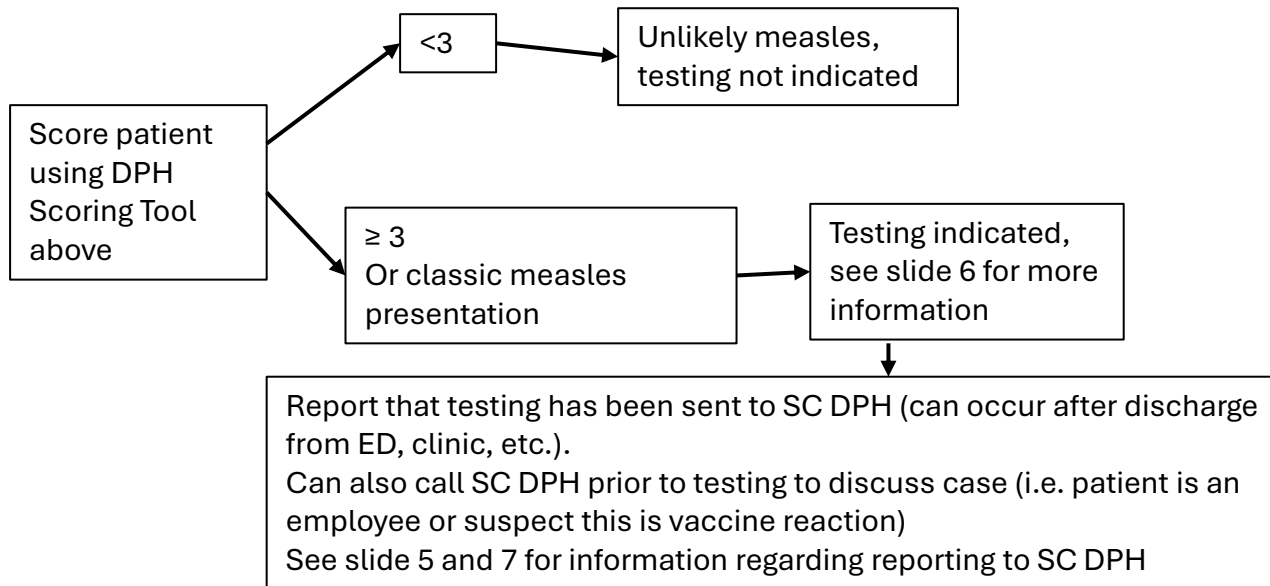


Measles Guidance for Providers Testing, Treatment, Post- exposure prophylaxis, Prevention

Clinical Assessment and Testing

Measles scoring from SC DPH	0 (low risk)	1 (some risk)	2 (high risk)
Immunity (1 MMR <7% suscept, 2 MMR <3% suscept)	Age appropriate vaccine (1 MMR even at ≥4 yo)	No vaccination records available, unsure	Unvaccinated
Clinical presentation (any one of below): 1. Prodrome: fever +cough, runny nose, OR conjunctivitis 2. Rash starting at hairline/face and spreading to trunk 3. Koplik spots (bluish gray specks on buccal mucosa by molars)	Atypical presentation (no fever) Other causes of rash more likely (fifth disease, HFM, antibiotic)	No typical prodrome (other causes of rash more likely HFM, antibiotics)	Typical prodrome AND rash
Exposure risk-known exposure to measles or possible epidemiologic link (majority of cases have been in Spartanburg County)	No exposure to confirmed case	Unknown or travel to area with active community spread	Epi linked to confirmed cases



Admission and Consultation criteria:

- Infectious Disease consultation is NOT required for Testing
- Admission is Not required for measles illness.
- Consider admission based on patient presentation, severe illness, and concerns other illness
- If admitting call:
 - Infection Prevention & Control (as appropriate for your facility)
 - Notify Referral and Transfer Center (as appropriate for your facility) for need for airborne

DPH documentation requirements

If calling DPH after seeing the patient or after discharging patient, please be sure the following information obtained.

