

Measles (Rubeola) Investigation Guideline

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Measles (Rubeola)

Disease Management and Investigative Guidelines

CASE DEFINITION (CDC 2009)

A. Clinical Description for Public Health Surveillance:

- An illness characterized by all the following:
 - Generalized maculopapular rash lasting ≥ 3 days and
 - Temperature $\geq 101.0^{\circ}\text{F}$ [38.3°C] and
 - Cough, coryza, or conjunctivitis

B. Laboratory Criteria for Case Classification:

- Isolation of measles virus from a clinical specimen, or
- Detection of measles-virus-specific nucleic acid by polymerase chain reaction, or
- Significant rise in serum measles immunoglobulin G antibody level between acute- and convalescent-phase specimens, by any standard serologic assay, or
- Positive serologic test for measles immunoglobulin M antibody.

C. Case Classification:

- 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 to be considered confirmed.*)
- 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.
- Suspected: Any febrile illness accompanied by rash.

IgM result	Optimal time for specimen collection? *	Recent vaccination? †	Meets clinical case definition?	Epidemiologic linkage?	Wild-type measles virus identified?	Case classification
+		No				Confirmed **
+		Yes	Yes	Yes		Confirmed
					Yes	Confirmed
+		Yes	Yes	No	No	Probable
+		Yes	No		No	Not a Case
-	Yes				No	Not a Case
-	No		Yes	Yes	No	Confirmed
-	No		Yes	No	No	Probable
-	No		No		No	Not a Case

* Optimal time for IgM serum specimen collection is 3-28 days after rash onset. For negative results before 3 days, collect another serum specimen within the 3-28 day period after rash onset.

† Recent is defined as receipt of measles-containing vaccine 6-45 days before rash onset.

** Consider confirmatory testing for cases in which a false-positive IgM is a possibility. (See Laboratory Testing.)

D. Laboratory Testing:

- Collection: For serology, KHEL Serology kit with yellow top blood tubes or any other red topped, clot separator blood tubes. For virus isolation, use Viral Transport Media (VTM).
- Specimen: Blood, 3-5 ml collected in clot separator tubes and throat and/or nasopharyngeal swab(s). Collection of both is important.
Note: Swabs are the preferred specimens for culture, but urine specimens can be used in addition and may prove superior to throat swabs if collection is delayed beyond 5 days after onset of rash.
- Timing of blood / serum for serology:
 - IgM: Collect ASAP and repeat at >72 hours after rash onset if negative. (30% of serum samples obtained <72 hours of onset give false-negative results. IgM is detected for at least 28 days after rash onset.)
 - IgG: Collect paired sera. Acute: ASAP after rash onset (7 days at the latest); Convalescent: 10–30 days after first specimen.
- Timing of swabs for culture:
 - Collect at the same time as samples for serology (best within 3 days of rash onset). Do not collect if after 10 days from rash onset.
 - Culture is necessary if case was vaccinated 6-45 days before testing.
- False-positive measles IgM tests are more likely to occur when:
 - 1) IgM test was not EIA,
 - 2) Case did not meet clinical case definition,
 - 3) Case is an isolated indigenous case, or
 - 4) Measles IgG was detected within 7 days of rash onset.
 - As needed, arrange for confirmatory testing but do not wait for results to begin the case investigation. The need to initiate prophylaxis will be evaluated based on initial findings defining any at-risk populations.
- Specimens are not required to be sent to the State Public Health the Kansas Health and Environment Laboratory (KHEL); but they are equipped to test for Measles if requested.
- Molecular typing of isolates is necessary to distinguish wild-type from vaccine type Measles virus. It is done by RT-PCR through the CDC.
- For additional information and/or questions concerning isolate submission, and laboratory kits:
 - Call KDHEL at (785) 296-1620 or refer to online guidance at http://www.kdheks.gov/labs/lab_ref_guide.htm , or
 - CDC technical assistance on Measles Isolation in the Manual for the Surveillance of Vaccine-Preventable Diseases, Appendix 7 <http://www.cdc.gov/vaccines/pubs/surv-manual/appx/appendix07-meas-vi-508.pdf>

E. Bioterrorism Potential: None.

F. Outbreak Definition:

- An outbreak is one or more case(s) of confirmed measles in a community. The situation should be treated as a public health emergency with appropriate resources allocated until additional cases have been ruled out.

INVESTIGATOR RESPONSIBILITIES

A. Investigation Related Tasks and Activities:

- 1) Confirm diagnosis with appropriate medical provider.
 - Before contacting the patient or family, first determine what information has been released about the patient's diagnosis.
 - Obtain information that supports clinical findings in the case definition and information on the onset date of the symptoms.
 - Obtain information on any laboratory tests performed and results.
 - If laboratory tests have not been run to test for measles immunoglobulin, coordinate testing to confirm the case.
 - If cultures need to be performed, testing can be coordinated with the KHEL.
 - Make a note of the laboratory (location and contact information) performing any tests and the expected turn-around time for testing.
 - Obtain accurate and complete immunization histories on cases.
 - For hospitalization, obtain medical records, including admission notes, progress notes, lab report(s), and discharge summary.
- 2) Conduct case investigation to identify potential source of infection.
- 3) Conduct contact investigation to locate additional cases and/or contacts.
 - Determine if case is involved in a high-risk occupation or if another special situation is involved (i.e. college, residential facility, health care).
 - Identify primary contacts within 24 hours.
- 4) Initiate control and prevention measures to prevent spread of disease.
 - Initiate control measures within 24 hours.
 - Assure prophylactic measures were received by contact(s).
 - Identify and exclude susceptible (i.e., unimmunized children and staff) when measles has been identified in a school or daycare facility.
 - Follow up with case(s) and contacts to assure compliance with work and/or school restrictions.
- 5) Report all confirmed, probable and suspect cases to the KDHE Office of Surveillance and Epidemiology (OSE) at KDHE (1-877-427-7317) within 4 hours of the initial report.
- 6) KDHE OSE staff report cases to the CDC Director's Emergency Operations Center (DEOC) at 1-770-488-7100.

