



High-Priority Pathogens: Epidemiology, Potential Spread, and Infection Control Response

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Nov 2025



Speaker Bio



Doe Kley, RN, MPH, T-CHEST, LTC-CIP, CIC Infection Prevention Fellow, Clorox Healthcare

Doe Kley is an Infection Prevention Fellow within Clorox Healthcare's Clinical and Scientific Affairs team. Her role focuses on providing consultative services and developing practice tools leveraging her 20+ years of clinical expertise in acute care infection prevention from working in large healthcare systems.

Doe is a registered nurse with undergraduate degree in Microbiology. She received her Master of Public Health from the University of Nevada. She is dual-board certified in infection prevention and epidemiology in both acute and long-term care and is certified to train EVS through the Association for the Healthcare Environment (AHE). Doe is currently a member of APIC, AORN, SHEA, and AHE. Doe served on the board of directors for California APIC Coordinating Council (CACC) in 2022 and currently she serves on the CBIC Test Committee and the Advisory Council for the Pearce Foundation Environmental Services Optimization Playbook (EvSOP).



Speaker Bio



Mariana Portillo Torres, MD

Head of Infectious Disease Surveillance, BlueDot

Dr. Mariana Torres is a physician and heads infectious disease surveillance at BlueDot where she has been instrumental in shaping BlueDot's surveillance program, enhancing the utilization of AI for detecting and assessing emerging threats, and fostering innovation in the response to disease outbreaks.

. With a comprehensive background in clinical and research work, Mariana's prior experience includes significant contributions to Clinical Infectious Diseases at the Hospital for Sick Children and the University of Toronto in Canada. She completed the Infectious Diseases Research Program at Universidad Alcala de Henares and earned a Master's degree in Immunology and Biology from Universidad del Zulia, Venezuela. Her academic foundation includes a Medical Doctor (Surgeon), and Paediatrics and Childcare post-graduate degree from the same institution. More recently she has obtained an Antimicrobial Resistance Certification from the London School of Hygiene & Tropical Medicine.



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Session Description



The landscape of infectious diseases is rapidly evolving, presenting new challenges for IPs. High consequence (and emerging) infectious diseases (HCIDs) are occurring with greater frequency and severity than any other time in history. Driven by factors like climate change, encroachment on animal territories, population growth, and global connectivity, a pathogen can traverse the globe in a day. Understanding the risks while balancing the day-to-day needs of the already burdened healthcare team has never been more challenging.

This session aims to provide an updated account of current high-priority pathogens with their potential for spread into and within the US. An overview of the pathogens, their disease spectrum, epidemiology, and IPC strategies will be provided. Several tools will also be provided.



Learning Objectives



1. Describe 2 current high-priority pathogen threats for the U.S.

2. Distinguish the pathogenesis and epidemiology for these pathogens

3. Outline the infection control measures to contain these pathogens.



2024 Recap

Go to CloroxPro.com and click on “Resources” and then “Educational Courses”: [“Emerging Pathogen Threats: Strategies for Infection Prevention & Control”](#)

2024: “Emerging Pathogen Threats: Strategies for IPC”

What we shared:

- Emerging pathogens are increasing in frequency and consequences of delayed identification & diagnosis.
- High-level overview of IC.07.01,01 (Identify, Isolate, and Inform).
- Emergency Response Plans and Point of Entry Screening.



2025: “High-Priority Pathogens: Epidemiology, Potential Spread, and IPC Response”

What we will cover today:

A deeper dive into the epidemiology and the specific IPC measures for 2 top-of-mind high-priority pathogen threats for the US:

- Avian Influenza
- Measles



"The 21st century has brought an undeniable surge in global health threats. Our reality is no longer one where pandemics are rare shock events but where they pose a constant, real danger."

— The Global Preparedness Monitoring Board (2024)

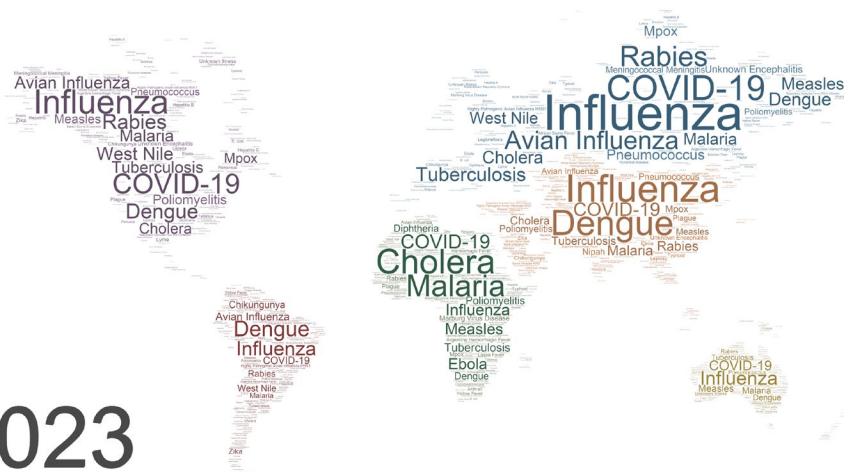


High-Priority Pathogens: Defining the Problem



Disease Maps of 2023 Vs 2024

2023



2024



Diseases 2024 vs. Diseases 2025

1. **Avian Influenza (H5N1)**
2. **Mpox Clade IIb**
3. **Vaccine-preventable diseases (measles, pertussis, polio)**
4. **Vector-borne (dengue, oropouche)**
5. **Disease X**
6. COVID-19, Influenza RSV
7. Hemorrhagic viral fever (e.g., Crimean-Congo hemorrhagic fever, Lassa fever)
8. Cholera

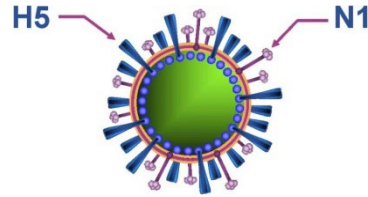
1. **Avian Influenza (H5N1)**
2. **Measles**
3. Mpox Clade Ib
4. Other vaccine-preventable diseases
5. Other respiratory viruses (COVID-19, Influenza, RSV, *Mycoplasma pneumoniae*)
6. AMRs (e.g., *Candida auris*)
7. Cholera



Epidemiology for H5N1

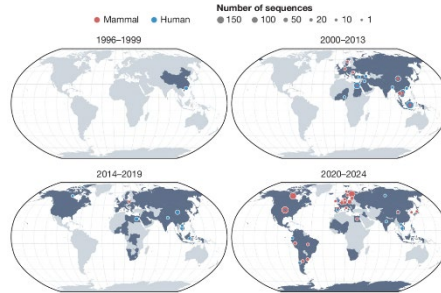


H5N1: Disease Profile and Epidemiology



Causal Agent

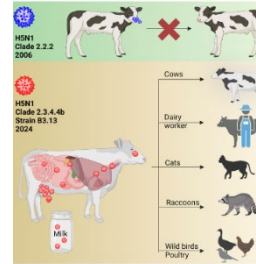
Influenza A virus (H5N1)
Susceptible to heat,
detergents, and alcohol.



Transmission & Endemicity

Animal-to-human
transmission

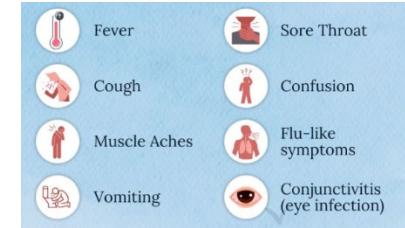
Enzoonotic in birds,
Panzyotic among many
animals



Alternate Transmission Routes

Recent FDA findings:
one in five pasteurized
milk samples were
positive.

Human cases without
direct animal exposure



Symptoms & Diagnostic

Sore throat, ILI,
conjunctivitis, seizures
rRT-PCR testing
NP & conjunctival swabs

H5N1 Quick Sheet

Available in the
CloroxPro
Resource Center

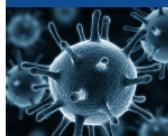
PATHOGEN & INFECTION PREVENTION INFO

CLOROXPRO

Highly Pathogenic Avian Influenza A (HPAI): H5N1



Overview



H5N1 is one of several influenza viruses that causes a highly infectious respiratory disease in birds. Since 2022, there have been increasing reports of deadly outbreaks among land and sea mammals (wild and domestic).¹ This pathogen ("animal pandemic") of Highly Pathogenic Avian Influenza A (HPAI) (H5N1) viruses in wild birds has resulted in outbreaks among commercial poultry, backyard bird flocks, and spread to infect wild and domestic mammals.² Sporadic H5N1 human infections have occurred since 1997 with a mortality rate of >50%.³ Most human infections with H5N1 virus have been the result of unprotected exposures to sick or dead infected animals.² To-date, there has been no evidence of sustained human-to-human H5N1 transmission. Human H5N1 infections range from mild (e.g., upper respiratory symptoms) to severe illness (e.g., pneumonia, multi-organ failure) that may result in death.² Clinicians should consider the possibility of H5N1 infection in persons showing signs or symptoms of conjunctivitis (eye redness) and/or acute respiratory illness who have relevant exposure history.² Keep current on the risk to public health [here](#).

About the Pathogen & Infection Control Measures

Infectious Agent (Pathogen) ^{1,3}	Agent Type: Virus Synonym(s): Avian Influenza, Bird Flu, HPAI Characteristics: Enveloped RNA virus	Taxonomy: Family: Orthomyxoviridae Genus: Influenza A Subtype: H5N1
Infectious Characteristics Definitions: Incubation period —the time from exposure to infection with symptoms. Period of communicability —time when a pathogen can be transmitted from one person to another. Mortality rate —the number of deaths due to a disease divided by the total population.	Risk factors for infection: ⁴ People who work with or have recreational exposure to affected animals Incubation period: ⁴ 3–5 days but can be as long as 7–10 days Period of communicability: ⁴ N/A (no sustained human-to-human transmission to-date) Signs & symptoms: ² - Eye redness (conjunctivitis) - Mild flu-like upper respiratory symptoms, including sore throat, cough, runny or stuffy nose, shortness of breath or difficulty breathing Duration of illness: ⁴ About 2 weeks Severity of illness and Mortality Rate: ⁴ The virus can cause mild to severe illness, including death. Mortality rate is ~50%	- Pneumonia requiring hospitalization - Fever or feeling feverish - Muscle or body aches - Headache - Fatigue
Reservoir ^{2,4} —where a pathogen normally lives and grows (e.g., humans, water, etc.)	Wild birds and other affected animals	
Mode(s) of Transmission ² How the Infection Spreads	Air and Contact: When virus from infected animals gets in a person's eyes, nose, or mouth or is inhaled	
Survival on Surfaces ⁴	The virus can survive for hours to days on surfaces in warm dry conditions, however under cold and wet conditions it can survive much longer (weeks to months).	
Immunization/Treatment ²	Currently, there is no vaccine in the US to prevent H5N1 infection in humans. CDC provides guidance for antiviral treatment of human infection with novel influenza A viruses.	
Infection Prevention & Control (IPC) Measures	General Measures for All Spaces (commercial buildings, K–12 schools, healthcare) ² - Get the flu vaccine each year. - Perform frequent hand hygiene by using alcohol-based hand sanitizer or washing hands with soap and water. - Avoid contact with sick or dead wild birds, poultry, and wild animals. - Do not consume raw or undercooked poultry or poultry products, including raw eggs or raw/unpasteurized milk products. - Persons who work with or have contact with poultry or potentially infected animals should wear appropriate PPE.	Healthcare-Specific Measures: ^{2,4} Isolation Precautions: Airborne and Contact Precautions in a single-patient airborne infection isolation (AII) room (negative pressure room) with door closed. Patients presumed to have the same infection can be cohorted. Only essential personnel should enter the room. PPE: Respirator (N95 or higher), eye protection (goggles or face shield), gown, gloves. Patient Transport: Limit to essential purposes; placement of a facemask on the patient. Linens: Handle per routine. Waste Management: Follow local medical waste regulations per state or local authorities. H5N1 is not considered a category A infectious substance, except in cultures from the lab. Other: Use caution with aerosol-generating procedures (AGP)—limit to medically necessary situations.
Cleaning & Disinfection ^{2,4,5}	Standard cleaning and disinfecting procedures are adequate as enveloped viruses are among the easiest pathogens to kill through disinfection. Use a disinfectant that has label claims against Avian Influenza A (H5N1), or a disinfectant from EPA List M . Healthcare personnel should not enter the room for cleaning until sufficient time has elapsed for enough air changes to remove potentially infectious particles.	