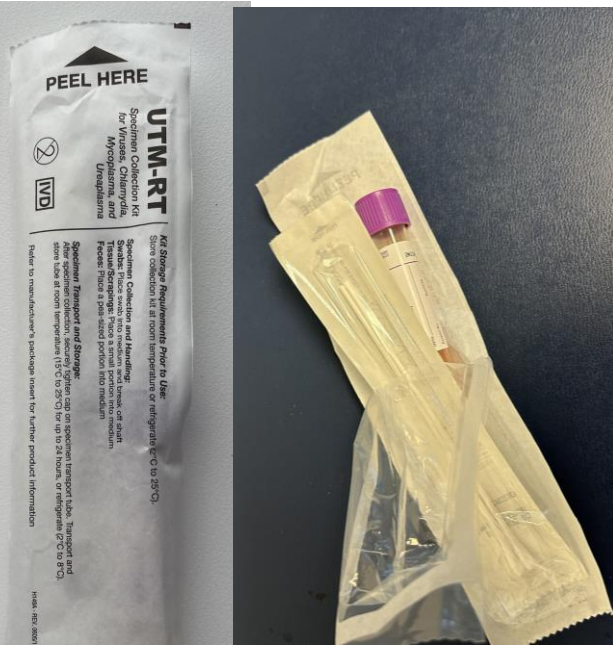
- Phone number of provider seeing patient in the event DPH needs to call back within an hour
- Facility information (address, name), date of being seen
- When test is sent date and time
- Patient information
 - Ensure up to date demographics:
 - Parent/guardian
 - Patient/parent phone number
 - Address

Clinical Chart:

- Number of MMR vaccines
- Symptoms: fever, rash, cough, runny nose, red/watery eyes
- Date of first symptom
- Order of symptom progression
- Rash:
 - Onset
 - Progression (e.g. face to trunk)
 - Characteristics (Rash Appearance)
- Known Exposure to measles?
 - If yes:
 - Whom
 - Where
 - When

Clinical Assessment and Testing

- **Testing:**
 - **Measles PCR (preferred)** from throat or NP swab on viral transport media or universal transport medium, flocked or nylon swab (in kit with UTM)
 - NOT cotton swab, can use swab in UTM-RT kit for pharyngeal swab (this is a synthetic swab)
 - To SC DPH (call PHL at 803-896-0819 and include submission form DPH-1335 found at <https://dph.sc.gov/sites/scdph/files/Library/D-1335oe.pdf> or can google form, label with basic patient label including date, time
 - Commercial labs such as LabCorp ,Quest etc also offer PCR testing
 - **Measles IgM** from blood if drawing blood for other reasons
 - . DO NOT SEND patient to another room/location. For blood draw or PCR testing since this increases the risk of exposures of susceptible people
 - Measles IgG to be used for determining past infection/vaccination and protection (mostly obtained in pregnant patients)



Pharyngeal-use swab included

Examples of swab types:



Nasopharyngeal-use swab included

When to consider requesting test to be sent to DPH

- If the patient is an employee consider sending test to SC DPH for expedited testing, due to patient exposure implications. Notify your local Infection Prevention or practice manager .
- If you are concerned this is post vaccine reaction consider sending to SC DPH as they can send to CDC. Unlikely to change patient's quarantine period but might change quarantine period for those exposed to the patient. Disease/presentation due to vaccine is not contagious.

Treatment

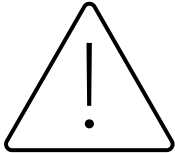
- Supportive Care
- Ribavirin is not recommended outpatient

