U.S. CENTERS FOR DISEASE CONTROL AND PREVENTION

2025 CDC Training for Vaccine-Preventable Disease (VPD) Surveillance

Session Content

- Mumps
- Measles
- Rubella
- Rotavirus
- Varicella
- Polio and Acute Flaccid Myelitis (AFM)
- Surveillance needs at various levels of public health

Objectives

- Identify the 3 main levels of the national surveillance system for vaccine-preventable diseases.
- Discuss the importance of case identification for surveillance.
- Describe appropriate mechanisms for surveillance.
- Describe the appropriate application of case definitions, including clinical description and case classification.
- List the most appropriate laboratory test(s) for surveillance.
- List epidemiologically important data to collect for surveillance.
- Describe one way that this educational activity will improve contributions as a team member.

Mumps

Mumps

- An acute illness caused by the mumps virus (a paramyxovirus)
- Typically presents as parotitis or other salivary gland swelling
  - Parotitis can be caused by infectious and non-infectious causes but **mumps virus is one of the only causes of parotitis outbreaks**
- Infection may be asymptomatic in ~1/5 of *unvaccinated* persons

Mumps Complications

- Complications are more frequent in adults than children
- Complications are less frequent among vaccinated patients
- Theoretical risk for infertility; no studies assessed

	Unvaccinated	Vaccinated
Orchitis*	30%	6%
Oophoritis**	7%	≤1%
Mastitis**	30%	≤1%
Pancreatitis	4%	<1%
Hearing loss	4%	<1%
Meningitis	<1–10%	≤1%
Encephalitis	≤1%	≤1%

