ALL ABOUT MEASLES
4.9.2025

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NORTH Dakota
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MEASLES

- Measles is a highly contagious virus.
  - Transmitted via direct contact with infectious droplets or airborne spread when an infected person breathes, coughs, or sneezes.
  - If one person has measles, up to 9 out of 10 unprotected people exposed will become infected.
- Measles can spread before the infection is identified.
- Measles can cause serious health complications.

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MEASLES HISTORY

Pre-Vaccine Era

- 1757: measles shown to be caused by an infectious agent in the blood by a Scottish physician, Francis Home
- 1912: measles was designated as a nationally notifiable disease in the United States, requiring reporting of all diagnosed cases
  - An average of 6,000 deaths were reported each year during the next decade.
- 1963: measles vaccine became available

History of Measles | Measles (Rubeola) | CDC

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MEASLES HISTORY

Pre-Vaccine Era

- Almost all children got measles before they were 15 years old.
- Annually in the United States, approximately
  - 3 to 4 million people were infected with measles
  - 400 to 500 people died
  - 48,000 people were hospitalized
  - 1,000 suffered encephalitis

History of Measles | Measles (Rubeola) | CDC

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MEASLES VACCINE HISTORY

Vaccine Development

- In 1954, 2 doctors in Boston isolated measles in an infected child's blood.
- In 1963, scientists developed a vaccine from that isolated strain and licensed it in the United States.
- In 1968, an improved vaccine was developed and began distribution. This is the measles vaccine in use in the United States today.
- In 1971, a combination vaccine inducing immunity to measles, mumps, and rubella, MMR, was licensed.

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Measles | History of Vaccines

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MEASLES VACCINE HISTORY

United States Measles Elimination

- In 1978, the CDC declared a goal of eliminating measles in the United States by 1982.
  - This goal was not met, but reported measles cases in 1981 were 80% less that in 1980.
- In 1989, measles outbreaks occurred in vaccinated school-aged children.
  - In response, a second dose of MMR was recommended for all children by the Advisory Committee on Immunization Practices (ACIP), the American Academy of Pediatrics (AAP), and the American Academy of Family Physicians (AAFP).
- In 2000, endemic measles was declared eliminated in the United States.
- In 2016, endemic measles was declared eliminated in the Americas.

History of Measles | Measles (Rubeola) | CDC
Measles | History of Vaccines

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History of Measles | Measles (Rubeola) | CDC
Measles | History of Vaccines

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MEASLES DISEASE FACTS

- Symptoms: fever, malaise, cough, coryza, conjunctivitis, Koplik spots and maculopapular rash.
- Incubation period: 7-21 days (average 12 days from exposure to illness onset)
- Duration: Prodrome (pre-rash) lasts from 2-8 days. Rash typically lasts from 4 to 7 days. Cough can persist for 2 weeks
- Hospitalization: 20%
- Period of infectivity: 4 days before rash onset to 4 days after rash onset.
- Susceptibility: Born in 1957 or later and unvaccinated
- Mode of Spread: airborne, droplet, secretions, fomites
- Diagnosis: **rule zero=risk factors!! (not vaccinated and recent travel or known exposure** **a) PCR (NP/OP swab and urine+NP/OP)** b) IgM NOT TO BE DONE ALONE c) acute and convalescent titers; d) viral isolation
- Pre-exposure vaccine efficacy: 90-95% one dose, 97-99% two doses (2-4 weeks for complete immune response)
- Isolation and quarantine: Yes
- Post-exposure prophylaxis: 72 hour window for vaccine but limited efficacy; 6 day window for IG but limited efficacy.
- Treatment: Supportive, severe measles (hospitalized) Vit A under guidance of physician

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MEASLES EPIDEMIOLOGY

- Ro=12-18 people
- Case fatality 1-2 in 1000
- Worldwide, over 100,000 people (mostly children) die from measles each year
- Peaks in ~10 year intervals

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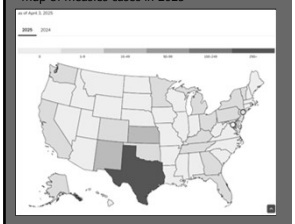
Measles in the United States

Map of measles cases in 2025



Source: CDC

- 2025 (as of 04/03/2025): 607 cases
  - Age Breakdown:
    - 32% under 5 years
    - 40% 5-19 years
    - 26% 20+ years
    - 2% unknown
  - Hospitalizations: 12% of cases hospitalized
  - Deaths:
    - 2 unvaccinated children in TX
    - Unvaccinated adult in NM

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MEASLES IN ND

- No cases currently
  - https://www.hhs.nd.gov/immunizations/measles
- No high suspect recent tests
- No high sensitivity syndromic signals
- Some provider or patient interest due to rashes, travel, ongoing outbreaks
- Increased interest for immunization checks, mostly from older adults

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CASE DEFINITION

The following case definition for case classification of measles cases, including case classifications for importation status, has been approved by the Council of State and Territorial Epidemiologists (CSTE) and was published in 2012. [29]

Case definition for case classification

Clinical description:

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 antibody; or direct epidemiologic linkage to a case confirmed by one of the methods above.

