavioral and intellectual deterioration and seizures that generally develop 7 to 10 years after measles infection.
- **Immune "amnesia":** Patients with measles are at higher risk for infectious diseases in the 2–4 years after measles infection, including for diseases they may have been previously immunized against or immune to. Maintain a lower threshold for testing/treating and refer to ID/immunology if there are concerns.

If patient received IVIG or IMIG

- No live-virus vaccines until 8 months after IVIG (recommendation based on receipt of 400 mg/kg dosing- timing may be variable if a different dose of IVIG was given, for example if patient was already on subcutaneous IG for another indication) or until 6 months after IMIG. *Note, patients at high risk of exposure may receive live-virus vaccines sooner and then should be reimmunized after 11 months if they have an inadequate serological response.*
- Risks of IVIG including: hemolytic anemia, aseptic meningitis.
- Most patients who receive IMIG have some discomfort and temporary mild swelling at the injection site.
- Note for patients weighing > 30 kg (66 lbs), IVIG is recommended over IMIG as they are unlikely to receive an effective dose via IMIG.

Post-exposure considerations (per CDC.gov)

- If a health care provider without evidence of immunity is exposed to measles, MMR vaccine should be given within 72 hours, or IG should be given within 6 days when available. Exclude healthcare personnel without evidence of immunity from duty from day 5 after first exposure to day 21 after last exposure, regardless of post-exposure vaccine.
- Infected people should be isolated for four days after they develop a rash; airborne precautions should be followed in healthcare settings.
- People without evidence of immunity who do not receive appropriate post-exposure prophylaxis within the appropriate timeframe should be excluded from affected institutions in the outbreak area until 21 days after the onset of rash in the last case of measles.

POST-EXPOSURE PROPHYLAXIS (PEP) WINDOW

MDH Minnesota Department of Health

VACCINE PREVENTABLE DISEASE SECTION

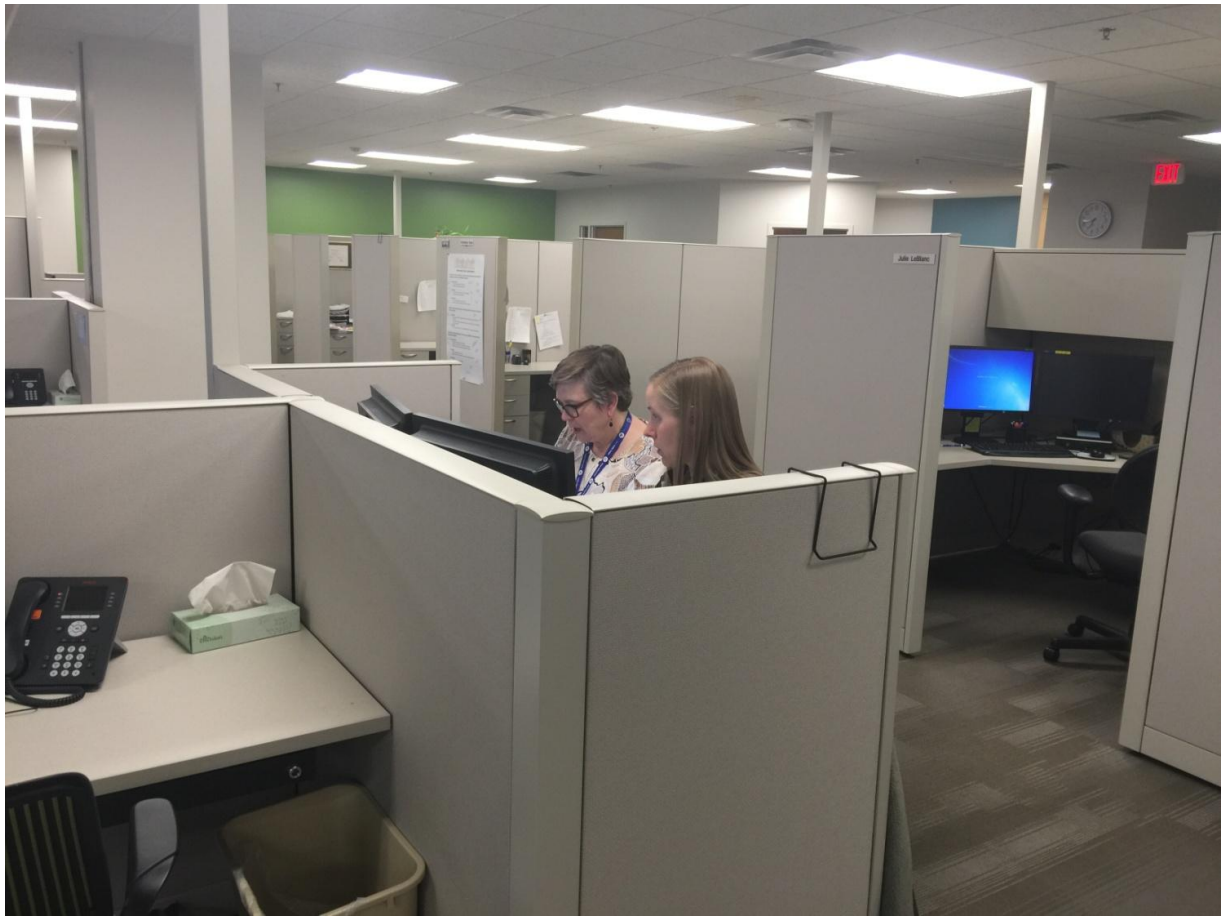
Measles Post-Exposure Prophylaxis (PEP) for Non-Symptomatic Susceptible Contacts