Treatment-Vitamin A considerations

- DOES NOT
 - Prevent measles
 - Treat measles
- Vitamin A TOXICITY
 - Too much vitamin A can cause toxicity with symptoms such as nausea, vomiting, headache, fatigue, joint/bone pain, blurry vision, skin and hair problems. Patients have been admitted in TX in 2025 due to vitamin A toxicity. **High doses of vitamin A are teratogenic in pregnancy and so WOULD NOT recommend vitamin A in pregnancies affected by measles.**
- Cochrane Review of Vitamin A showed no change in mortality amongst children with measles given vitamin A supplementation. Studies are predominantly performed in low- and middle-income countries where there is malnutrition NOT the U.S.
- From AAP Fact Checked: vitamin A has been used to lessen symptoms in children who already have measles and who have low levels of this micronutrient which is rare in the US
- **Contraindicated in pregnancy**

Treatment-Vitamin A

- Who should get vitamin A
 - All inpatient children with measles
 - Consider in immunosuppressed adult inpatients with measles
 - Outpatient consider **ONLY** with direction by PCP in children who are nutritionally deficient (e.g. failure to thrive, fat malabsorption, restrictive diet, CF-if not already receiving ADEK supplementation)
 - **PCP must pay attention to formulation as it is often not in IU**
 - **Make sure not already receiving vitamin A supplements (or products that include vitamin A)**



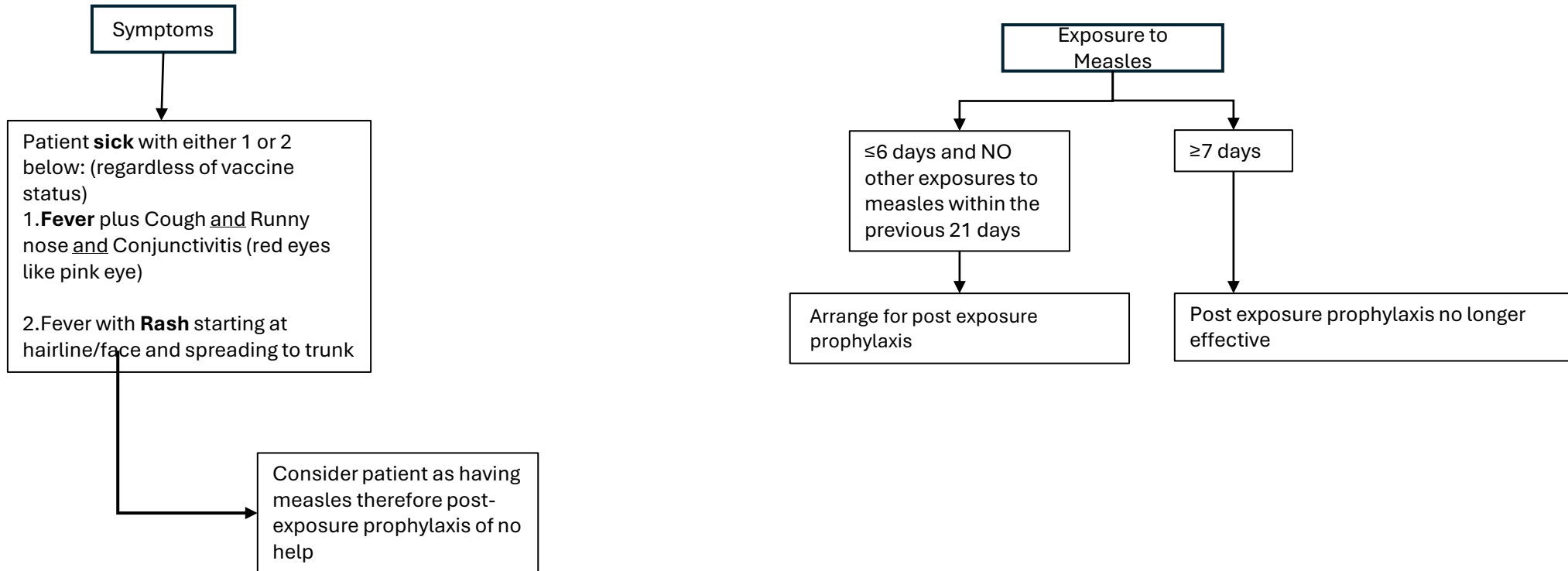
<6 months	50,000 IU daily x2 days
6-11 months	100,000 IU daily x2 days
≥12 months	200,000 IU daily x2 days

