This toolkit was developed by Arizona Department of Health Services (ADHS) to assist various healthcare settings prepare for and address a measles exposure in the state of Arizona. These recommendations were guided by the best available evidence and resources available. This toolkit is only a single piece of an infection prevention and control plan. Healthcare workers should use and incorporate other professional resources to develop a comprehensive infection prevention and control plan.
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**Disease Description**

Measles is a serious respiratory disease that is spread easily through coughing and sneezing. Measles is a very contagious virus that can remain in a room for up to two hours even if the person with measles is no longer in the room. Measles can also be spread by an infected person even before a rash or any other symptoms appear.

Symptoms of measles include a prodrome of:
- Fever
- Runny nose
- Cough
- Malaise—feeling achy and run down
- Red, watery eyes
- Koplik’s spots—tiny white spots with bluish/white centers found inside the mouth
- The prodrome is followed in 2-4 days by a rash—starting on the hairline, face, and neck
  - Then spreading downward on the body to the hands and feet

The average incubation period for measles is 14 days, with a range of 7-21 days. Persons with measles are usually considered infectious from 4 days before until 4 days after onset of rash with the rash onset being considered as day zero. Immunocompromised individuals may shed virus longer and can be contagious for the duration of illness.

Measles is spread from person to person through the air by infectious droplets. Severe cases of measles can cause pneumonia, convulsions, brain damage, and death. One to three children out of 1,000 in the U.S. who get measles will die from the disease.

According to the Centers for Disease Control and Prevention, in 2011, 38 percent of children younger than 5 years old who had measles in the United States had to be treated in the hospital. Although the number of cases in the U.S. is low, measles is common in other countries.

**Healthcare Settings**

Persons who work in health care facilities (including volunteers, trainees, nurses, physicians, technicians, receptionists, and other clerical and support staff) are at increased risk of exposure to measles and at increased risk of transmission to persons at high risk of severe measles. All persons who work in such facilities in any capacity should have presumptive evidence of immunity to measles to prevent any potential outbreak.

**Presumptive evidence of immunity and routine vaccine recommendations for health care personnel**

Health care personnel (HCP) have slightly different criteria for acceptable presumptive evidence of immunity. All persons who work in health care facilities should have presumptive evidence of immunity to measles. This information should be documented and readily available (ideally through electronic medical records) at the work location.

Presumptive evidence of immunity to measles for health care personnel includes any of the following:

- Written documentation of vaccination with 2 doses of live measles or MMR vaccine administered at least 28 days apart
- Laboratory evidence of immunity
- Laboratory confirmation of disease or
- Birth before 1957
Although birth before 1957 is considered as presumptive evidence of immunity, for unvaccinated HCP born before 1957 that lack laboratory evidence of measles immunity or laboratory confirmation of disease, health care facilities should consider vaccinating personnel with two doses of MMR vaccine at the appropriate interval.\(^3\)

**Prevention and control strategies in medical settings**

In a medical setting, both the employee health and infection control practitioners have a role. When a measles case occurs in a health care facility, including outpatient and long-term care facilities, the following measures should be undertaken:

- Immediate review of evidence of measles immunity in all exposed staff
- Vaccination of personnel without presumptive evidence of immunity
- Exclusion of HCP with active measles illness from all patient contact and excluded from the facility
- HCP without presumptive evidence of immunity should be offered the first dose of MMR vaccine and excluded from work from day 5 to day 21 following exposure
- Isolation of patient in whom measles is suspected in a negative air pressure isolation room, also known as airborne infection isolation (AII) or airborne infection isolation room (AIIR). If AII or AIIR is not available, mask the patient and place in a private room with the door closed.
- Implementation of airborne precautions in addition to respiratory etiquette

An effective vaccination program is the best approach to prevent health care associated measles transmission. Health Care Infection Control Practices Advisory Committee (HICPAC) and CDC have recommended that secure, preferably computerized, systems should be used to manage vaccination records for HCP so records can be retrieved easily as needed. Failure to have such records can be costly and can increase resources needed to respond to the outbreak.

If a measles case or an outbreak occurs within a hospital, clinic, or other healthcare setting or in the surrounding community, all personnel regardless of birth year, should receive two doses of MMR vaccine, unless they have other documentation of measles immunity. Health care facilities should provide MMR vaccine to all personnel without presumptive evidence of measles immunity at no charge. Recently vaccinated HCP do not require any restriction in their work activities. All possibly exposed personnel need to self-monitor for compatible symptoms of measles.

Serologic screening of HCP during an outbreak to determine measles immunity prior to vaccination is not recommended, because preventing measles transmission requires the rapid vaccination of HCP without presumptive evidence of immunity, which can be impeded by the need to screen, wait for results, and then contact and vaccinate susceptible persons. Results from serological testing, if performed, can inform of need for the second MMR vaccine dose.

HCP without presumptive evidence of immunity who have been exposed to measles should be relieved from patient contact and excluded from the facility from the 5\(^{th}\) day after the first exposure through the 21\(^{st}\) day after the last exposure, regardless of whether they received vaccine or intramuscular immune globulin after the exposure. Personnel who develop measles should be relieved from all patient contact and excluded from the facility for four days after they develop rash.