B. Notifications:

- 1) Report all cases by telephone to the Local Health Officer, the local on-call epidemiologist and KDHE (1-877-427-7317) within 4 hours of initial report.
- 2) Alert physicians, hospital emergency rooms, student infirmaries, and local officials of the potential for additional cases; encourage the consideration of measles in persons with rash illness and the use of special arrangements to alter patient flow that will prevent contact between cases and susceptible persons. Emphasize the need to report all suspected cases immediately.
- 3) As appropriate, use the notification letter(s) and the disease fact sheet to notify the case, contacts and other individuals or groups.

EPIDEMIOLOGY

Measles occurs worldwide. In temperate zones, peak incidence occurs in late winter and early spring. A single dose of MMR vaccine induces measles immunity in about 95% of vaccinees; however, due to measles extreme infectiousness, 2 doses are recommended. In developing countries, case fatality rates average 3-5% but can be as high as 10-30%. Since 1995, the incidence of measles in the United States has been very low with only a few hundred cases reported each year. An increasing proportion of these cases are imported.

DISEASE OVERVIEW

A. Agent:

Measles virus causes measles.

B. Clinical Description:

Measles is a highly contagious disease characterized by fever, cough, runny nose, conjunctivitis, and a generalized maculopapular rash. Complications include diarrhea, otitis media, pneumonia, and encephalitis. The case fatality rate ranges between 1 and 3 per 1,000 cases. Immunocompromised individuals are at increased risk for pneumonias, encephalitis, and death. The characteristic rash sometimes does not develop in these patients. There is no documented asymptomatic. Rubella, scarlet fever, and other childhood rashes are part of a differential diagnosis.

Koplik spots on mucous membranes are considered to be pathognomonic for measles. Occurring 1-2 days before to 1-2 days after the rash, they appear as punctate blue-white spots on the bright red background of the buccal mucosa.

The maculopapular rash seen in measles begins at the hairline and then involves the face and upper neck. During the 3 days after onset, the rash gradually proceeds downward and outward, reaching the hands and feet. The maculopapular lesions are generally discrete, but may become confluent, particularly on the upper body. Initially, lesions blanch with fingertip pressure. By 3-4 days, most do not blanch with pressure. Fine desquamation occurs over more severely involved areas. Usually lasting 5-6 days, the rash fades in the same order that it appears, from head to extremities.

C. Reservoirs:

Humans.

D. Mode(s) of Transmission:

Transmission is person-to-person by airborne droplet or direct contact with nasopharyngeal secretions of an infected person.

E. Incubation Period:

About 10 days, varying from 7-18 days from exposure; an average of 14 days until rash appears.

F. Period of Communicability:

4 days before to 4 days after rash onset (count the day of rash onset as day zero). Immunocompromised patients may have prolonged excretion of virus in

their secretions and can be infectious for the duration of their illness.

G. Susceptibility and Resistance:

Persons born after 1957 that have not had the disease or have not been properly immunized are susceptible. Immunity is lifelong after infection.

H. Treatment:

Supportive care; no specific antiviral therapy is available.

STANDARD CASE INVESTIGATION AND CONTROL METHODS

Remember: Case investigation and vaccination of susceptible contacts should NOT be delayed pending laboratory results. (Refer to Figure 1 – Measles Case Investigation on Page 13.)

Note the date investigation started. Standard activities include the following:

- 1) Confirmation of diagnosis using case definition.
- 2) Collection of demographic data (birth date, county, sex, race/ethnicity)
- 3) Collection of clinical and vaccine status data:
 - Rash: date of onset, duration and presentation
 - Symptoms, date of onset
 - Hospitalizations
 - Complications
 - Outcome status: survived or date of death
 - Measles vaccine: dates of vaccination, type, manufacturer, vaccine lot number, number of doses or why not vaccinated
- 4) Determination of risk factors and transmission settings
 - Exposure and transmission and spread setting(s)
 - Reason for infection (e.g., age, vaccination status, relationship to a case)
 - Source of exposure (contact with case, immigrants or travelers)
 - For epi-links, note the case ID of the epi-linked case
 - Import status (indigenous, international import, or out-of-state import, linked or traceable to an international importation)
 - Residency (Did the patient reside in the United States?)
 - Travel history (mode of transportation, location, dates)
- 5) Investigation of epi-links among cases (cluster, household, co-workers, etc).

Standard investigation **includes** completion of the General Investigation Form and Measles Supplemental form. Further investigative activity should include:

A. Case Investigation - Identify Potential Source of Infection:

Focus within the incubation period of 7-18 days prior to symptom onset for:

- History of possible exposure(s):
 - Any visits to a doctor's office, clinic, or hospital (exact date and time)
 - Any indoor group activities attended: church, theater, tourist locations, air travel, parties, athletic events, family gatherings, etc.
 - Any visitors from outside the U.S.
- Travel history, with dates of exit from and reentry to Kansas.
 - Include travel history with dates of travel to other counties.

- If travel by plane or ship, KDHE will contact CDC’s regional Quarantine Station at 972-973-9258. (If not able to reach anyone, then use 866-694-4867.) (http://www.cdc.gov/ncidod/dq/quarantine_stations.htm)
- Case finding and defining transmission setting:
 - Identify rash illnesses among household members or guests, neighbors, schoolmates, and other possible transmission setting(s).
 - Record immune status of household and other close contacts.
 - Collect immunization history; number and date of doses given
 - Verbal history of receipt of measles vaccine is NOT considered adequate proof of vaccination.

B. Contact Investigation – Identify Exposed Individuals / Populations:

Focus on those in contact with case from 4 days before to 4 days after rash onset.

- For each transmission setting, maintain a contact listing which notes the date evaluated and any symptoms, the immunization status and the potential risks of exposure, including type and period of contact.
- Exposure is defined as direct contact with the case or anyone who was in the same room with a case even for a few minutes. Measles virus lingers in the air, so anyone who enters a room within 2 hours after a measles case should be considered exposed.
- Susceptible contacts are:
 - Born in 1957 or after, and
 - Have no written record showing dates of receipt of at least 2 doses of measles-containing vaccine received on or after the 1st birthday, or
 - Have no written record of measles seropositivity.
- There are several types of contacts to consider when dealing with a measles investigation, they include:
 - General: Household and close contacts of a case.
 - Daycare: All direct caregivers and classmates of a case.
 - School: All close personal contacts, educators and classmates of a case.
 - Work: Coworkers sharing the same workspace of a case.
- Follow-up symptomatic contacts as suspect cases.