To determine appropriate post-exposure prophylaxis:

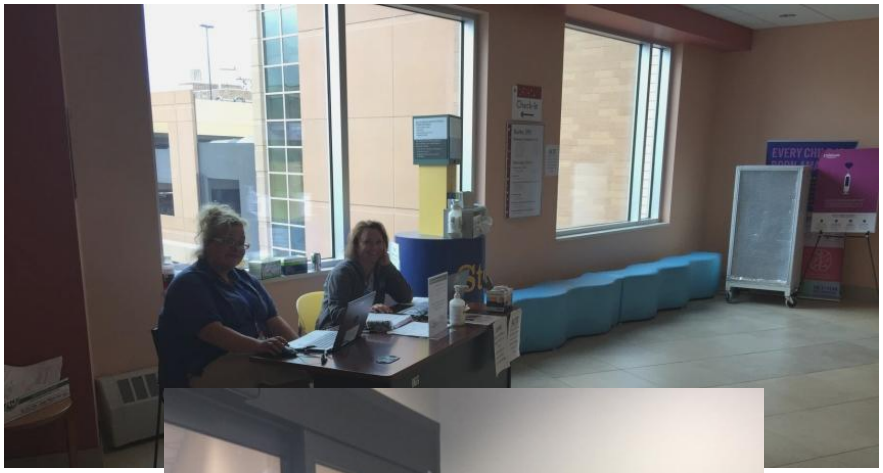
1. Determine patient's risk factor and identify time from first exposure to measles case.
2. Read the reminders and footnotes for definitions and special considerations.
3. Contact MDH with questions or if further guidance is needed (651-2014-5414 or toll free 1-877-676-5414).

Risk Factor	Time from first exposure[1]	
	< 72 hours	72 hours through day 6
Infant less than 6 months old	Give intramuscular IG[2] (IGIM): 0.5 mL/kg[3]	Give IGIM[2]: 0.5 mL/kg[3]
Infant age 6 through 11 months	Give IGIM[2]: 0.5 mL/kg[3] or Give MMR[1] vaccine	Give IGIM[2]: 0.5 mL/kg[3]
Susceptible[4] pregnant woman	Give intravenous IG[2] (IGIV): 400 mg/kg	Give IGIV[2]: 400 mg/kg
Severely immunocompromised[5]	Give IGIV[2]: 400 mg/kg	Give IGIV[2]: 400 mg/kg
Susceptible close contact over 1 year old[6]	Give MMR[2] vaccine if no contraindications	Give IGIM[2]: 0.5 mL/kg to those <66 pounds (≥66 pounds, see footnote 6)

