# South Dakota Department of Health

## Measles Response Webinar

Thursday, May 22

3 – 4 pm CT / 2 – 3 pm MT

# Welcome

SOUTH DAKOTA DEPARTMENT OF HEALTH

# What is Public Health?

Public health is the science of protecting and improving the health of families and communities through promotion of healthy lifestyles, research for disease and injury prevention, and detection and control of infectious diseases.

**Public health is a system of entities and individuals working together** to protect the health of entire populations – whether it's as small as a local neighborhood, or as big as the entire state.

- Federal Health Agencies
- State Health Departments
- Local Health Departments
- Tribal Health/ Government
- Healthcare Institutions/ Providers
- Schools & Universities
- Other State Agencies
- Emergency Responders
- Community Organizations/ Coalitions
- Elected Officials
- Faith-Based Institutions
- Philanthropy & Civic Groups

- Prevents epidemics and the spread of disease
- Protects against environmental hazards
- Prevents Injuries
- Promotes and encourages healthy behaviors
- Responds to disasters and assists communities in recovery
- Assures the quality and accessibility of health services

**VISION**
Every South Dakotan Healthy and Strong

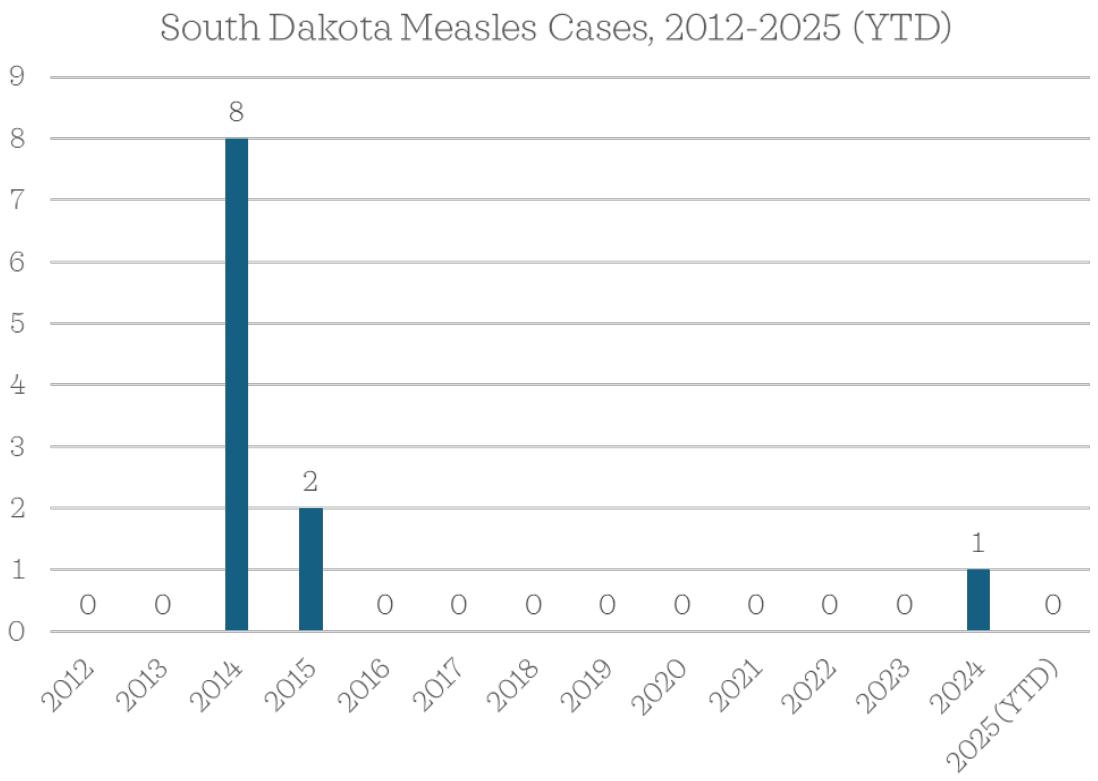
**MISSION**
Working together to promote, protect, and improve health

# Measles Infection
# Overview & Current Trends

# Measles Basics

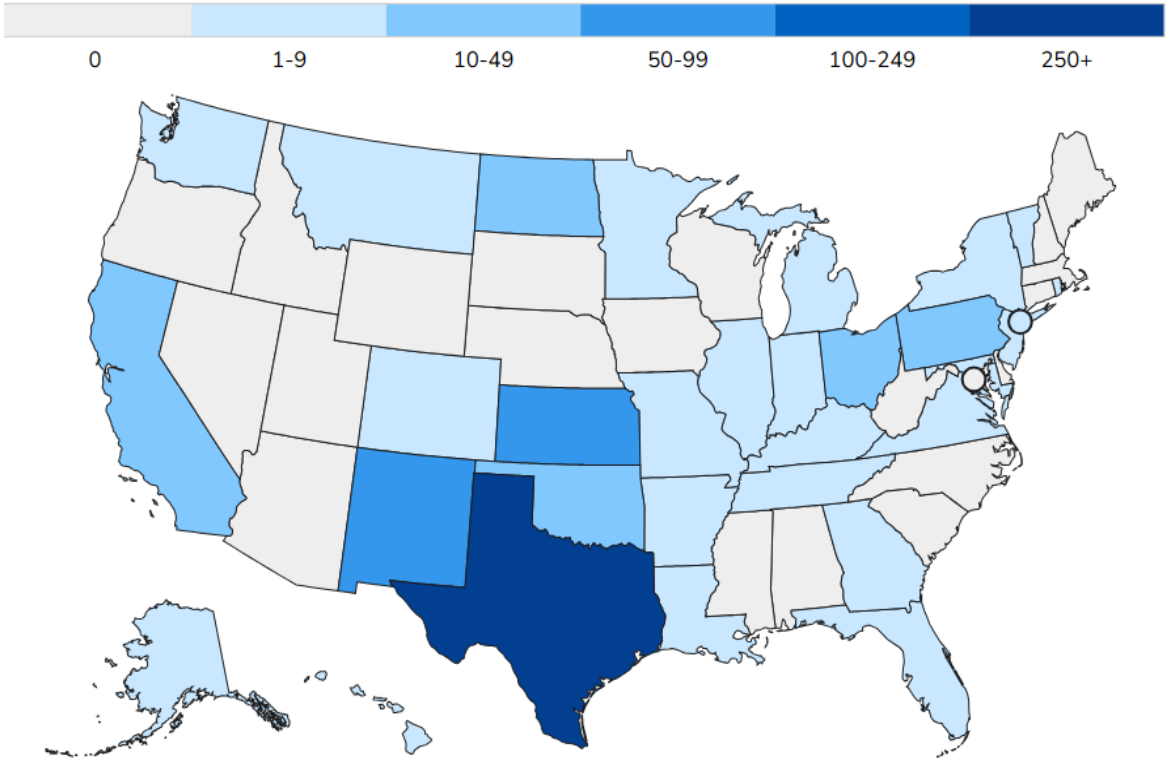
- Febrile rash illness caused by the virus *Morbillivirus hominis*
- Highly contagious: up to 90% of non-immune close contacts will get measles
- Incubation Period: usually 7-14 days but can be up to 21 days
- Infectious Period: from 4 days before until 4 days after emergence of rash
- Spreads person to person via airborne respiratory droplets, which can linger in the air for up to 2 hours

