Measles:
Identification, Testing, and Management of Suspected Cases

(Updated February 2024)

Triage febrile rash illnesses by phone, or immediately upon arrival, to assess need for control measures.

Does Patient Have Signs and Symptoms of Measles?

Prodrome with:
- Fever (100.4°F or higher).
- Cough.
- Runny nose (coryza).
- Red, watery eyes (conjunctivitis).

Followed in 3-5 days by:
- Generalized descending maculopapular rash.
- Koplik spots (may not be present).

AND

Has risk factors for measles (history of international travel, contact with travelers or links to a known outbreak or case, or no/unknown immunity).

Note: One dose of measles vaccine is 93% effective, and two doses are 97% effective at preventing measles.

NO →

Manage as clinically indicated.

Consider other differential diagnoses for the illness and address as indicated.

Seek commercial testing for pathogens of concern (e.g., Influenza, Group A Streptococcus) as indicated.

YES ↓

Minimize Risk of Transmission

- Measles is a highly infectious airborne illness.
- Identify febrile rash illnesses prior to, or immediately upon, arrival to expedite evaluation **in a private room and to minimize patient exposures**.
  - Have the patient avoid the waiting room (use a side/back entrance).
  - Request the patient wear a surgical mask.
  - Conduct patient evaluation in a room that can be left vacant for at least 2 hours after the patient's visit.

Call Immediately (24/7) Upon Suspicion for Public Health Reporting and Follow-Up: County Health Department (www.floridahealth.gov/CHDEpiContact) *or* Bureau of Epidemiology (850-245-4401)

Laboratory Testing

Preferred Specimens, Should Be Collected <72 Hours After Rash Onset:
- Nasopharyngeal (NP) or oropharyngeal (OP) swab in universal viral transport media for measles RT-PCR.*
- Urine in a sterile cup for measles RT-PCR.*

Serum Specimens, Should Only be Collected ≥ 72 Hours After Rash Onset:
- Serum for measles specific IgG and IgM.**

*Measles RT-PCR is only available at certain commercial laboratories and is available at the Bureau of Public Health Laboratories, after prior authorization by the county health department.
In a vaccinated patient, a negative measles IgM does NOT exclude measles; **RT-PCR is preferred.

Suspect Case Management

- Isolate patient immediately.
- Exclude from childcare/school/ workplace for at least 4 days after the onset of rash.
- Reassess isolation based on diagnosis.
- Provide supportive treatment and treatment of complications.
  - Consider administration of vitamin A for all children.

If you have a positive measles test (PCR or IgM) OR high suspicion for active measles infection after public health consultation:

- Notify receiving facilities of diagnosis.
- Identify patients/visitors and staff that shared the same airspace with the case up to 2 hours later.
- Review the measles evidence of immunity status of patients and staff potentially exposed at your practice.
- Provide vaccine within 3 days or immunoglobulin within 6 days of exposure, as indicated.
- Exclude all health care staff without evidence of immunity from day 5 through day 21 following the exposure.
- Clean surfaces that may have been contaminated with an EPA-registered disinfectant for health care settings.

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Clinical Overview: Measles

Updated February 2024

Background

- Also known as rubeola.
- Acute, febrile rash illness.
- Highly contagious: Up to 9/10 susceptible persons with close contact to measles will get measles.