*Frequency among post-pubertal males

**Frequency among post-pubertal females.

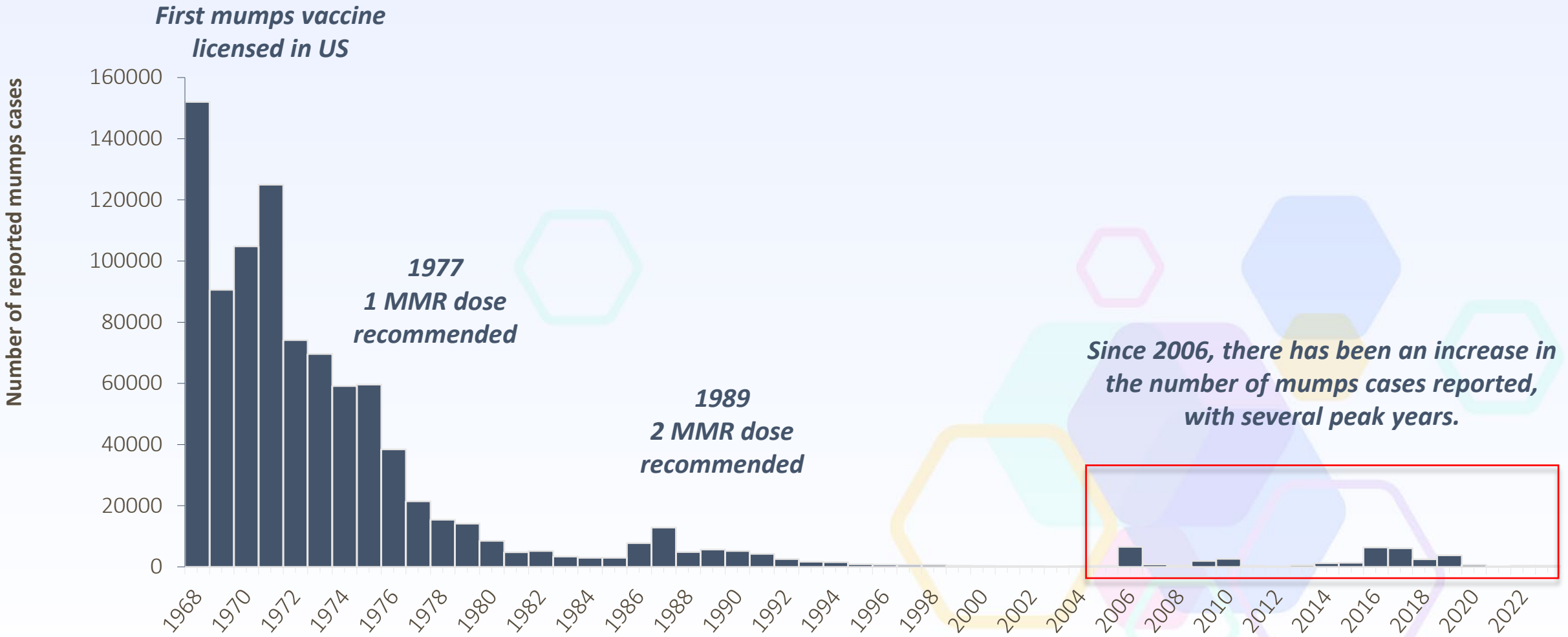
Mumps Transmission

- Transmitted by droplet secretions
- Requires close contact to spread from person to person
- People are contagious from 2 days before until 5 days after parotitis onset
- People with non-specific respiratory symptoms or asymptomatic infections can also transmit disease
- Incubation period ranges from 12 to 25 days, average 16-18 days
- Outbreak is defined as 3 or more cases linked by time and space

Mumps Vaccine in the U.S.

- A component of the measles, mumps, and rubella vaccine (MMR)
- Advisory Committee on Immunization Practices (ACIP) Recommendations
    - 1977: 1st dose of MMR
    - 1989: 2nd dose of MMR (in response to national measles outbreaks)
    - 2006: 2nd dose of MMR (in response to national mumps outbreaks)
- Vaccine effectiveness estimated at 72% for 1 dose and 86% for 2 doses
- Factors that may decrease vaccine effectiveness include:
    - Crowded or very close-contact settings
    - Behaviors that foster sharing of intimate air space or oral secretions

In the US, mumps cases decreased by >99% since the introduction of mumps vaccine



Outbreaks among Fully Vaccinated Persons Led to 3rd Dose MMR Recommendation during Outbreaks

- Outbreaks occurred in a variety of settings and geographies:
  - In **2006**, there was a multi-state mumps outbreak mostly among Midwest college-aged students across many college campuses
  - In **2009-2010**, there were two large outbreaks, one in a close-knit community in New York City, and the second among school-aged children in Guam
  - In **2016-2017**, health departments reported 150 outbreaks (>9200 cases) in a variety of settings, including schools, athletics, church groups, and workplaces.
  - From **2018-2019**, there were nearly 900 mumps cases reported by 19 health departments associated with migrant detention facilities
- These outbreaks among fully vaccinated persons prompted ACIP to recommend a 3rd dose of MMR during mumps outbreaks in October 2017 for persons public health deems at increased risk of mumps

Recent Changes to US Mumps Case Definition

- In June 2023, the Council of State and Territorial Epidemiologists (CSTE) approved a new case definition for mumps, to:
  - **Improve capture of true burden of mumps and increase characterization of the full spectrum of mumps illness and atypical presentations**
    - Remove the 2-day duration of parotitis if epidemiologically linked
    - Include all laboratory-confirmed mumps cases
  - **Address high volume of IgM+ results often performed for low-suspect cases**
    - Asymptomatic persons with an IgM+ no longer meet suspect case criteria unless there is documentation mumps was suspected
    - Encourage PCR confirmation
    - Encourage testing for other etiologies that might cause parotitis