PEP PLAN–SETTING UP THE CALL BANK, SCRIPTS, INTERPRETERS, LOTS OF HELPERS



AMBULATORY PATIENT MANAGEMENT-MULTIPURPOSE



UNIVERSAL MASKING REQUIREMENT

VISITOR GUIDANCE

General Guidance

Parent/Legal Guardian and Visitor Wellness Screening Tool

Symptom screening:

- Do you have fever, cough, diarrhea, vomiting or any other symptoms of illness* today?
- Have you tested positive or been exposed to anyone with COVID in the past 10 days?**

*Other symptoms of illness may include chills, runny nose, congestion, nausea, headache, muscle aches, shortness of breath, sore throat, or loss of taste or smell.
**Anyone with a known COVID exposure must wear a mask while in the hospital

If you do not have any symptoms of illness:

WASH 'EM PROUD

- You have passed the wellness screening.
- You MUST perform hand hygiene NOW and each time you enter or leave the patient's room.
- Further visiting restrictions may be in place on the patient care unit – check with your child's nurse.

If you are a parent or legal guardian and have symptoms of illness:

- The Patient Care Manager will work with you to discuss whether an exception can be made.
- If visiting is permitted, a mask must be worn while in the hospital

Measles Specific

- Measles specific: Process for handling parent/legal guardian of pediatric patient or significant other of a laboring mom when the patient has measles.
- Should parents/legal guardians/significant others be permitted to visit if they are exposed or positive for measles?
- If yes, what safeguards should be in place?
- If no, how do we see to the needs of the family unit?
- Limits on other visitors who are not parents/legal guardians/significant others
- Many challenges with checking the immunity status of visitors. Not worth the effort?

EMPLOYEE SAFETY

- Materials management stock up on N95 masks
- Reallocated the PAPR mask carts
- Provided JIT staff education on use of new PAPR mask
- Provided education/information to charge nurses daily
- Increased rounding on the units
- Worked with EHS on staff MMR verification
- Use contact/droplet Airborne Precautions signs
- All staff vaccinated, condition of employment

- Enguidanos R, Mascola L, Frederick P. A survey of hospital infection control policies and employee measles cases during Los Angeles County's measles epidemic, 1987 to 1989. Am J Infect Control. 1992 Dec;20(6):301-4. doi: 10.1016/s0196-6553(05)80233-0. PMID: 1492693.

FACILITY MANAGEMENT

HICS facilitates quick action

- Created temporary Airborne Infection Isolation (AII) rooms ED and inpatient
- Implemented process to monitor functionality of temporary AII rooms
- Worked collaboratively with materials management to increase the PAR levels of PPE (N95, surgical mask, PAPR hoods-powered air purifying respirator
- Purchased additional portable HEPA filter units for clinic (high efficiency particulate air)

Temp AII rooms

DECREASE EXPOSURE: FACILITY MANAGEMENT ULTRAVIOLET LIGHT

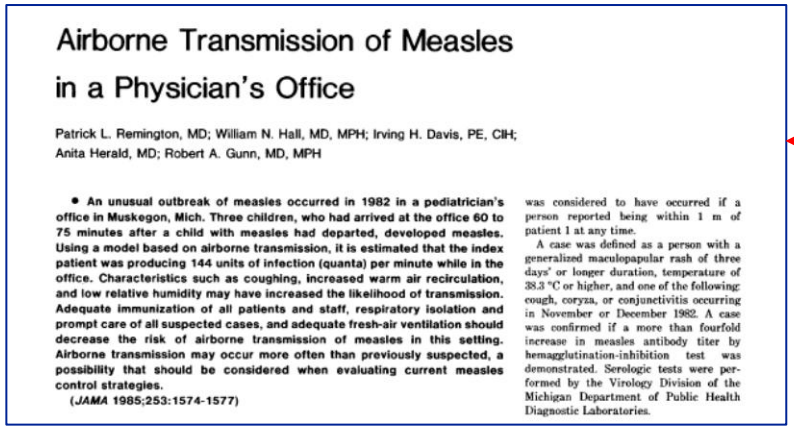
WHEN A MEASLES CASE HAS BEEN PRESENT IN A HEALTHCARE FACILITY WHO IS CONSIDERED EXPOSED?