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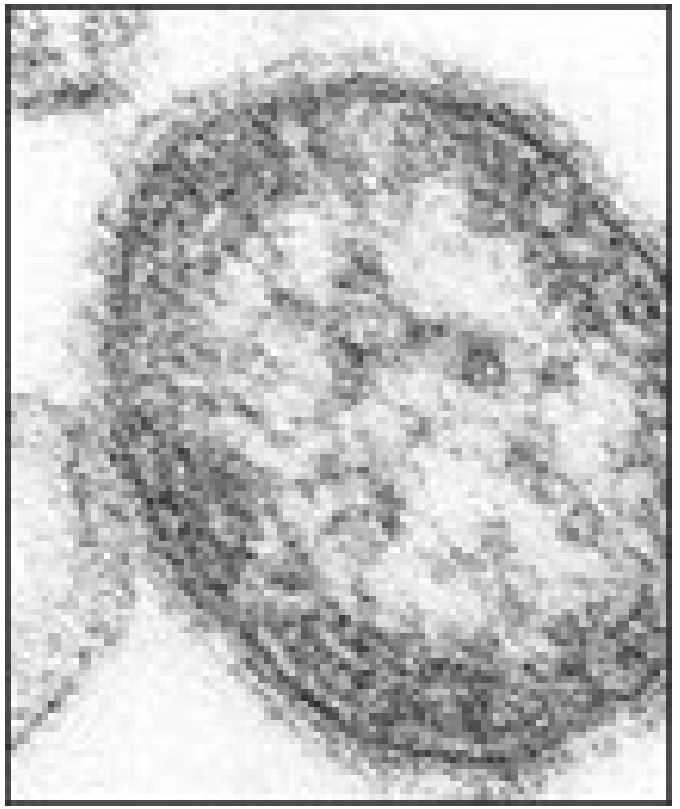
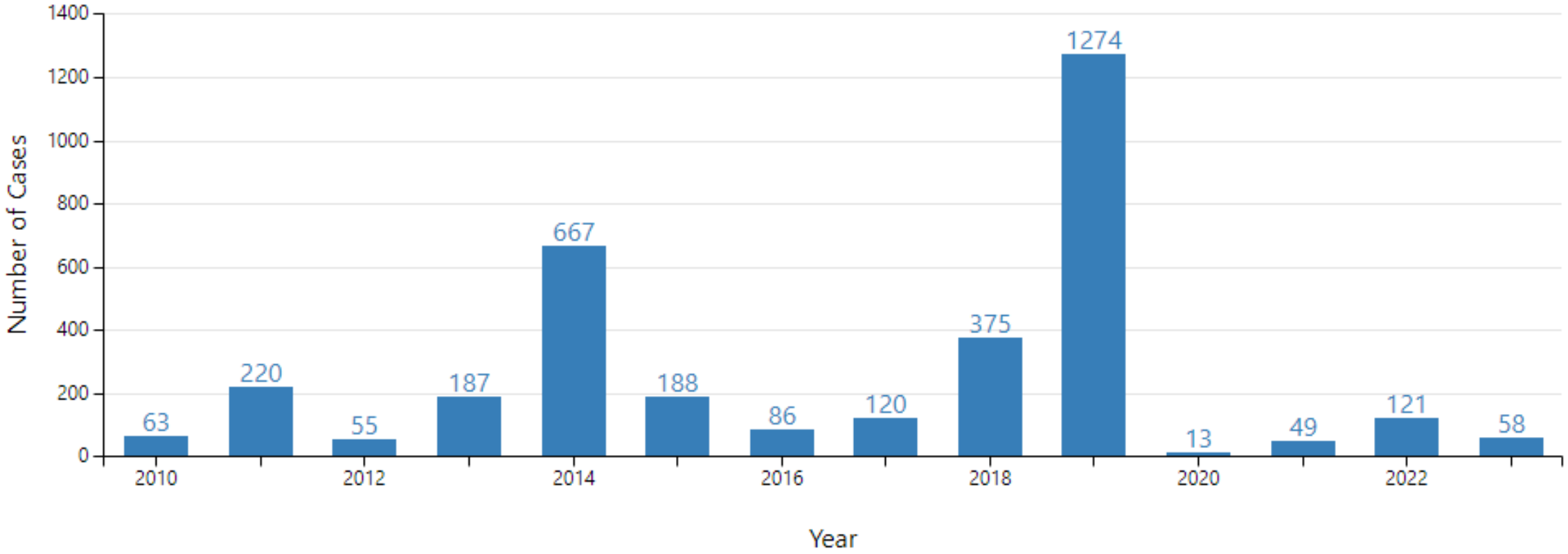
Background

- Paramyxovirus, genus *Morbillivirus.*
- Single-stranded RNA virus.
- Humans are the natural host.



Epidemiology: Cases in US

2010-2023* (as of February 15, 2024)