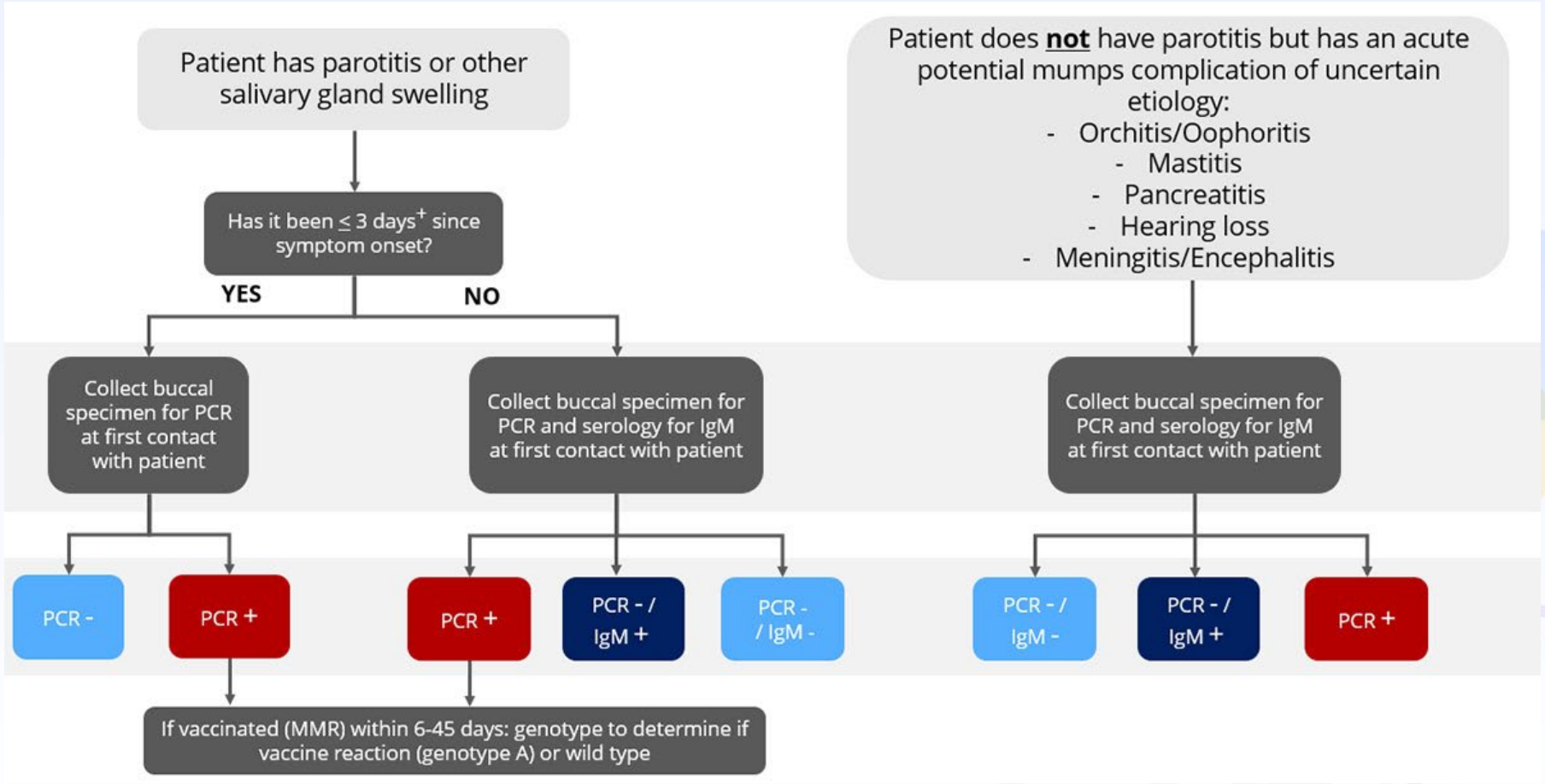
Source: CSTE Update to Public Health Reporting and National Notification for Mumps (Approved June 2023)

