# Recognizing, Diagnosing and Preventing Measles in Your Patients

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Children's National

# Objectives

Be able to recognize patients with a clinical presentation suggestive of measles

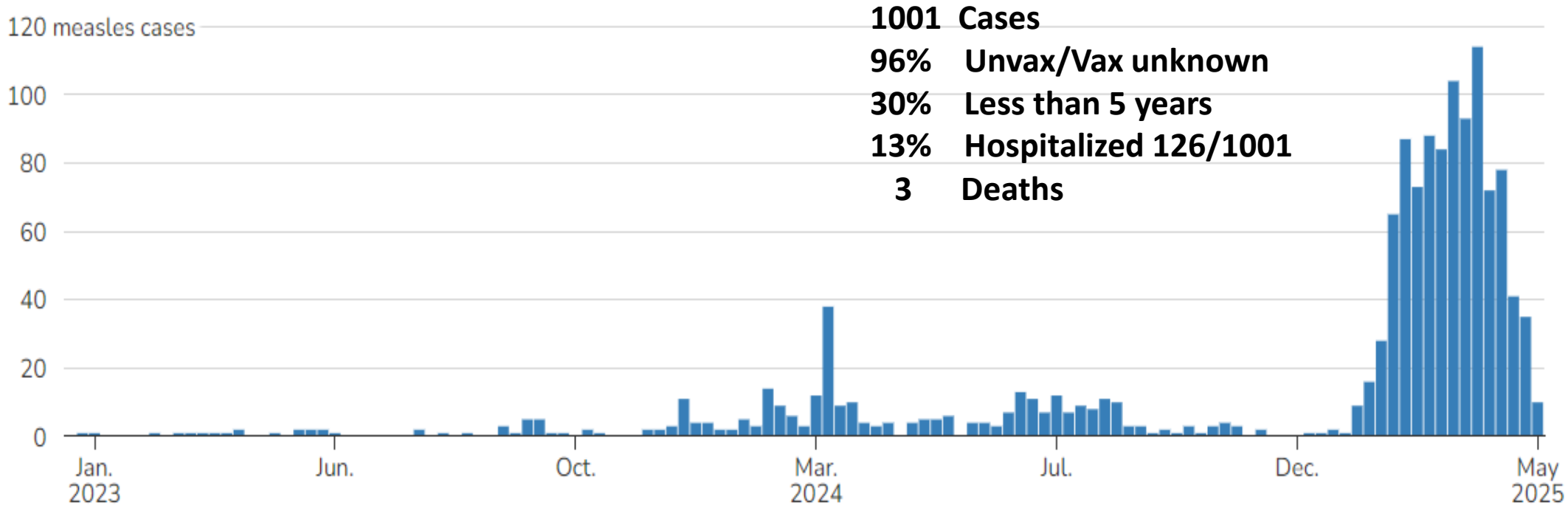
Be able to perform appropriate laboratory testing, including RT-PCR testing and serology, to diagnose measles

Be able to prevent measles through routine immunization practices, immunization for travelers and prophylaxis for those exposed to measles

# Measles:  Why Now?

- Declining immunization rates (pockets)
- Measles still common worldwide
  - 2024: 334,717 confirmed cases (WHO)
  - Increased travel
  - Remains endemic in some countries
- Measles can enter our country easily
  - From visitors or when we travel abroad