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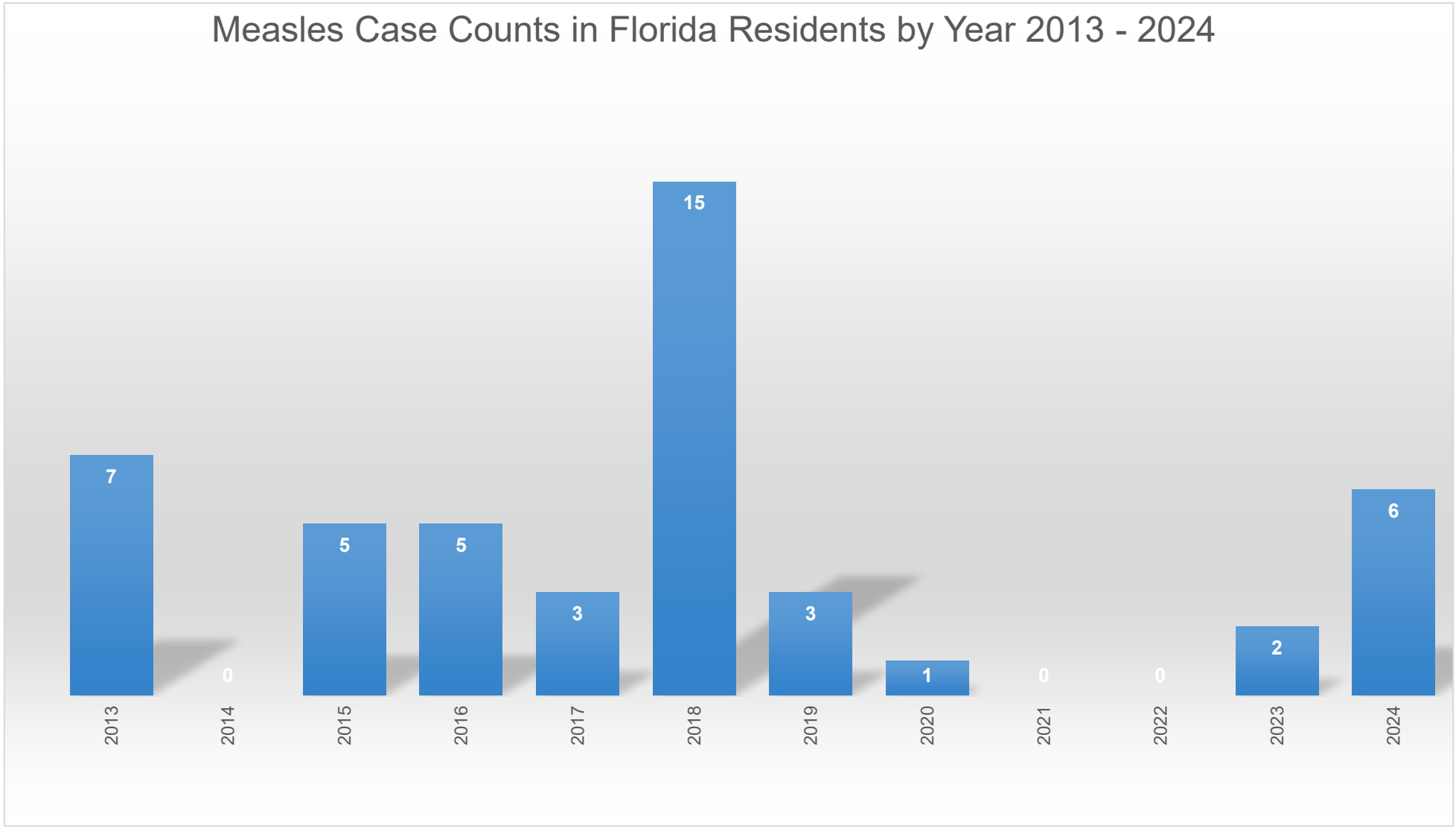
Epidemiology: Cases in FL



Note: 2024 is Year to Date as of February 21, 2024

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Transmission

- One of the most infectious diseases.
- Transmitted by direct contact with infectious droplets or airborne routes.
- Can remain in the air and on surfaces for up to two hours.
- Infected persons are infectious from four days before through four days after rash onset.

Clinical Presentation

- Incubation Period: 10-14 days (range 7-21 days).
- Prodrome: Lasts 2-4 days.
  - Fever (100.4°F or higher).
  - Cough.
  - Coryza.
  - Conjunctivitis.
- Koplik spots.

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Measles Rash

- Starts 2-4 days after the onset of fever.
- Starts in face at hairline or behind the ears.
- Spreads cephalocaudally.
- Maculopapular – can coalesce.
- Not pruritic.