Mumps Laboratory Diagnostic Tests and Specimens

	Mumps Tests		When to Collect?
Acute Disease	PCR	Buccal Swab (Requires Parotid Massage) 	As soon as possible upon suspicion of mumps: ideally **0-3 days** after parotitis onset, up to **10 days** after parotitis onset.
Acute Disease	PCR	Urine 	**Within 10 days** of symptom onset **Appropriate when patients have orchitis and not parotitis*
Acute Disease	IgM	Serum 	Most sensitive within **3-14 days** of parotitis onset
Immunity	IgG	Serum 	When assessing evidence of immunity, can be detected ~**2 weeks** after MMR vaccination

Source: https://www.cdc.gov/mumps/php/laboratories/specimen-collection.html

Sporadic (no epidemiologic-link, not outbreak-related) mumps testing flowchart



Source: https://www.cdc.gov/mumps/downloads/mumps-testing-job-aid.pdf

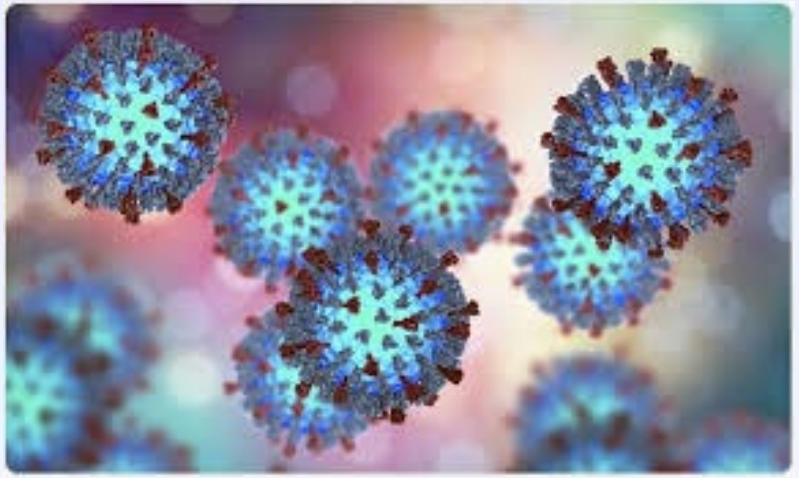
Mumps Summary

- There have been few cases reported since the onset of the COVID-19 pandemic
- Numerous large mumps outbreaks in the United States have occurred between 2006 and 2019
  - Primarily in young adults vaccinated with 2 doses of MMR vaccine
  - Settings with intense, close-contact exposures, such as college campuses, and immigrant detention facilities
- In response to outbreaks among fully vaccinated persons, ACIP recommended 3rd dose of MMR during outbreaks among groups deemed to be at increased risk
  - Updated outbreak resources available: https://www.cdc.gov/mumps/php/public-health-strategy/
- RT-PCR testing with a buccal swab is the preferred way to confirm mumps
  - Specimen collection information available here: https://www.cdc.gov/mumps/php/laboratories/specimen-collection.html