C. Isolation, Work and Daycare Restrictions

- K.A.R 28-1-6 for rubeola (measles):
 - Each infected person shall remain in isolation for four days after the onset of rash.
 - Each susceptible contact of an infected person in a school, child care facility, or family day care home shall be vaccinated within 24 hours of notification to the secretary or excluded from the school, child care facility, or family day care home until 21 days after the onset of the last reported illness in the school, child care facility, or family day care home.
- Due to the highly contagious nature of measles there are a variety of restrictions that may need to be placed upon cases, contacts and others within the community, these restrictions include:
 - Hospitalized patients with measles must be under airborne precautions

from the onset of prodrome until 4 days after the appearance of the rash. (i.e., 4 days before and 4 days after rash onset with onset day of rash counted as day 0.)

- Cases who are employees of schools, daycares, food service facilities, and health care facilities should be excluded from work/school during the period of communicability (i.e., 4 days before and 4 days after rash onset, with rash onset day counted as day 0).
- Exclude children with confirmed, probable, or suspected measles from school or daycare as long as they could be contagious (i.e., 4 days before and 4 days after rash onset, with onset day counted as day 0).
- Exclude susceptible contacts from schools and daycare facilities for 21 days after the onset of rash of the last reported illness; unless immunized or have proof of immunity < 24 hours of notification to the secretary.
- If necessary, reference the Kansas Community Containment Toolbox for templates concerning isolation and quarantine measures.

D. Case Management, Including Follow-up of cases:

- Cases should be followed to determine compliance of control measures.

E. Contact Management, Including Protection of Contacts:

Decisions on the proper strategies for the effective use of immunization and/or IG will be made with the assistance of the local Health Officer, Office of Surveillance and Epidemiology, and the Kansas Immunization Program. The following guidelines are presented:

- All susceptible contacts should be immunized or provided immune globulin (IG) to prevent or modify disease development after exposure to measles.
- The use of postexposure vaccine in susceptible individuals:
 - Immunization is preferred to the use of IG for postexposure as it may protect the individual from disease and achieves the high level of population immunity needed to control a measles outbreak.
 - To protect those with contraindications to measles containing vaccine, who cannot receive the vaccine, ensure that household and close contacts are fully immunized to measles and exclude the individual from settings in which additional measles exposure may occur.
 - Timing of immunization, for those without contraindications:
 - Give within 72 hours of exposure to attempt to provide protection.
 - >72 hours, still recommend to prevent infection in future exposures.
 - Measles vaccine should not be given until at least 5 months have passed since the administration of IG.
- Use of postexposure Immune Globulin (IG):
 - IG should not be used to control measles outbreaks but may prevent or modify disease in susceptible contacts at risk for serious complications.
 - IG is only to provide temporary protection from an exposure to measles. Without vaccination, individuals are still considered susceptible to future exposures and should be excluded from institutions affected by measles until 21 days after the onset of rash in the last case of measles.

- IG is especially indicated for susceptible household contacts of measles patients when contacts are younger than 1 year of age, pregnant, or immunocompromised.
 - See HIV Infections under Special Situations for more information on the use IG in HIV-infected individuals.
- Dosing of IG:
 - Immunocompetent persons: 0.25 mL/kg body weight, intramuscularly (maximum of 15 mL).
 - Immunocompromised persons: 0.5 mL/kg of body weight, intramuscularly (maximum 15 mL).
- Timing of IG:
 - Temporary protection provided if given within 6 days of exposure.
 - If an individual has received Immune Globulin Intravenous preparation (IGIV) (400 mg/kg) <3 weeks before exposure, no additional IG is required. However, some experts recommend an additional dose of IGIV if >2 weeks have elapsed since last IGIV.
 - Remember, when deciding to vaccinate these individuals, MMR vaccine should be given >2 weeks before any IG or other blood products or 5 months after the receipt of IG.
- Post-exposure immunization and IG administration are not 100% effective; contacts may still be infectious from day 5 to 21 post exposure.
 - All contacts should be followed for signs and symptoms of measles for 2 weeks after exposure.
 - Any contacts that develop measles should be reported to the KDHE Office of Surveillance and Epidemiology and investigated as a case.
- Use the contact listing to record the compliance with postexposure prophylaxis recommendations and the findings of contact follow-up.
 - Note any missing or gone explanations (MOGEs) when a contact is lost to follow-up.
- Hospital Personnel: To decrease nosocomial infection, immunization programs should be established to ensure that health care professionals who may be in contact with cases are immune to the disease.
 - See Medical Settings under Special Situations for more information.

F. Environmental Measures: None.

G. Education:

- Advise cases that, while infectious, they should avoid contact with susceptible children, pregnant women, and immunosuppressed individuals.
- Instruct contacts or parents to look for the symptoms and signs of measles beginning one week after the first day of contact with a person during the period of communicability.
- If suggestive symptoms develop, they should call the local health department for instructions.