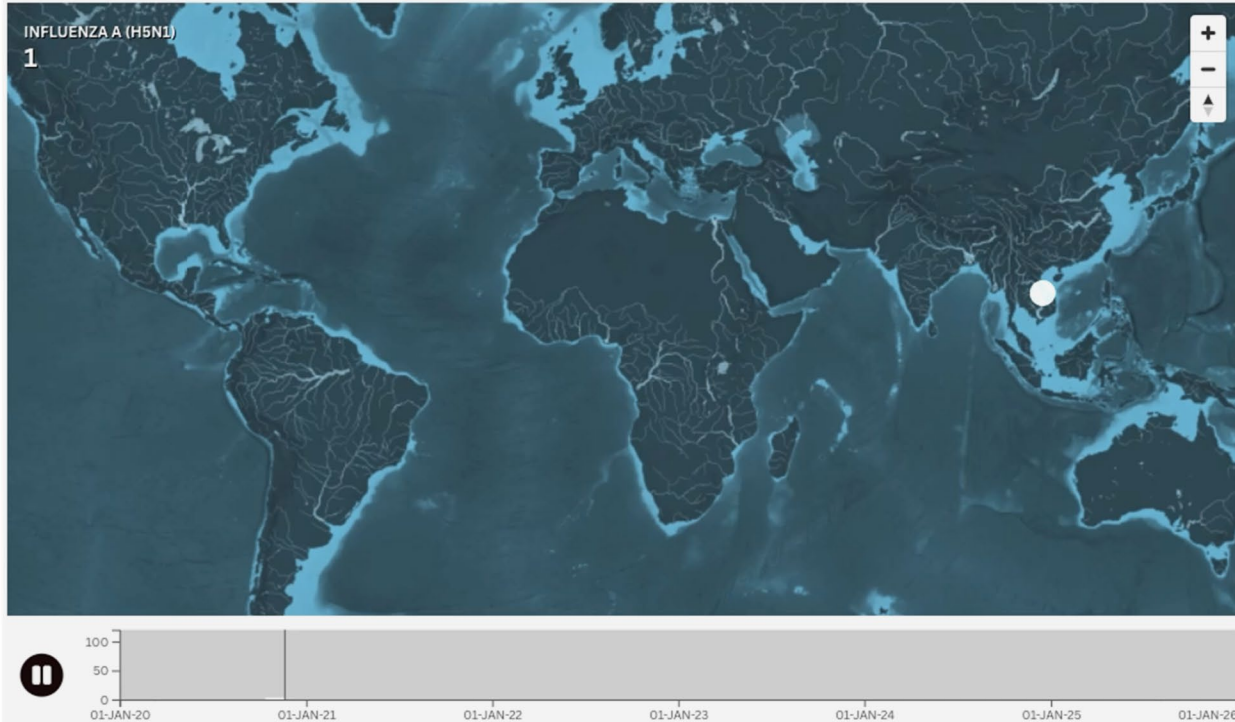
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What are the current H5N1 human infection risk factors in the US?

H5N1 – Global Human Cases

Confirmed human H5N1 cases

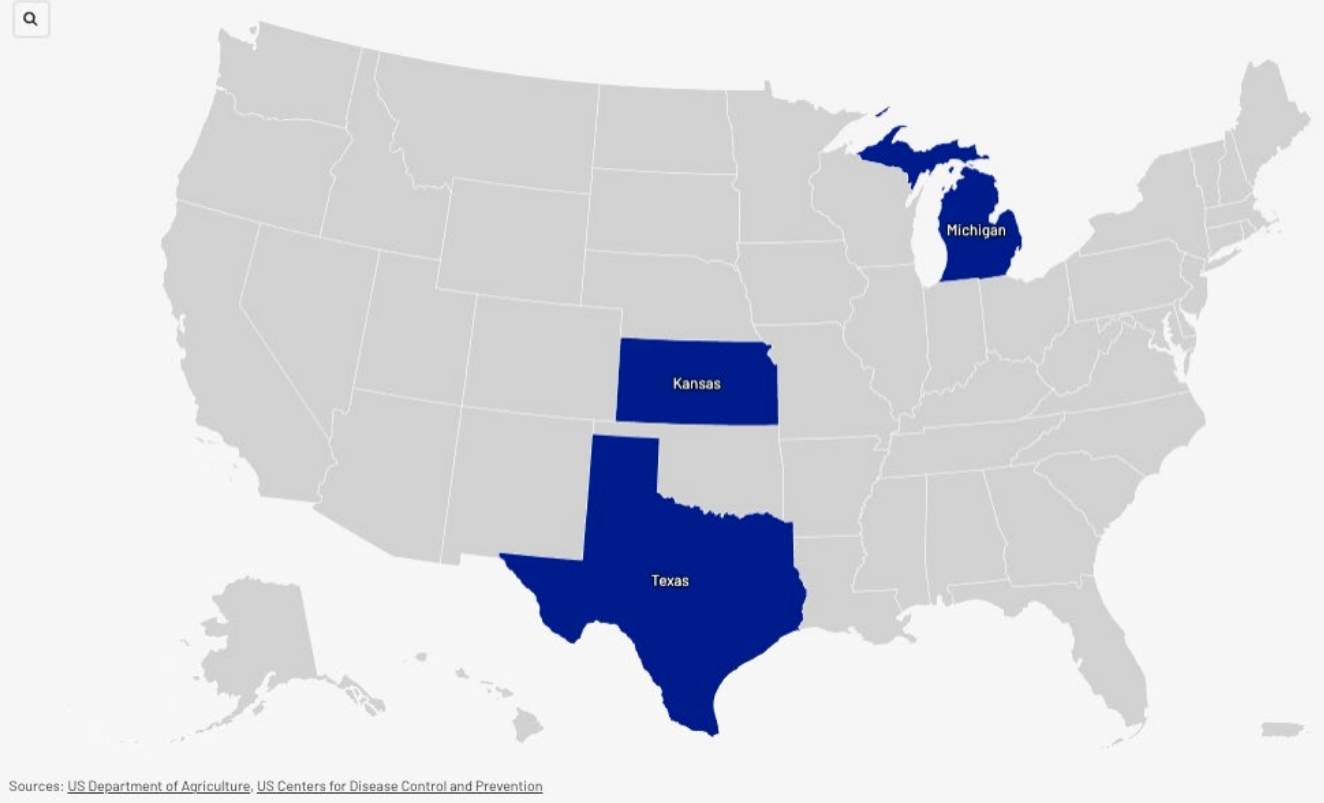


TEMPLATE CREDITS
3D map by Flourish team

H5N1 –USA- Humans and Dairy Cattle

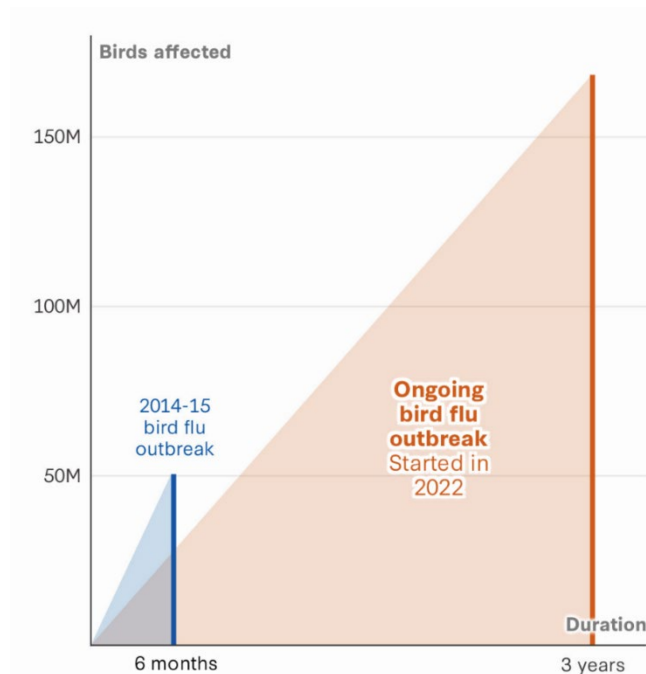


March 2024



H5N1: The Silence...

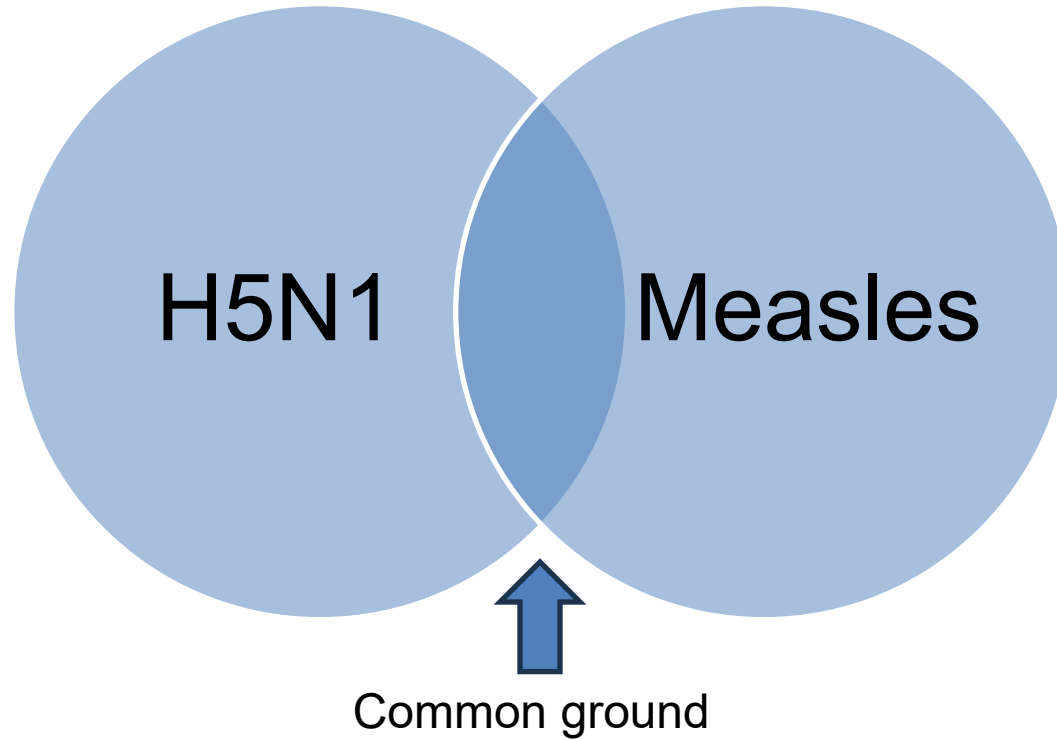
1. The virus has burned through all of the susceptible herds?
2. Expanded milk testing is allowing for faster containment?
3. It was an oddly active winter, so a spring spike hasn't appeared?
4. It has burned through enough of the migratory fowl?
5. Unknown unknowns?