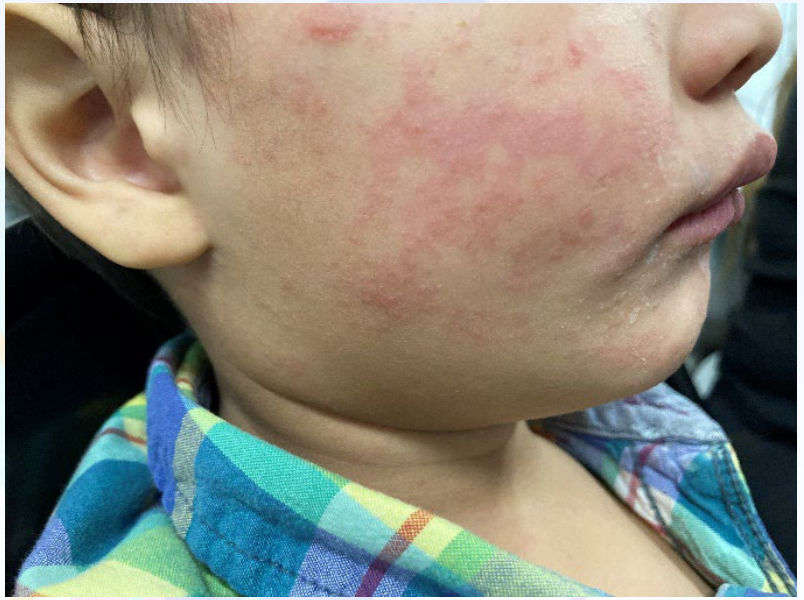
Measles

Measles

- An acute, febrile rash illness caused by the measles virus
- Transmitted by direct contact with infectious droplets or airborne route
- Measles is highly contagious
  - 90% of susceptible household contacts will develop illness
  - R_o (the number of people who are infected by a single case) is estimated to be 12–16 in an unvaccinated population



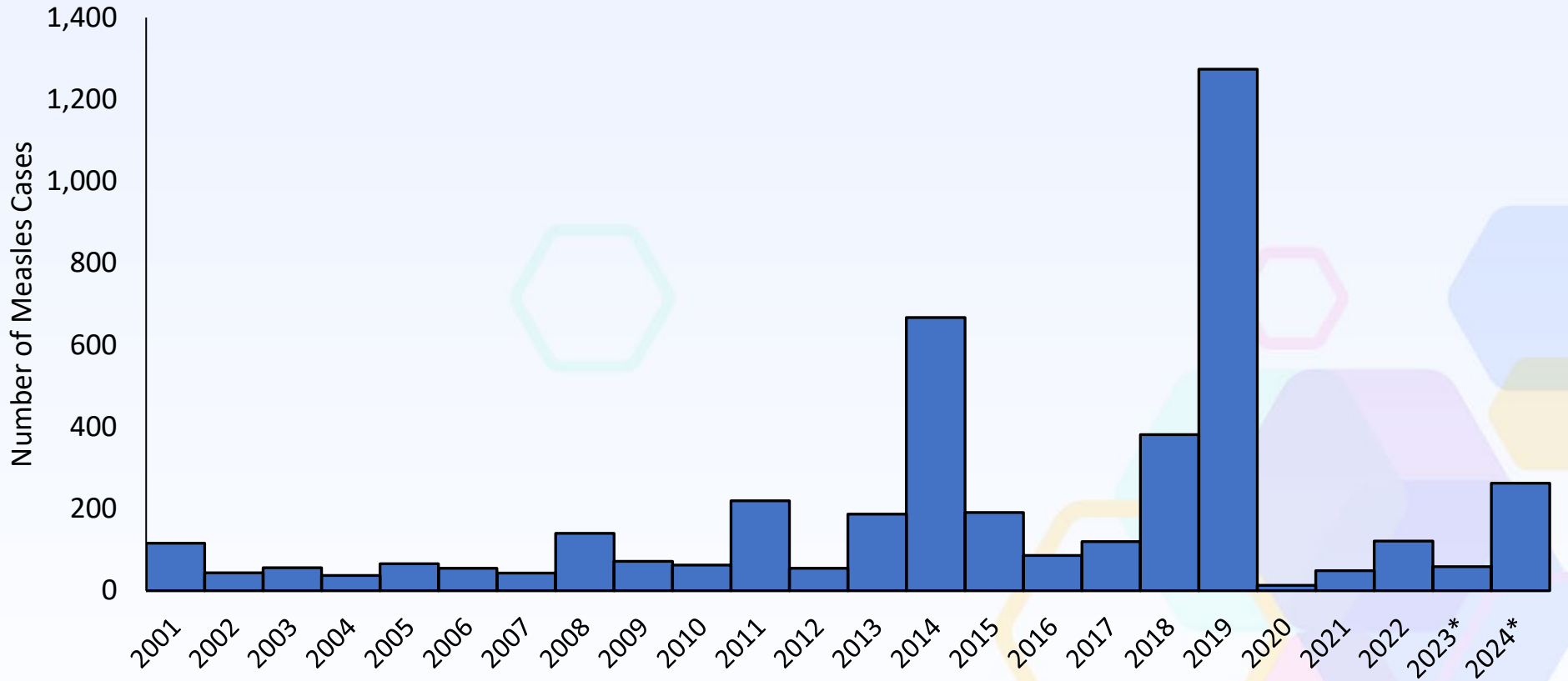
Measles virus



Measles rash

Reported Measles Cases, U.S., 2001–August 29, 2024 (N=4,378)