- **ONCE** a day for 2 days **ONLY**
- **DO NOT** give vitamin A to pregnant patients

Establish Time of Exposure

Questions for patient:

1. Known exposure to measles and timing --- **Must find out timing as these patients will be sent to centers where immune compromised patients are being seen and therefore CANNOT have had exposure ≥ 7 days prior to enter these locations**
2. Symptoms
3. Check vaccination status (in chart and ask): 1 vaccine is protective—if vaccinated should not need post-exposure prophylaxis. 2 vaccines required for presumptive immunity in pregnancy.



Post Exposure Prophylaxis in Immune Compromised and Pregnant Patients

Table 3.33. Postexposure Prophylaxis (PEP) for People Exposed to Measles Who ARE Pregnant or Immunocompromised

Category	Measles Immune Status ^a	PEP Type Depending on Time After Initial Exposure		
		≤3 days (≤72 hours)	4–6 days	>6 days
Severely immunocompromised ^b	IG recommended regardless of measles immune status	<ul style="list-style-type: none"> Administer immune globulin intravenous (IGIV)^c Home quarantine^d 		<ul style="list-style-type: none"> PEP not indicated (too late) Home quarantine^d
Pregnant	Immune =2 vaccines		<ul style="list-style-type: none"> PEP not indicated 	
	Nonimmune	<ul style="list-style-type: none"> Administer IGIV^c Home quarantine^d 		<ul style="list-style-type: none"> PEP not indicated (too late) Home quarantine^d

See next slide for severe immune compromised conditions

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

^aAcceptable evidence of immunity includes written documentation of age-appropriate vaccination, laboratory evidence of immunity, laboratory confirmation of disease, or birth before 1957.

^bThe degree of altered immunocompetence in a patient should be determined by a physician. Severely immunocompromised patients include patients with severe primary immunodeficiency; patients who have received a hematopoietic cell transplant until at least 12 months after finishing all immunosuppressive treatment, or longer in patients who have developed graft-versus-host disease; patients on treatment for acute lymphoblastic leukemia (ALL) within and until at least 6 months after completion of immunosuppressive chemotherapy; and patients with HIV with severe immunosuppression, which for children ≤5 years is defined as CD4+ T-lymphocyte percentage <15% and for children >5 years and adolescents is defined as a CD4+ T-lymphocyte percentage <15% **or** a CD4+ T-lymphocyte count <200 lymphocytes/mm³, and those who have not received MMR vaccine since receiving effective antiretroviral therapy. Additional severely immunocompromising conditions and medications are provided in Rubin LG, Levin MJ, Ljungman P, et al. 2013 IDSA Clinical practice guideline for vaccination of the immunocompromised host. *Clin Infect Dis*. 2014;58(3):e44-e100.

^cDosing of IGIV is 400 mg/kg of body weight.

^dThe quarantine period is 21 days after the last exposure; most health departments would extend the monitoring period to 28 days if IG is administered as PEP because IG can prolong the incubation period. Decisions on whether exposed persons who received IG as PEP appropriately (ie, within 6-day window) should return to settings such as child care, school, or work (ie, not be quarantined) should include consideration of the immune status and intensity of contacts in the setting and presence of high-risk individuals. These persons should be excluded from health care settings.

Severe Immune Compromising Conditions

- Solid organ transplant recipient on immunosuppressive therapy
- Solid tumor or hematologic malignancy on treatment
- Stem cell transplant recipient or CAR-T therapy within 2 years on immunosuppressive therapy
- Moderate or severe primary immunodeficiency
- Within 1 year of B-cell depleting therapy (e.g. rituximab)
- Untreated HIV with CD4 <50 cells/mm³
- Are receiving active treatment with high dose corticosteroids, alkylating agents, antimetabolites, or immunosuppressive or immunomodulatory biologic agents (e.g. B cell-depleting agents).