Source: U.S. Department of Agriculture's (USDA);
Animal and Plant Health Inspection Service (APHIS)

Shared IPC measures for both Measles and H5N1

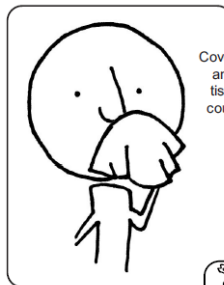
IPC Measures in Common



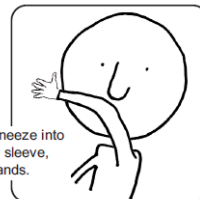
Shared IPC Measures: Prevent Transmission

Stop the spread of germs that make you and others sick!

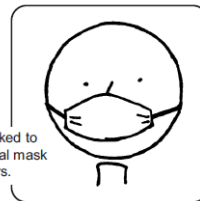
Cover your Cough



Cover your mouth and nose with a tissue when you cough or sneeze or cough or sneeze into your upper sleeve, not your hands.



Put your used tissue in the waste basket.



You may be asked to put on a surgical mask to protect others.

Clean your Hands

after coughing or sneezing.



Wash hands with soap and warm water for 20 seconds or

clean with alcohol-based hand cleaner.



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Minnesota
Department
of Health

APIC
Association for
Professional
Infection Control



Shared IPC Measures: Screening Considerations



What to Screen for:

Fever and cough
or
Fever and rash

International travel prior 30 days

Local transmission

Contact with a suspect or
confirmed HCID case.

Key Points of Entry

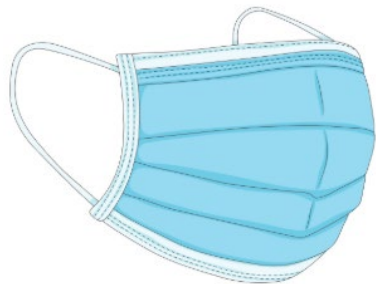
Emergency Departments

Outpatient Clinics

Admission Areas

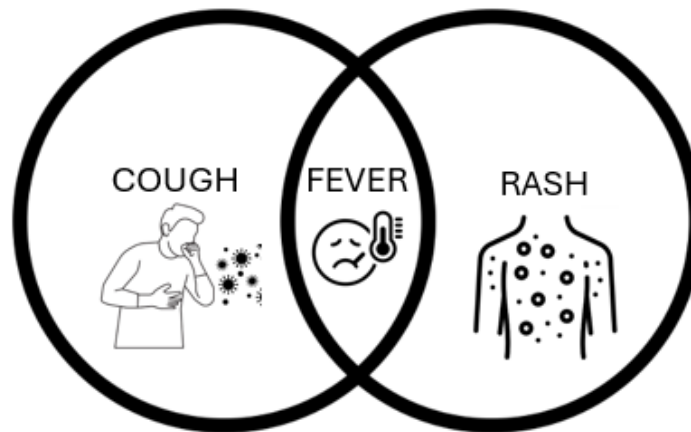


Shared IPC Measures: Screening (Alerts)



**IMPORTANT NOTICE
TO ALL PATIENTS**

**DO YOU HAVE FEVER & COUGH
-OR- FEVER & RASH?**



**Put on a MASK and ALERT staff
immediately!**

Thank you!



Shared IPC Measures: Screening (Alerts)



Shared IPC Measures: Screening (EMR)



Infectious Disease Screening

Preadmission Testing

Visit Messaging

Patient Summary
Pre-Proc Note
Call Complete
AN MD Review...
Fall Risk

PAT REVIEW
Best Practice
Vitals
OB/Gyn Status
Travel Screening
Infectious Screen...
Problem List
History
Allergies
Home Medications

Infectious Disease Screening

Time taken: 4/16/2024 1459 Responsible Create Note

Measles Screening

Have you recently developed a rash?
 [Print] [Cancel]

Do you also have a fever of more than 101°F or 38.3°C?
 [Print] [Cancel]

Have you traveled outside of the United States in the past 3 weeks?
 [Print] [Cancel]

Have you been in contact with anyone who was diagnosed with measles?
 [Print] [Cancel]

Create Note

Restore Close Cancel

Critical (1)

Rule Out for Measles

1. Ensure patient is masked.
2. Nurse/MA to wear appropriate PPE—Airborne (N95 or equivalent respirator) prior to any vitals or further direct patient interactions.
3. Place patient into a negative pressure isolation room if available. If there is not a negative pressure room available, patient does NOT need to be transferred to a different location. Please room patient into a single room with the door closed.
4. Alert the patient's MD/patient's provider in your location
5. Alert the IP team at your location [Redacted] for any further questions

[SCVH Measles QuickSheet](#)

Acknowledge Reason

Accept

Shared IPC Measures: Screening (EMR)



Travel Screening

A screenshot of an EMR interface. On the left is a "Navigators" sidebar with a list of menu items: Overview, Care Everywhere, Allergies, Problem List, Home Meds, Travel Screening (highlighted in green), Gender Identity/..., Admission History, Immunizations, Vaccinations, COVID Vaccinati..., Exposure/Infection, OB/Gyn Status, Exercise, and Psychosocial. At the top of the main content area are three tabs: Admission (selected), Transfer, and Discharge. Below the tabs is a green header for the "Travel Screening" section. The main content area contains two sections: "Travel Screening" with a green checkmark icon and a list of three questions, and "Travel History" with a purple circular icon and the text "No documented travel since 02/12/25". At the bottom right is a "Close" button with a green checkmark icon.

Navigators

Admission Transfer Discharge

OVERVIEW

- Care Everywhere
- Allergies
- Problem List
- Home Meds
- Travel Screening**
- Gender Identity/...

ADMISSION HISTORY

- Immunizations
- Vaccinations
- COVID Vaccinati...
- Exposure/Infection
- OB/Gyn Status
- Exercise
- Psychosocial

Travel Screening

Question

- Have you been in contact with someone who was sick?
- Do you have any of the following new or worsening symptoms?
- Have you traveled internationally or domestically in the last month?

Travel History

No documented travel since 02/12/25

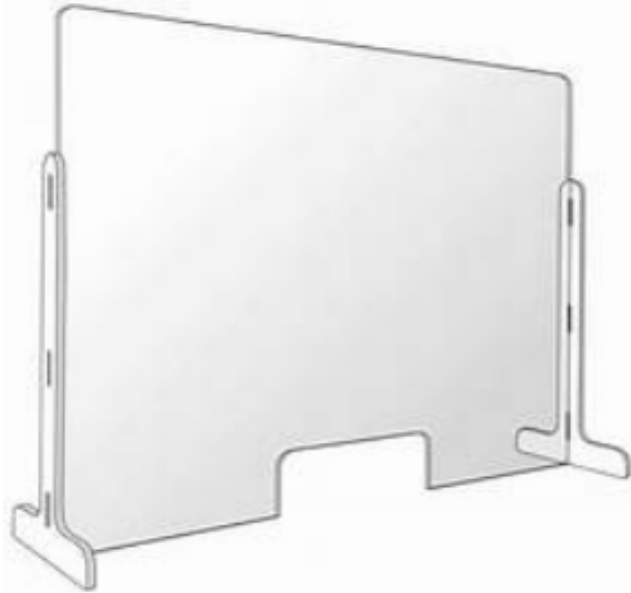
Close



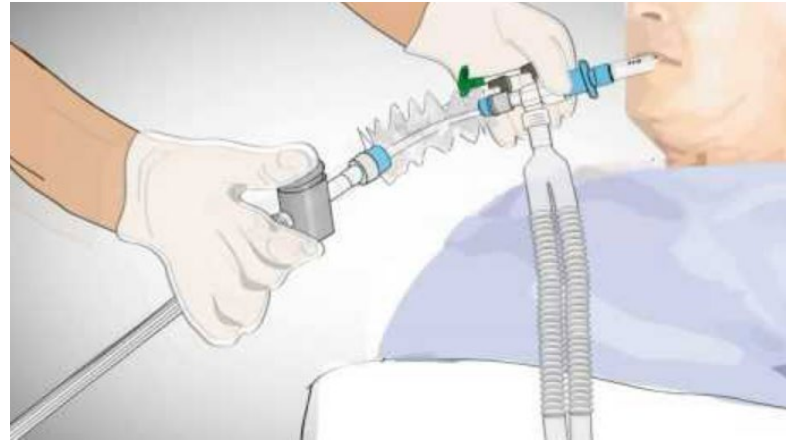
Engineering Controls



Barriers such as partitions



Closed suctioning systems



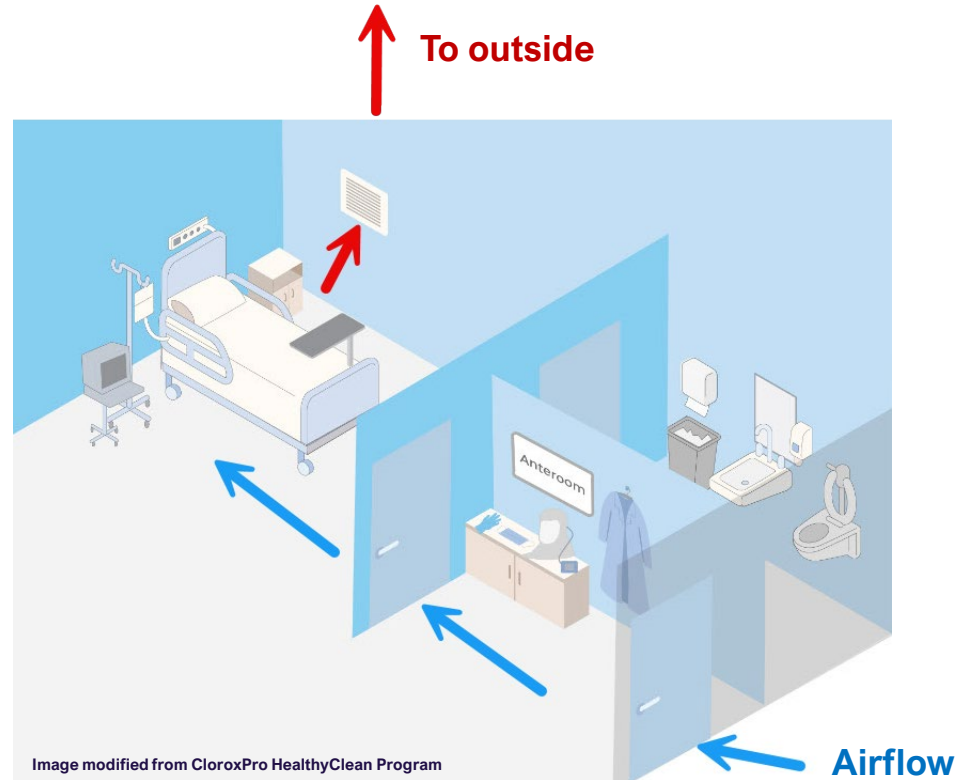
References:

CDC. Interim Guidance for Infection Control Within Healthcare Settings When Caring for Confirmed Cases, Probable Cases, and Cases Under Investigation for Infection with Novel Influenza A Viruses Associated with Severe Disease, Mar 2022 [Internet]. Available from [CDC](https://www.cdc.gov/media/releases/2022/s0302-novel-influenza-a-virus.html).