- Median of 79 cases/year (range: 13– 1,274)



*2023 and 2024 data are preliminary. 2024 data are as of August 29, 2024.

National and State Level 2-dose MMR Coverage has decreased since 2020

	2019–2020	2020–2021	2021–2022	2022–2023	2023–2024
MMR (2 doses)	95.2	93.9	93.0	93.1	92.7

- ~280,000 kindergarteners at risk for measles per year
- 14 states reported 2-dose MMR coverage <90%
- 14 states reported exemption rates for at least one routine pediatric vaccine of >5%

Source: https://www.cdc.gov/schoolvaxview/data/

Clinical Case Definition

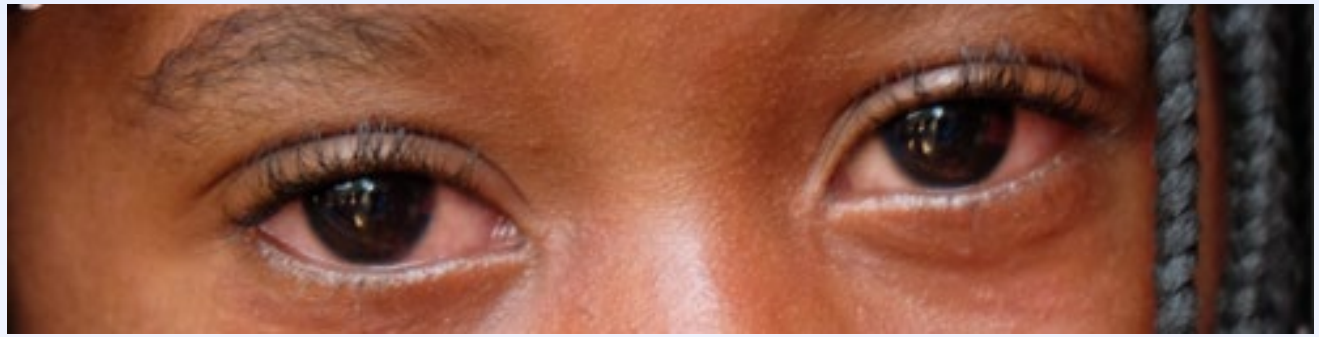
- Fever (up to 105°F)