Post Exposure Prophylaxis for Immunocompetent, Not Pregnant Patients

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 * • Home quarantine ^d		• PEP not indicated (too late). • Home quarantine ^d
6–11 mo	Nonimmune	• Administer MMR vaccine (MMR vaccine preferred over immune globulin [IG]) • No quarantine needed.*	• Administer IGIM ^c * • Home quarantine ^d	• PEP not indicated (too late). • Home quarantine ^d
≥12 mo	Nonimmune	• Administer MMR vaccine • No quarantine needed*	• IG PEP usually not administered ^f • Home quarantine, ^d then administer MMR vaccine to protect from future exposures	
≥12 mo	1 dose of MMR vaccine	• Administer 2 nd MMR vaccine dose if ≥28 days from the first dose • 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

^aAcceptable evidence of immunity includes written documentation of age-appropriate vaccination, laboratory evidence of immunity, laboratory confirmation of disease, or birth before 1957.

^bMMR vaccine is not indicated in this age group.

^cDosing of IGIM is 0.5 mL/kg of body weight (max dose 15 mL).

^dThe quarantine period is 21 days after the last exposure; most health departments would extend the monitoring period to 28 days if IG is administered as PEP, because IG can prolong the incubation period. Decisions on whether exposed persons who received IG as PEP appropriately (ie, within 6-day window) should return to settings such as child care, school, or work (ie, not be quarantined) should include consideration of the immune status and intensity of contacts in the setting and presence of high-risk individuals. These persons should be excluded from health care settings.

^eQuarantine is not needed for persons who received MMR as PEP appropriately (ie, within the 3-day window), although these persons should be excluded from health care settings for 21 days.

^fIGIM is recommended for infants <12 months of age, and IG administered intravenously is recommended for nonimmune pregnant people and severely immunocompromised persons. IGIM can be given to other persons (eg, ≥12 months of age) who do not have evidence of measles immunity, but priority should be given to persons exposed in settings with intense, prolonged, close contact (eg, household, child care, classroom).

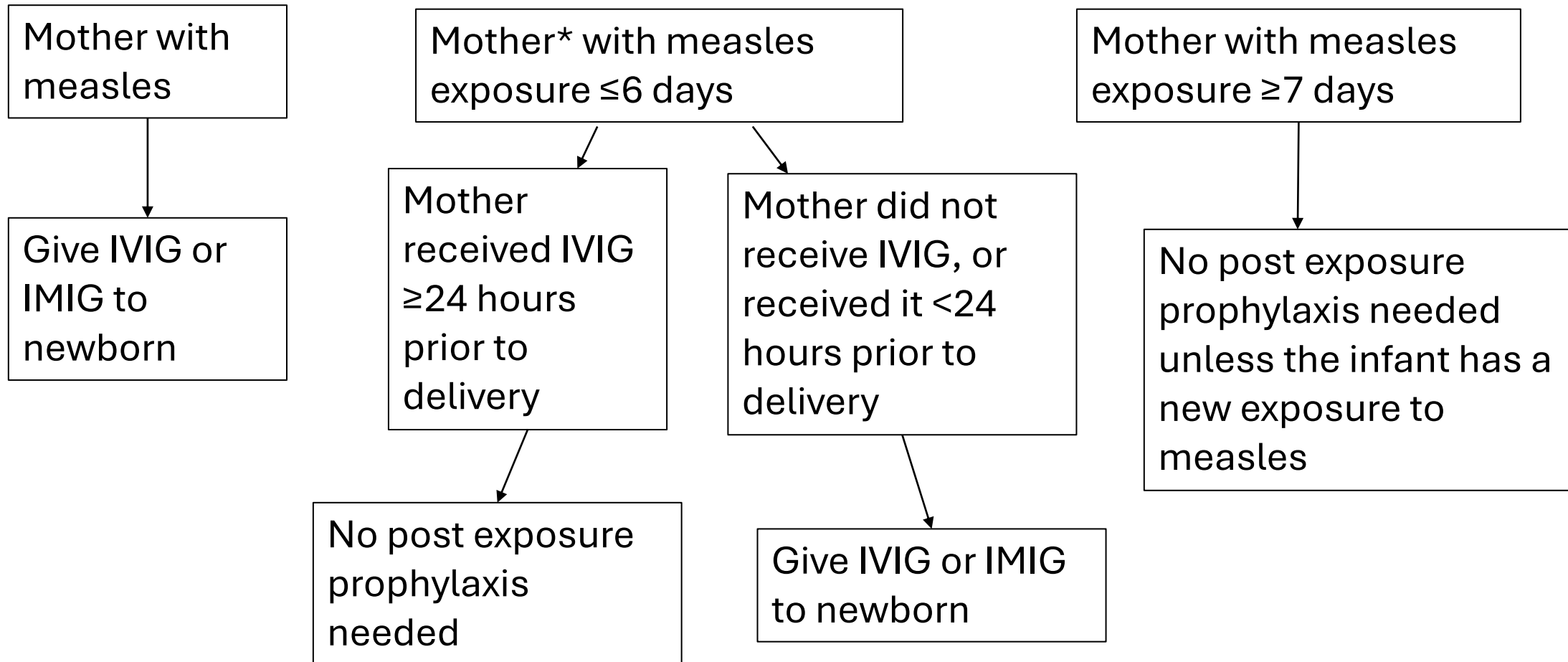
*Prefer Intravenous immune globulin (IVIG) if able to establish IV access and if site is capable (e.g. nursery level)