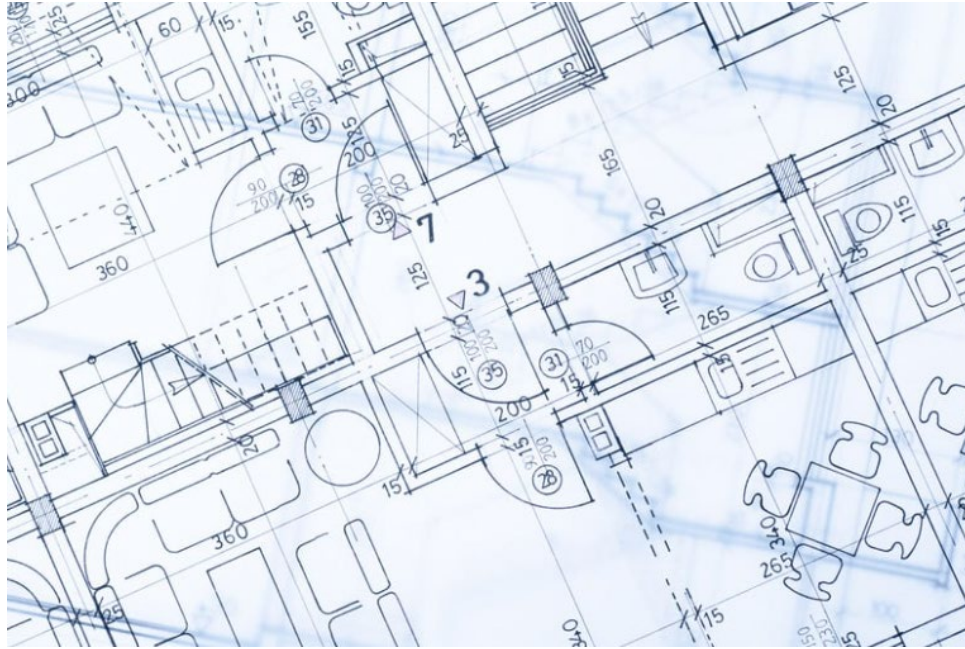
Shared IPC Measures: Engineering Controls (Air Handling)

- ✓ Negative airflow
- ✓ 6-12 ACHs per hour
- ✓ No AIIR? Recirculated exhaust air should be HEPA filtered.
- ✓ HEPA filters installed properly



Shared IPC Measures: Engineering Controls (Air Handling)

Which HVAC handlers serve which areas of the hospital?



Shared IPC Measures: Aerosol-Generating Procedures (AGPs)



Definition: Procedures that generate infectious aerosols of a respirable size¹

- Limit to medically necessary and cannot be postponed²
- When possible, perform in an AIIR²
- Consider portable HEPA unit³
- Wear appropriate PPE (respirator, etc)
- Limit the number of HCWs present to only those who are essential²
- Terminally clean the room following the procedure³

AGP Examples

- Suctioning airways
- Sputum induction
- CPR
- Intubation or extubation
- BiPAP/CPAP
- Bronchoscopy
- Dental procedures

References:

1. OSHA. Standard 19.10.502 Subpart U, COVID-19; nd [Internet]. Available from [OSHA](#).
2. CDC. Interim Guidance for Infection Control Within Healthcare Settings When Caring for Confirmed Cases, Probable Cases, and Cases Under Investigation for Infection with Novel Influenza A Viruses Associated with Severe Disease, Mar 2022 [Internet]. Available from [CDC](#).
3. APIC. H5N1 Playbook, Feb 2025 [Internet]. Available from [APIC](#).



Shared IPC Measures: Aerosol-Generating Procedures (AGPs)



Aerosol Generating Procedure Sign

An Aerosol Generating Procedure was performed in this room
on ____ / ____ / ____ / at ____ : ____ AM\PM

There are ____ air changes per hour in this room.

Based on the table below. Please wear an N95 respirator when
entering this room until ____ / ____ / ____ / at ____ : ____ AM\PM

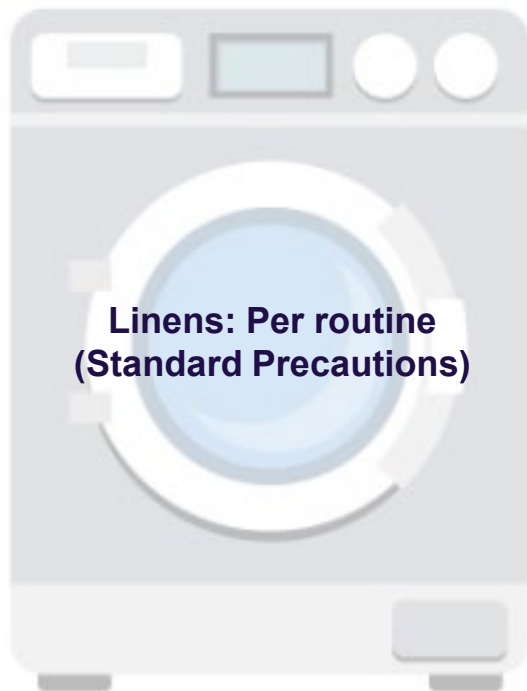


Shared IPC Measures: Transport with the Facility



- ✓ Limit transport to essential purposes.
- ✓ Notify receiving dept.
- ✓ Consider scheduling as last case of the day.
- ✓ Identify low-traffic route.
- ✓ Patient to wear face mask
- ✓ Transporters to wear appropriate PPE.
- ✓ Clear the elevator.

Shared IPC Measures: Linens & Waste



**Linens: Per routine
(Standard Precautions)**



**Waste: Per routine
(Exception: H5N1 cultures!)**

References

1. CDC. Avian Influenza (Bird Flu): H5N1: Interim Guidance for Infection Control Within Healthcare Settings When Caring for [Cases] with Novel Influenza A Viruses Associated w/Severe Disease, Mar 2022 [Internet]. Available from [CDC](https://www.cdc.gov/media/releases/2022/s0302-avian-flu-h5n1.html).
2. CDC. Interim IPC Recommendations for Measles in Healthcare Settings, Apr 2024. Available from [CDC](https://www.cdc.gov/media/releases/2024/s0404-ipc-recommendations-measles.html).
3. US DOT. Planning Guidance for Handling Category A Solid Waste, Apr 2024 [Internet]. Available from [phmsa.dot.gov](https://www.phmsa.dot.gov/safety/press-releases/2024/04/24-phmsa-releases-guidance-handling-category-a-solid-waste)



Shared IPC Measures: Category A Waste



Regulated Medical Waste should always be managed in accordance with federal, state, and local regulations.

- ✓ For high-risk infectious substances (e.g., Ebola, etc)
- ✓ Ensure your waste vendor handles Cat. A waste
- ✓ Special DOT permit required
- ✓ Coordinate with waste vendor, public health
- ✓ Segregate from general waste
- ✓ Special packaging

References

- 1) Pipeline and Hazardous Materials Safety Administration. Managing Solid Waste Contaminated with Category A Infectious Substance, Apr 2024 [Internet]. Available from [phmsa](https://www.phmsa.dot.gov).
- 2) National Emerging Special Pathogen Training & Education. Handle with Care: Key Takeaways on Special Pathogen Waste Management; Apr 2025 [Internet]. Available from [NETEC](https://www.netec.org).



IPC Measures Specific for H5N1



“Think flu” even outside of the respiratory virus season¹

When to Suspect Avian Flu^{2,3}

Pt presents with acute resp illness or conjunctivitis

-AND-

Recent contact with:

- Birds, poultry
- Known affected mammals like cattle
- *Any* animal with unexplained death
- A suspect or confirmed human case

References:

1. CDC, COCA Call: Clinician Update on Human Cases of H5N1 ad Influenza A Virus Surveillance, May 2025. Available at [CDC](#).
2. CDC. H5N1: Interim Recommendations for Prevention, Monitoring, and Public Health Investigations, Dec 2024 [Internet]. Available from [CDC](#).
3. CDC. Interim Guidance for Infection Control Within Healthcare Settings When Caring for Confirmed Cases, Probable Cases, and Cases Under Investigation for Infection with Novel Influenza A Viruses Associated with Severe Disease, Mar 2022 [Internet]. Available from [CDC](#).



On a hot summer day in California, a 34-year-old dairy cattle worker presents to the ED with mild illness, including conjunctivitis, fever, and non-productive cough. He was found to be rapid influenza A positive and was not sub-typeable on further testing at the facility. Should precautions be implemented and the specimen sent to public health lab for H5 sub-typing?

Poll Answer Explained

Clues!



Rationale to Sub-Type for H5

- ✓ Flu positive outside of the ILI season
- ✓ High risk patient (dairy cattle worker)
- ✓ Conjunctivitis (rarely seen with seasonal flu)
- ✓ Not a seasonal subtype (H1 or H3)



H5N1: Transmission-based Precautions

Do not admit solely for isolation purposes!

- ✓ Airborne & Contact Precautions
- ✓ Single patient AIIR, negative pressure
- ✓ Door closed except to enter/exit
- ✓ May cohort same infection
- ✓ PPE: N95 or higher respirator, gown, gloves, eye protection (goggles or face mask)
- ✓ Consider dedicated staff
- ✓ Log all who enter the room
- ✓ Continue precautions for duration of illness



References:

1. APIC. H5N1 Playbook, Feb 2025 [Internet]. Available at [APIC](#).
2. CDC. COCA Call: Clinician Update on Human Cases of H5N1 ad Influenza A Virus Surveillance, May 2025. Available at [CDC](#).
3. CDC. Infection Control: Guidelines for Isolation Precautions: Appendix A, Feb 2025 [Internet]. Available from [CDC](#).
4. CDC. Interim Guidance for Infection Control Within Healthcare Settings When Caring for Confirmed Cases, Probable Cases, and Cases Under Investigation for Infection with Novel Influenza A Viruses Associated with Severe Disease, Mar 2022 [Internet]. Available from [CDC](#).