Statement of the problem:

- In the US, there are different recommendations, practices and language about who to consider exposed when a person with measles has been present in a healthcare facility; the exposure definition needs clarifying for public health professionals and clinicians.
- CDC considers people exposed to measles if they are not wearing recommended respiratory protection (e.g., N95 or higher) AND have been:
  - In a shared air space* with an infectious measles patient at the same time, OR
  - In a shared air space* vacated by an infectious measles patient within the prior 2 hours (may be less than 2 hours based on air changes per hour [ACH] in the airspace)
- Most state health departments consider people exposed if they shared airspace with a measles case or were in that airspace up to 2 hours after the case left the area.
- California has used a 1-hour window in all settings since 2013 with no secondary cases, MN has used a 1-hour window in healthcare settings since 2023, and UT has been using a 1-hour window in healthcare settings since earlier this year.

*Shared airspace = sharing a common air handling system

FREQUENTLY CITED REAL WORLD DATA: TWO 1985 REPORTS OF MEASLES TRANSMISSION



Airborne Transmission of Measles in a Physician's Office

Patrick L. Remington, MD; William N. Hall, MD, MPH; Irving H. Davis, PE, CIH; Anita Herald, MD; Robert A. Gunn, MD, MPH

• An unusual outbreak of measles occurred in 1982 in a pediatrician's office in Muskegon, Mich. Three children, who had arrived at the office 60 to 75 minutes after a child with measles had departed, developed measles. Using a model based on airborne transmission, it is estimated that the index patient was producing 144 units of infection (quanta) per minute while in the office. Characteristics such as coughing, increased warm air recirculation, and low relative humidity may have increased the likelihood of transmission. Adequate immunization of all patients and staff, respiratory isolation and prompt care of all suspected cases, and adequate fresh-air ventilation should decrease the risk of airborne transmission of measles in this setting. Airborne transmission may occur more often than previously suspected, a possibility that should be considered when evaluating current measles control strategies.

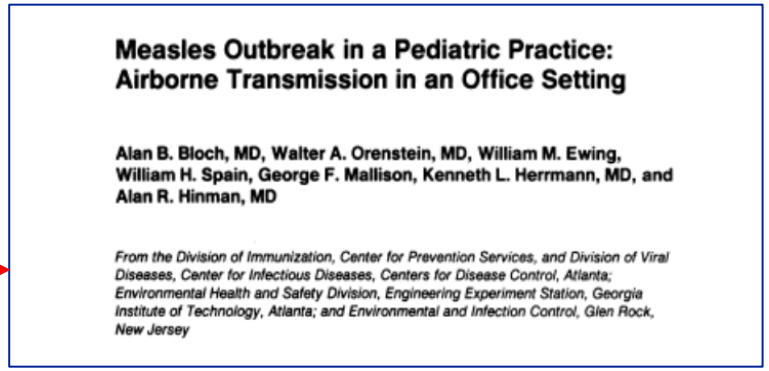
(*JAMA* 1985;253:1574-1577)

was considered to have occurred if a person reported being within 1 m of patient 1 at any time.

A case was defined as a person with a generalized maculopapular rash of three days' or longer duration, temperature of 38.3 °C or higher, and one of the following: cough, coryza, or conjunctivitis occurring in November or December 1982. A case was confirmed if a more than fourfold increase in measles antibody titer by hemagglutination-inhibition test was demonstrated. Serologic tests were performed by the Virology Division of the Michigan Department of Public Health Diagnostic Laboratories.

Remington: Three children, who had arrived at the office 60-75 minutes after a child with measles had departed, developed measles.

Bloch: Three children who contracted measles were never in the same room with the source patient; one of the three arrived at the office at least one hour after the source patient had left.