Hospital contacts of a case-patient, who do not have presumptive evidence of measles immunity, should be vaccinated or offered immune globulin\(^3\). Contacts of people with measles compatible symptoms should be isolated, and appropriate infection control measures should be implemented to prevent further spread. If immune globulin is
administered to an exposed person, observations should continue for signs and symptoms of measles for 28 days after exposure since immune globulin may prolong the incubation period.

Remember:

- Isolate patients presenting with a febrile rash illness and evaluate for measles
- Immunocompromised patients may not have rash or present with atypical rash
- IMMEDIATELY consult with your local health department for suspected measles cases
- Collect throat or NP (polyester or synthetic) swabs & urine for PCR and serum for IgM serology on suspected cases
- Ensure patients and staff are up to date on MMR vaccine and other vaccinations
Know your county resources

Contact your county health department for:

- Evaluation and classification of a possible clinical case
- Guidance for communicable disease reporting including measles
- Specimen submission information
- Subject matter expertise

Arizona County Contact Information

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<thead>
<tr>
<th>County</th>
<th>Day Time Hours</th>
<th>After Hours</th>
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<tbody>
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<td>Apache</td>
<td>928-337-4364</td>
<td>928-337-4321</td>
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<tr>
<td>Cochise</td>
<td>520-432-9400</td>
<td>800-423-7271</td>
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<tr>
<td>Coconino</td>
<td>928-679-7272</td>
<td>928-255-8715</td>
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<tr>
<td>Gila</td>
<td>928-402-8811</td>
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<td>520-724-7770</td>
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<td>Pinal</td>
<td>520-866-7325</td>
<td>520-866-6239</td>
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<tr>
<td>Santa Cruz</td>
<td>520-375-7900</td>
<td>877-202-0586</td>
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<tr>
<td>Yavapai</td>
<td>928-771-3134</td>
<td>928-442-5262</td>
</tr>
<tr>
<td>Yuma</td>
<td>928-317-4450</td>
<td>928-317-4624</td>
</tr>
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If you are unable to reach the local health department, please call the Arizona Department of Health Services at 602-364-3676 or after hours at 480-303-1191.
EXAMPLE MEASLES (RUBEOLA) QUICK GUIDE

<table>
<thead>
<tr>
<th>Incubation Period:</th>
<th>Period of Communicability:</th>
<th>Characteristics:</th>
<th>Mode of Transmission:</th>
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</thead>
<tbody>
<tr>
<td>7 to 21 days from exposure to onset of symptoms; usually 14 days until rash appears.</td>
<td>From 4 days before until 4 days after appearance of the rash. Communicability is decreased after the second day of rash. Immunocompromised individuals may shed virus longer and can be contagious for the duration of illness.</td>
<td>An acute highly communicable disease with a prodrome of fever, conjunctivitis, coryza, cough, and Koplik’s spots on buccal mucosa. A characteristic dusky red blotchy rash appears after 2-4 days of prodrome. The rash lasts five to six days. Sometimes ends in bran-like desquamation. The rash begins at the hairline and spreads down to the face, body, and then to the hands and feet.</td>
<td>Airborne by droplet spread, direct contact with nasal or throat secretions of infected person, and less commonly by articles freshly soiled with nose and throat secretions.</td>
</tr>
</tbody>
</table>

OCCUPATIONAL HEALTH CONTROLS
A. Employees should not provide care for measles patients unless they have proof of immunity.
B. Employee with Disease
   1. Each employee should be seen by their personal physician with documentation of active disease sent to occupational health.
   2. Confirmation by throat/NP/urine PCR, culture, measles-specific IgM antibodies or significant rise in measles IgG antibody concentration between acute and convalescent period.
C. Employee Exposure
   1. Each employee should be seen by Occupational Health if Rubeola IgG is negative and employee classified as susceptible.
      a. Live virus measles vaccine given within 72 hours of exposure usually prevents or modifies natural measles. No known adverse effects if given later in incubation period.
      b. Employees susceptible to measles will be restricted from duty from the 5th day after exposure thru the 21st day post exposure and/or 4 days after rash appears.
   2. If employee contracts disease due to exposure, an employee illness/injury report must be filed and Occupation Health notified immediately.
Epidemiology
- A febrile viral illness with rash that is one of the most contagious diseases in existence.
- Transmission is by infectious airborne droplets or by contact with infected respiratory secretions.

Incubation Period
- Usually 8-12 days until the febrile prodrome starts. The average time between exposure and subsequent rash is 14 days, with a range of 7-18 days.

Clinical Presentation
- Prodrome (usually 2-4 days) of stepwise increasing fever (often reaching 103°-105°F), cough, coryza (runny nose), and conjunctivitis (the “3 C’s”) before the rash appears.
- Koplik’s spots (small bluish white spots on an erythematos base) on buccal mucosa are sometimes seen 1-2 days before rash and are pathognomonic for measles.
- After 2-4 days of prodrome, a maculopapular rash begins at hairline, then face and upper neck, then the rash proceeds downward and outward, reaching hands and feet over several days.
- Complications include otitis media, diarrhea, pneumonia (viral and bacterial), encephalitis, death.

