# Measles Investigation and Control Guidelines

**Colorado Department of Public Health and Environment (CDPHE)**
**Communicable Disease Epidemiology Program**

Suspect measles cases should be reported by telephone within 24 hours of suspicion/diagnosis (CDPHE: business hours (303) 692-2700, after hours (303) 370-9395). Investigation of a suspect measles case should be started immediately, as vaccination of eligible contacts should begin as soon as possible.

## Background

- During the five-year period, 1997-2002, only two measles cases were reported in Colorado. Both cases were reported in 2000 and were linked to measles importation. Measles outbreaks occurred in Colorado 1988-1990 (1988/115 cases, 1989/101 cases & 1990/138 cases).
- Only 116 measles cases were reported in the United States during 2001.
- Since 1993, measles in the United States has occurred mainly among adults; usually due to importation.
- In 1989, ACIP/AAP/AAFP recommended a two-dose schedule for MMR vaccine. Recommendation of a second dose was intended to produce measles immunity in persons who failed to respond to the first dose (there is approximately a 5% vaccine failure rate).
- Colorado implemented a school requirement of 2 measles doses on July 1, 1992. By school year 2006-2007, all students attending school/college in Colorado will be required to have two doses of measles vaccine.

## Clinical Description

- Incubation period for measles from exposure to prodrome averages 10-12 days; from exposure to rash onset averages 14 days (range, 7-18 days).
- Prodrome usually lasts 2-4 days and is characterized by fever, cough, coryza and/or conjunctivitis.
- Fever continues through rash and is usually ≥ 101° F (≥ 38.3° C), often as high as 103°-105° F.
- Koplik spots (blue-white spots) may be present inside mouth 1-2 days before or after rash onset.
- Rash is maculopapular and usually lasts 5-6 days. Rash most often begins on the face along the hairline and behind the ears. Over the next 3 days rash becomes generalized.
- Infectious period is from 4 days prior to rash onset through 4 days after rash onset.
- Measles transmission has been documented in closed areas (e.g. office, exam room) for up to 2 hours after a person with measles was present.
- Complications of measles include diarrhea, otitis media, pneumonia, acute encephalitis, and death.

## Measles Immunity

Persons are considered to be immune to measles if: 1) they were born prior to 1957; or 2) they have had 2 measles containing vaccinations separated by at least 28 days, with the first dose on or after their first birthday; or 3) they have a positive antibody test for measles. Vaccination prior to 1968 is not considered adequate evidence of immunity unless there is documentation of live attenuated measles vaccine administration.

## Measles Case Definition

### Clinical case definition

An illness that has all the following characteristics:

- Generalized rash lasting ≥ 3 days
- Fever ≥ 101° F (≥ 38.3 C) and
- Cough, coryza, or conjunctivitis

### Laboratory criteria for diagnosis

- Positive serologic test for measles IgM antibody (capture test preferred), or
- Significant rise in measles antibody level by any standard serologic assay, or
- Isolation of measles virus from a clinical specimen (*specimen collection instructions are attached and available at:* http://www.cdphe.state.co.us/dc/epidemiology/dc_guide.asp).

CDPHE recommends that measles IgM testing be performed using the capture method, which is available at CDPHE Laboratory. CDPHE typically reports IgM results within 24 hours of receiving a specimen. A second serum should be obtained if: 1) the case meets the clinical case definition, and 2) the initial IgM test is negative, and 3) serum was obtained prior to 72 hours after rash onset.

### Case classification

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| Suspected: | Any febrile illness accompanied by rash. |
| Probable: | A case that meets the clinical case definition, has noncontributory or no serologic or virologic testing, and is not epidemiologically linked to a confirmed case. |
| Confirmed: | A case that is laboratory confirmed or that meets the clinical case definition and is epidemiologically linked to a confirmed case. A laboratory-confirmed case does not need to meet the clinical case definition. |