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MEASLES PREVENTION

- Primary prevention through vaccination
  - MMR/MMRV (in US)
- Secondary prevention through post-exposure prophylaxis and case investigation
  - Vaccine w/in 72 hours of exposure or IGIM/IGIV
- Tertiary prevention
  - Treatment for measles is supportive care. No specific antivirals are approved for treatment. Antibiotics may be used to treat secondary infections

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EVIDENCE OF MEASLES IMMUNITY

- ACIP recommends that people who don't have presumptive evidence of immunity to measles, mumps, and rubella should get immunized against these diseases.
  - Presumptive evidence of immunity can be established in any of the following ways:
    - Written documentation of adequate vaccines for measles, mumps, and rubella
    - Laboratory evidence of immunity
    - Laboratory confirmation of disease
    - Birth before 1957. Although birth before 1957 is considered acceptable evidence of immunity for healthcare personnel in routine circumstances, healthcare facilities should consider vaccinating healthcare personnel born before 1957 who lack laboratory evidence of immunity or laboratory confirmation of disease.
- Healthcare providers should not accept verbal reports of vaccination without written documentation as presumptive evidence of immunity.

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CLASSIFICATION

- Measles CASE
  - A "case" is someone who meets the case-definition for measles
  - Rash onset=Day 0
    - They are contagious -4 through +4
    - Day -5 would not be considered within their contagious period
  - They must ISOLATE at home and may only leave for medical treatment
    - Day +5 is the first day they are allowed to leave
- Measles CONTACT
  - A "contact" is someone who has shared an airspace with a case while the case was contagious (see CASE)
  - Incubation period=7 through 21 days (average 11-14)
  - They must QUARANTINE at home for days five after first exposure through day 21 after last exposure
    - Quarantine could become much longer than 21 days
    - In some circumstances, entire daycare facilities and schools may have to close

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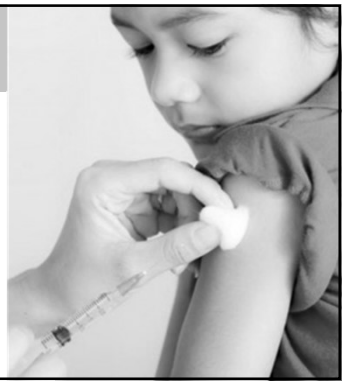
MMR/MMRV VACCINE

- MMR (measles, mumps and rubella) vaccine is routinely recommended for children.
  - First dose should be given at 12 to 15 months.
  - Second dose should be given at four to six years.
- One dose=90%
- Two doses= 97% effective



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Source: CDC

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ADULT MMR RECOMMENDATIONS

- Adults born before 1957 are presumed to be immune to measles and are therefore not recommended to receive MMR vaccine.
- All adults born in 1957 or later should have at least one documented dose of MMR vaccine or laboratory evidence of immunity.

Source: CDC

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HIGH RISK MMR RECOMMENDATIONS

- Adults who are considered high risk are recommended to have two documented doses of MMR vaccine or laboratory evidence of immunity.
- High risk groups include:
  - Healthcare workers
  - College students
  - International travelers
    - Including infants ages 6-11 months
  - Close contacts of immunocompromised people
  - People living with HIV

International Travel and MMR Vaccine Infographic | Measles (Rubeola) | CDC

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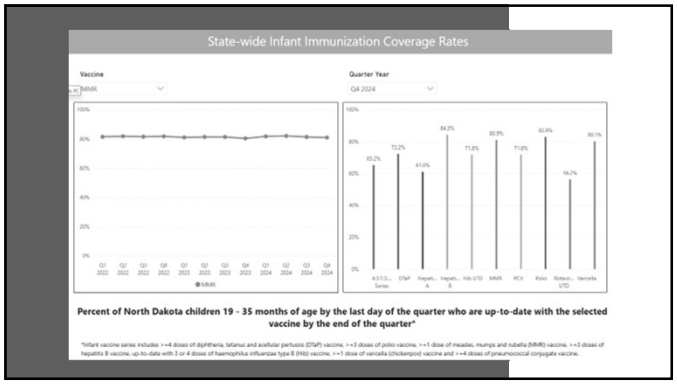
State-wide Infant Immunization Coverage Rates
Vaccine
MMR
Quarter Year
Q4 2024
Percent of North Dakota children 19 - 35 months of age by the last day of the quarter who are up-to-date with the selected vaccine by the end of the quarter*