- See next 5 slides for newborns with:
 - Mothers with active measles
 - OR
 - Mothers with measles exposure

Determining if mother and baby are at risk for measles

- Mothers with positive rubella IgG have likely been immunized against measles as the vaccine is a combination product (e.g. MMR, MMRV) and most patients have not been infected with rubella
- 2 MMR vaccines are required for presumptive immunity.
- Rubella IgG and Rubeola (measles) IgG can be discrepant about 10-20% of the time
- Even if rubeola (measles) IgG is negative, in an immunized patient, there is still protection against measles based on memory B cells. If the patient does develop infection the symptoms are less severe than those who are unimmunized.
- It is unknown and unlikely that a mother with negative rubeola (measles) IgG passes any protection to the newborn infant
- **Discuss with pregnant patients who are exposed to measles. Consider and highly recommend obtaining rubeola IgG if exposed and within 6 days of exposure as they are within the window to get post exposure prophylaxis.**
- In the event of a mother who is exposed to measles with negative rubeola (measles) IgG consider giving IVIG within 6 days of exposure.
- In the event of a mother who is exposed to measles and has negative rubeola IgG if no IVIG is given prior to delivery, give post-exposure prophylaxis to the neonate.

Post-exposure prophylaxis in newborn infants



*unvaccinated or unprotected mother, see previous slide for considerations

Post Exposure Prophylaxis in <6 months

- Prefer intravenous immune globulin (IVIG) if able to establish IV access and able based on level of nursery
- If unable to get IV placed after 2 attempts or unable to give IVIG based on level of nursery, give IMIG (see slides 23 and 26 for more information)
- If mother has already received IVIG while pregnant this will pass to baby and provides protection
- IVIG in patients <6 months may be given over 2 hours and these infants do not require pre-meds with acetaminophen or diphenhydramine
- IMIG should not exceed 1 ml in each shot/location

IMIG (<6 months only)

- Order IMIG (also called gamastan)
- Recommend no more than 0.5 ml per injection site for infants <3 kg
- Infants ≥ 3 kg should receive no more than 1 ml per injection site
- Dosages will be prepared by pharmacy and dispensed divided into the appropriate number of syringes
- Recommend vitals, including blood pressure every 30 minutes x2 after giving IMIG