Measles Outbreak in a Pediatric Practice: Airborne Transmission in an Office Setting

Alan B. Bloch, MD, Walter A. Orenstein, MD, William M. Ewing, William H. Spain, George F. Mallison, Kenneth L. Herrmann, MD, and Alan R. Hinman, MD

From the Division of Immunization, Center for Prevention Services, and Division of Viral Diseases, Center for Infectious Diseases, Centers for Disease Control, Atlanta; Environmental Health and Safety Division, Engineering Experiment Station, Georgia Institute of Technology, Atlanta; and Environmental and Infection Control, Glen Rock, New Jersey

Airborne Contaminant Removal

Table B.1. Air changes/hour (ACH) and time required for airborne-contaminant removal by efficiency *

ACH § ¶	Time (mins.) required for removal 99% efficiency	Time (mins.) required for removal 99.9% efficiency
2	138	207
4	69	104
6+	46	69
8	35	52
10+	28	41
12+	23	35
15+	18	28
20	14	21
50	6	8

The number of air changes per hour and time and efficiency.

CDC 2024, https://www.cdc.gov/infection-control/hcp/environmental-control/appendix-b-air.html

ADDITIONAL CDC MEASLES EXPOSURE GUIDANCE

- Measles has been reported to remain infectious in air for up to 2 hours.
- For spaces with a defined rate of air changes/hour, see the following for additional considerations about estimating the time for 99.9% removal efficiency of airborne contaminants: Table B.1 "Air changes/hour and time required for airborne-contaminant removal by efficiency" from the 2003 *Guidelines for Environmental Infection Control in Health-Care Facilities*.

Table B.1. Air changes/hour (ACH) and time required for airborne-contaminant removal by efficiency *

ACH § ¶	Time (mins.) required for removal 99% efficiency	Time (mins.) required for removal 99.9% efficiency
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6⁺	46	69
8	35	52
10⁺	28	41
12⁺	23	35
15⁺	18	28
20	14	21
50	6	8

The number of air changes per hour and time and efficiency.

PROS AND CONS OF USING A SHORTER WINDOW

Pros

- Fewer people on contact lists to investigate (an ED exposure can result in hundreds of exposures), fewer resources used for contact investigations
- Greater opportunity to focus on high-risk contacts
- Lower risk of classifying people as exposed when they weren't actually exposed, i.e., less risk of unnecessary use of IG PEP, IgG testing and quarantine, and less stress, expense, and risk of negative impact on future healthcare seeking behavior
- Less disruption and potential loss of trust at healthcare facilities

Cons

- Low, but possible risk of missing high-risk and other exposed people

MEASLES SUMMIT KEY POINTS COMMUNICATION

Meet people where they are	The vast majority of parents vaccinate their kids, amplify their voices	Low vaccine rates are not all about hesitancy-look at access, schedule, catch up	When low rates ARE about lack of trust in vaccines, no bus or education will help
Use social media for us, not against us	Trust is our biggest challenge and opportunity for success. Build it!	Trusted message from trusted messengers	Listen empathetically, consistently, ask if you can share what you know
"Help me understand how you came to this decision"	Build trusting relationships over time	People might not remember what you said, but they will remember how you made them feel	School nurses are in a unique position to be that trusted messenger

- Measles Summit, May 7, 2026 Communications Workgroup

ARE YOU READY? A CHECKLIST.

- ❑ Strong relationship with local and state public health; can quickly call your colleague
- ❑ Question at triage for Fever + International travel in past 30 days
- ❑ ED and clinics recognize measles symptoms and have protocol to quickly isolate in Airborne Infection Isolation (AII)
- ❑ Definition and resources available to assist providers with who should be tested
- ❑ Easy access to a lab with capability to quickly do measles PCR test
- ❑ Hard-wired measles PCR lab order set in the EMR
- ❑ Hospital is proficient in using the HICS system and willing to use it for ID outbreak situations
- ❑ Organization is clear that 1 case of measles should be considered an emergency and supportive of providing resources to respond

ARE YOU READY? A CHECKLIST.