# South Dakota Overview




- There have been **0 confirmed cases of measles** in South Dakota in 2025.
- The most recent case of measles occurred in summer 2024, an unvaccinated adult who acquired measles while abroad. There were no further cases.
- The most recent measles cluster occurred in 2014-2015, which began with an unvaccinated adult who acquired measles while abroad and spread it to several family members, total of 10 cases.

# Current National Overview




- 1024 cases nationwide*
- 96% are unvaccinated or unknown vaccination status
- 13% of cases hospitalized
- 3 deaths: 2 children, 1 adult. All unvaccinated.
- 14 outbreaks nationwide.
- 31 states have had at least 1 case of measles in 2025.

*Confirmed cases as of 05/16/2025, https://www.cdc.gov/measles/data-research/index.html

# North Dakota Cases

- As of Friday 05/16/2025:
  - 13 confirmed cases
  - 2 in Cass County were imported from international travel, not associated with Williams County cases. Both adults, unvaccinated, 1 was hospitalized.
  - 11 cases in Williams County (Williston area)
    - Thought to have begun with an unvaccinated child who acquired measles from an out of state visitor
    - Suggests community spread, as epi linkage could not be established between all cases
    - Exposures occurred at 3 Williston Area Schools, as well as the Walmart, Tractor Supply, and a parade event
    - Unvaccinated children who were exposed to measles at school were excluded from school for 21 days.
      - One child who was in quarantine went on to develop measles. Excluding this child from school likely prevented additional cases.

# Public Health Case Definition

## Clinical Criteria:

An acute illness characterized by

- Generalized, maculopapular rash lasting ≥3 days; and
- Temperature ≥101°F or 38.3°C; and
- Cough, coryza, or conjunctivitis.

## Probable

In the absence of a more likely diagnosis, an illness that meets the clinical description with:

No epidemiologic linkage to a laboratory-confirmed measles case; and

Noncontributory or no measles laboratory testing.

## Confirmed

- An acute febrile rash illness† with:
  - Isolation of measles virus‡ from a clinical specimen; or
  - Detection of measles-virus specific nucleic acid‡ from a clinical specimen using polymerase chain reaction; or
  - IgG seroconversion‡ or a significant rise in measles immunoglobulin G antibody‡ using any evaluated and validated method; or
  - A positive serologic test for measles immunoglobulin M(IgM) antibody‡§; or
  - Direct epidemiologic linkage to a case confirmed by one of the methods above.

†Temperature does not need to reach ≥101°f/38.3°C and rash does not need to last ≥3 days.

‡ Not explained by MMR vaccination during the previous 6-45 days.

§ Not otherwise ruled out by other confirmatory testing or more specific measles testing in a public health laboratory.

# Who is a close contact?

- Anyone who had been around the case while they were contagious
  - All household members
  - Depending on size/set up: all daycare attendees and staff; all school attendees and staff; all workplace contacts
  - Anyone who was present in an area where the case was plus 2 hours after, which may include healthcare settings (healthcare workers and other patients)
  - Close contacts of a measles case who are **not immune** should quarantine for 21 days after their exposure.
  - All close contacts (regardless of immunity) should monitor for symptoms for 21 days.

# Testing Protocols & Clinical Guidance

# South Dakota Public Health Laboratory
# Measles Testing

# Measles PCR Testing

- Gold Standard* since it detects RNA
- Sample:  Nasopharyngeal swab in VTM preferred
  - Throat or nasal swabs acceptable
  - Avoid wooden shaft or cotton-tipped swabs
- Timing: Ideally collect within 3 days of rash onset
- Transport: 2-8 °C to be tested within 72 hours.
- Free Courier Service Available

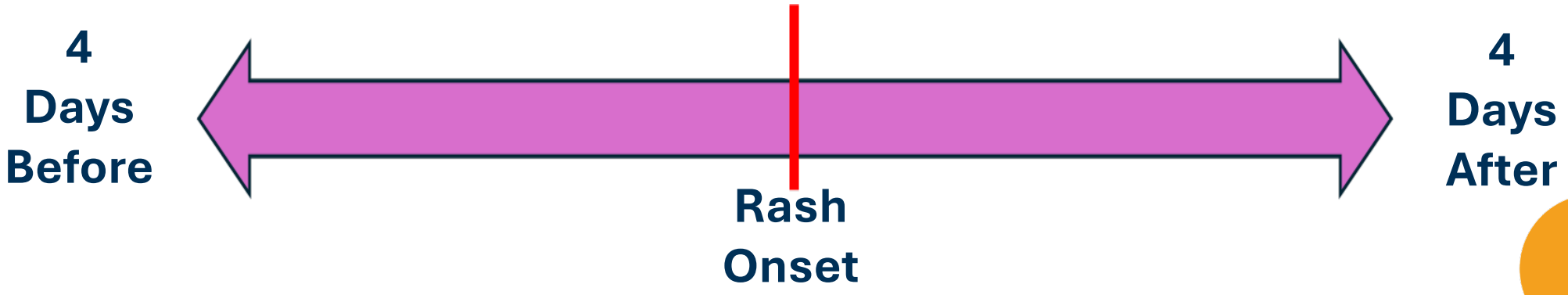
# Measles IgG and IgM Serology

- Do not distinguish between measles disease and vaccine response
- IgG is the long-term antibody to measles
  - Appears a few days after IgM and can be detectable for 7-10 days after rash onset
  - Used for Immunity check
- IgM is considered the acute response to measles
  - IgM detection starts 1-3 days after rash onset and can be detected for up to 8 weeks
  - Not offered at the SDPHL due to many challenges
    - Cross-reactivity
    - False-positives