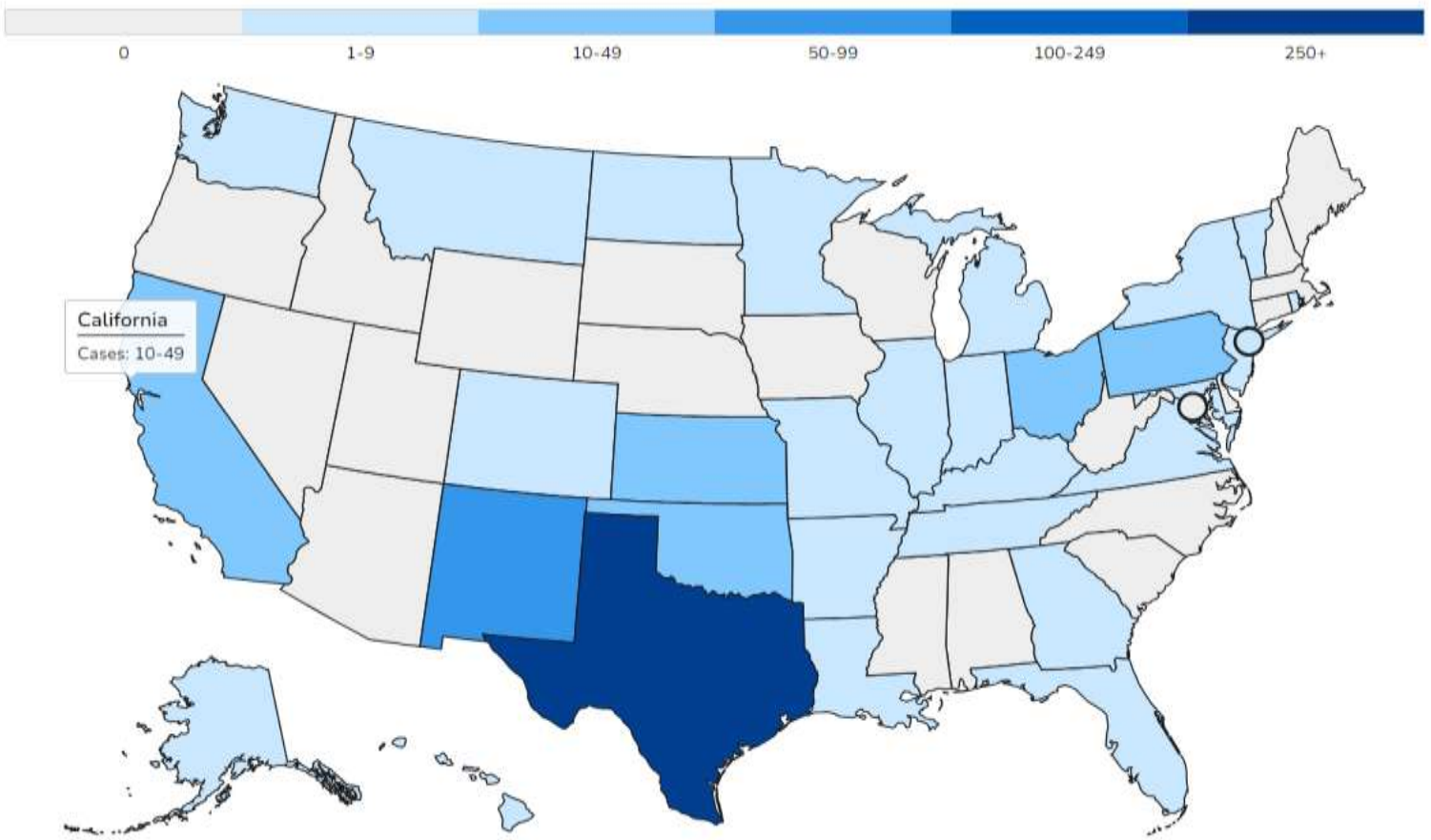
# Weekly Measles Cases 2023–2025 as of May 8, 2025




**1001 Cases**
**96% Unvax/Vax unknown**
**30% Less than 5 years**
**13% Hospitalized 126/1001**
**3 Deaths**

[Measles Cases and Outbreaks | Measles (Rubeola) | CDC]

# Map of Measles Cases in 2025 as of May 8, 2025




| Measles Cases | |
|---|---|
| Texas | 250+ |
| New Mexico | 50-99 |
| California | 10-49 |
| Florida | 1-9 |
| New Jersey | 1-9 |
| New York | 1-9 |
| Pennsylvania | 10-49 |
| Maryland | 1-9 |
| Virginia | 1-9 |
| DC | 0 |
| West Virginia | 0 |

[Measles Cases and Outbreaks | Measles (Rubeola) | CDC]