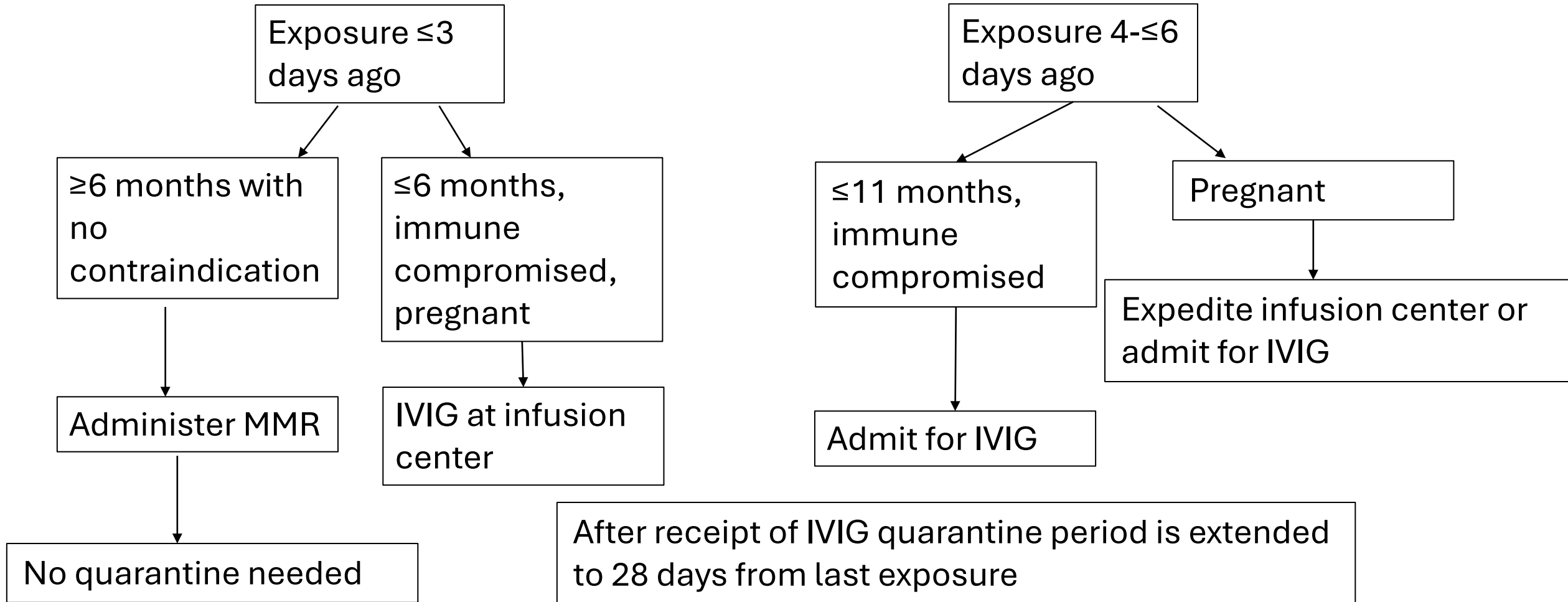
IVIG considerations

- IVIG is a pooled blood product of antibodies and will give your patient antibodies to measles. Giving this reduces the chance of the patient developing measles and can reduce the severity of disease with measles. It does not mean that no quarantine is needed. It also does not mean that measles will not occur.
- Side effects from IVIG can include fever (even for 24 hours post administration end), headache, noninfectious meningitis, rash and so we typically give patients Tylenol and often Benadryl prior to giving IVIG.
- If the patient/patient's family is concerned about the patient, should bring back in for evaluation
- Quarantine period extends to 28 days from last exposure to measles if IVIG is given.