H5N1: Cleaning and Disinfection



- Delay room entry for 2hr or until sufficient time has elapsed for 99.9% removal of airborne contaminants.^{1,2}
- Standard cleaning and disinfection procedures.¹
- Enveloped virus – easy to kill
- Survival on surfaces: Hours to months
- Use EPA-registered healthcare-grade disinfectant from **EPA List M.**¹
- Pay special attention to frequently touched surfaces such as toys, doorknobs, tables, and counters.¹

EPA List Q

References:

1. CDC. Interim Guidance for Infection Control Within Healthcare Settings When Caring for Confirmed Cases, Probable Cases, and Cases Under Investigation for Infection with Novel Influenza A Viruses Associated with Severe Disease, Mar 2022 [Internet]. Available from [CDC](#).
2. CDC. Guidelines for Environmental Infection Control in Health-Care Facilities, Appendix B. Air, 2003, Updated 2019 [Internet]. Available from [CDC](#).
3. EPA. Selected EPA-Registered Disinfectants, Jan 2025 [Internet]. Available from [EPA](#).

H5N1: Exposed Healthcare Personnel



Exposure Definition: Unprotected (no respirator and eye protection) with 6 feet of a symptomatic H5N1 positive patient

	Exposed, Asymptomatic	Exposed, Symptomatic
Exclusion from Duty	For 10 days after exposure	Until >24hr afebrile and all symptoms resolved.
Staffing shortage	May return to work if: • Flu negative (PCR), • Received antiviral within 2 days of the exposure, <i>and</i> • Wears mask.	NA

References:

1. APIC. H5N1 Playbook, Feb 2025 [Internet]. Available at [APIC](#).
2. CDC. Interim Guidance for Infection Control Within Healthcare Settings When Caring for Confirmed Cases, Probable Cases, and Cases Under Investigation for Infection with Novel Influenza A Viruses Associated with Severe Disease, Mar 2022 [Internet]. Available from [CDC](#).
3. CDC. Case Definitions for Investigations of Human Infection with Avian Influenza A Viruses in the United States, May 2022 [Internet]. Available from [CDC](#).

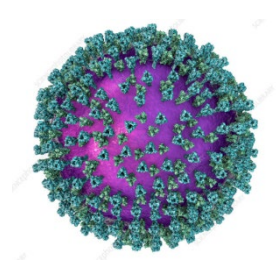




Epidemiology for Measles



Measles: Disease Profile and Epidemiology



Causal Agent:

A single-stranded, negative-sense RNA virus.

Extremely contagious;

The envelope allows easy fusion with host cells but makes it fragile outside the body.



Transmission: Air

Contact: Remains infectious on surfaces and in the air for up to two hours.

Contagious period: from four days before to four days after rash onset.



Initial Symptoms: High fever, cough, runny nose, red and watery eyes.

Progression: Rash appearing 3–5 days after initial symptoms, starting on the face and spreading downward.

Complications:

Pneumonia, encephalitis (brain swelling), blindness, and death



Diagnostic, Treatment & Prevention

Antibody testing, PCR
Supportive, Vitamin A

The MMR vaccine is **97% effective** after two doses.

Measles Quick Sheet

Available in the
[CloroxPro](#)
[Resource Center](#)

PATHOGEN & INFECTION PREVENTION INFO

CLOROXPRO

Measles (Rubeola)

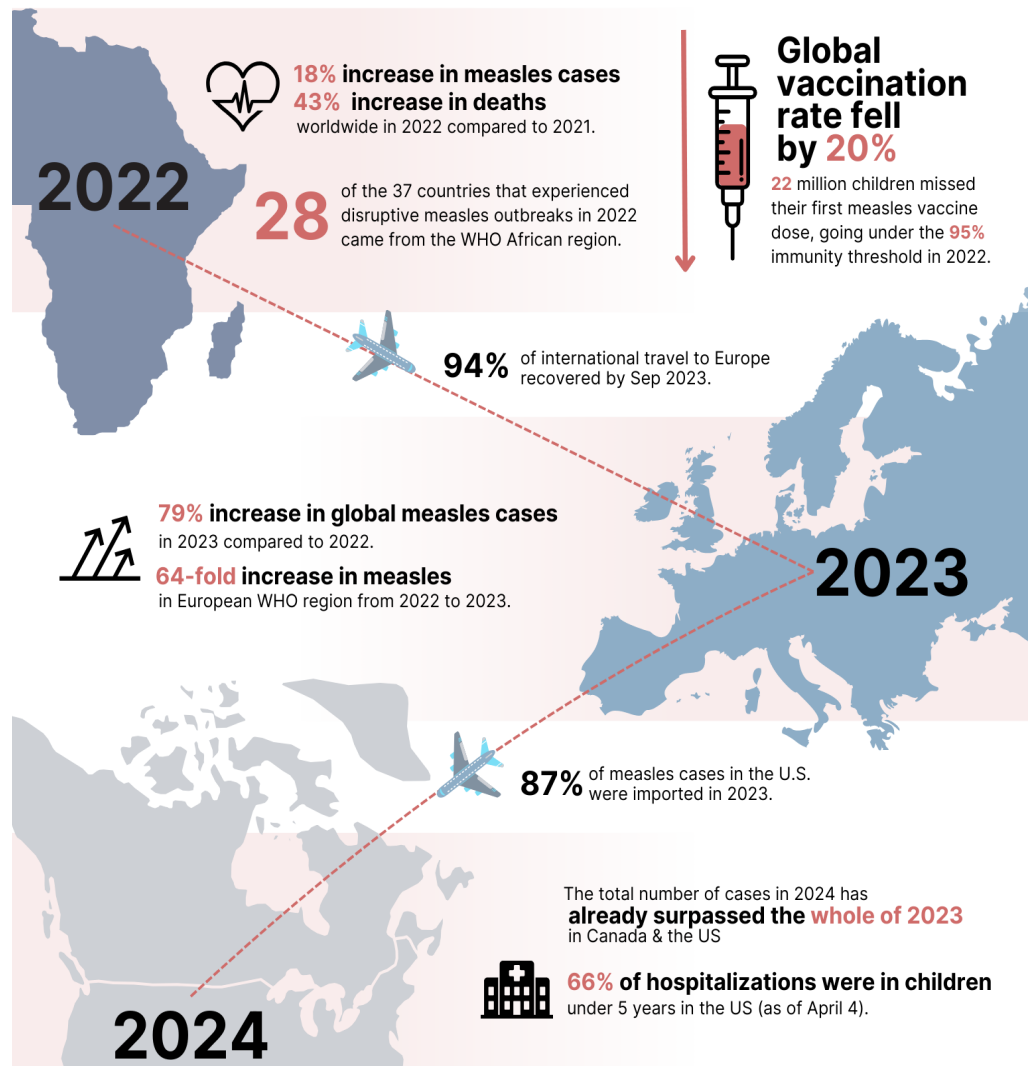
Overview^{1,2}



Measles, also known as Rubeola, is an acute viral respiratory illness. It is one of the most contagious human diseases—so contagious that up to 90% of people exposed who are not immune or vaccinated will become infected. It can lead to severe complications and death. Measles is spread by direct contact with respiratory secretions or by the airborne route when an infected person breathes, coughs, or sneezes. Measles infects the respiratory tract and then spreads throughout the body. Symptoms include high fever, cough, red watery eyes, runny nose, and a rash all over the body. Measles can affect anyone but is most common in children. Most cases in the U.S. occur among people who are not vaccinated against measles. Vaccination is the best way to prevent measles and spreading it to others.

About the Pathogen & Infection Control Measures

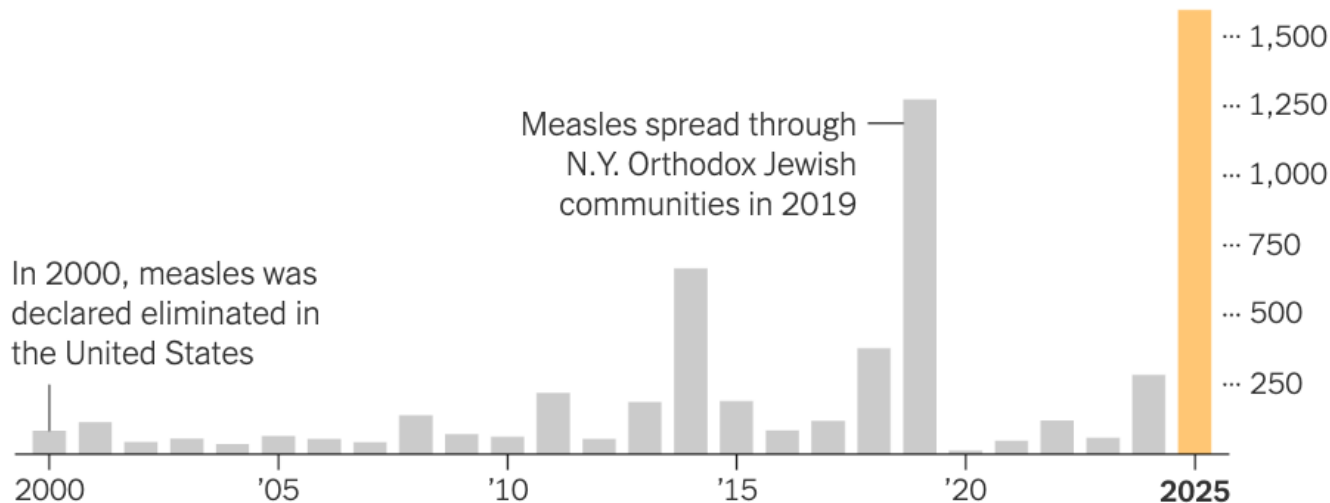
Infectious Agent (Pathogen)	Agent Type: Virus Synonym(s): Measles, Rubeola	Taxonomy: ► Family: Paramyxoviridae ► Genus: Morbillivirus Characteristics: Single-stranded enveloped RNA virus
Infectious Characteristics Definitions: ► Infectious dose—number of organisms necessary to cause disease. ► R-naught (R0)—the number of people that an infected person can be expected to transmit that disease to ("spreadability") ► Incubation period—the time from exposure to infection w/symptoms. ► Period of communicability—time when a pathogen can be transmitted from one person to another ► Mortality rate—the number of deaths due to a disease divided by the total population.	Risk factors: Infectious dose and R-naught (R0): ³ Incubation period: Period of communicability: Signs & symptoms: Duration of illness: Severity of illness and Mortality Rate:	► Unvaccinated persons including infants under the age of 1 year and persons with compromised immune systems ► Infants/children <5 years ► Adults >20 years, including pregnant women 90% of people exposed who are not immune or vaccinated will become infected. 9 in 10 susceptible persons who are exposed will contract measles. R0 is 12–18. 7–14 days 1 day before symptoms start and 4 days before to 4 days after the rash appear The symptoms appear 7–14 days after an exposure and include fever (as high as 105°F) and malaise, cough, runny nose, and Koplik spots (cluster of white lesions on the inner cheek). Rash (see image above) develops 3–5 days after symptom onset. It usually begins on the face and spreads downward to the body. 2–3 weeks 1 in 5 cases will require hospitalization; 1 in 1,000 cases will develop encephalitis (a brain infection) which can result in permanent brain damage; and 1–3 in 1,000 cases in children will die.
Reservoir ⁴ How the Infection Spreads	Infected persons; Touching one's eyes, nose, or mouth after contact with an environmental surface contaminated with the infected persons respiratory secretions.	
Mode(s) of Transmission ⁷ How the Infection Spreads	Airborne and contact with contaminated surfaces.	
Survival Time on Surfaces ⁴	Several hours	
Immunization/Prophylaxis/Treatment ⁴	There is no specific treatment – supportive care only. Preventative: CDC recommend 2 doses of the measles-mumps-rubella (MMR) vaccine which is ~97% effective at preventing measles.	
Infection Control Measures ^{1,5}	General Public Health Measures: ► Vaccination (2 doses of MMR). ► Stay home if you have fever and/or rash ► Perform proper and frequent hand hygiene ► Practice respiratory hygiene/cough etiquette ► If exposed, self-monitor for signs and symptoms and adhere to local public health department recommendations (such as quarantine).	Healthcare-Specific Measures: ► Isolation Precautions: Placement in an airborne isolation room (e.g., negative pressure) with door close ► PPE: Respirator; other PPE per Standard Precautions. ► Patient Transport: Mask the patient ► Linens: Per routine ► Waste management: per routine ► Other: Keep patient separated from other patients (e.g., waiting room). Susceptible healthcare workers and visitors should not enter the room.
Cleaning & Disinfection ¹	Follow standard cleaning and disinfection procedures using an EPA-registered disinfectant effective against the measles virus. Pay special attention to frequently touched surfaces such as toys, doorknobs, tables, and counters. Delay room entry for cleaning for 2 hours to allow for sufficient air exchanges.	