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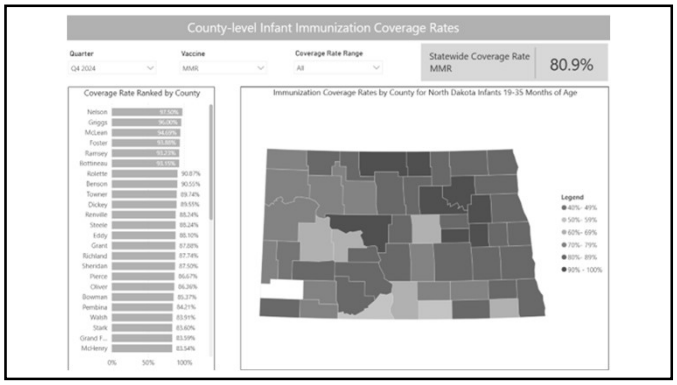
County-level Infant Immunization Coverage Rates
Quarter
Q4 2024
Vaccine
MMR
Coverage Rate Range
All
Statewide Coverage Rate
MMR
80.9%
Coverage Rate Ranked by County
Immunization Coverage Rates by County for North Dakota Infants 19-35 Months of Age
Legend
40% - 49%
50% - 59%
60% - 69%
70% - 79%
80% - 89%
90% - 100%

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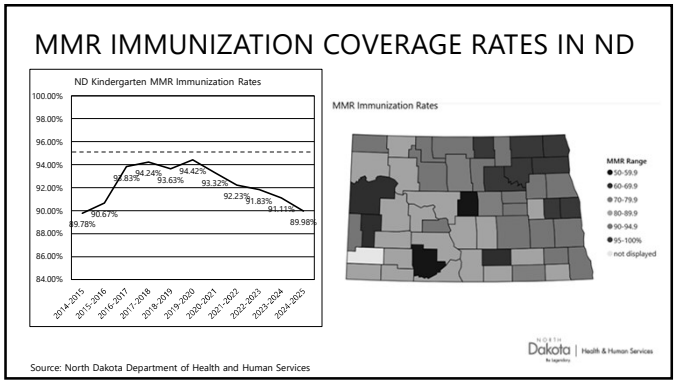
MMR IMMUNIZATION COVERAGE RATES IN ND
ND Kindergarten MMR Immunization Rates
100.00%
98.00%
96.00%
94.00%
92.00%
90.00%
88.00%
86.00%
84.00%
89.78%
90.67%
94.83%
94.24%
93.63%
94.42%
93.32%
92.23%
91.83%
91.11%
89.98%
2014-2015
2015-2016
2016-2017
2017-2018
2018-2019
2019-2020
2020-2021
2021-2022
2022-2023
2023-2024
2024-2025
MMR Immunization Rates
MMR Range
50-59.9
60-69.9
70-79.9
80-89.9
90-94.9
95-100%
not displayed
Source: North Dakota Department of Health and Human Services

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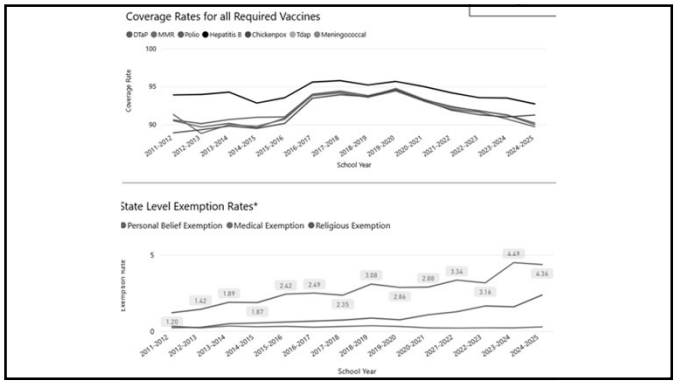

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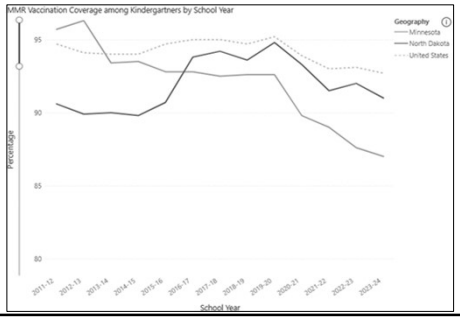
MMR Immunization Coverage Rates in the U.S.



Source: CDC SchoolVaxView

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HOW CAN WE IMPROVE RATES?