MANAGING SPECIAL SITUATIONS

A. Outbreak Investigation:

- Notify KDHE immediately, 1-877-427-7317.
- Identify a team leader for case investigators. The team leader is responsible for tracking of all new cases in the jurisdiction; noting what needs to be done for each case; and providing regular briefings to local, regional and state partners.
- Organize and maintain all data related to outbreak:
 - Construct and maintain case listing which includes:
 - KS-EDSS ID,
 - Name and DOB (or age)
 - Rash onset date
 - Source of exposure (i.e., case ID, setting),
 - Specimen collection date,
 - Lab results,
 - Immunization history (i.e. MMR-1, -2 dates),
 - Case status (i.e., confirmed, probable, suspect)
 - Use tracking tools (logbooks, chalkboards or databases) to record actions needed for each suspected case (i.e., draw blood, call for immunization history, notify contacts)
- Identify population(s) at risk of infection based on the scope and spread of the outbreak; use the information collected in case investigations to define:
 - Person: who is getting measles (i.e., age, gender, occupations) and how many cases have had 0, 1, or 2 doses of measles vaccine
 - Place: where are the cases; to what settings are they associated
 - Time: when did it start and is it still going on
- Enhance surveillance:
 - Review emergency department logs or laboratory records for previously unreported cases.
 - Maintain active surveillance with medical providers serving the affected communities for two incubation periods from last confirmed case.
- Outbreak control:
 - Target efforts on those population(s) identified as at risk.
 - Primary control strategy is to achieve a high level of immunity (i.e., 2 doses of measles vaccine) in the population defined as at risk.
 - Quarantine measures for specific groups, buildings or communities (i.e. closures or restriction of events) are to be considered only under special circumstances, such as during outbreaks in a settings attended by large numbers of persons who refuse vaccination.
 - Mass revaccination of entire communities is not useful or feasible in controlling measles outbreaks.
 - Establish protocols for control measures necessary for all likely situations (i.e., exposure in child care center, school, doctor's office)

B. School or Child Care Settings:

- Coordinate activities with school nurse and/or administration.
- If a case is reported at a school or child care setting, the health department will exclude from school any children, staff or visitors considered susceptible to measles including those with medical or religious exemptions for vaccinations.
- These individuals will be excluded until 21 days after the onset of the last reported illness in the school or child care setting; unless the individual is immunized or shows proof of immunization within 24 hours of notification to the secretary.
- Refer to the Sample Letter, School Notification for further guidelines.

C. Institutions:

- Coordinate activities with the infection control or administration
- If exposure occurred in the institution; all occupants of same quarters, ward, or classroom are considered contacts.
- Carry out investigation and preventive measures as outlined above.

D. Medical Settings:

- During a measles outbreak in the community:
 - All personnel born during or after 1957 should receive 2 doses of MMR unless they have documentation of immunity.
 - All personnel born before 1957 without documentation of measles immunity should receive 1 dose of MMR.
 - Serological screening of healthcare workers during an outbreak to determine measles immunity is not recommended.
 - Personnel who become ill should be relieved from all patient contact and excluded from the facility for 7 days after they develop rash.
- When a measles case is associated to a medical setting (treated at or visited), consult with the facilities' infection control practitioner to identify all contacts that need immediate evaluation for measles susceptibility.
- Contacts include:
 - All individuals in the waiting and examination rooms during and up to two hours after the index case was present;
 - All staff both with and without direct patient contact.
- All susceptible contacts should be immunized or provided immune globulin (IG) to prevent or modify disease development after exposure to measles.
 - Refer to Contact Management for further guidance.
 - Susceptible personnel who have been exposed to measles should be excluded from the facility and patient contact from the third to the 21st day after exposure, regardless post-exposure vaccine or IG receipt.
- Refer to Sample Letter, Medical Notification for further guidance.

E. HIV infection in Contacts Susceptible to Measles:

- To determine whether an HIV infected individual meets the criteria for severe immunosuppression, use the following table:

Age-specific CD4+ T-lymphocyte count and percent of total lymphocytes as criteria for severe immunosuppression in HIV-infected persons.

Criteria	age <12 months	age 1-5 years	age 6-12 years	age ≥13 years
Total CD4+ T-lymphocytes	<750 per µL	<500 per µL	<200 per µL	<200 per µL
OR	OR	OR	OR	OR
CD4+ T-lymphocytes (as % of total lymphocytes)	<15%	<15%	<15%	<14%

- HIV-infected individuals if susceptible and not severely immunosuppressed (with age-specific CD4+ T-lymphocyte counts or a percentage higher than those in the table) should receive:
 - MMR vaccine if exposed 72 hours prior, or
 - IG 0.25cc/kg IM (maximum 15cc) if exposure was greater than 72 hours earlier but less than 6 days prior. The individuals should then receive an immunization with MMR after the appropriate time interval.
- Measles containing vaccines are not recommended for HIV-infected persons with evidence of severe immunosuppression.
 - Regardless of past immunization or disease, HIV-infected contacts with evidence of severe immunosuppression and without recent serologic proof of immunity should receive IG 0.5cc/kg IM (15cc max).
- Asymptomatic children do not need to be evaluated and tested for HIV infection before MMR or other measles-containing vaccines are administered.

DATA MANAGEMENT AND REPORTING TO THE KDHE

- A.** Organize, collect and report data with the “General Investigation Form(s)” and “Measles Supplemental Form”.
- B.** Report data electronically via KS-EDSS or by fax, include:
- At a minimum, data that was collected during the investigation that helps to confirm or classify a case. (For epi-linked cases, please include the KS-EDSS investigation ID of the related case.)
 - All information collected on the General Investigation and supplemental forms.