# Clinical Guidance

# How does measles spread?

- Infectious respiratory particles from an infected person
- Spread out the mouth or nose when a person breathes, talks, sings, coughs, or sneezes
- Virus can be present in a room for hours
- Able to spread measles:



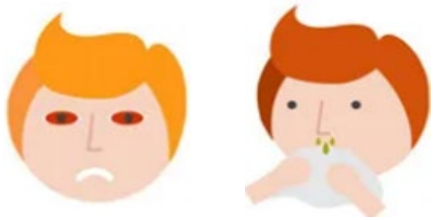
# Clinical Diagnosis of Measles:

## Fever

- Greater than 101 degrees
- Can spike to 105 degrees
- Starts before rash and usually resolves when rash begins

## Rash

- Begins on Day 3-4
- Starts on face/forehead
- Descends downward to trunk
- Maculopapular (Can see and feel it)



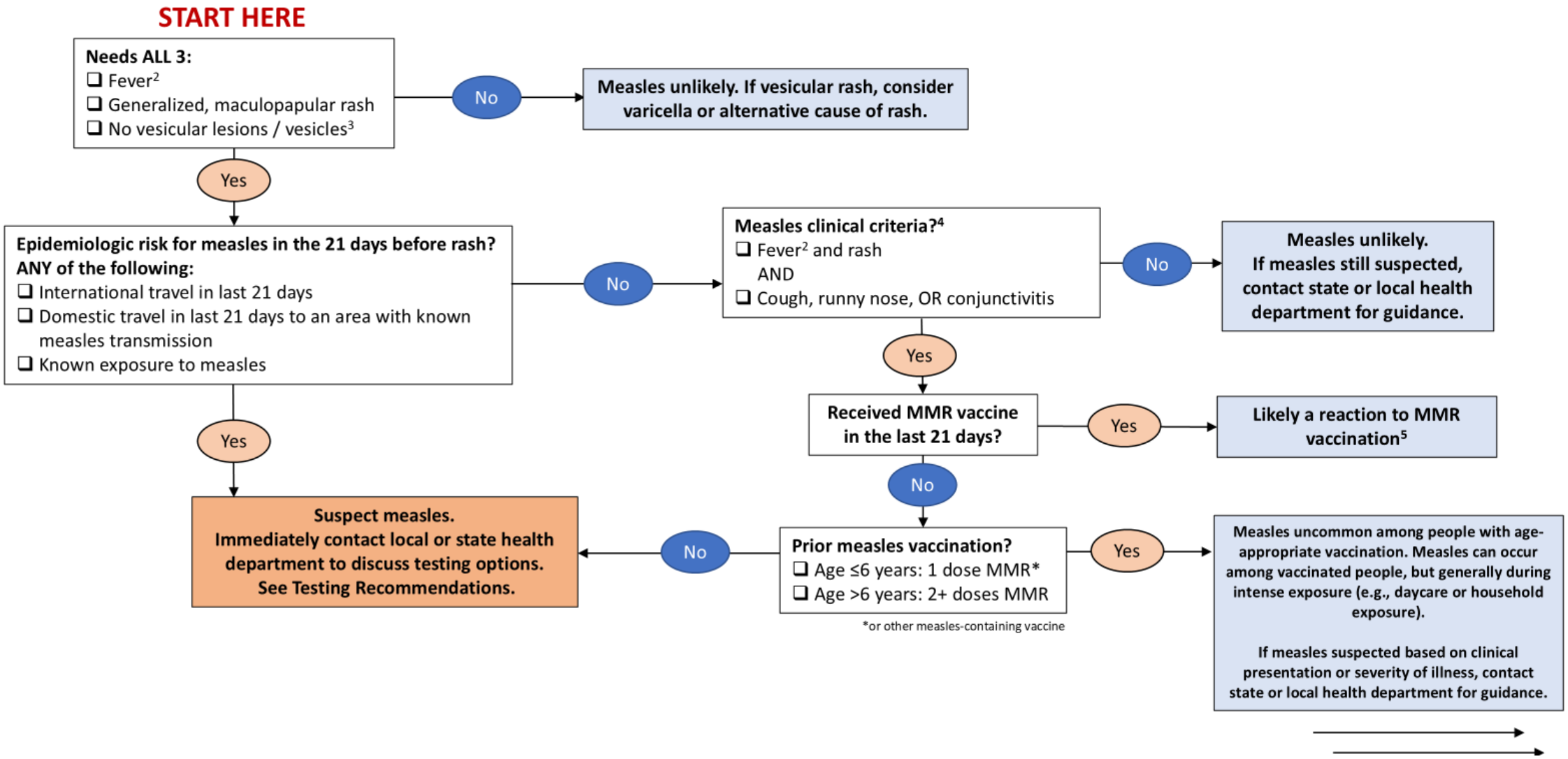
## ONE of the 3 C's

- Cough
- Conjunctivitis
- Coryza (Runny nose)