Variations
- Modified measles: Measles in persons who received recent immunoglobulin (IG), in previously vaccinated persons, or in infants who still have some maternal measles antibody. With modified measles there can be a prolonged incubation period, mild prodrome, and a nonspecific rash of short duration.
- Atypical measles: Measles in persons who received inactivated (“killed”) measles vaccine, given in the U.S. from 1963-67 (symptoms: fever, pneumonia, pleural effusions, rash on extremities).
- Immunocompromised persons have a febrile respiratory disease, often with an atypical rash or no rash. They can have severe pneumonia, encephalitis, and prolonged viral shedding.

Differential Diagnosis
- Rubella, scarlet fever, drug rash, Kawasaki disease, adenovirus, roseola infantum (HHV6), dengue fever, EBV infection, enterovirus, or fifth disease (human parvovirus B19).

Laboratory
- For a suspect case, report it immediately to your county health department and they will help to arrange for the following testing:
  - Measles IgM serology (false negatives can occur during first 72 hrs of rash).
  - Nasopharyngeal swabs OR throat swabs AND urine for measles PCR.
  - Measles IgG is not helpful for rapid measles diagnosis, but acute and convalescent measles IgG serology may sometimes be of assistance in excluding or diagnosing measles.

Infection Control
- Healthcare facilities should immediately put suspect cases in airborne isolation. If airborne isolation is not available, mask the patient and place the patient in a private room with the door closed.
- Transmission has been documented in closed areas up to 2 hours after patients have left the room.
- Patients are contagious from four days before the rash through four days after the rash. Immune compromised patients may shed virus longer. In healthcare settings, staff should use a N95 mask or equivalent when caring for measles patients even if the staff members are fully vaccinated.
- Exposed, nonimmune persons should be considered potentially contagious from the 5th to 21st day after exposure, and can be contagious a day before symptoms begin.
- Nonhospitalized patients with measles or suspected measles should remain at home away from nonimmune people through the 4th day after the rash began.
Persons with fever and rash should call ahead before going for medical evaluation so that the facility can minimize the risk of potential transmission to other patients if the person does have measles.

**Treatment**

**Prevention through Vaccination**
- Children, health care workers, international travelers, and post-secondary students should have two documented doses of measles-mumps-rubella vaccine (MMR) with the first dose at ≥ 12 months of age.
- There must be a minimum of at least 28 days between the 1st and 2nd doses of MMR.
- Adults born 1957 or after should have documentation of at least one measles vaccine.
- Infants 6-11 months who are having international travel should get one dose of MMR before travel, but they will still need two more doses of MMR once they reach 12 months of age.

**Contraindications** to measles vaccine include severe allergic reaction to a previous MMR or vaccine components (e.g., gelatin, neomycin), pregnancy, and immunosuppression.

**Precautions** to measles vaccine include moderate to severe acute illness with or without fever, recent receipt of immune globulin (IG) or antibody-containing blood products, history of thrombocytopenia or thrombocytopenic purpura, and the need for tuberculin skin testing.

MMR can be given safely to people who are allergic to eggs.

MMR does not result in viral shedding so it can be given to contacts of immune compromised people or contacts of pregnant women.

**Outbreak Control**
- Think of measles in the differential diagnosis of any febrile illness with rash, especially if there has been recent international travel or contact with someone with recent international travel.
- Call your local health department immediately to report any suspect case of measles.
- Public health departments will help in the diagnosis of measles, trace contacts, and offer post-exposure prophylaxis.

**Post-exposure Prophylaxis**
- Determine immune status of all those exposed:
  - Presumed immunity for non-healthcare workers is considered to be documentation of receipt of age-appropriate measles vaccine, laboratory documented disease, positive serology, or birth before 1957.
  - Vaccination with two doses of live measles virus vaccine, at least 28 days apart, with the first dose given at 12 months of age or older is about 97% protective against measles.
- If a patient is exposed to measles, without presumptive immunity to measles and is ≥ 6 months old, vaccinate with MMR within 72 hours of exposure to prevent or modify measles severity. Pregnant women should not receive MMR.
- If unable to give MMR or if vaccine is contraindicated, give IG (intramuscular IG [IGIM] or intravenous IG [IVIG]) within 6 days of exposure, especially to persons at higher risk of complications from measles.
  - Infants ≤ 12 months old should get IMIG (0.5mL/kg body weight), maximum 15 mL.
  - Immunocompromised persons and susceptible pregnant women should get 400 mg/kg IVIG.
- IG is not indicated for persons ≥ 12 months old who have received 1 MMR unless they are severely immunocompromised.
- When IMIG 0.5 mL/kg is given, wait ≥ 6 months (or if IVIG 400 mg/kg given, wait ≥ 8 months) before giving any needed MMR or varicella-containing vaccine.

**For More Information on Measles and Measles Vaccine**
- Arizona Department of Health Services: (602) 364-3676; www.azdhs.gov/measles.
- CDC: www.cdc.gov/vaccines/vpd-vac/measles.
What are the recommendations for measles postexposure prophylaxis for pregnant women?