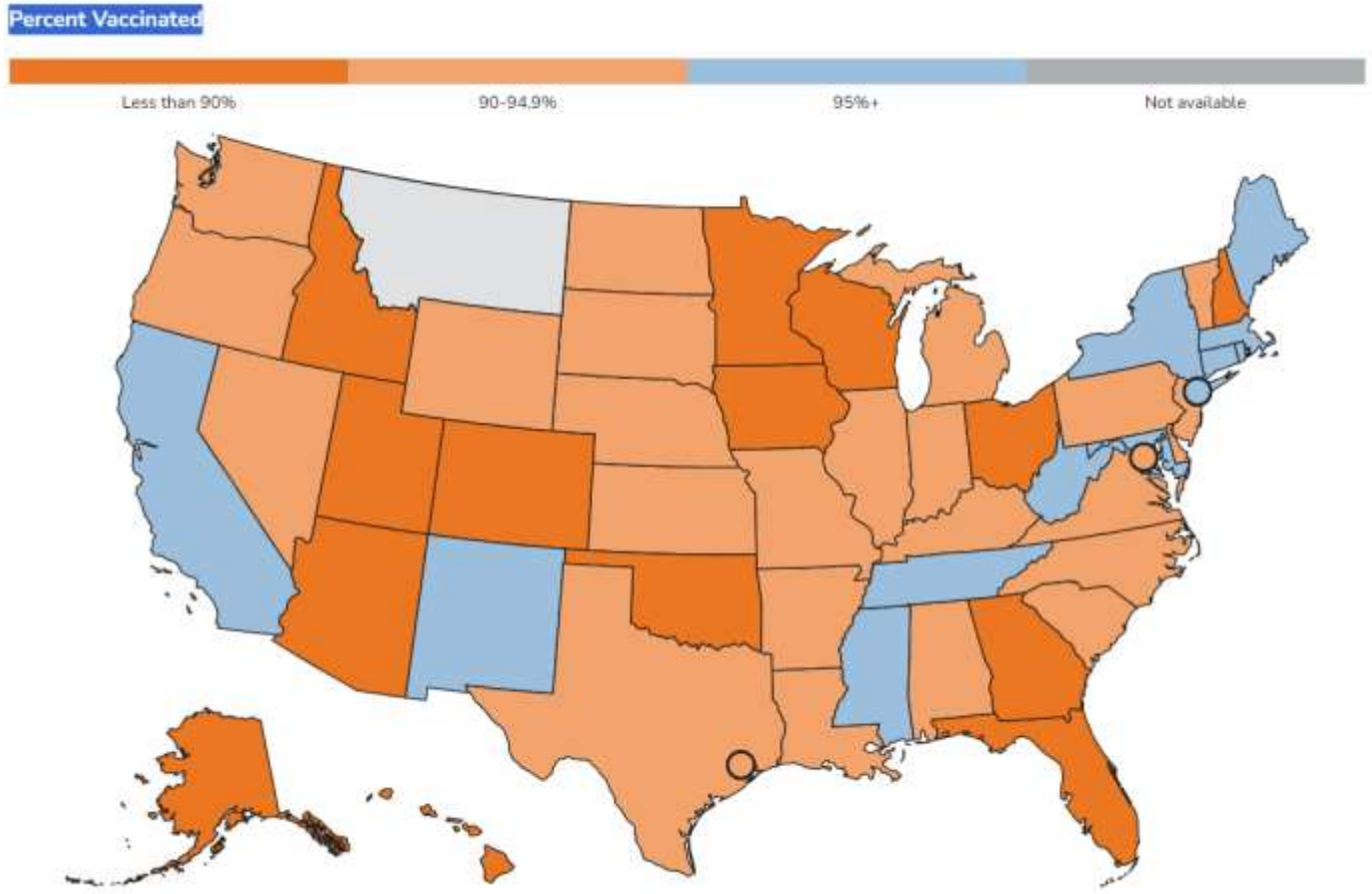
# Measles: Herd Immunity

- Vaccinated people = barrier to disease for their communities, reducing the risk of infection for people who are susceptible

- To disrupt broad transmission, herd immunity must be maintained >**95**%

- 2023-2024: Overall national coverage for MMR among US kindergartners= **92.7%**
  - BUT: Highly variable by state
  - At county levels, vaccine rates may vary considerably.
    - Pockets of unvaccinated people in states with high vaccination coverage

# MMR vaccine coverage for kindergarteners by school year 2023-24




| State | %Vaccinated |
|---|---|
| Texas | 94.3 |
| New Mexico | 95 |
| California | 96.2 |
| Florida | 88.1 |
| New Jersey | 93/96.1 |
| New York | 97.7 |
| Maryland | 96.6 |
| Virginia | 94 |
| DC | 92 |
| West Virginia | 98 |

[Measles Cases and Outbreaks | Measles (Rubeola) | CDC]