What are the uncommon of 2025 US Outbreak?

Where are the other 1000-3000 cases?!

Confirmed measles cases since 2000



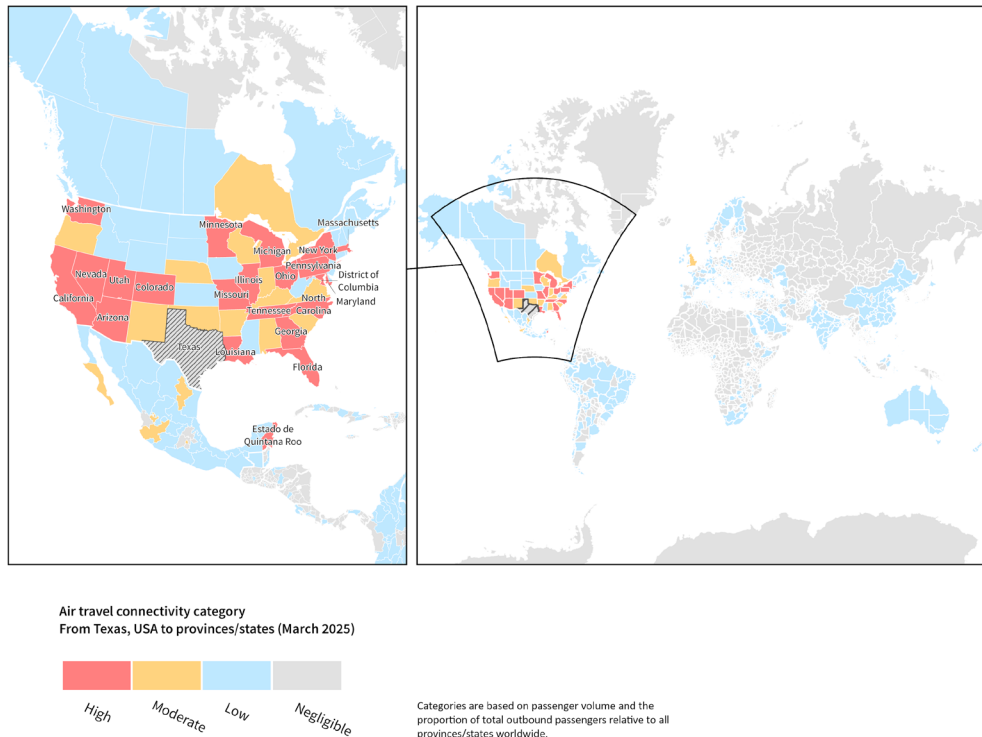
Source: C.D.C. confirmed cases through Oct. 14

Where is this going next? Where could cases be?

Ground Travel Connectivity from Texas



Air Travel Connectivity from Texas





IPC Measures Specific for Measles



Measles (Rubeola): Screening



High Suspicion for Measles¹⁻³

- Signs & symptoms consistent w/measles
- Cases/outbreak in geographic area
- Exposure to suspect or confirmed case
- International travel prior 21 days

Cases in Your Area?^{1,3}

- Post alert signage at entrance
- Rash hot line
- Self-scheduling appts
- Triage and test *outside*³

References:

1. CDC. Measles (Rubeola): Healthcare Providers: Stay Alert for Measles Cases, Apr 2025 [Internet]. Available from [CDC](#).
2. Joint Commission. Standards FAQ: HCID or Special Pathogens – Understanding the Requirement (IC.07.01.01) [Internet]. Available from [TJC](#).
3. APIC Measles (Rubeola) Playbook, 2025. Available from [APIC](#).



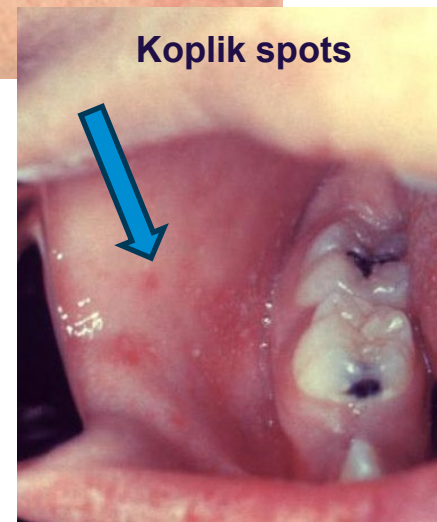
Measles: Screening

3 C's of Measles

C Cough

C Coryza

C Conjunctivitis



Images courtesy of CDC. Photos of Measles, May 2024 [Internet]. Available from [CDC](https://www.cdc.gov).

References:

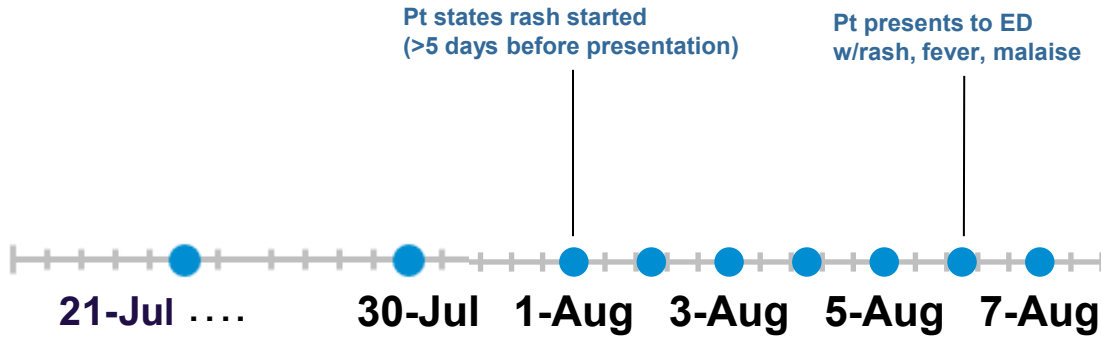
1. CDC. Measles (Rubeola): Measles Symptoms and Complications, May 2024 [Internet]. Available from [CDC](https://www.cdc.gov).
2. CDC. Pink Book; Chapter 13: Measles, Apr 2024 [Internet]. Available from [CDC](https://www.cdc.gov).



Measles: A Case Study

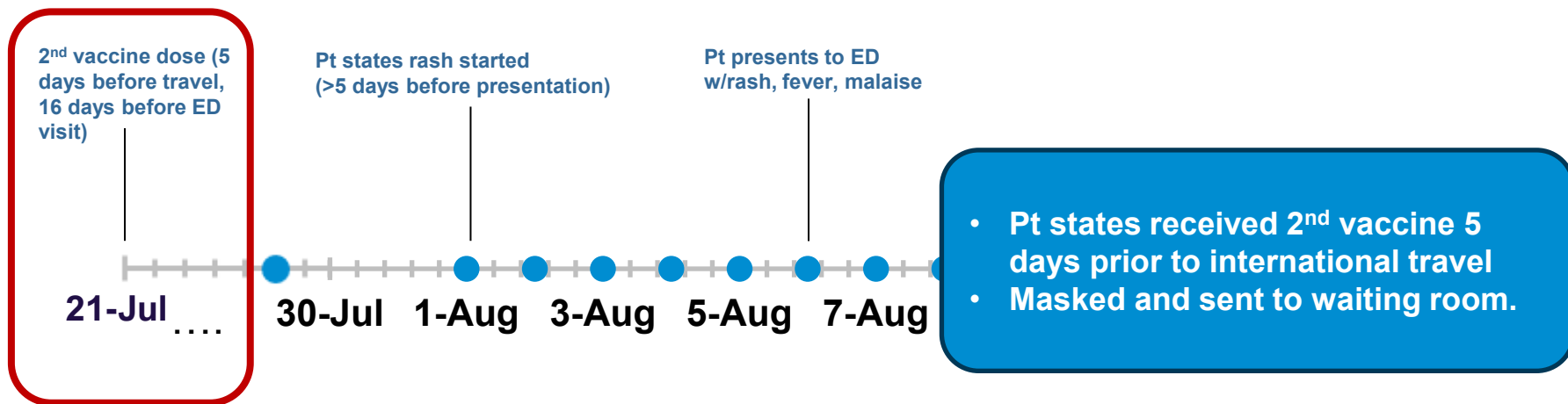


Measles: Case Study & Timeline

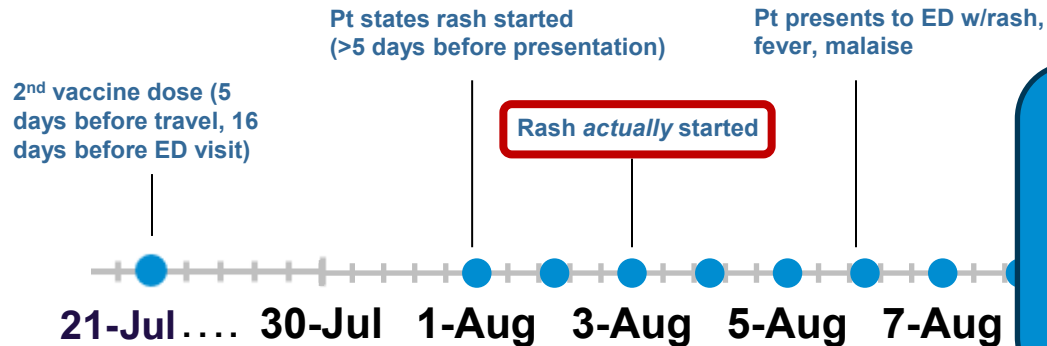


- 61-year-old female w/fever, rash, malaise x >5 days
- Recent international travel.
- Pt was immediately evaluated.