*Koplik spots may not be present and not necessary for diagnosis

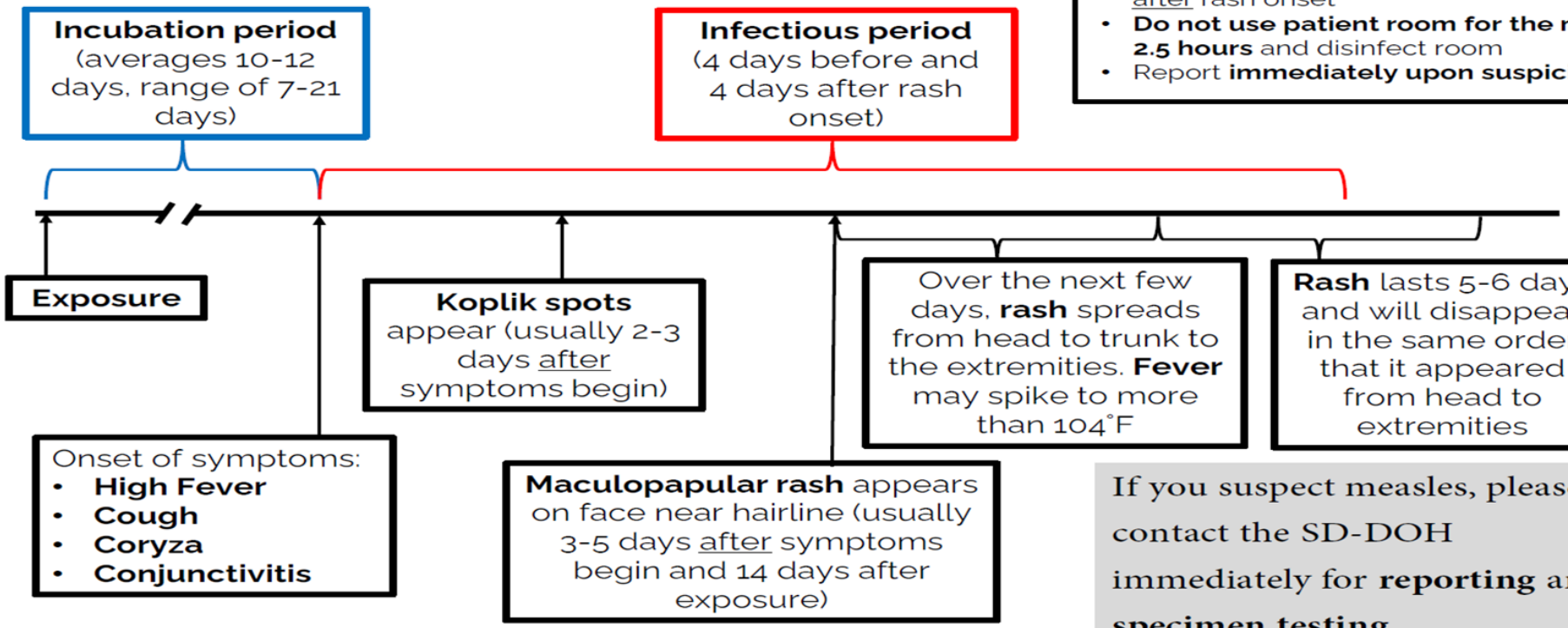
# Measles Characteristics

- Classic symptoms
  - Fever (up to 105F) + generalized maculopapular rash + one of the “3 C’s”
    - 3 C’s: Cough, coryza (runny nose), conjunctivitis
    - Prodrome of fever and at least 1 of 3 C’s often starts 2–4 days before rash
    - Rash starts on head or face and spreads downwards
    - Fever continues through onset of rash, often peaking around the time when the rash starts
- Measles is rare in vaccinated people, especially with 2 prior doses of MMR
    - 1 dose generally provides 93% protection, and 2 doses provides 97% protection from measles infection


START HERE
Needs ALL 3:
❑ Fever[2]
❑ Generalized, maculopapular rash
❑ No vesicular lesions / vesicles[3]
No
Measles unlikely. If vesicular rash, consider varicella or alternative cause of rash.
Yes
Epidemiologic risk for measles in the 21 days before rash?
ANY of the following:
❑ International travel in last 21 days
❑ Domestic travel in last 21 days to an area with known measles transmission
❑ Known exposure to measles
No
Measles clinical criteria?[4]
❑ Fever[2] and rash
AND
❑ Cough, runny nose, OR conjunctivitis
No
Measles unlikely.
If measles still suspected, contact state or local health department for guidance.
Yes
Yes
Received MMR vaccine in the last 21 days?
Yes
Likely a reaction to MMR vaccination[5]
No
Suspect measles.
Immediately contact local or state health department to discuss testing options.
See Testing Recommendations.
No
Prior measles vaccination?
❑ Age ≤6 years: 1 dose MMR*
❑ Age >6 years: 2+ doses MMR
*or other measles-containing vaccine
Yes
Measles uncommon among people with age-appropriate vaccination. Measles can occur among vaccinated people, but generally during intense exposure (e.g., daycare or household exposure).
If measles suspected based on clinical presentation or severity of illness, contact state or local health department for guidance.

# Measles Infection Timeline

**Reminders for providers**
- **Collect NP swab** if within **3 days** of rash onset
- Collect serum for serology testing (IgM, IgG)
- Tell patient to **self-isolate for 4 days** after rash onset
- **Do not use patient room for the next 2.5 hours** and disinfect room
- Report **immediately upon suspicion**




SOUTH DAKOTA DEPARTMENT OF HEALTH

Adapted, with permission, from the Indiana DOH.

If you suspect measles, please contact the SD-DOH immediately for **reporting** and **specimen testing.**

Phone: 605-773-3737

Fax: 605-773-5509

# TREATMENT OF MEASLES

- No treatment is available
- CDC recommends Vitamin A supplementation for hospitalized children
  - Can decrease severity in undernourished children
  - Vitamin A is not a replacement for vaccination
- Provide post-exposure prophylaxis of close contacts
  - MMR vaccine:  If given within 72 hours
  - Measles immune globulin: If given within 6 days
    - Infants under 12 months
    - Severely immunocompromised people
    - Pregnant women without evidence of immunity

# Other Common Causes of Rash in Children

- **Parvovirus B-19 (“Fifth Disease”)**
  - Classic “slapped cheek” rash
  - More common in school-aged children than infants
- **Human Herpesvirus 6 (HHV-6, “Sixth Disease”, “Roseola”)**
  - Common cause of febrile rash in infants
  - Rash commonly starts on trunk (measles rash starts on face/hairline)
  - Fever often resolves before start of rash (measles fever peaks around time of rash onset)
- **Enteroviruses**
  - Common cause of Hand/Foot/Mouth, rash can involve hands/feet which are generally spared in measles

# Vaccination Recommendations

# Vaccine Schedule

**62 YEARS**
Measles vaccine has been safely administered since 1963.

- Two doses of MMR recommended for children
  - 1st dose given at age 12-15 months
  - Second dose given at age 4-6 years (as early as 28 days after 1st dose)
- Anyone ages 12 months and older who has not previously received MMR can get it at any time
- Contraindications
  - Allergy to a vaccine component
  - Current pregnancy
  - Immune system disorders
- Infants ages 6-12 months can receive an early MMR dose if measles exposure is likely.
  - Recommended to receive additional doses at 12-15 months and 4-6 years

# MMR Side Effects

- Most don't have any side effects

- Those that do are usually mild:
  - Soreness, redness, or swelling at vaccination site
  - Fever
  - Mild rash
  - Temporary pain and stiffness in the joints

# Am I Immune?

- Immunity from infection and vaccination is considered life-long
  - Birth in US before 1957
  - 1 dose MMR vaccine among adults (non-high risk*)
  - 2 doses MMR vaccine (children [age-appropriate] and high risk adults)
  - Lab evidence of immunity (IgG [+] in serum)
  - Lab confirmation of measles