Pregnant women cannot be immunized against measles during pregnancy. Pregnant women who have previously received 2 doses of measles vaccine (MMR) are immune to measles.

Pregnant women who are unvaccinated or do not have evidence of immunity (documentation of at least 1 dose of MMR or having had the disease) are presumed susceptible to measles. They should receive IVIG (IV Immunoglobulin 400 mg/kg) as soon as possible or within 6 days of exposure to a confirmed case of measles. Any nonimmune person who was exposed to measles and received IVIG should subsequently receive MMR vaccine, which should be administered no earlier than 8 months after IVIG administration, provided that the vaccine is not otherwise contraindicated.

If pregnant women have been exposed to measles yet have documentation of 2 previous doses of MMR at least one month apart, given on or after their first birthday, AND happen to be tested and have a negative measles IgG result, they are still presumed immune to measles and do not need to receive IVIG.

Household members of pregnant women should be fully immunized (age appropriate) against measles. It is safe to give household contacts of pregnant women the MMR vaccine, since MMR vaccine recipients are not contagious.

What are the recommendations for measles postexposure prophylaxis for immunocompromised individuals?

Immunocompromised people who are exposed to measles should receive IVIG (IV Immunoglobulin, 400mg/kg) as soon as possible but at least within 6 days of exposure to a confirmed case of measles.

Severely immunocompromised people include:
- Persons with severe primary immunodeficiency.
- Persons who have received a bone marrow transplant until at least 12 months after completing all immunosuppressive treatment (and longer in those who have developed graft vs host disease).
- Persons on treatment for acute lymphocytic leukemia within and until 6 months after completion of immunosuppressive chemotherapy.
Persons with a diagnosis of AIDS or HIV-infected persons with severe immunosuppression defined as CD4 >15% (all ages) or CD4 count < 200 lymphocytes/mL3 (aged > 5 years) and those who have not received MMR vaccine since receiving effective antiretroviral therapy.

Household members of immunocompromised persons should be fully immunized (age appropriate) against measles. It is safe to give household contacts of immunocompromised persons the MMR vaccine, since MMR vaccine recipients are not contagious. Severely immunocompromised people should not receive the MMR vaccine.

**What are the recommendations for accelerating MMR vaccinations in children?**

During a community-wide measles outbreak, the local health department may recommend the acceleration of MMR vaccination in children.

In this situation, MMR can be given to infants as young as 6 months of age. MMR vaccine that is given between 6-11 months of age is not considered a valid dose. Infants who are immunized before 12 months of age need a first valid MMR once they have reached 12 months old. It is important to have a minimal interval of 4 weeks between the vaccine given under 12 months of age and the first valid vaccine.

The second valid MMR dose is usually scheduled at 4-6 years of age. The second dose may be given sooner as long as there is a minimal interval of 4 weeks between the first and second valid doses of MMR.

Arizona school entry requirements ask for documentation of two valid doses of MMR vaccine, with a minimum interval of 4 weeks between them. Arizona child care entry requirements ask for documentation of at least one valid dose of MMR vaccine.

Communication with health insurance providers is important during accelerated vaccinations schedules in order to assure timely reimbursement for vaccines given earlier than normally scheduled.

**What are the recommendations for measles vaccination in healthcare workers in the context of a measles outbreak?**

During an outbreak of measles, healthcare facilities should make sure healthcare workers have received 2 documented doses of MMR vaccine at the appropriate interval (regardless of birth year), laboratory evidence of measles immunity, or laboratory confirmation of disease.
Healthcare workers who have 2 documented doses of MMR do not need to be tested serologically for measles antibody. If they happen to be tested and are seronegative, revaccination with MMR is not routinely recommended.

What are the recommendations for measles postexposure prophylaxis for children < 12 months of age?

Children 6-11 months old who are exposed to measles should receive one dose of MMR vaccine within 72 hours of exposure in order to prevent or modify the illness. A MMR vaccine dose in this age group is not valid and the child will need two more MMR doses once turning 12 months or older. If MMR vaccine cannot be given within this time period, the child should receive 0.5 mL/kg intramuscular immune globulin (IMIG) within 6 days of exposure.

Children under 6 months of age who are exposed to measles should receive one dose of IMIG (0.5 mL/kg) as soon as possible or at least within 6 days of exposure. Children who have received 0.5mL/kg of IMIG should wait at least 6 months before receiving any recommended MMR or varicella vaccine.

Resources

Arizona Department of Health Services Measles Website for Providers
http://www.azdhs.gov/preparedness/epidemiology-disease-control/measles/index.php#providers

Centers for Disease Control and Prevention Measles Website for Providers
http://www.cdc.gov/measles/hcp/

Centers for Disease Control and Prevention. Morbidity and Mortality Review, June 2013

Immunization Action Coalition Measles Website
http://www.immunize.org/measles/

Immunization Action Coalition Vaccine Contraindication and Precaution Website

Local Health Department Contact List
http://www.azdhs.gov/preparedness/epidemiology-disease-control/index.php#resources-county
# EXAMPLE PHYSICIAN FACT SHEET

## MEASLES (Rubeola)

### County Health Department Contact Information

**Clinical Description**
Measles is an acute illness caused by the measles virus, a member of the genus *Morbillivirus* of the family Paramyxoviridae. Measles is highly contagious and can transmit rapidly person to person via the airborne route, especially in communities with lower vaccination rates or in healthcare settings where immunosuppression can play a role.