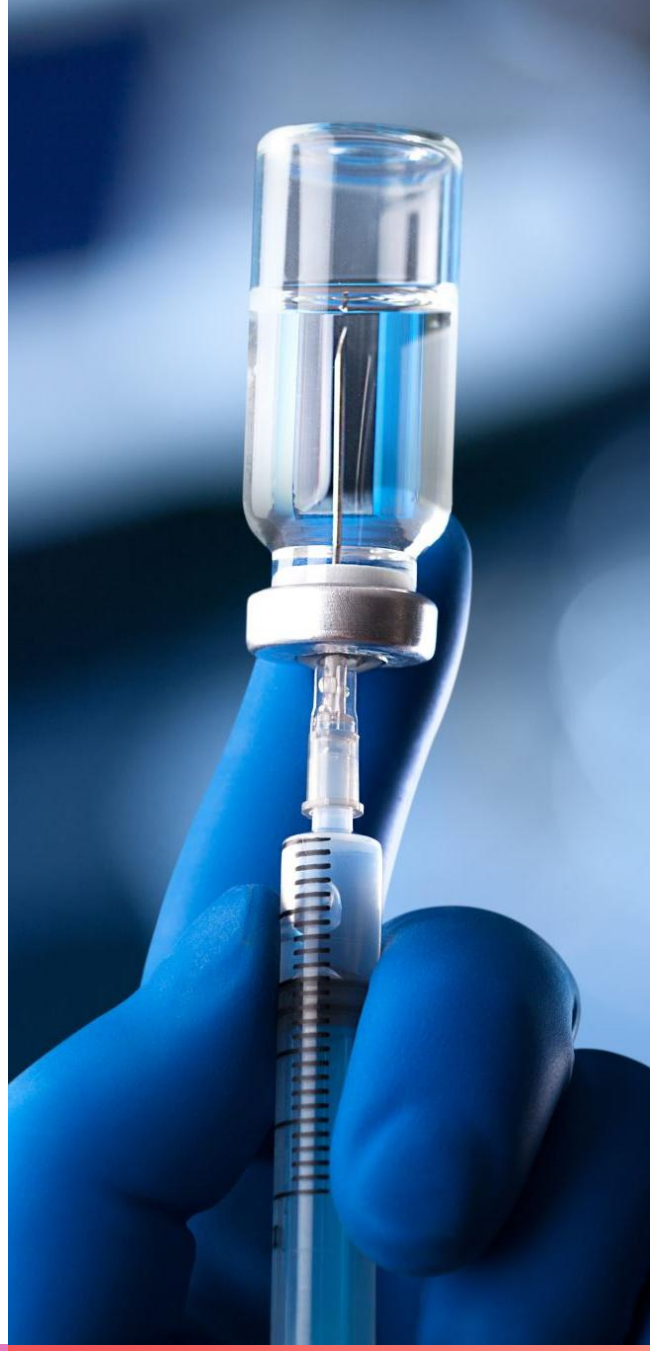
- ❑ Marketing and communications department can dedicate staff to assist with quickly making signage, FAQ's, external media responses, etc
- ❑ Internal communications systems in place so staff know where to go for infection prevention updates that are quickly accessible and user-friendly (your own webpage)
- ❑ AII rooms are available. Facilities has ability to create additional temporary AII rooms if needed.
- ❑ IT systems/reports in place that can quickly identify individual patients in specific locations
- ❑ Able to determine MMR status
- ❑ Resources identified who can assist with calling exposed patients and mailing letters
- ❑ Access to interpreters for phone calls and translating letters
- ❑ Facility carries a supply of IMIG. If not, know how and where to get it quickly.
- ❑ Standing order for IMIG post measles exposure in the EMR
- ❑ HCW's vaccinated with 2 doses of MMR

LESSONS LEARNED

1. Screening questions may not always capture our intent.
2. Measles is not always a textbook presentation but is always a public health emergency.
3. Presentation while infectious but without rash is where most exposures occur, especially prior to first diagnosis
4. Everyday is a new day where an index case can present; ongoing vigilance is in order
5. MMR vaccine for HCP's may not be protective with repeated exposure thus N95 mask wearing is in fact important
6. Reviewing immunization status in triage, inpatient is critical medical information
7. HICS is imperative in "non-code orange" situations
8. Outbreaks are expensive. Outbreaks change minds