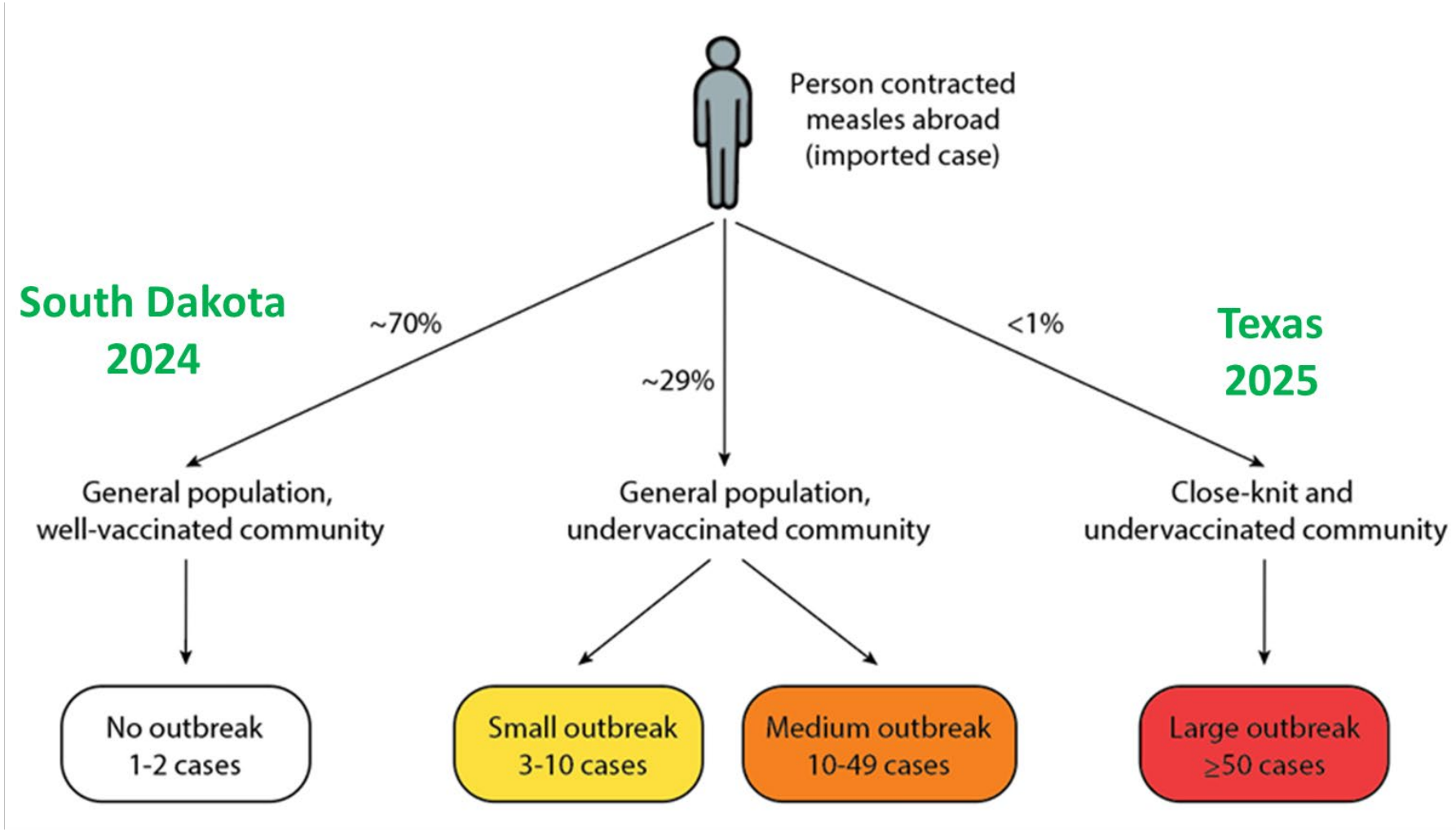
- Community immunity: attained when ~95% of population is immune

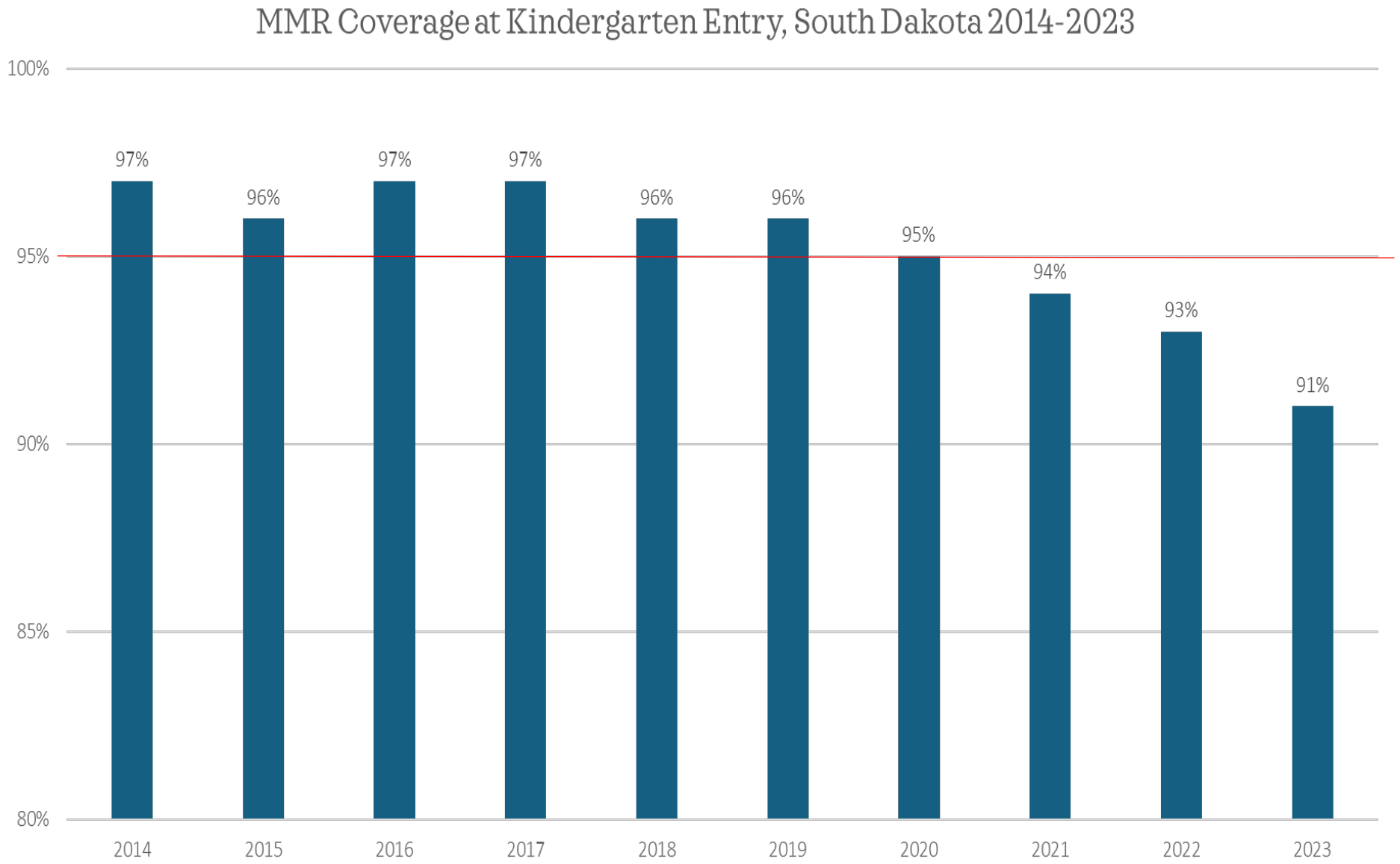
High Risk Adults
Student at post-high school educational institutions
International travelers
Healthcare personnel
Household and close contacts of people with compromised immune systems