# Recognizing Measles: Incubation and Prodrome

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Incubation Period

- 11-12 days exposure to prodrome
- 14 (7-21)days exposure to rash

Prodrome:  2- 4 days before rash

- Fever
- Cough, Coryza, Conjunctivitis

Enanthem:  2- 3 days after symptoms begin

- Koplik's spots
- 48 hours prior to examthem
- Last 12-72 hours

# Recognizing Measles: Exanthem

Exanthem 2-5 days after symptoms begin

- erythematous, maculopapular, blanching rash,
- classically begins on the face and spreads cephalocaudally and centrifugally

# Recognizing Measles: Exanthem

Courtesy of Centers for Disease Control and Prevention

# Recognizing Measles: Morbilliform Rash


Blutinger E,et. al. Measles: Contemporary considerations for the emergency physician. J Am Coll Emerg Physicians Open. 2023 PMID: 37692196

# Recognizing Measles: Complications

1/5 measles patients are hospitalized

1/20 children with measles develop pneumonia

1/1000 mealses patients develop acute encephalitis- often leads to brain damage

1/1000 people with measles will die

1-3/1000 children with measles will die from respiratory and neurologic complications

[Clinical Overview of Measles | Measles (Rubeola) | CDC]

# If you suspect your patient has measles or was exposed to measles

- **Isolate patient immediately** in airborne infection isolation room (AIIR) OR private room with closed door
  -call ahead
  -triage, test outside facility
  -telemed triage

- **Immediately notify your local DOH** for testing, isolating and managing recommendations

- **Collect samples**: NP swab, throat swab (urine)for RT- PCR, measles IgM

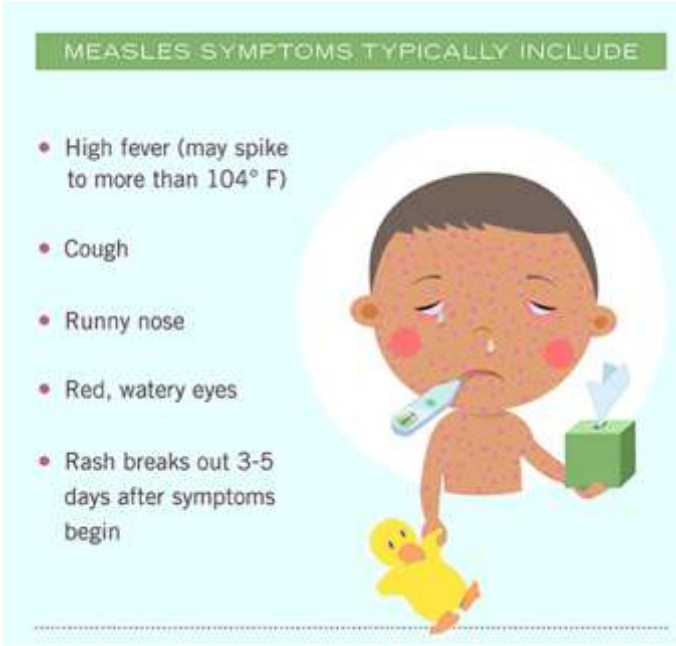
- **Manage patients with supportive care**