Illness begins with a prodrome of high fever (103-105°F), malaise and “the 3 Cs”: cough, coryza and/or conjunctivitis. A maculopapular rash follows the prodrome in 2-4 days, starting at the hairline and spreading slowly downward and outward, reaching hands and feet. The rash generally lasts 5-6 days and recedes in the same order, fading first from the face. Other symptoms may include anorexia, diarrhea (especially in infants), and generalized lymphadenopathy. In immunocompromised persons, disease may be severe and prolonged without typical rash. Complications include otitis media, pneumonia, encephalitis, blindness, premature birth or low-birth-weight, and death.

An unvaccinated patient with febrile rash illness as described above and with recent international travel (measles is not endemic in the USA) or occurring in the context of a measles outbreak in the community, should be managed as a highly suspect measles case. Place in airborne isolation and collect laboratory specimens as described below.

### Incubation Period
Usually 8-12 days from exposure to onset of prodrome (range of 7-18 days). Average time from exposure to rash onset is 14 days (rarely, as long as 21 days).

### Transmission/Infection Control
Cases are highly contagious. Transmission is airborne, by respiratory droplets or by contact with secretions or contaminated surfaces. Infectious droplets remain active and contagious for up to 2 hours after the person has left an area. Place in airborne isolation, if not available place in private room with door closed.

### Contagious Period
4 days prior to rash onset through 4 days after rash onset. Immunocompromised individuals may shed virus longer and can be contagious for the duration of illness.
Diagnosis
Testing is indicated for all suspected cases, especially those most likely to have measles (unvaccinated, recent history of travel to endemic areas, contact to a confirmed measles case, etc.). Measles-specific IgM antibody and measles RNA detection by real-time RT-PCR are the most common methods for confirmation of measles infection.

Collect serum, throat or nasopharyngeal swab, and urine to be sent to the Arizona State Public Health Laboratory, arranged by your county health department. Collect additional specimens for testing at a commercial or hospital lab if needed.

Clinical evidence of measles is not sufficient to diagnose a case. Laboratory confirmation is essential for the identification and control of outbreaks and sporadic cases of measles.

Viral testing by RT-PCR and/or culture

Throat or Nasopharyngeal swab
Use a polyester or synthetic swab to collect a throat or NP swab ASAP after rash onset and place in viral transport media, ideally within 3 days of rash onset.
(Throat or NP swabs collected up to 7-10 days post rash-onset may be successful in identifying measles virus).

Collect urine ≤ 14 days after rash onset

Serologic Testing

Use of IgM for confirmation of measles:
Ideally collect acute serum ≤ 7 days after rash onset. Ideal time for IgM testing is 3-7 days after rash onset.
False negatives can occur if drawn sooner than 72 hours after rash onset. If initial IgM is negative, IgM should be repeated in suspect cases.
Measles IgM will persist up to 1 month following infection.
IgM Antibody testing is less reliable for previously vaccinated individuals, and positive results should be confirmed at the Arizona State Public Health Laboratory. Arranged by contacting your county health department.

Treatment
Supportive care, including adequate hydration, and consider Vitamin A supplementation for all children. Patients may experience photosensitivity. Advise resting eyes and avoiding bright lights, including TV and computer screens, as well as sunlight.
Post-Exposure Prophylaxis

Determine immune status of all those exposed

Adults born before 1957 are generally presumed to be immune due to prior measles infection (except in outbreak situations)

Complete vaccination includes 2 doses of live virus vaccine (MMR), separated by at least 28 days, with the first dose given at ≥ 12 months of age. Serological evidence of immunity is demonstrated by a positive measles IgG titer.

People exposed to measles who cannot demonstrate immunity as above should be offered post-exposure prophylaxis (PEP), which may provide some protection or may modify the clinical course of the illness. Non-immune healthcare workers should be excluded from duty from day 5 after first exposure thru day 21 after last exposure, regardless of post-exposure immunoprophylaxis

If susceptible, vaccinate all exposed, 6 months of age and older, with MMR vaccine within 72 hours of exposure

(For infants aged 6-11 months, MMR vaccine can be given in place of IG if administered within 72 hours of exposure)

Infants vaccinated before their first birthday must be revaccinated at 12-15 months of age and again when they are 4-6 years of age)

If unable to vaccinate with MMR (MMWR June 14, 2013) give IG within 6 days of exposure

IG dose: 0.5 mL/kg body weight, maximum dose 15 mL, given IM especially to immune competent infants < 12 months old.

Pregnant women without evidence of measles immunity and severely immunocompromised individuals should be given IG intravenously (IGIV), the recommended dose is 400 mg/kg.