* Adult with inactivated/killed (1963-1967) or unknown type are recommended to be re-vaccinated

https://www.cdc.gov/vaccines/vpd/mmr/hcp/recommendations.html

# Ability for Measles to Spread

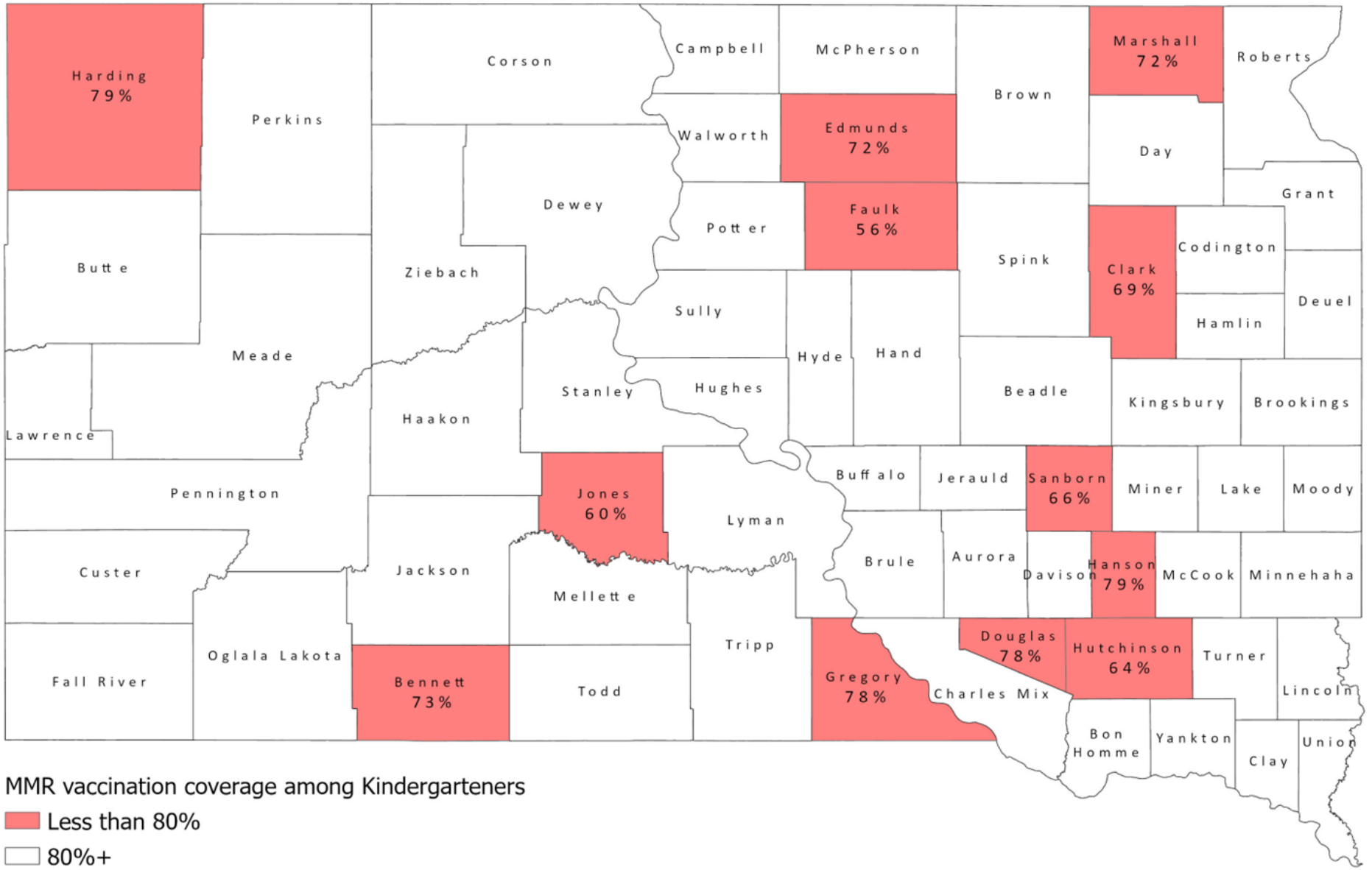



MMR Coverage at Kindergarten Entry, South Dakota 2014-2023
100%
95%
90%
85%
80%
97%
96%
97%
97%
96%
96%
95%
94%
93%
91%
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023

# SD Counties by MMR Coverage at Kindergarten Entry

Coverage under 80% used to show risk

Gaines Co Texas at ~80%




https://doh.sd.gov/health-data-reports/data-dashboards/school-immunization-dashboard/