  AND

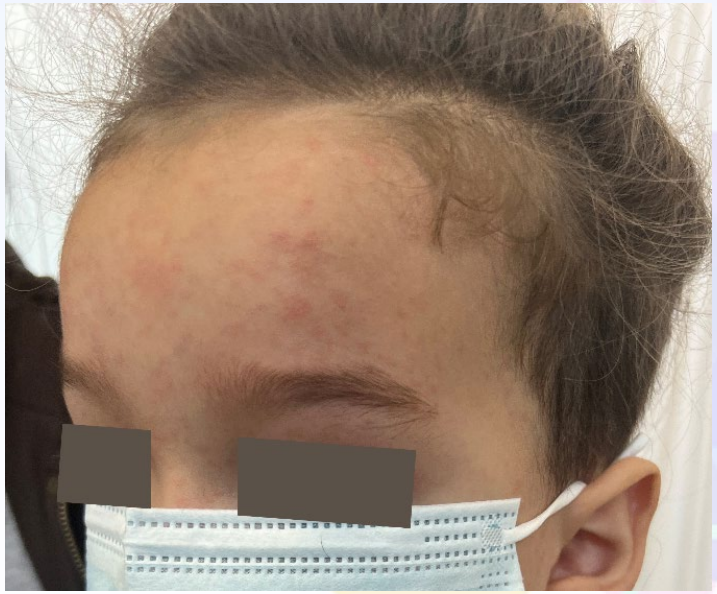
- Rash

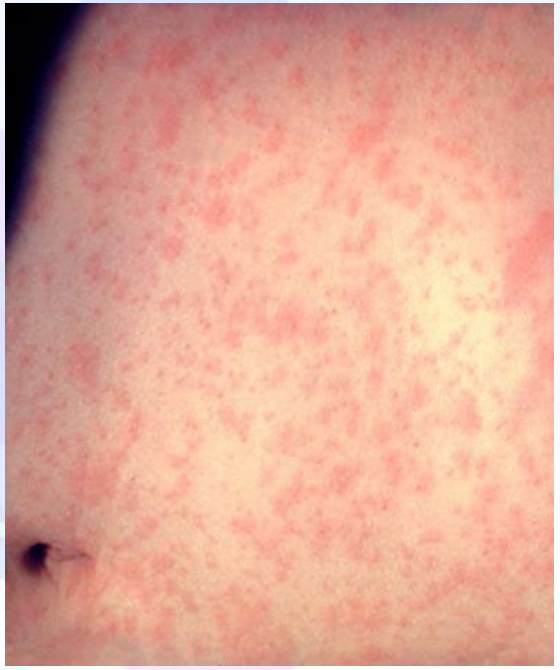
  AND

- At least 1 of “The 3 C’s”
  - Cough
  - Coryza (runny nose)
  - Conjunctivitis



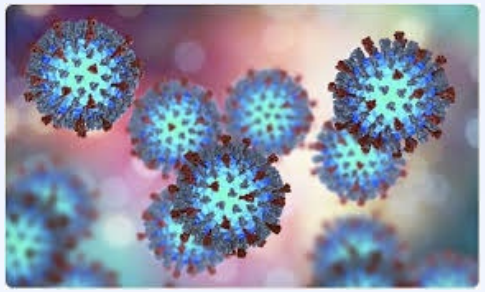
Measles conjunctivitis

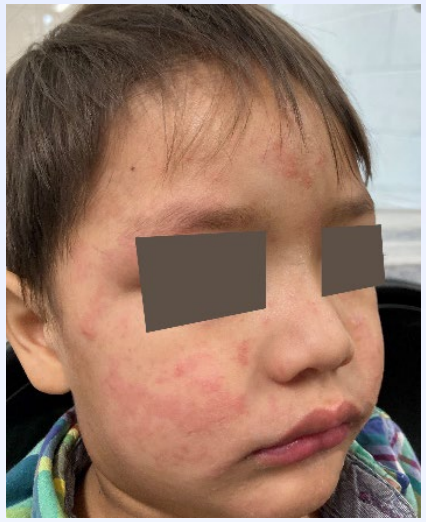




Measles rash

Measles Timeline





Incubation period 7 - 21 days between exposure and rash onset (average 10-14)

Symptoms begin

Rash Onset

Out of isolation

-21	-20	-19	-18	-17	-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5

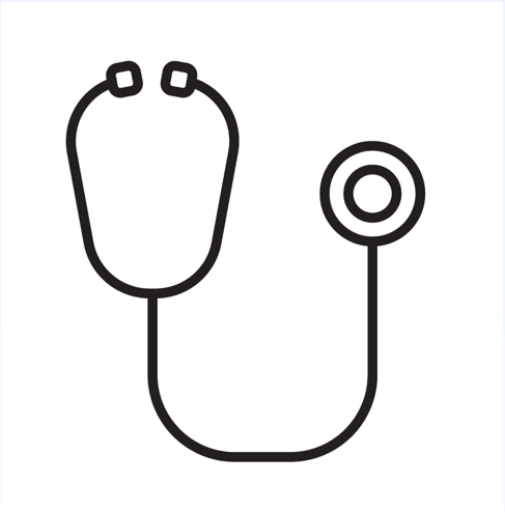
Infectious Period
4 days before to 4 days after rash onset