**Investigation Summary**

1. Report case by phone to CDPHE (24 hour reportable ) and consult with CDPHE Regional Epidemiology Consultant or Communicable Disease Epidemiology Program.
2. Arrange and obtain appropriate diagnostic specimens (blood and virus isolation specimens). Specimen collection instructions are attached and available at: http://www.cdphe.state.co.us/dc/epidemiology/dc_guide.asp .
3. Interview the patient (family) and speak with health care provider.
   a) Obtain immunization history (patient may have a positive IgM test for measles antibody if recently vaccinated).
   b) Verify symptoms and onset dates.
   c) Identify all contacts (4 days prior and 4 days after rash onset) that had direct exposure to the case (were in the same room, home, airplane etc.) or were in in these areas up to 2 hours after the case was present.
   d) Determine probable source of infection by detailing the patient's activities 7-18 days prior to rash onset including travel or visitors from foreign countries.
4. Patient suspected of having measles should be excluded from work, school, or daycare and should voluntary self-isolate at home until 4 days after rash onset. If suspect measles is lab confirmed, the case may be officially quarantined until 4 days after rash onset.
5. Ensure **only** persons who are immune to measles are allowed to come in contact with case until at least four days after rash onset.
6. If suspected measles case is hospitalized, patient must be in isolation with airborne precautions and should be attended by or visited only by persons who are immune to measles.
7. Determine measles immunity status of all contacts (including medical personnel). See "Measles Immunity" section.
8. Arrange urgent receipt of measles containing vaccine (MMR) for susceptible contacts age ≥ 6 months who were initially exposed within the past 72 hours, unless vaccine is contraindicated. (Note: receiving measles containing vaccine may abort infection in exposed persons if given within 72 hours of initial exposure.)
9. Non-immune contacts that are unable to receive measles vaccine within 72 hours of exposure, should be quarantined at home from the $7^{th}$ through $18^{th}$ day following exposure.
10. If a measles exposure occurs within a health-care facility (e.g., hospital, clinic, physician office), all possibly exposed persons working at the facility without proof of measles immunity should receive a dose of MMR vaccine within 72 hours of exposure. Susceptible personnel who have been exposed to measles should be relieved from patient contact and excluded from the facility from the $5^{th}$ to the $21^{st}$ day after exposure or until the facility is declared measles-free, regardless of whether they received vaccine or immune globulin after the exposure. Personnel who develop measles should be relieved from patient contact immediately and may not return to the facility until 7 days after rash onset.
11. If a measles exposure occurs within a school, all susceptible students and staff refusing measles containing vaccine or lacking proof of immunity to measles will be

excluded from school until the outbreak is over, (i.e. until 18 days after the onset of rash in the last reported case).

12. Immune globulin (IG) should not be used to control measles outbreaks. IG is indicated for certain household contacts of measles patients, particularly those for whom the risk for complications is increased (i.e. infants ≤ 12 months, pregnant women, or immunocompromised persons).
13. Determine reported case classification; suspected, probable, or confirmed.
14. Report case in CEDRS.
15. For probable and confirmed cases, intensify surveillance by disseminating measles information to hospitals, emergency rooms, physicians, schools, and day care providers.
16. Complete "Measles Surveillance Worksheet" (5/98) and update CEDRS record including final case classification. All forms should be mailed or faxed (303-782-0338) to CDPHE. Surveillance forms can be obtained on the "Communicable Disease Guidelines and Manuals" web page at: www.cdphe.state.co.us/dc/epidemiology/dc_guide.asp

## Authority to Quarantine and Exclude

The Colorado Department of Public Health and Environment has the authority to close public places (daycare, school, medical facility, etc.), order isolation or quarantine, or exclude persons from school for measles, for the protection of public health. See, Colorado Revised Statues §§25-1.5.101(1)(a), 25-1.5-102(1)(c) and 25-4-906(4). Exclusions are officially rescinded when 17 days have elapsed since the onset of rash in the last known case. Facilities should be notified in writing when the exclusion is terminated.

Individual(s) can be quarantined to prevent the spread of measles under the authority of Colorado Revised Statutes §§25-1.5-102(1)(c) and 25-4-908. Quarantine is ordered for persons exposed to measles who have no documentation that they are immune to measles. Quarantine is intended to prevent the possibility of transmitting the infection to others in the community. Quarantined persons are confined to their homes until 18 days after exposure (health care workers 21 days) to a contagious person and may not attend any public gathering or have visitors at their home who are susceptible to measles.

*Please contact your CDPHE Regional Epidemiology Consultant or the Communicable Disease Epidemiology Program (303-692-2700) for further guidance.*