What providers can do now…

- Vaccinate at every opportunity
- Vaccinate international travelers
- Reminder/recall for MMR
- Have a high suspicion for measles
- Review infection control procedures

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PROTECT YOUR STAFF

- Make sure all staff are appropriately vaccinated against measles.
- Use airborne precautions (PPE)
- Use a negative pressure room if available
- Only vaccinated individuals should enter the room with the patient
- Staff who are immune-suppressed should avoid being around patient(pregnancy, medication, etc.)
- Make sure staff are fit-tested for N95 masks and have them available for use in the event of a suspect measles case. (Because it is airborne, a regular surgical mask will not fully protect a person from contracting or passing along measles)

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EDUCATE PATIENTS AND IMPROVE EARLY DETECTION

Educate established patients who are delaying vaccination about the risk of non-vaccination and travel. Ask about upcoming travel plans.

Ask patients to call ahead before using walk-in clinic or emergency department services and collect basic information at the first opportunity: reason for visit, recent possible exposures (especially international travel), and vaccination status.

Use secure online portals to allow families to submit photos of rash illness to assess for characteristics.

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KNOW HOW TO DIAGNOSE MEASLES

Know when to test for measles. Please use this flow chart.

Be aware of the distinguishing features of measles rash versus other rash illnesses, as well as how this rash appears on a variety of skin tones.

Screen patients for additional explanations for rash illness (dermatological reactions to recent antibiotic use are commonly mistaken for measles, but without proper travel history and testing, may be erroneously diagnosed when measles infection is responsible for the rash.)

Use the proper test for measles: collect a PCR swab at a minimum and consider a blood test, if practical. (Both of these may also be useful in checking for other diseases that are on the differential diagnosis. People being screened for measles may also need to be screened for other common/seasonal respiratory diseases such as COVID-19, Influenza, Strep infection, etc.) **In general, IgM tests alone for many diseases are not able to confirm a clinical diagnosis and PCR should be collected whenever applicable.**

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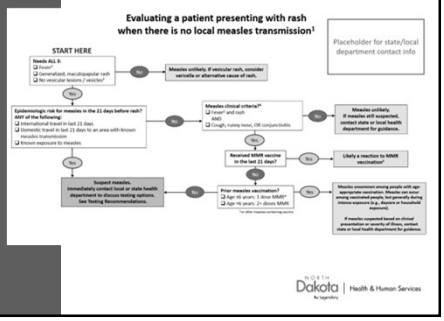
TO TEST OR NOT TO TEST?



Toolkit-Measles-Clinical-Provider-Flowsheet.pptx

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LIMIT EXPOSURE TO YOUR OTHER PATIENTS AND STAFF

Have receptionists ask patients measles screening questions at intake. If patients have symptoms of measles (febrile rash) and/or recent travel abroad, **room the patient as soon as possible after check-in.**

Have staff working with suspect measles patients use N-95 masks. Other patients and individuals may use surgical masks, since N-95 masks will be of limited use without a prior fit test.

Use a negative pressure room, if available.

Sanitize any rooms or space that a suspect or confirmed measles case has been and do not use the room for a minimum of **TWO HOURS** after its use.

Consider implementing drive-up testing or have contingency plans for testing patients outdoors or in their vehicle when weather allows.

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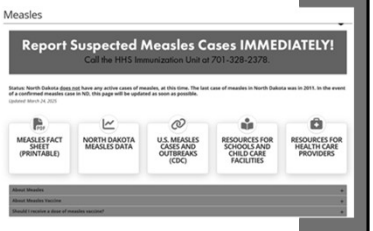
RESOURCES ARE AVAILABLE

ND HHS has many resources available online at:
Measles | Health and Human Services North Dakota



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RESOURCES ARE AVAILABLE

- Printable fact sheet
- North Dakota case data (county level)
- Link to CDC information on U.S. measles cases and outbreaks
- Resources designed for schools and childcare facilities (printable tools, facts, action guidance, etc.)
- Resources designed for healthcare providers (HANs, planning guidance, testing guidance, printable posters, isolation guidelines, etc.)

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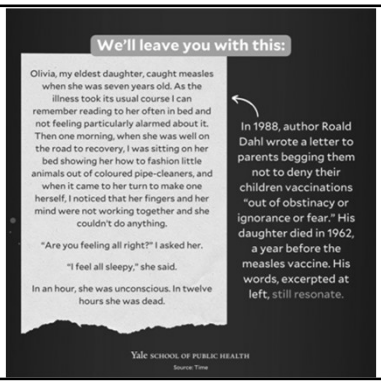

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POST-TEST

- Successfully complete the five-question post-test to receive your certificate for nursing credit using the link below: https://ndhealth.co1.qualtrics.com/jfe/form/SV_e2Smgb0YoK25S5M
- Credit for this session will be available until May 13, 2025.
- This presentation will be posted to our website at: www.hhs.nd.gov/immunizations

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Questions?

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STAFF MEMBERS

For general immunization questions: vaccine@nd.gov For NDIIS-specific questions: NDIIS@nd.gov

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