Measles: Case Study & Timeline

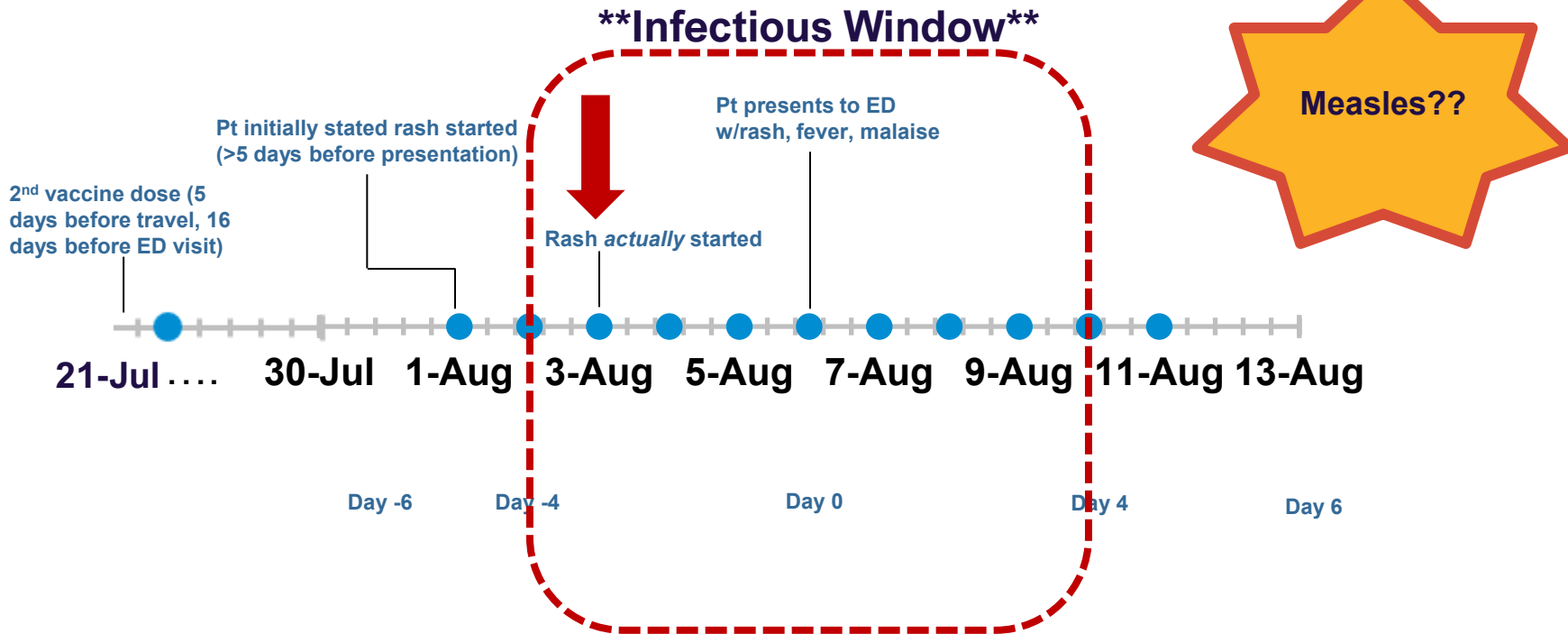


Measles: Case Study & Timeline

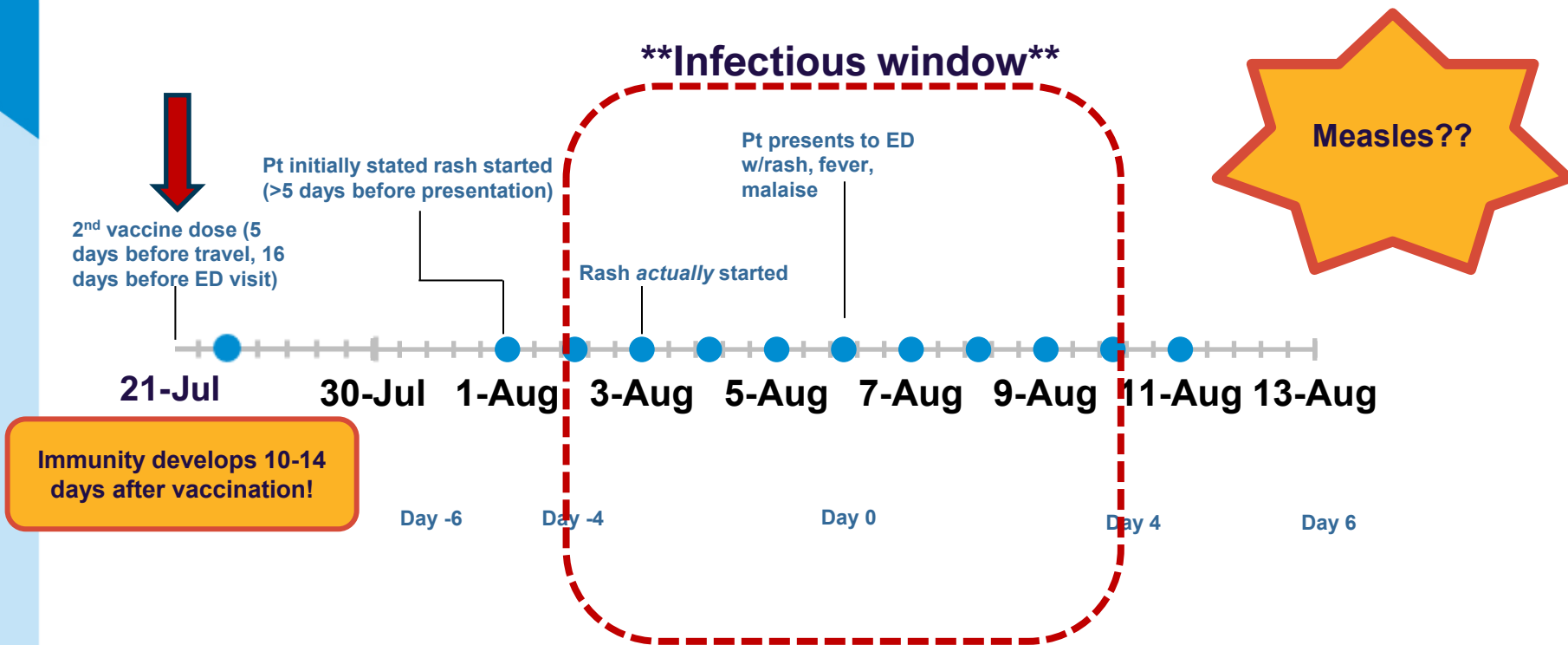


- Later evaluated in ED by a second MD.
- Inconsistencies noted in her history.
- Now states her rash began 3 days ago.

Measles: Case Study Timeline



Measles: Case Study Timeline





Was having this patient mask and sit 6 feet from other patients in the ED waiting room for 20 minutes considered an exposure event?

Answer:  YES

Exposure Definition

Having spent *any* time while unprotected (i.e., not wearing recommended respiratory protection) in a shared airspace:¹

- with an infectious measles patient (even if patient masked), or
- vacated by an infectious measles patient within the prior 2 hours (may window adjust based on ACH rate to remove 99.9% of airborne contaminants - see table)²

References:

1. CDC. Interim IPC Recommendations for Measles in Healthcare Settings, 2024 [Internet]. Available from [CDC](#).
2. CDC. Guidelines for Environmental Infection Control in Health-Care Facilities, Appendix B1, 2003, Updated 2019 [Internet]. Available from [CDC](#).

Measles: Need to Close the ED



ACH	Time required for removal: 99.9% efficiency
6	69 min
10	41 min
12	35 min
15	28 min

Table adapted from CDC (see reference #2 below)

References:

1. Fifolt M, Lee RA, Nafziger S, McCormick LC. Infectious disease hospital preparedness: lessons learned from the 2019 measles outbreak. Disaster Med Public Health Prep. 2022;16: 899–903. doi: <https://doi.org/10.1017/dmp.2021.18>.
2. CDC. Guidelines for Environmental Infection Control in Health-Care Facilities, Appendix B1, 2003, Updated 2019 [Internet]. Available from [CDC](https://www.cdc.gov/infectioncontrol/guidelines/environmental/index.html).



Measles: Patient Management



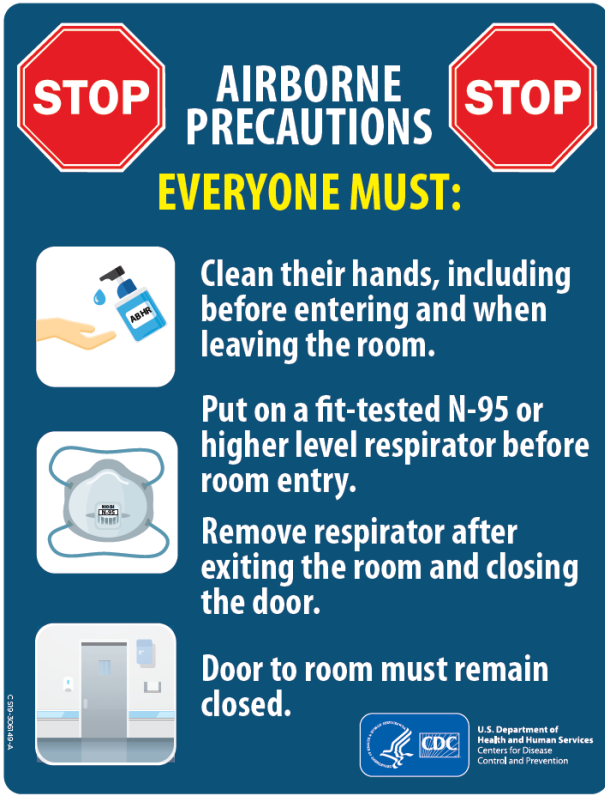
Highly Contagious!



**9 out of 10 unprotected persons
exposed will contract measles**

Measles: Transmission-based Precautions

- ✓ Single patient AIIR, negative pressure
- ✓ Door closed except to enter/exit
- ✓ **PPE:** N95 or higher respirator
- ✓ Measles susceptible staff should not enter the room
- ✓ **Duration of precautions:** For 4 days after rash onset



STOP AIRBORNE PRECAUTIONS STOP

EVERYONE MUST:

-  Clean their hands, including before entering and when leaving the room.
-  Put on a fit-tested N-95 or higher level respirator before room entry.
-  Remove respirator after exiting the room and closing the door.
-  Door to room must remain closed.

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 U.S. Department of Health and Human Services
Centers for Disease Control and Prevention

References:

1. CDC. Infection Control: Interim Infection Prevention and Control Recommendations for Measles in Healthcare Settings, April 2024 [Internet]. Available from [CDC](#).
2. CDC. Infection Control: Guidelines for Isolation Precautions: Appendix A, Feb 2025 [Internet]. Available from [CDC](#).

Measles: Cleaning and Disinfection



- Survival on surfaces: Hours
- Enveloped virus – easy to kill
- Standard cleaning and disinfection procedures.¹
- Pay special attention to high-touch surfaces.¹
- Use EPA-registered healthcare-grade disinfectant effective against the measles virus.¹
- Delay room entry for 2hr or until sufficient time has elapsed for 99.9% removal of airborne contaminants.^{1,2}

References:

1. WHO. Measles, Nov 2024 [Internet]. Available from [WHO](#).
2. CDC. Guidelines for Environmental Infection Control in Health-Care Facilities, Appendix B. Air, 2003, Updated 2019 [Internet]. Available from [CDC](#).