Reports Required

Immediate telephone reports of cases and suspect cases are required within 24 hours

Contact Your County Health Department

Remember

• Isolate patients presenting with a febrile rash illness and evaluate for measles
• Immunocompromised patients may not have rash or present with atypical rash
• IMMEDIATELY consult with your local health department for suspected measles cases
• Collect throat or NP (polyester or synthetic) swabs & urine for PCR and serum for IgM serology on suspected cases
• Ensure patients and staff are up to date on MMR vaccine and other vaccinations

Practitioner Resources

PRACTITIONER INFORMATION-Quick Summary of Similarities and Differences of Measles, Influenza, and German Measles


Prevention of Measles, Rubella, Congenital Rubella Syndrome, and Mumps, 2013: Summary Recommendations of the Advisory Committee on Immunization Practices (ACIP)

http://www.cdc.gov/mmwr/preview/mmwrhtml/rr6204a1.htm?s_cid=rr6204a1_e

(Most up to date post-exposure prophylaxis information)

The Pink Book: Course Textbook - Measles

http://www.cdc.gov/vaccines/pubs/pinkbook/meas.html
# Example Exposure Event Worksheet

**Infection Prevention/Occupational Health**

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<th>History (Brief story):</th>
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## Notification:

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<thead>
<tr>
<th>Date</th>
<th>By Whom:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>County Health Department</strong></td>
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<tr>
<td></td>
<td>Occupational Health</td>
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<tr>
<td></td>
<td>IP, Medical Director</td>
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<td>Dept. Directors</td>
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<td>CNO</td>
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<td>CMO</td>
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<td>QM Director</td>
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<tr>
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<td>Risk Mgmt.</td>
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<td>Other Physicians: See List</td>
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</table>

## Exposure Summary

<table>
<thead>
<tr>
<th>Employees Exposed (Occ. Health Responsibility)</th>
<th>How Many</th>
<th>Follow Up completed</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients Exposed (IP/MCPHD)</td>
<td>unknown</td>
<td>unknown</td>
<td>unknown</td>
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<tr>
<td>Physicians/ LIP Exposed (IP/ Med Staff Services)</td>
<td>unknown</td>
<td>unknown</td>
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<tr>
<td>Other</td>
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</table>
## Example Measles Case Tracking Form

<table>
<thead>
<tr>
<th>Case ID</th>
<th>Name (Last, First)</th>
<th>Age</th>
<th>Date of Birth</th>
<th>Rash Onset Date</th>
<th>Source of Exposure</th>
<th>Blood Draw Date</th>
<th>IgM Result</th>
<th>Viral Specimen (Type, Date and Result)</th>
<th>MMR-1 Date</th>
<th>MMR-2 Date</th>
<th>Reason for NOT Vaccinating</th>
<th>Case Status</th>
</tr>
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</tbody>
</table>
## Example Measles Exposures Tracking Form

<table>
<thead>
<tr>
<th>Contact #</th>
<th>First Name</th>
<th>Last Name</th>
<th>DOB</th>
<th>Phone #</th>
<th>Email</th>
<th>Address</th>
<th>Contacted</th>
<th>Date of Contact</th>
<th>Immune Status</th>
<th>Symptom watch dates (+7 days to +21 days)</th>
<th>Symptomatic?*</th>
<th>Notes or actions needed</th>
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</table>

*If contact is symptomatic contact you [county health department](#)
EXAMPLE MEASLES SCREENING TOOL FOR HEALTH CARE FACILITIES

Anyone with Generalized Rash Must be Masked and Put in Airborne Isolation Room.
(Generalized =more than 1 part of body) If airborne isolation room not available, place in private room with closed door.

Documented or subjective fever on any day of rash?

- YES
  - Did rash begin on face?
    - YES
      - Is the patient immunosuppressed?
        - YES
          - Call Infection Control
          - Release
          - Admit
        - NO
          - Is there a travel history to a measles outbreak area OR measles endemic country OR measles exposure?
            - YES
              - Release w/surgical mask & measles discharge instruction sheet.
              - Assure correct telephone #
            - NO
              - Remain in Isolation
    - NO
      - Is the patient immunosuppressed?
        - YES
          - Call Infection Control
          - Release
          - Admit
        - NO
          - Did the rash begin on face & extend down the body?
            - YES
              - Release w/surgical mask & measles discharge instruction sheet.
              - Assure correct telephone #
            - NO
              - Remain in Isolation

- NO
  - Were anti-fever meds taken on any day of rash (i.e. Tylenol)?
    - YES
      - Was there fever within 4 days prior to rash onset?
        - YES
          - Does patient have a laboratory-confirmed diagnosis other than measles to explain both rash & fever?
            - NO
              - No further action. Discontinue isolation.
              - Call Health Department if strong clinical suspicion
            - YES
              - Release w/surgical mask & measles discharge instruction sheet.
              - Assure correct telephone #
        - NO
          - Remain in isolation
    - NO
      - Did the rash begin on face & extend down the body?
        - YES
          - Call Infection Control
          - Release
          - Admit
        - NO
          - Remain in Isolation

**Contact County Health Department** for assistance and guidance

**Report Cases to Your County Health Department**
Tel: (    ) ___-_____

*Rev 5/27/16*
Measles Testing at the Arizona State Public Health Laboratory

If you have a suspected case of measles at your facility IMMEDIATELY consult with your county health department.