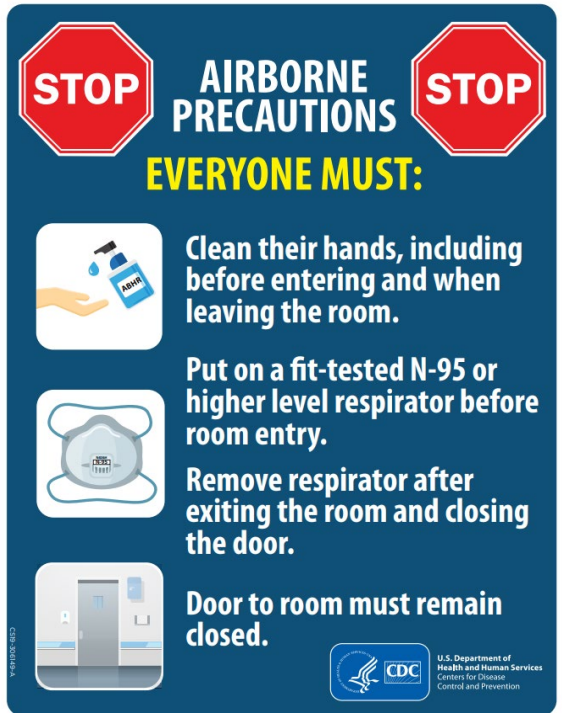
# Infection Prevention & Control Strategies

# Respiratory Hygiene Measures

- Adhere to respiratory hygiene measures including cough etiquette, hand hygiene, and triage procedures.
- Educate patients and families about cough etiquette.
- Post visual alerts (signs and posters) in different languages throughout the facility entrances and in common areas (waiting rooms, elevators, cafeterias.
- Make supplies available to all persons, including facemasks and hand hygiene stations, at facility entrances and in common areas.

# Adhere to Standard and Airborne Precautions

- Adhere to Standard Precautions, which are foundational for preventing infections in all healthcare settings.
- Adhere to Airborne Precautions with known or suspected measles. Microorganisms carried by the airborne route can be widely dispersed by air currents and may become inhaled by a susceptible host in the same room.



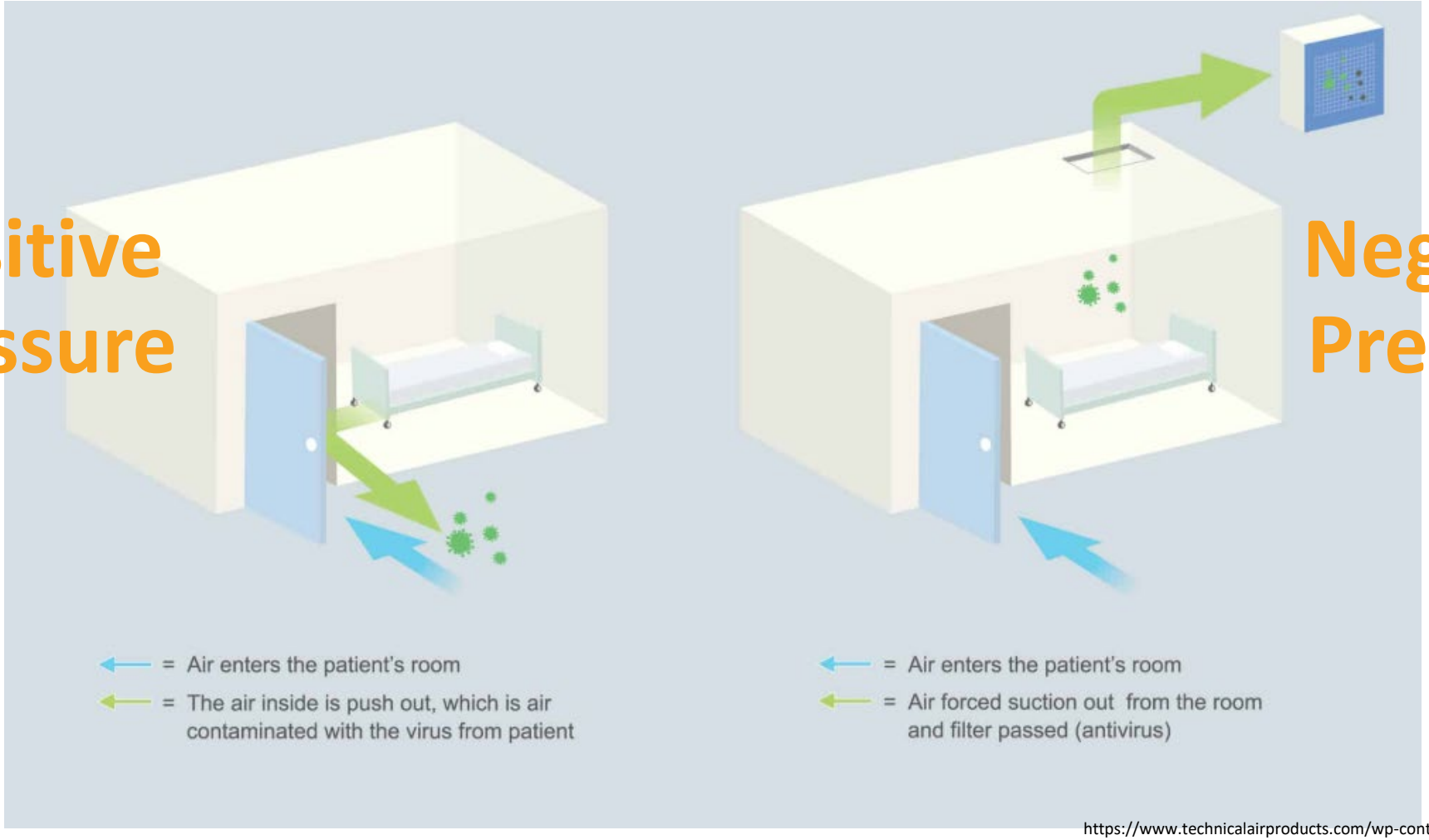

airborne precautions final rev3

# Why Airborne Precautions?

- Airborne Precautions prevent the transmission of infectious agents that remain viable or suspended in the air over long distances such as measles, varicella, chickenpox, and mycobacterium tuberculosis.
- AIIR rooms have special air handling and ventilation. The air is exchanged at a faster rate than other areas with exhaust directed to outside and/or HEPA filtered.
- AIIR rooms provide negative pressure with a minimum of 6 air exchanges per hour in existing facilities or 12 air exchanges in new construction or renovation.

# Understanding Positive vs Negative Pressure

## Positive Pressure




## Negative Pressure

https://www.technicalairproducts.com/wp-content/uploads/2022/01/isolation-rooms.jpg

# N95 Mask or PAPR is required for Airborne Precautions

- A particulate respirator must be worn by anyone entering the patient room. This may be an N95 or a PAPR (powered air purifying respirator).
- N95 masks needs to be fit tested by trained personnel. A fit test will ensure the face mask have a tight seal against the face.
- A PAPR  could be worn in place of N95 if the employee has facial hair or if they are having trouble getting a tight seal.