Measles Rash

Complications

- Diarrhea: 8%.
- Otitis Media: 7-9%.
- Pneumonia: 1-6%.
- Encephalitis: 1 per 1,000 cases.
- Acute Disseminated Encephalomyelitis (ADEM): 1 per 1,000 cases.
- Death: 1-3 per 1,000 cases.
- Subacute Sclerosing Panencephalitis (SSPE): 7-11 per 100,000 cases.
- Immune suppression with secondary infections.

Individuals at Risk for Complications

- **Immunocompromised patients.**
  - Especially those with defects in cell-mediated immunity (e.g., AIDS, lymphoma).
  - Can have atypical findings.
- **Pregnant women.**
  - Increased risk for serious maternal and fetal complications.
  - Can result in low birthweight, miscarriage, intrauterine fetal death, and maternal death.
- **Individuals with vitamin A deficiency or poor nutritional status.**
- **Extremes of age, especially infants <12 months old.**

Laboratory Diagnostics

Preferred Specimens, Should Be Collected <72 Hours After Rash Onset:

- Detection of measles RNA by real-time polymerase chain reaction (RT-PCR).
  - RT-PCR is preferred.
  - Nasopharyngeal or oropharyngeal swap.
  - Urine in a sterile cup.
  - Viral shedding declines with time after rash onset so early collection is encouraged.

Serum Specimens, Should Only Be Collected ≥72 Hours After Rash Onset:

- Detection of measles-specific IgM antibodies.
  - Serum.
  - Up to 20% of tests may have a false negative if collected within 72 hours of rash onset.
  - May be absent or transient in persons with 1 or 2 MMR doses.

Vaccination

- Measles vaccine was licensed in the U.S. in 1963, and combination MMR vaccine was licensed in 1971.
- MMR is an attenuated live virus vaccine.
- Highly effective.
  - One dose: 93% protection.
  - Two dose: 97% protection.
- Recommended:
  - Children: First dose at 12-15 months, with a second dose at 4-6 years old.
  - Adults: Born during or after 1957.
  - International Travelers.
  - Health Care Personnel.

MMR Vaccine Contraindications

- Severely immunocompromised individuals (e.g., hematologic malignancy, receiving chemotherapy, long-term immunosuppressive therapy, AIDS).
- Family history suggestive of a congenital immunocompromising condition.
- History of allergic reaction to MMR or vaccine component.
- Pregnancy.

MMR Vaccine Adverse Events

- Generally, well tolerated.
- Common side effects:
  - Fever: <15%.
  - Brief rash: 5%.
  - Lymphadenopathy: 5% - 20%.
- Serious side effects:
  - Anaphylaxis: 2-14 events per million doses.
  - Febrile seizures: 1 event per 3-4,000 doses.
  - Thrombocytopenia: 1 event per 40,000 doses.

Post-Exposure Prophylaxis (PEP)

- Immune:
  - PEP is not indicated.
- Non-immune:
  - MMR vaccine: Within 72 hours of exposure.
  - IM or IV Immunoglobulin (IG): Within 6 days of exposure for infants younger than 12 months, pregnant women, severely immunocompromised, or potentially in outbreak settings.
- Infection control:
  - Airborne precautions.
  - Infected people should be isolated for four days after they develop the rash.

Treatment

- Supportive: Antipyretics, fluids, treatment of secondary infections.
- No specific antiviral therapy approved for the treatment of measles.
- Vitamin A:
  - Vitamin A deficiency can contribute to delayed recovery and to risk of complications associated with measles infection.
  - Can lean lead xeropthalmia.
  - Vitamin A recommended for all children with measles regardless of hospital status.
  - Dosing: Oral administration once daily for two days:
    - Infants < 6 months: 50,000 IU.
    - Infants 6 -11 months: 100,000 IU.
    - Children ≥12 months: 200,000 IU.

Treatment

- Ribavirin:
  - Susceptible in vitro. Clinical data is limited.
  - Some experts recommend for the treatment of measles pneumonia in patients ≤12 months, patients ≥12 months with pneumonia requiring ventilatory support, and immunosuppressed patients.
  - Dosing: 15 to 20 mg/kg per day orally in two divided doses for 5-7 days.
- Investigational Therapies for SSPE:
  - Isoprinosine.
  - Interferon-alpha or beta.

Reporting Measles

- Measles is a reportable disease in Florida.
- Measles should be reported **immediately** (24/7) upon initial suspicion or laboratory test order to your local county health department (FloridaHealth.Gov/CHDEpiContact) or the Florida Department of Health Bureau of Epidemiology (850-245-4401).