Arizona State Public Health Laboratory (ASPHL) testing capability:
- PCR
- Culture
- IgM Serology (currently unavailable at ASPHL)
  - Please consider sending to commercial labs for timely serological results for clinical management

***Your county health department MUST be notified of any specimens prior to submission to ASPHL***

Collection:
The following specimens can be sent to ASPHL for measles testing:
- OP (throat) or NP swab (polyester or synthetic only)
  - calcium alginate and cotton swabs will be rejected
- Urine
- Serum
  - Need for IgM will be decided case by case
Any of the following transport media can be used:
- Hanks
- Viral Transport Media
- Universal Transport Media
- Sterile Saline

Storage:
- Swab
  - Store at 4º C
    - If swab will not be tested within 72 hours, store at -70º C
- Urine
  - Store at 4º C

Transport:
An ASPHL submission form must be filled out for all specimens that are sent to ASPHL
- Transport on wet ice or cool packs

Turnaround Time:
- PCR 1 – 5 days
- Culture 7 – 14 days
- Serology (currently unavailable at ASPHL – case by case sent to CDC)

Resources:
County Contact Information: http://www.azdhs.gov/preparedness/epidemiology-disease-control/index.php#resources-county
ASPHL Shipping and Receiving: http://www.azdhs.gov/preparedness/state-laboratory/index.php#shipping-receiving
XXX XX, 2015

Dear Sir or Madam:

On XXX, we became aware that you, and anyone accompanying you to the XXXXX, may have been exposed to measles at the (Location/Facility), (Address), from (identified possible exposure period).

Measles is a vaccine-preventable disease that is spread through coughing, sneezing, and contact with mucus or saliva from the nose, mouth, or throat of an infected individual. Measles virus can also survive in the air for several hours and may be transmitted to unvaccinated individuals even after the infected person left the room.

Measles is a highly contagious viral illness. The illness begins with symptoms which include fever (101 degrees F or higher), red, watery eyes, cough and runny nose. This is followed by a rash that is red, raised, and blotchy. The rash begins on the head at the hairline and moves down the body. The rash may last for 5-6 days and may turn brownish. Symptoms typically appear 8-12 days after exposure to measles but may take up to 21 days. A person with measles is considered to be contagious 4 days before until 4 days after rash onset.

You may be protected from measles if you were immunized for measles or if you have previously had the disease. If you develop symptoms of measles as described above, please contact your healthcare provider by phone and let them know you have been exposed to measles. They will let you know when to visit their office so as not to expose others in the waiting area. If you develop symptoms and do not have a healthcare provider, you may need to be seen at your local hospital emergency room/urgent care center. IF YOU HAVE SYMPTOMS, PLEASE CALL BEFORE GOING TO ANY HEALTHCARE PROVIDER TO LET THEM KNOW YOU MAY HAVE MEASLES.

If you or your healthcare provider thinks that you have measles, please notify (county health department or point of contact) immediately so that appropriate follow-up can be initiated. Please phone (XXX) XXX-XXX Mon-Fri 8am-5pm, or (XXX) XXX-XXXX after hours, holidays and weekends and ask to speak with XXXX.

Sincerely,
Think it might be Measles?
Measles is in our County!

If you have ANY of these symptoms: Cough, Runny Nose, Red eyes, or Fever OR RASH!

PUT A MASK ON and tell the receptionist right away.
¿Cree que tiene Sarampión?
¡Tenemos Sarampión en nuestro Condado!

Si usted tiene CUALQUIERA de estos síntomas:
Tos, Nariz congestionada o moquienta, Ojos rojos, o
Fiebre O ERUPCIÓN/SARPULLIDO

PÓNGASE UNA MÁSCARA y luego dígale a la recepcionista inmediatamente
Think it might be Measles?

If you have ANY of these symptoms: Cough, Runny Nose, Red eyes, or Fever OR RASH!

PUT A MASK ON and tell the receptionist right away.
¿Cree que tiene Sarampión?

Si usted tiene CUALQUIERA de estos síntomas:
   Tos, Nariz congestionada o moquienta, Ojos rojos, o Fiebre O ERUPCIÓN/SARPULLIDO

PÓNGASE UNA MÁSCARA y luego dígale a la recepcionista inmediatamente
MEASLES SYMPTOMS
Measles disease starts with a high fever followed by the “3 C’s” that include cough, runny nose (coryza), and/or red, watery eyes (conjunctivitis). A red, blotchy rash begins 2-4 days after onset. The rash begins at the hairline and spreads down to the face, body, and then to the hands and feet over the next 3 days. The rash then fades in the same order it appeared. The rash lasts 5-6 days.

Up to a third of measles cases become severe and may progress to pneumonia, seizures, encephalitis, brain damage, and death.

HOW IS MEASLES SPREAD?
Measles is very contagious and can be spread when an infected person coughs or sneezes. The virus can live in the air and on surfaces for at least two hours. A person with measles is infectious four days before the start of the rash until 4 days after the rash begins.