RELIABLE RESOURCES

- Immunize.org
- Children's Hospital of Philadelphia Vaccine Education Center
- National Foundation for Infectious Disease
- American Academy of Pediatrics
- Voices for Vaccines
- Vaccinate Your Family
- Vaccine Integrity Project U of MN Center for Infectious Disease Research & Practice
- Johns Hopkins Measles Tracker



QUESTIONS

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- https://radiopaedia.org/articles/measles
- UptoDate - Measles
- UptoDate - vitamin A
- National Foundation for Infectious Diseases Call to Action: vitamin A for the Management of Measles in the United States.
- www.nfid.org/measles
- https://www.cdc.gov/measles/hcp/index.html
- https://medicalguidelines.msf.org/viewport/CG/english/measles-16689967.html
- https://starnet.childrenshc.org/departments/infectioncontrol/pdf/measles-post-exposure-prophylaxis.pdf

Current Children's Minnesota Measles Guideline Workgroup: Berg (Infection Prevention), Kalaskar (ID), Pozos (Immunology), Sznewajs (Hospital Medicine), Sicoli (ED), Chawla (Primary Care), Hoff (Pharmacy), Bunzli (Pharmacy), Montesinos (CPDP), Brunsberg (Hospital Medicine/Quality)

Original versions of guidelines developed by: Hester, Stinchfield

CHILDREN'S ACKNOWLEDGEMENTS

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  - Adriene Thornton, RN, MA, CIC Infection Preventionist
  - Caramae Steinwand, BS Infection Prevention Specialist
  - Jennifer Boe, RN, PHN, CIC Infection Preventionist
  - Joseph Kurland, MPH Infection Preventionist
  - Julie LeBlanc, MPH, CIC Epidemiologist
  - Martina Korinek, MPH, CIC Epidemiologist
  - Patsy Stinchfield, CPNP, MS, CIC Senior Director
  - Wendy Berg, RN, CIC Infection Preventionist
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  - Kathy Como-Sabetti, MPH
  - Jayne Griffith, MPH
  - Aaron Devries, MD
- **Entire HICS Team**
  - Emergency Preparedness Manager-Ken Combs
  - Public Information Officers-Madeline Riggs, Kate Gillen
  - Safety Officer-Bob Brokow

QUESTION 1

Which of the following days is someone with measles most infectious?

A. Immediately after exposure

B. After the rash crusts over

C. 4 days before and 4 days after the rash onset

D. 10 days after the rash emerges

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Which of the following days is someone with measles most infectious?

A. Immediately after exposure

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C. 4 days before and 4 days after the rash onset

D. 10 days after the rash emerges

E. (answer is C)

QUESTION 2

Vitamin A is use with measles in US children is for:

A. Prevention of measles

B. Treatment of measles virus

C. Promotion of the immune response after diagnosis

D. Management of measles to reduce morbidity & mortality

E. C and D

QUESTION 2

Vitamin A is use with measles in US children is for:

A. Prevention of measles

B. Treatment of measles virus

C. Promotion of the immune response after diagnosis

D. Management of measles to reduce morbidity & mortality

E. C and D

The right answer is E.

QUESTION 3

What stops a measles outbreak? How do we get out of this?

A. High community MMR vaccination rate
B. Immediate airborne isolation
C. Rapid identification and exclusion of susceptible contacts
D. Prompt post-exposure prophylaxis. (MMR within 72 hours, Ig within 6 days)
E. Frontline worker high vaccination rates
F. All of the above

QUESTION 3

What stops a measles outbreak? How do we get out of this?

A. High community MMR vaccination rate
B. Immediate airborne isolation
C. Rapid identification and exclusion of susceptible contacts
D. Prompt post-exposure prophylaxis. (MMR within 72 hours, Ig within 6 days)
E. Frontline worker high vaccination rates
F. All of the above

The correct answer is F