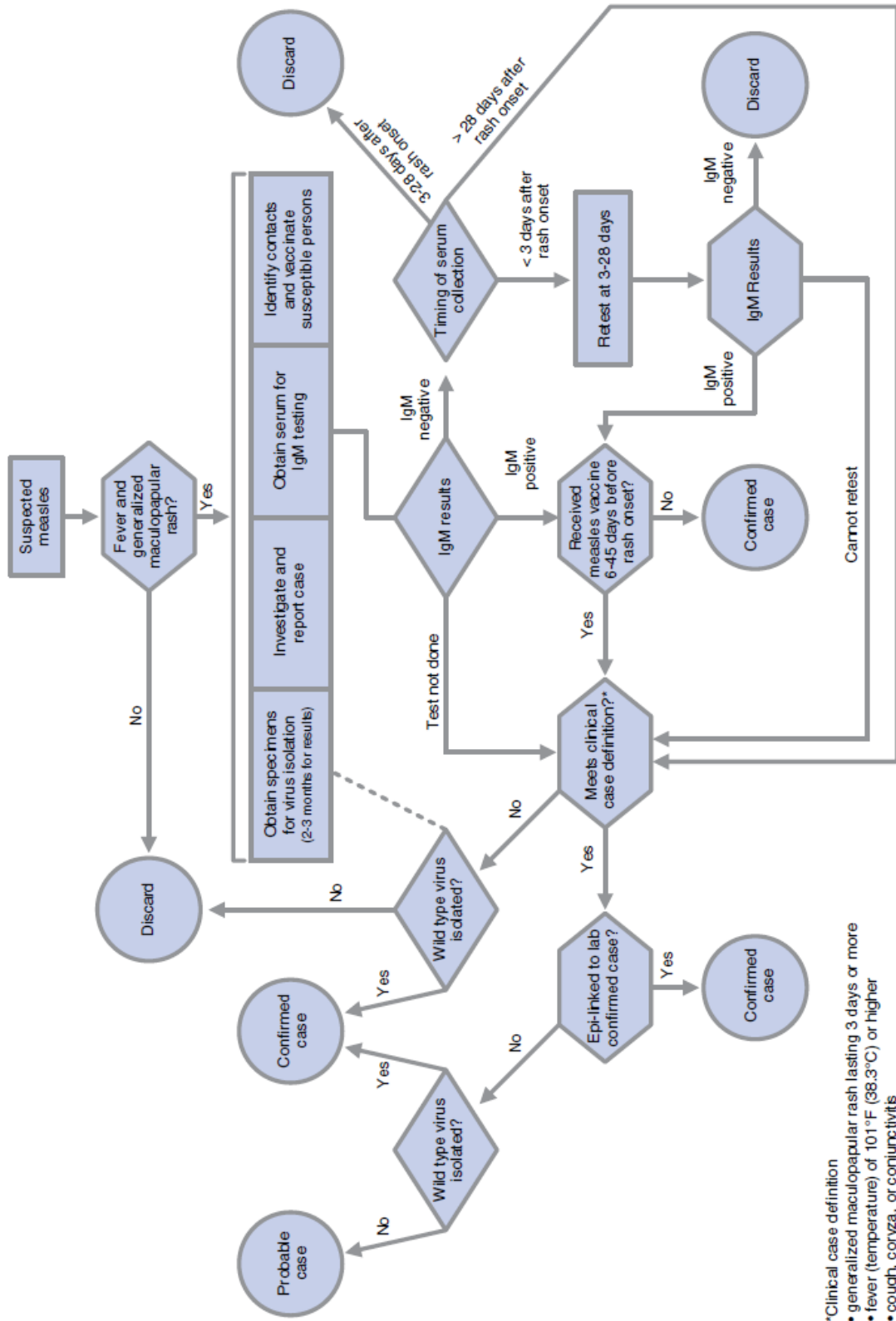
ADDITIONAL INFORMATION / REFERENCES

- A. Treatment / Differential Diagnosis:** American Academy of Pediatrics. 2006 Red Book: Report of the Committee on Infectious Disease, 27th Edition. Illinois, Academy of Pediatrics, 2006.
- B. Epidemiology, Investigation and Control:** Heymann. D., ed., Control of Communicable Diseases Manual, 19th Edition. Washington, DC, American Public Health Association, 2008.
- C. Case Definitions:** CDC Division of Public Health Surveillance and Informatics, Available at: http://www.cdc.gov/ncphi/diss/nndss/casedef/case_definitions.htm
- D. Quarantine and Isolation:** Kansas Community Containment Isolation/ Quarantine Toolbox Section III, Guidelines and Sample Legal Orders <http://www.waldcenter.org/Quarantine%20and%20Isolation%20Information%20for%20Health%20Officers.pdf>
- E. Kansas Regulations/Statutes Related to Infectious Disease:** <http://www.kdheks.gov/epi/regulations.htm>
- F. Quarantine and Isolation:** Kansas Community Containment Isolation/ Quarantine Toolbox Section III, Guidelines and Sample Legal Orders <http://www.waldcenter.org/Quarantine%20and%20Isolation%20Information%20for%20Health%20Officers.pdf>
- G. Pink Book:** Epidemiology and Prevention of Vaccine-Preventable Diseases. Available at: <http://www.cdc.gov/vaccines/pubs/pinkbook/default.htm>
- H. Manual for the Surveillance of Vaccine-Preventable Diseases:** Available at: <http://www.cdc.gov/vaccines/pubs/surv-manual/default.htm> .
- I. Additional Information (CDC):** <http://www.cdc.gov/health/default.htm>
- J. Measles Disease Reporting Guide** from Massachusetts Department of Public Health, Bureau of Communicable Disease Control: http://www.mass.gov/Eeohhs2/docs/dph/disease_reporting/guide/measles.pdf

Figure 1: Measles Case Investigation

Source: VPD Surveillance Manual, 4th Edition, 2008; Measles: Chapter 7

Figure 1. Measles Case Investigation



Kansas Disease Investigation Guidelines

General Investigation Form

Investigation Information		
Case Type: <input type="checkbox"/> Human Case <input type="checkbox"/> Non-human Case	Disease Name: _____	
Classification: <input type="checkbox"/> Suspect <input type="checkbox"/> Probable <input type="checkbox"/> Confirmed	KS-EDSS Investigation ID: _____	
Outbreak: <input type="checkbox"/> Yes <input type="checkbox"/> No	Outbreak Name: _____	Outbreak #: _____
Onset Date: _____	Diagnosis Date: _____	Report Date: _____
Assigned to (Investigator): _____	Patient Died: <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown	
Patient Information		
Name Type: <input type="checkbox"/> Default/Common <input type="checkbox"/> Legal <input type="checkbox"/> Maiden <input type="checkbox"/> Nickname		
Last: _____	First: _____	Middle: _____
Street: _____	City/State: _____	Zip: _____
Evening Phone #: _____	Daytime Phone #: _____	
Sex: <input type="checkbox"/> Failure to Report <input type="checkbox"/> Female <input type="checkbox"/> Male <input type="checkbox"/> Other <input type="checkbox"/> Transexual <input type="checkbox"/> Unknown		
Race: <input type="checkbox"/> American Indian or Alaska Native <input type="checkbox"/> Asian <input type="checkbox"/> Black or African American <input type="checkbox"/> Native Hawaiian or Other Pacific Islander <input type="checkbox"/> White <input type="checkbox"/> Unknown		
Hispanic / Latino Ethnicity: <input type="checkbox"/> Yes <input type="checkbox"/> No		
Date of Birth: _____	Age: _____	Age Unit: <input type="checkbox"/> Days <input type="checkbox"/> Weeks <input type="checkbox"/> Months <input type="checkbox"/> Years
Parent Information (if under 18)		
Last: _____	First: _____	Middle: _____
Street: _____	City/State: _____	Zip: _____
Evening Phone #: _____	Daytime Phone #: _____	
Work / Occupation or School / Grade		
Worksites / School: _____		
Occupations / Grade: _____		
Travel History		
1st	Destination: _____	Depart Date: _____ Return Date: _____
2nd	Destination: _____	Depart Date: _____ Return Date: _____
3rd	Destination: _____	Depart Date: _____ Return Date: _____
4th	Destination: _____	Depart Date: _____ Return Date: _____