Measles: Exposure Management



Measles: Exposure Management



Exposure Definition

Having spent *any* time while unprotected (i.e., not wearing recommended respiratory protection) in a shared airspace:¹

- with an infectious measles patient (even if patient masked), or
- vacated by an infectious measles patient within the prior 2 hours (may window adjust based on ACH rate to remove 99.9% of airborne contaminants - see table)²

Infectious window³

4 days before to 4 days after rash onset (with day of rash onset being day 0)

References:

1. CDC. Interim IPC Recommendations for Measles in Healthcare Settings, 2024 [Internet]. Available from [CDC](#).
2. CDC. Guidelines for Environmental Infection Control in Health-Care Facilities, Appendix B1, 2003, Updated 2019 [Internet]. Available from [CDC](#).
3. CDC. Pink Book, Chapter 13: Measles, 2024 [Internet]. Available from [CDC](#)



Measles: Who is Considered Immune?



Presumptive evidence of immunity¹:

- Birth before 1957.
- Written documentation of adequate vaccination (1 dose for most adults is sufficient – 2 doses for HCWs).
- Lab evidence of immunity or confirmation of disease.

For HCWs lacking evidence of immunity:

Consider vaccinating if **born <1957** *and* lack lab evidence of immunity or confirmation of disease.¹

If vaccinated during **1963–1967** with a killed measles vaccine should be revaccinated with 2 doses of live measles virus vaccine.²

References:

1. CDC. Measles (Rubeola). Measles Vaccine Recommendations, Sept 2024 [Internet]. Available from [CDC](#).
2. CDC. MMWR: Immunization of HCP: ACIP Recommendations, 2011 [Internet]. Available from [CDC](#).



Measles PEP: The Clock is Ticking!



2019 AUGUST						
SUN	MON	TUE	WED	THU	FRI	SAT
28	29	30	31	1	2	3
4	5	6 Exposure! (day 0)	7 MWR -or- IVIG/IMIG	8 MWR -or- IVIG/IMIG	9 MWR -or- IVIG/IMIG	10 IVIG/IMIG
11 IVIG/IMIG	12 IVIG/IMIG	13 Monitor	14 Monitor	15 Monitor	16 Monitor	17 Monitor
18 Monitor	19 Monitor	20 Incubation period ends	21	22	23	24
25	26	27	28	29	30	31

MMR: Offer within 72hr of exposure to non-immune persons who are vaccine-eligible.

IVIG/IMIG: Offer within 6 days of exposure to non-immune persons if vaccine window has passed -OR- the exposed person is not a vaccine candidate.

References:

1. CDC. Measles (Rubeola): Measles Vaccine Recommendations, Sep 2024 [Internet]. Available from [CDC](#).
2. CDC. Interim IPC Recommendations for Measles in Healthcare Settings, 2024 [Internet]. Available from [CDC](#).



Resource:

Measles Exposure Investigation Form

Available at [Washington State Dept of Health](#)

APPENDIX B: MEASLES CONTACT TRACKING FORM

Date	___/___/___	Time:	Investigator:
Case Name	Case rash onset date: ___/___/___		
Contact Name			
Date of first contact	___/___/___	Date of last	___/___/___
Symptom watch dates	___/___/___ (1st contact + 7 days) to ___/___/___ (Last contact +21 days)		
Relation to Case	☐ Household	☐ Family, non-household	☐ Co-Worker
	☐ Healthcare Worker	☐ Friend	☐ Other
DOB	___/___/___		
Age	☐ Years ☐ Months		
Address			
City, State, Zip			
County			
Home Phone	() ___ - ___		
Work Phone	() ___ - ___		
Other Phone	() ___ - ___		
Contact location			
Location details			
Is contact symptomatic?	☐ Yes ☐ No		
Date of onset	___/___/___		
Briefly describe symptoms			
Last date contact followed	___/___/___		
Immune Status	☐ Had measles	☐ Born before 1957	
	☐ Unknown	☐ Pending serology Date collected ___/___/___ Results: _____	
	☐ Unvaccinated	☐ Vaccinated # MMR rec'd before exposure: ___ #1 ___/___/___ #2 ___/___/___	
Contacted by PH?	☐ Recommendations given ☐ Left message ☐ Not contacted		
Notes or actions needed			



MEASLES INVESTIGATION FORM



INTERVIEWER NAME: _____ CIRCLE: ADULT (≥18) CHILD INFANT (<1yr) v4

ID/MD COMMENTS: _____ HIGH RISK LOW RISK IMMUNE NOT IMMUNE

MEASLES INVESTIGATION FORM

PATIENT INFO MR# _____ NAME (Last, First): _____ ADDRESS: _____ PHONE (Best): _____ PHONE (ALT): _____ DOB: _____ AGE: _____ SEX: _____ *BE SURE TO DOCUMENT YOUR CONVERSATION IN HEALTHCONNECT USING DOT PHRASE .MEASLES	1) CHECK ANY THAT APPLY: ☐ BORN IN U.S. <1957 ☐ BORN IN U.S. >1970 AND ATTENDED U.S. SCHOOL ☐ US ARMED FORCES ☐ ENTERED U.S. >1996 (GREEN CARD, NATURALIZATION) ☐ WRITTEN DOCUMENTATION W/DATES OF PRIOR MEASLES VACCINATION (AT LEAST 1 DOSE AT >1YR OF AGE) 2) PT TYPE (CIRCLE): MEMBER NON-MEMBER EMPLOYEE 3) IS PT (CIRCLE): immunocompromised pregnant HCW day care workers/work with infants
CONTACT INFO (DID ANYONE ACCOMPANY PT? IF YES, COMPLETE INFO IN THIS BOX BELOW AND COMPLETE SEPARATE INVESTIGATION FORM) MR# _____ RELATIONSHIP: _____ NAME (Last, First): _____ ADDRESS: _____ PHONE (Best): _____ PHONE (ALT): _____ DOB: _____ AGE: _____ SEX: _____	1) CHECK ANY THAT APPLY: ☐ BORN IN U.S. <1957 ☐ BORN IN U.S. >1970 AND ATTENDED U.S. SCHOOL ☐ US ARMED FORCES ☐ ENTERED U.S. >1996 (GREEN CARD, NATURALIZATION) ☐ WRITTEN DOCUMENTATION W/DATES OF PRIOR MEASLES VACCINATION (AT LEAST 1 DOSE AT >1YR OF AGE) 2) PT TYPE (CIRCLE): MEMBER NON-MEMBER EMPLOYEE 3) IS PT (CIRCLE): immunocompromised pregnant HCW day care workers/work with infants

CHART REVIEW

RISK LEVEL (HIGH, NON-HIGH RISK, IMMUNE) — SEE DEFINITIONS ON REVERSE SIDE	
EXPOSURE DATE/TIME	
EXPOSURE LOCATION	
MMR1 DATE	
MMR2 DATE	
IgG STATUS (NEG, POS, NOT DONE) (found under Labs under serology)	
OTHER COMMENTS	
ACTIONS TAKEN	CIRCLE: SEROLOGY ORDERED: YES NO DECLINED IVIG OR IMIG: YES NO DECLINED

MMR:	YES	NO	DECLINED
COUNSELED:	YES	NO	DECLINED

HIGH RISK:

- HCW
- PREGNANT
- IMMUNOCOMPROMISED
- CONTACT OF A CASE, IN SETTING W/KNOWN UNVACCINATED PERSONS SUCH AS CHILDCARE
- INFANT ≤1YR

LOW RISK (considered immune):

- Born <1957 in U.S.
- Written documentation with dates of prior measles vaccine (at least 1 in lifetime given when > 12 months is considered immune)
- Documented + IgG
- Born in US after 1970 AND attended US elementary school
- US armed forces
- Entered US 1996 or after (green card, naturalization)

Management:

	ADULT (≥18YR)	CHILD (≥12mo)	INFANT (<1YR)
HIGH RISK	IgG IVIG & quarantine (per ID/MD)	• If no MMR >12 mo, give MMR#1 if within 72 hours and if within 6 days give Gammasan. • If 1 MMR → give #2 now as long as its been 28 days and if <72 hours and document in chart re early MMR status • If 2 MMR → counsel re symptoms of measles and reassure • If status unknown check serology and give MMR if >1yr and within 72 h	Gammasan within 6days
LOW RISK	If screening doesn't support immunity. IgG and MMR with 72hr		

HCW: 2 MMR or (+) IgG = immune
(-) IgG = exclude from duty day 5-21

Counseling:

Transmission: airborne (e.g. coughing, sneezing) or contact with infectious droplets

S/S: cough, runny nose, red eyes AND fever or rash usually starting on face and spreading to rest of body

If develop any of these signs within 21 days of potential exposure call advice nurse at (408) 362-4791

If you need emergency room care, please wear a mask and let the receptionist and provide know right away.



Measles Exposure: Exclusion from Duty



2019 AUGUST						
SUN	MON	TUE	WED	THU	FRI	SAT
28	29	30	31	1	2	3
4	5	6 Exposure! (day 0)	7	8	9	10
11 Exclude from duty (day 5)	12 Exclude	13 Exclude	14 Exclude	15 Exclude	16 Exclude	17 Exclude
18 Exclude	19 Exclude	20 Exclude	21 Exclude	22 Exclude	23 Exclude	24 Exclude
25 Exclude	26 Exclude	27 Exclude (day 21)	28 Return to work	29	30	31

Exclude from **Day 5 through Day 21** following the exposure.

If HCW develops measles, further exclude for **4 days** after rash onset.



Closing



Resources



HCIDs (General)

- [BlueDot Outbreak Insider](#)
- [National Emerging Special Pathogens Training and Education Center \(NETEC\)](#)

H5N1

- Monitor the situation: [CDC Avian Influenza \(Bird Flu\) H5 Bird Flu: Current Situation](#) and [CDC FluView](#)
- [H5N1: Interim Guidance for Infection Control Within Healthcare Settings When Caring for Confirmed Cases, Probable Cases, and Cases Under Investigation for Infection with Novel Influenza A Viruses Associated with Severe Disease](#)
- [Airborne Contaminant Removal](#)
- [APICs Avian Influenza Playbook](#)
- [CloroxPro H5N1 Pathogen Education Sheet](#)

Measles

- [Measles: Interim IPC Recommendations for Measles in Healthcare Settings](#)
- [Measles: Considerations when Evaluating a Person for Exposure to Measles in a Healthcare Setting](#)
- [Measles; Post-Exposure Prophylaxis](#)
- [APICs Measles Playbook](#)
- [CloroxPro Measles Pathogen Education Sheet](#)



Recap of Learnings



1

Today, as we navigated the twin threats of H5N1 avian influenza and measles.
Our mission is clear: Protect, Prevent, and Prepare.

2

High mobility increases the risk of introducing or amplifying ID. In a world where pathogens know no borders, IPC measures are our shield, and vigilance is our responsibility.

3

Hospitals and other facilities remain key battlegrounds for IPC, as pathogens like H5N1 or measles can spread rapidly in these environments, but now we are well-versed on the IPC control measures for 2 of these immediate threats.



Questions?



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Please follow me on [LinkedIn](#) (*Mariana Torres M.D.*)



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Please follow me on [LinkedIn](#)



Post Session Test for CEUs



Link to the survey:

<https://www.surveymonkey.com/r/6R8LR9Q>