WHAT TO DO IF YOU THINK YOU HAVE MEASLES
If you think you may have measles, CALL YOUR HEALTH CARE PROVIDER FIRST for instructions on what to do. Calling ahead will avoid exposing others. It is very important to stay home and away from others when sick.

MEASLES TREATMENT
There is no specific treatment for measles. Measures can be taken to possibly prevent measles in persons who have been exposed.

MEASLES PREVENTION:
The best way to prevent measles is through two doses of MMR (measles-mumps-rubella) vaccine given according to the recommended schedule:
- First dose of MMR—given on or after the first birthday
- Second dose of MMR—recommended to be given at age 4-6 years, may be given as soon as 1 month after the first dose.

Since MMR vaccine is not routinely given to children less than one year of age, it is especially important for family members of young children to make sure that everyone in their household is up to date on their vaccinations to protect the family from illness. Please contact your health care provider or your local health department for further information about MMR vaccine.
SINTOMAS DEL SARAMPIÓN
La enfermedad conocida como sarampión se presenta al comienzo con fiebre alta, seguida de tos, secreción nasal (coriza) y/o ojos rojos y llorosos (conjuntivitis). Una erupción de manchas rojas comienza entre 2 a 4 días después de iniciar los síntomas. La erupción comienza en el nacimiento del pelo, y se extiende a la cara, el cuerpo, y luego las manos y los pies en los próximos 3 días. La erupción desaparece en el mismo orden como aparece, y dura entre 5-6 días.

Hasta un tercio de los casos de sarampión llegan a ser severos y pueden progresar a cuadros de neumonía, convulsiones, encefalitis, daño cerebral y muerte.

¿COMO SE CONTAGIA EL SARAMPIÓN?
El sarampión es muy contagioso y puede propagarse cuando una persona infectada tose o estornuda. El virus puede vivir en el aire y en las superficies por al menos dos horas. Una persona que tiene sarampión puede contagiar a otra durante los 4 días antes que aparezca la erupción de la piel y hasta 4 días después del inicio de la erupción.

¿QUÉ HACER SI CREE QUE TIENE SARAMPIÓN?
Si usted cree que puede tener sarampión, LLAME A SU PROVEEDOR DE SALUD ANTES DE IR A VERLO, para recibir instrucciones sobre qué hacer. Llamar con antelación evitará que usted exponga a otras personas. Es muy importante quedarse en casa y lejos de otra gente cuando se está enfermo.

TRATAMIENTO PARA SARAMPIÓN
No existe un tratamiento específico para el sarampión. Se pueden tomar ciertas medidas para posiblemente evitar el desarrollo de la enfermedad en personas que han estado expuestas.

COMO PREVENIR EL SARAMPIÓN:
La mejor manera de prevenir el sarampión es a través de dos dosis de la vacuna triple vírica (sarampión, paperas y rubeola) la cual debe ser administrada según el siguiente calendario recomendado:
- Primera dosis triple vírica administrada a la edad de doce meses en adelante
- Segunda dosis se recomienda administrar entre los 4 y 6 años, pero se puede administrar tan pronto como un mes después de la primera dosis.

Dado que la vacuna triple vírica no es administrada rutinariamente a niños menores de un año, es especialmente importante que los miembros de familias con niños pequeños se aseguren que todos en su hogar estén al día con el calendario de vacunación, para proteger a todos los integrantes de la enfermedad. Por favor, póngase en contacto con su proveedor de salud o su departamento de salud local para obtener más información acerca de la vacuna triple vírica.

Si tiene alguna pregunta, por favor comuníquese con su departamento de salud local http://azdhs.gov/preparedness/epidemiology-disease-control/index.php#resources-county
References and Resources

1. Association for Professionals in Infection Control and Epidemiology, Inc.
   Measles: What you should know
   http://apic.informz.net/informzdataservice/onlineversion/ind/bWFpbGluc2ltc3RhbAncW9NDAwODMzMCZz
   dWJzY3JpYmVyaWQ9ODE4MTY1Mzcy

2. Centers for Disease Control and Prevention
   Manual for the Surveillance of Vaccine-Preventable Diseases
   Chapter 7: Measles

   Prevention of Measles, Rubella, Congenital Rubella Syndrome, and Mumps, 2013: Summary Recommendations
   of the Advisory Committee on Immunization Practices (ACIP)
   http://www.cdc.gov/mmwr/preview/mmwrhtml/rr6204a1.htm
   (Most up to date post-exposure prophylaxis information)

4. Centers for Disease Control and Prevention
   Epidemiology and Prevention of Vaccine-Preventable Diseases
   http://www.cdc.gov/vaccines/pubs/pinkbook/meas.html


6. Arizona Department of Health Services-Measles
   http://www.azdhs.gov/measles/

7. ADHS-Communicable Disease Reporting
   http://www.azdhs.gov/phs/oids/reporting/index.htm

8. ADHS-State and County Contacts
   http://azdhs.gov/preparedness/epidemiology-disease-control/infectious-disease-services/index.php#contact