Supplemental Laboratory Report Form

Lab Reports

Laboratory Name: _____

Lab Report Date: _____

Ordering Provider Name: _____

Phone: _____

Facility: _____

Specimen Accession Number: _____

Specimen Collection Date: _____

Organism Name: _____

Organism Species: _____

Organism Serogroup: _____

Organism Serotype: _____

PFGE Results

Pattern 1 KS: _____

Other State: _____

CDC: _____

Pattern 2 KS: _____

Other State: _____

CDC: _____

Pattern 3 KS: _____

Other State: _____

CDC: _____

Additional Results Information

Reported Test Name:

Coded Result:

Text Result:

Numeric Result:

Comments:

Supplemental Contact Form

Contacts

Last: _____ **First:** _____ **Middle:** _____

Street: _____ **City/State:** _____ **Zip:** _____

Evening Phone #: _____ **Daytime Phone #:** _____ **E-mail:** _____

Sex: Failure to Report Female Male Other Transexual Unknown

Race: American Indian or Alaska Native Asian Black or African American Native Hawaiian or Other Pacific Islander White Unknown

Hispanic / Latino Ethnicity: Yes No

Date of Birth: _____ **Age:** _____ **Age Unit:** Days Weeks Months Years

Worksites / School: _____

Occupations / Grade: _____

Exposure Information

Contact Type: Household Sexual Other: _____ **Partner / Cluster Code:** _____

Date of First Exposure: _____ **Date of Last Exposure:** _____ **Frequency:** _____

Nature of Exposure: _____ **Comments:** _____

Testing and Treatment Information

Clinic Code: _____ **Examination Date:** _____

Examination Test: _____ **Examination Result:** _____

Prophylaxis/empiric treatment date: _____ **Drug / Dosage:** _____

Provider (Name / Facility): _____

Disposition and Diagnosis Information

Initiation Date: _____ **Disposition Date:** _____ **Disposition:** _____

Diagnosis: _____ **Referral Type:** Patient Provider **Post-test Counseled :** Yes No

Currently Assigned To: _____ **Follow-up Date:** _____

Risk Factors

Pregnant: Yes No **If Yes, # of Weeks:** _____

Risk factors for complications in contact: None Pregnant Woman HIV Seropositive Unimmunized Index case is a super-spreader

Child younger than 5 Age > 65 Otherwise immunosuppressed (s/p transplant, high dose steroids, etc)

Measles Supplemental Form

Appendix 7

Kansas Department of Health and Environment

Epidemiologic Case History

* indicates required fields

Case Type* <i>Human Case Non Human Case</i>	Classification* <i>Confirmed Not a Case Probable Suspect Deleted Unknown</i>
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Supplemental Form Status <i>Not Done Form Complete Form in Progress Form Approved Form Sent to CDC</i>
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Report Date* <small>mm/dd/yyyy</small>
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Date Investigation Started <small>mm/dd/yyyy</small>
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Patient Demographic Information

* indicates required fields

Last Name*	First Name*	Middle Name	Name Type*	Age
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Age Unit <i>Days Weeks Months Years</i>	Date of Birth <small>mm/dd/yyyy</small>
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Race* <small>(Check all that apply)</small> <i>American Indian or Alaska Native Asian Black or African American Native Hawaiian or Other Pacific Islander White Unknown</i>
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Ethnicity* <i>Hispanic or Latino Not Hispanic or Latino Unknown</i>

Sex* <i>Failure to Report Female Male Other Transexual Unknown</i>

Street Address

City	County	State	Zip
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Evening Phone <small>###-###-####</small>	Daytime Phone <small>###-###-####</small>	Occupation
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Person Providing Report

Name of Reporting Facility*

Clinical Data

Any Rash <i>Yes No Unknown</i>			Rash Onset <small>mm/dd/yyyy</small>			Rash Duration <small>(0-30 Days; 99=Unknown)</small>			Rash Generalized <i>Yes No Unknown</i>		
Fever? <i>Yes No Unknown</i>			If Yes, Highest Recorded Temp. <small>(36-110.0 degrees; 999.9=Unknown)</small>			Cough <i>Yes No Unknown</i>			Coryza <i>Yes No Unknown</i>		
Conjunctivitis <i>Yes No Unknown</i>											

Complications

Otitis <i>Yes No Unknown</i>			Diarrhea? <i>Yes No Unknown</i>			Pneumonia <i>Yes No Unknown</i>			Encephalitis <i>Yes No Unknown</i>		
Thrombocytopenia <i>Yes No Unknown</i>			Death <i>Yes No Unknown</i>			Was patient hospitalized? <i>Yes No Unknown</i>			Days Hospitalized <small>(0-998; 999=Unknown)</small>		
Other complications <i>Yes No Unknown</i>				If Yes, Please Specify:					If Death, Date <small>mm/dd/yyyy</small>		

Vaccine History

Vaccinated? <small>(Received measles-containing vaccine?)</small> <i>Yes No Unknown</i>											
If Not Vaccinated, What was The Reason?											
<i>Religious Exemption</i>				<i>Medical Contraindication</i>				<i>Philosophical Objection</i>			
<i>Lab Evidence of Previous Disease</i>				<i>MD Diagnosis of Previous Disease</i>				<i>Under Age For Vaccination</i>			
<i>Parental Refusal</i>				<i>Other, Specify _____</i>				<i>Unknown</i>			