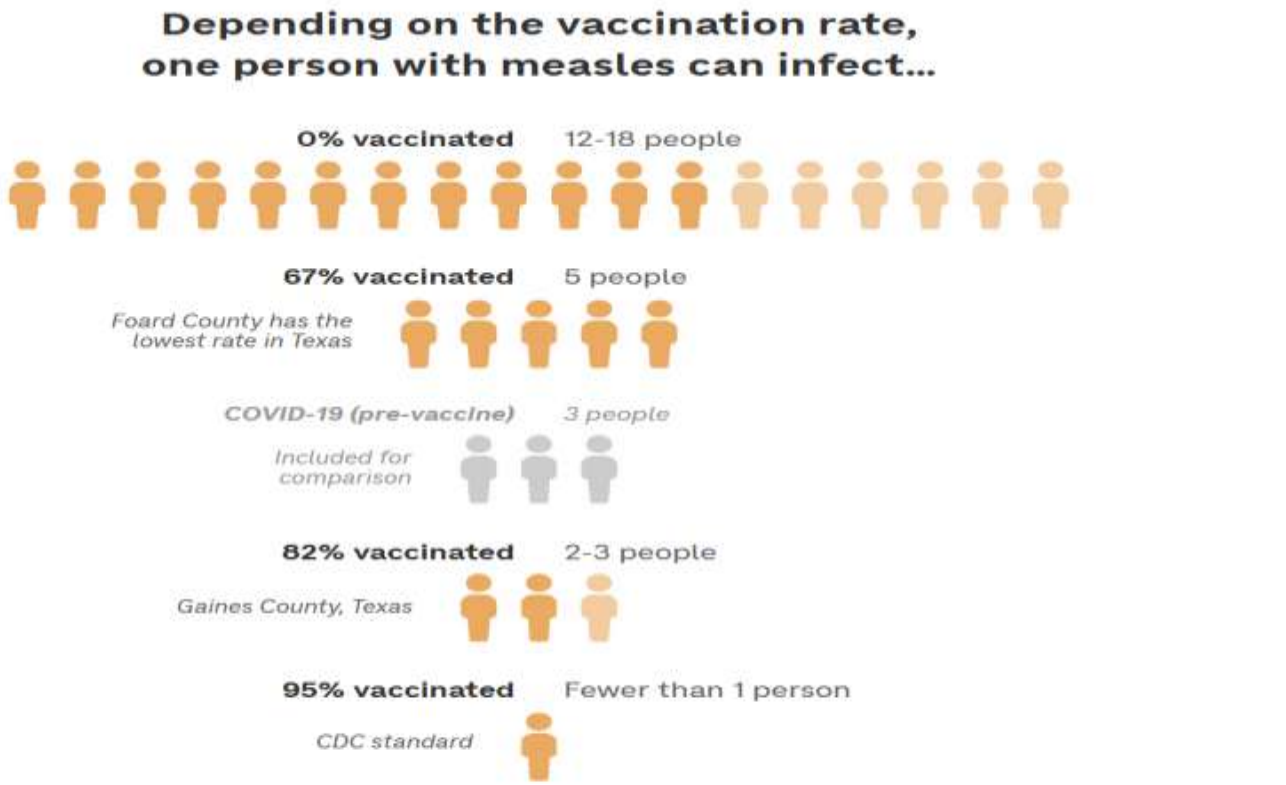

Healthcare Providers: Stay Alert for Measles Cases | Measles (Rubeola) | CDC

# Measles: Infectivity

- Transmitted by direct contact with infectious droplets or by airborne spread when an infected person breathes, coughs, or sneezes
- Patients are contagious from 4 days before to 4 days after the appearance of the rash
- Virus remains in air for 2 hours -one can acquire it by being in a room where a measles patient had been 2 hours earlier



# Measles: Infectivity




**Notes**

The $R_0$ for measles — the number of people one person might infect if there is zero immunity in a population — is 12-18 people. NPR used the middle of that range, 15 people, to estimate an effective reproduction number for other vaccination rates. Vaccination rates shown are kindergarten MMR vaccination rates for the 2023-2024 school year.

*Source: Matthew Ferrari, Center for Infectious Disease Dynamics at Pennsylvania State University; Texas Department of State Health Services*

*Credit: Maria Godoy, Alyson Hurt and Carmel Wroth/NPR. Icon created by Alice Design from The Noun Project*

# Infection Control

For any possible cases:

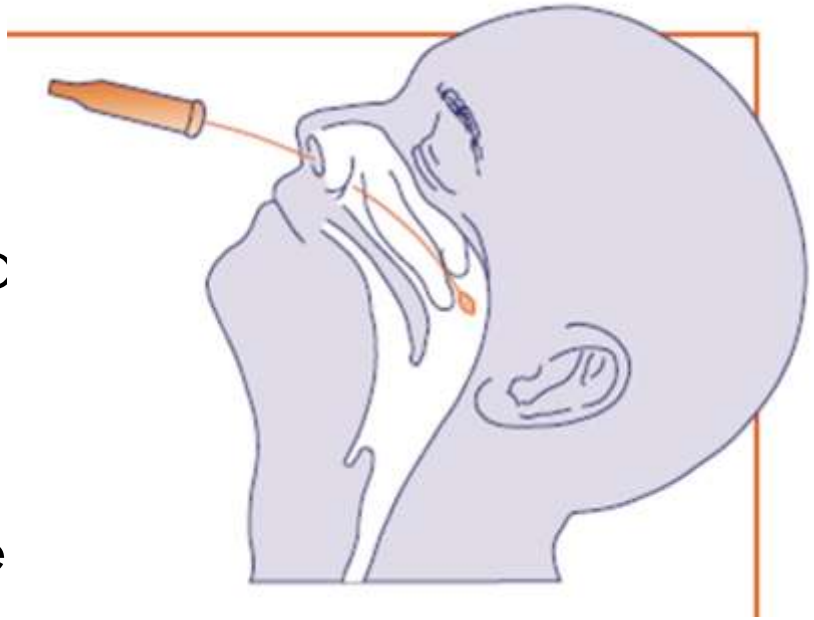
- **Immediately place standard isolation mask on patient** (or cover infant with blanket) and **place in private patient room with closed door.** Negative pressure room preferred if available