IMIG Considerations

- If unable to get IV x2 in newborn infants, can consider intramuscular immune globulin (IMIG)
- Dosing is 0.5 ml/kg
- Give no more than 0.5-1 mL per IM injection site
- Side effects: tenderness, pain, soreness at injection site that typically resolves within 24 hours
 - Hypotension-if needing to give saline bolus try again for IV but if unsuccessful and needed, place IO
- Should monitor for 1 hour after injection
- Discuss things for family to monitor for when going home (e.g. fever would still recommend coming in for work up in the ED but should call ED or upon entry let them know that the patient is measles exposed), peak levels of immune globulin G are obtained 2 days after IM injection

Potential Treatment Pathway



IVIG

- Considerations:
 - May need to fill out prior authorization for this to be covered by insurance, this should be performed by the ordering provider's office
 - Lack of weekend hours may affect ability to schedule, recommend calling your infusion center to try to expedite scheduling.
- Recommend:
 - Vitals, pre-medications with acetaminophen and diphenhydramine as appropriate for the patient
 - Labs typically not needed
 - Dose 400 mg/kg, one time dose
 - For ≥ 6 months can titrate time given
 - For < 6 months give at continuous rate over 2 hours
 - Vitals every 30 min x2 and at end of infusion
 - Recommend medications to be given in the setting of hypersensitivity reaction (i.e. diphenhydramine, solumedrol, epinephrine)

Prevention

- Vaccination considerations (early vaccine and 3rd dose consideration)
- Infection prevention and control for those who receive IVIG or IMIG
- Patients that receive the IVIG or IMIG are still considered susceptible and in quarantine so if they are seen in the office they should be treated as an exposed person for 28 days from the exposure – this does include infants as well that received immunoglobulin

Table 3.34. Recommendations for Measles Immunization^a

Category	Recommendations
Unimmunized, no history of measles (12 through 15 mo of age)	MMR or MMRV vaccine is recommended at 12 through 15 mo of age; a second dose is recommended at least 28 days after the first dose (or 90 days for MMRV) and usually is administered at 4 through 6 y of age.
Children 6 through 11 mo of age in outbreak situations ^b or before international travel	Immunize with MMR vaccine, ideally at least 2 weeks prior to travel, but this dose is not considered valid, and 2 valid doses administered on or after the first birthday are required. MMRV should not be administered to children <12 mo of age.
Students in kindergarten, elementary, middle, and high school who have received 1 dose of measles vaccine at 12 mo of age or older	Administer the second dose.
Students in college and other postsecondary institutions who have received 1 dose of measles vaccine at 12 mo of age or older	Administer the second dose.
History of immunization before the first birthday	Dose not considered valid; immunize (2 doses).

Category	Recommendations
History of receipt of inactivated measles vaccine or unknown type of vaccine, 1963–1967	Dose not considered valid; immunize (2 doses).
Further attenuated or unknown vaccine administered with IG	Dose not considered valid; immunize (2 doses).
Allergy to eggs	Immunize; no reactions likely (see text for details).
Neomycin allergy, nonanaphylactic	Immunize; no reactions likely (see text for details).
Severe hypersensitivity (anaphylaxis) to neomycin or gelatin	Avoid immunization.
Tuberculosis	Immunize (see Tuberculosis, p 888); if patient has untreated tuberculosis disease, start antituberculosis therapy before immunizing.
Measles exposure	Immunize or give IG, depending on circumstances (see Care of Exposed People, p 574, Table 3.32, and Table 3.33).
People with HIV	Immunize (2 doses) unless severely immunocompromised (see text, p 577); administration of IG if exposed to measles is based on degree of immunosuppression and measles vaccine history (see text, p 577).
Personal or family history of seizures	Immunize; advise parents of slightly increased risk of seizures.
IG or blood product recipient	Immunize at the appropriate interval (see Table 1.11, p 69).

HIV indicates human immunodeficiency virus; IG, immune globulin; MMR, measles, mumps, and rubella vaccine; MMRV, measles, mumps, rubella, and varicella vaccine.

^aSee text for details and recommendations for use of MMRV vaccine.

^bSee Outbreak Control (p 585).

Infection Prevention and Control

- For all those patients who receive IVIG and IMIG, quarantine is extended to 28 days past last exposure to contagious measles.
- Given this if needing to bring back in to the office or hospital consider them as exposed and use precautions.
 - For inpatient use airborne precautions
 - If sending to the ED then call ahead to let them know about measles risk