Vaccination Date	Vaccine Type	Vaccine Manufacturer	Lot Number
<small>mm/dd/yyyy</small>	<small>Select One</small>	<small>Select One</small>	

Number of doses received BEFORE 1st birthday						Number of doses received ON or AFTER 1st birthday					
If vaccinated BEFORE 1st birthday, but no doses given on or after 1st birthday, what was the reason?											
<i>Religious Exemption</i>				<i>Medical Contraindication</i>				<i>Philosophical Objection</i>			
<i>Lab Evidence of Previous Disease</i>				<i>MD Diagnosis of Previous Disease</i>				<i>Under Age For Vaccination</i>			
<i>Parental Refusal</i>				<i>Other, Specify _____</i>				<i>Unknown</i>			
If received one dose after 1st birthday, but never received 2nd dose after 1st birthday, what was the reason?											
<i>Religious Exemption</i>				<i>Medical Contraindication</i>				<i>Philosophical Objection</i>			
<i>Lab Evidence of Previous Disease</i>				<i>MD Diagnosis of Previous Disease</i>				<i>Under Age For Vaccination</i>			
<i>Parental Refusal</i>				<i>Other, Specify _____</i>				<i>Unknown</i>			

Epidemiologic Information

Transmission Setting

(Where did this case acquire measles?)

<i>Daycare</i>	<i>School</i>	<i>Doctor's Office</i>	<i>Hospital Ward</i>	<i>Hospital ER</i>
<i>Hosp. outpatient clinic</i>	<i>Home</i>	<i>Work</i>	<i>Unknown</i>	<i>College</i>
<i>Military</i>	<i>Correctional Facility</i>	<i>Church</i>	<i>International Travel</i>	<i>Other</i>

Specify Other Transmission Setting.

(If transmission setting not listed, provide here)

Source of Exposure For Current Case

(Enter State ID if source was an in-state case; Enter State if source was out-of-state; Enter Country if source was out of US.)

Spread Setting

(Check all that apply)

<i>Daycare</i>	<i>School</i>	<i>Doctor's Office</i>	<i>Hospital Ward</i>	<i>Hospital ER</i>
<i>Hosp. outpatient clinic</i>	<i>Home</i>	<i>Work</i>	<i>Unknown</i>	<i>College</i>
<i>Military</i>	<i>Correctional Facility</i>	<i>Church</i>	<i>International Travel</i>	<i>Other</i>

Epi-linked to Another Confirmed or Probable Case

Yes No Unknown

Case ID of epi-linked case
Is Case Traceable Within 2 Generations to an International Import

Yes No Unknown

History of Previous Measles?

Yes No Unknown

If Yes, Age When Ill

DETACH HERE

Activity History

Activity History For 18 Days Before Rash Onset and 7 Days After Rash Onset

Day	Activity
Day -18	
Day -17	
Day -16	
Day -15	
Day -14	
Day -13	
Day -12	
Day -11	
Day -10	
Day -9	
Day -8	
Day -7	
Day -6	
Day -5	
Day -4	
Day -3	
Day -2	
Day -1	
Day 0 (Rash Onset)	
Day 1	
Day 2	
Day 3	
Day 4	
Day 5	
Day 6	
Day 7	

Notes/Other Information

Case Definition

Case Classification:

Suspected: Any febrile illness accompanied by rash.

Probable: A case that meets the clinical 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.

Date:

This letter is to advise you that a case of Measles has recently been diagnosed within the county.

Measles is transmitted person-to-person by droplet or direct contact with nasopharyngeal secretions and is one of the most highly communicable infectious diseases. The following information is provided to help reduce the possibility of transmission within medical settings.

- 1) Screen all patients with rash illness or with other potential airborne diseases, either prior to or immediately on arrival at the intake area. Escort any suspect patients to a separate waiting area or private room.
- 2) Both patients and staff should wear appropriate masks/respirators (masks for patients to prevent generation of particles, and respirators for staff, if possible, to filter airborne particles).
- 3) If the patient is admitted while infectious, maintain airborne precautions (in addition to standard precautions) in a negative pressure room. (Patients are considered infectious for 4 days before through 4 days after rash onset, counting the day of rash onset as day zero).
- 4) If not admitted, maintain respiratory isolation until patient has exited the facility. (e.g., mask, separate exit). Patient should remain in isolation at home through the 4 days after rash onset, counting the day of rash onset as day zero. The patient may resume normal activities on the 5th day.
- 5) Avoid placing susceptible individuals in a room that has been occupied by a suspect case for 2 hours following the case's exit.
- 6) Identify all contacts among patients and staff. This includes patients and families in the waiting and examination rooms up to 2 hours after index patient was present and all staff both with and without direct patient contact. Due to airborne route of transmission, those exposed may include everyone at the entire facility.
- 7) Determine which contacts are susceptible to measles (particularly those at high-risk for disease) and offer MMR vaccine within 72 hours of exposure, or for high-risk susceptible contacts and those ineligible for vaccination, IG < 6 days after exposure. A susceptible contact was born in 1957 or after, and has no written record showing dates of receipt of at least 2 doses of measles-containing vaccine received on or after the 1st birthday or no written record of measles seropositivity.
- 8) Notify infection control, employee health, department heads and the healthcare providers of exposed patients.
- 9) During a measles outbreak in the community:
 - All personnel born during or after 1957 should receive 2 doses of MMR unless they have documentation of immunity.
 - All personnel born before 1957 without documentation of measles immunity should receive 1 dose of MMR.
 - Serological screening of healthcare workers during an outbreak to determine measles immunity is not recommended.
- 10) Exclusion of susceptible individuals:
 - All staff born in or after 1957, who have not received the second dose of measles vaccine before being exposed to a measles patient must receive a second dose of measles within 72 hours of the exposure or they must be excluded from 5 days after their earliest exposure through 21 days after their last exposure to the patient during his/her potential infectious period.
 - Staff who contract measles should be excluded for 4 days after their first day of rash onset.
 - In special high-risk healthcare settings such as transplant, oncology, neonatal units, etc., exclusion criteria should be even more rigorous. Infection control personnel may wish to exclude all susceptible personnel even if they have been immunized within 72 hours.