- **N95 Mask (or PAPR)** should be worn by immune healthcare provider when interacting with patient

- Immediately notify Department of Health

# Diagnosing Measles: Contact your local DOH

- Serum blood sample for serology
  - 5 mL of whole blood or 4 mL of serum in red-top or gold-top vacutainer AND
- Either a nasopharyngeal (NP) or throat swab for PCR
  - Swabs must be placed in unexpired Viral Transport Media (also called Universal Transport Media). Swabs in other types of media cannot be tested for measles



# Treatment of Measles

No anti-viral therapy for measles

Medical care is supportive

- Provide symptomatic relief
- Treat bacterial infections
- Vitamin A for patients on diagnosis and next day for total 2 doses

# Preventing Measles: Measles Vaccine Efficacy

- One dose of MMR vaccine is ~ **93% effective** at preventing measles

- Two doses of MMR (second dose given at least 28 days after the first dose) ~ **97% effective**

  - 1-3% will still remain susceptible to measles despite 2 vaccines – milder disease, less likely to spread

# Preventing Measles: Vaccine Recommendations Before Any International Travel

6 -11 months of age: 1 dose of MMR vaccine

*These children will need two additional doses at least 28 days apart on or after their first birthday

12 months of age and older: 2 doses of MMR vaccine

*Separated by at least 28 days

Teenagers and adults who do not have evidence of immunity should get 2 doses of MMR vaccine

*Separated by at least 28 days

# Measles: Pearls

- Check immunization status
- Ask about travel and exposure history
- Essential history: rash should begin on face and neck and spread distally, with delayed onset of rash after illness began
- Check for Koplik spots on patients presenting with severe viral respiratory syndromes
- Advise patients discharged with viral syndromes to monitor for later development of rash

# Preventing Measles: Measles Post-exposure Prophylaxis

**Table 3.32. Postexposure Prophylaxis (PEP) for People Exposed to Measles Who Are NOT Pregnant or Immunocompromised**

| Age Range | Measles Immune Status[a] | PEP Type Depending on Time After Initial Exposure | | |
|---|---|---|---|---|
| | | ≤3 days (≤72 hours) | 4–6 days | >6 days |
| All ages (≥6 mo) | Immune | • PEP not indicated. Exposed person has documented immunity. | | |
| <6 mo | Nonimmune (because of age[b]) | • Administer immune globulin intramuscular (IGIM)[c]<br>• Home quarantine[d] | | • PEP not indicated (too late).<br>• Home quarantine[d] |
| 6–11 mo | Nonimmune | • Administer MMR vaccine (MMR vaccine preferred over immune globulin [IG])<br>• No quarantine needed.[e] | • Administer IGIM[c]<br>• Home quarantine[d] | • PEP not indicated (too late).<br>• Home quarantine[d] |
| ≥12 mo | Nonimmune | • Administer MMR vaccine<br>• No quarantine needed[e] | • IG PEP usually not administered[f]<br>• Home quarantine,[d] then administer MMR vaccine to protect from future exposures | |
| ≥12 mo | 1 dose of MMR vaccine | • Administer 2nd MMR vaccine dose if ≥28 days from the first dose<br>• No quarantine needed (person had 1 dose when exposed) | | |

Adapted from a table developed by New York City Department of Health: **www1.nyc.gov/assets/doh/downloads/pdf/imm/pep-measles-providers.pdf.** Additional source: Centers for Disease Control and Prevention. Prevention of measles, rubella, congenital rubella syndrome, and mumps, 2013. *MMWR Recomm Rep*. 2013;62(RR-4):1-34; and Gastanaduy P, Redd S, Clemmons N, et al. Chapter 7: Measles. In: Roush SW, Baldy LM, Kirkconnell Hall MA, eds. *Manual for the Surveillance of Vaccine-Preventable Diseases*. Centers for Disease Control and Prevention. Page last reviewed May 13, 2019. Available at: **www.cdc.gov/vaccines/pubs/s0urv-manual/chpt07-measles.html**

# Objectives

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# Thank you!