# What if I don't have a Negative Pressure Room?

- Provide a facemask to the patient and place the patient in a private room with the door closed.
- Instruct patient to keep the facemask on while in the room.
- If the facemask becomes wet, it should be changed.
- Per CDC recommendations, transfer to a facility that has AIIR room or return to the home environment, as medically appropriate.

- Once patient leaves the exam room or patient room, the room should remain empty for up to 2 hours to allow for adequate air exchanges to occur.
- If the patient is in a AIIR room, the patient could remove the mask while in the room.

Interim Infection Prevention and Control Recommendations for Measles in Healthcare Settings | Infection Control | CDC

# Transporting patients

- Limit transport of patients with known or suspected measles to only essential purposes. If procedures can be done in the patient room, that is preferred.
- If transport within facility is necessary, patient should wear a facemask, choose route that will have minimal contact with others, notify receiving area.
- Transportation outside the facility, inform the receiving facility and drivers in advance.

# Duration of airborne precautions

- Patients with measles should remain in airborne precautions for 4 days after the onset of rash. (onset of rash considered to be Day 0)
- Immunocompromised patients should remain in airborne precautions for the duration of the illness due to prolonged virus shedding in these individuals.

# Manage visitor access and movement

- If there are measles within your community, consider screening visitors for signs and symptoms before they enter the facility.
- Visitors without acceptable presumptive evidence of immunity should not enter the room of the patient with known or suspected measles.
- Limit visitors to patients to those who are necessary for the patient's well-being and care.

# Proper Cleaning

- Identify and Prioritize High Touch Surfaces

Doorknobs, handles, light switches, elevator buttons, call lights, handrails, faucets, shared equipment such as keyboards, phones, computers, and monitors. Don’t forget about the vending machines!

- Select the Right Disinfectants

EPA registered and specifically approved for use against measles. Pay close attention to the required dwell time.

- Implement Proper Disinfection Techniques

Includes pre-cleaning to remove contamination before applying disinfectant, observing contact time, proper dilution of the product, applying sufficient product, using clean cloths and mop heads for each area and working from cleanest to dirty areas. Don't forget about the curtains and soft surfaces!

# EPA

Feb 24, 2024- EPA Lists C, D, E and F are now retired and will be redirected to the new List S.

- In general, **EPA**-registered disinfectants suitable for hepatitis B viruses and HIV (**EPA list** S) will be effective against the **measles** virus.
- Measles virus is enveloped so it is easier to kill than other virus using the proper products and contact time.
- Manage used, disposable PPE and other patient care items for **measles** patients as regulated medical waste according to federal and local regulations.

https://www.osha.gov/measles/control-prevention

# EPA Quick List Guide (Measles is List S)

| List Identifier | Description | Additional Information |
|---|---|---|
| List A | EPS's Registered Antimicrobial Products Effective as Sterilizers | Used in healthcare for critical items (surgical tools) |
| List B | EPA Registered Antimicrobial Products Against Mycobacterium Tuberculosis (TB) | Used in Laboratories and healthcare settings |
| List G | EPA Registered Antimicrobial Products effective against Norovirus | Commonly in schools, restaurants, cruise ships |
| List H | EPA's Registered Antimicrobial Products Effective Against MRSA and/or VRE | Targeted for high-risk healthcare areas |
| List J | EPA Registered Antimicrobial Products Effective against Medical Waste Treatment | Designed for safe handling of infectious waste |
| List K | EPA's Registered Antimicrobial Products for Clostridium Difficile spores | Effective with specific contact times for spore eradication |
| List L | EPS's Registered Antimicrobial Products Effective Against Ebola Virus | Includes products for terminal cleaning in outbreaks |
| List M | EPA's Registered Antimicrobial Products Effective Against Avian Influenza | Useful for agriculture and veterinary environments |
| List N | Disinfectants for use Against SARS-CoV-2 | Approved for use during the COVID-19 pandemic |
| List O | Disinfectants for Use Against Rabbit Hemorrhagic Disease Virus | Key for managing outbreaks in rabbit populations |
| List P | EPS's Registered Antimicrobial Products Effective Against Candida auris | Critical for controlling outbreaks in healthcare settings |
| List Q | Disinfectants for Emerging Viral Pathogens | Reserved for potential future pandemic pathogens |
| List S | EPS's Registered Antimicrobial Products Effective Against Bloodborne Pathogens (HIV, Hepatitis B and C) | Consolidates former list C,D, E, and F |

# Key Takeaways:

- Ensure that all HCP have presumptive evidence of immunity to measles.
- Ensure all HCP have been fitted to an appropriate respirator
- Clinic setting- end of day appointment, give instructions for patient arrival including which entrance to use and necessary precautions, masking instructions.
- Unexpected arrival-Use triage areas for identifications and isolation. Isolate and mask as soon as possible. Private room with door closed and use Standard plus Airborne precautions.

# Key Takeaways:

- Train staff to recognize suspected measles and to immediately isolate suspected cases.
- Instruct EMS to notify the receiving facility in advance when transporting a patient with known or suspected measles.
- Persons with signs or symptoms of measles should be identified and given a facemask to wear and be separated from other patients prior to or as soon as possible after entry into a facility.

# Guidance & Available Resources

# Resources

- SD-DOH
  - Measles disease webpage: https://doh.sd.gov/diseases/measles/
  - Fact sheet: https://doh.sd.gov/media/hafbcfgd/measles_diseases_fact_sheet.pdf
  - Immunization webpage: https://doh.sd.gov/topics/immunizations-vaccinations/
- CDC
  - Case county by state: https://www.cdc.gov/measles/data-research/index.html
  - Measles photos: https://www.cdc.gov/measles/signs-symptoms/photos.html
  - MMR routine vaccination: https://www.cdc.gov/vaccines/vpd/mmr/hcp/recommendations.html
  - Measles infection, prevention, and control: https://www.cdc.gov/infectioncontrol/guidelines/measles/index.html
  - Measles post-exposure prophylaxis: https://www.cdc.gov/measles/hcp/vaccine-considerations/index.html
  - Precautions to MMR vaccination: https://www.cdc.gov/pinkbook/hcp/table-of-contents/chapter-13-measles.html#cdc_report_pub_study_section_9-contraindications-and-precautions-to-vaccination
  - Specimen collection timing: https://www.cdc.gov/mumps/media/pdfs/2025/02/MMRV-Testing-for-Clinicians_Jan2025.pdf
  - Clinical provider flowsheet: https://www.cdc.gov/measles/downloads/Toolkit-Measles-Clinical-Provider-Flowsheet.pptx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