If you have questions, please contact the Health Department.

Sincerely,
Investigator Name, Title
Phone #
Address Line 1
City, State Zip Code

Date:

This letter is to advise you that a case of Measles has recently been diagnosed within the County.

Measles is transmitted person-to-person by droplet or direct contact with nasopharyngeal secretion and is one of the most highly communicable infectious diseases. The following information is provided to help reduce the possibility of transmission within school settings.

Control guidelines are dependent on whether measles is currently occurring at your institution. Schools without any cases but who will be involved with an institution that is experiencing cases should also follow these control guidelines. Please refer to the categories below for the appropriate recommendations.

At the school with measles case reported:

- 1) All students, staff, supporters and media personnel leaving to attend activities at other schools or participating in sports or other group activities at your school must have proof of immunity as defined below:
 - Born in the United States before January 1, 1957, or
 - Serologic proof of immunity, or
 - Two doses of measles vaccine with both doses administered at >12 months of age, given at least 4 weeks apart.
 - Those who do not have proof of immunity within 24 hours of _____ must wait 21 days before attending school, participating in school events or traveling to another school. If multiple cases occur, this susceptible student, staff or visitor must wait 21 days after the onset of rash of the last reported case in the outbreak setting before participating in school activities.

Note: A physician-diagnosed disease is **NOT** acceptable evidence of immunity.

- 2) Notify the schools to which students are traveling and inform them of:
 - The case or suspected case at your school.
 - The immune status of your students and staff that are traveling to the other school.

School without measles receiving students from or traveling to a school with measles:

All students, staff, supporters and media personnel, participating in activities with students from a school with cases, must have proof of immunity as defined below:

- Born in the United States before January 1, 1957, or
- Two doses of measles vaccine with both administered at \geq 12 months of age and given at least 4 weeks apart, or
- Serologic proof on immunity.

Note: A physician-diagnosed disease is **NOT** acceptable evidence of immunity.

If you have questions, please contact the Health Department.

Sincerely,

Investigator Name, Title
Phone #
Address Line 1
Address Line 2
City, State Zip Code

Public Health Fact Sheet

Measles

What is measles?

Measles is a very contagious disease that usually lasts 1-2 weeks. Measles often causes ear infections and pneumonia. Deafness, blindness and seizure disorders are less common. Although rare, it may also cause swelling of the brain and death. Measles is most dangerous for infants, pregnant women, and people with weakened immune systems.

How is measles spread?

Measles is very contagious. It is spread when an infected person sneezes, coughs or talks and other people nearby inhale the virus. Touching tissues or sharing a cup used by someone who has measles can also spread it. People with measles can spread the disease starting 4 days before until 4 days after the rash begins. Initial symptoms appear 10–14 days after a person is exposed.

How serious is measles?

Measles itself is unpleasant, but the complications are dangerous. Six to 20 percent of the people who get the disease will get an ear infection, diarrhea, or even pneumonia. One out of 1000 people with measles will develop inflammation of the brain, and about one out of 1000 will die.

What are the symptoms of Measles?

A cough, high fever, runny nose, and red watery eyes are common initial symptoms. A few days later a red blotchy rash starts on the face and then spreads to the rest of the body.

Who gets Measles?

Widespread use of measles vaccine has led to a greater than 99% reduction in measles cases in the United States compared with the pre-vaccine era. However, measles is still common in other countries, and we still see measles among visitors to the United States and among U.S. travelers returning from other countries. The measles viruses these travelers bring into our country sometimes cause outbreaks among certain groups, including:

- Anyone who never had measles and has never been vaccinated.
- Babies < 12 months old, because they are too young to be vaccinated.
- Adults who were vaccinated before 1968, because some early vaccines did not give lasting protection.

How is measles diagnosed?

Because measles can look like other rash causing diseases, the only sure test for measles is a blood test.

This fact sheet is for information only and is not intended for self-diagnosis or as a substitute for consultation. If you have any questions about the disease described above or think that you may have an infection, consult with your healthcare provider. This fact sheet is based on the Centers for Disease Control and Prevention's topic fact sheets.

How can you prevent measles?

- Protect your children by having them vaccinated when they are 12–15 months old, and again when they are about to enter kindergarten. Measles vaccine is usually given in an immunization called MMR, which protects against mumps and rubella as well.
- If you have been exposed to measles, talk to your doctor or nurse right away to see if you need a vaccination. If you get the vaccine less than 3 days (72 hours) after being exposed, it will help protect you against measles. People who cannot be vaccinated can be treated with immune globulin (IG) up to 6 days after exposure. IG may not prevent measles but it does make the disease milder.
- People with measles should be kept away from people who are not immune until they are well again.

Is the MMR vaccine safe?

Yes, it is safe for most people. However, a vaccine, like any medicine, is capable of causing problems like fever, mild rash, temporary pain or stiffness in the joints, and allergic reactions. More severe problems are very rare. Getting MMR vaccine is much safer than getting measles, and most people do not have any problems with it.

Are there any health regulations to prevent measles?

State regulations do require every student enrolled or enrolling in a Kansas school to have proof of 2 doses of measles vaccine (MMR). If a case is reported at a school or childcare setting, any persons at risk of becoming ill from measles, including those children with immunization exemptions, will be excluded from the school or childcare setting until 21 days after the onset of the last reported illness in the setting. If the person at risk for measles disease is immunized or shows proof of immunization within 24 hours of a case being reported, the exclusion will not be needed. Regulations also require that anyone who has measles be isolated until 4 days after the rash appears. That means they must be kept away from public places like daycare centers, school and work.

Where can I get more information?

- Your Local Health Department
- Kansas Department of Health and Environment, Epidemiologic Services Section (877) 427-7317
- <http://www.cdc.gov/health/default.htm>
- Your doctor, nurse, or local health center

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