Source: https://www.cdc.gov/vaccines/pubs/pinkbook/meas.html

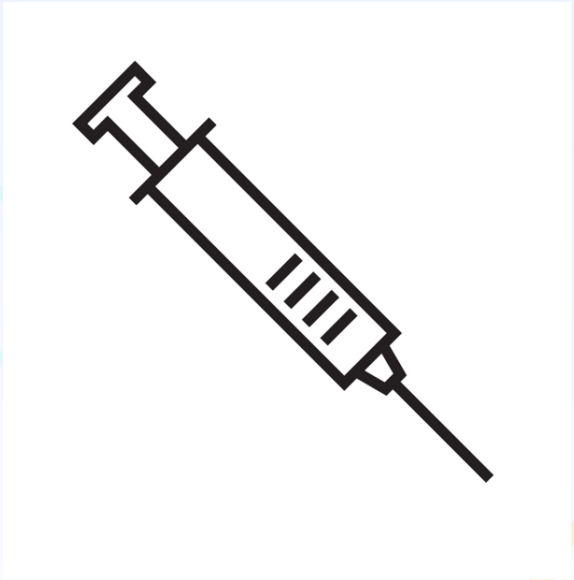
Measles Diagnosis

- Ideally, RT-PCR and serology (IgM) should be performed for all suspect cases
  - For suspect cases with low pre-test probability of having measles, IgM detection will result in more false positives than true positives.
  - RT-PCR is available at most state laboratories, the APHL Vaccine Preventable Disease Reference Centers (VPD-RCs), and CDC. Some commercial laboratories offer standalone measles RT-PCR or panel-based testing.
- All RT-PCR positive specimens should be directed to a VPD-RC or CDC for genotyping

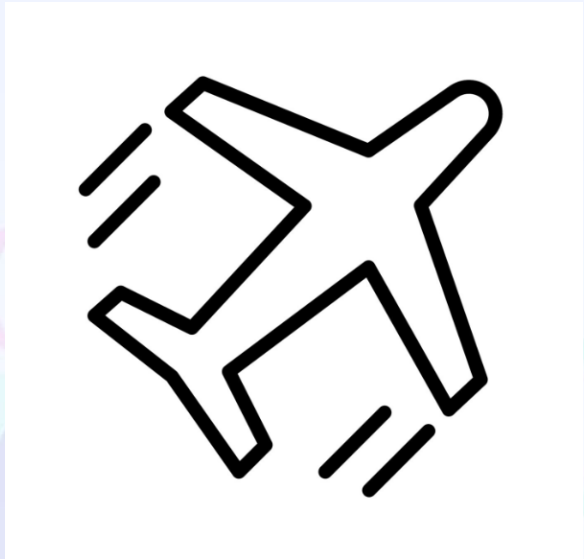
Identify cases and establish the diagnosis



Clinical and laboratory data



Vaccination history



Travel or exposure history in 21 days before rash

Opportunities for exposure to unknown measles cases

- Schools
- Childcare facilities
- Contact with international travelers (airports)
- Tourist locations
- Healthcare settings

Management of Contacts

- Identify all locations where measles exposures may have occurred during the infectious period of the confirmed case (4 days before to 4 days after rash onset)
- Identify and prioritize susceptible contacts
  - Exposed persons at higher risk of severe disease include infants <1 year of age, pregnant women, and people with immunocompromising conditions
- Quarantine or exclusion from high-risk settings may be warranted for exposed contacts without evidence of immunity

Control Measures: Post Exposure Prophylaxis (PEP)

PEP within the target window may provide measles protection or modify the clinical course of disease among susceptible people

MMR

- Should be given within 72 hours (3 days) of initial measles exposure
- Vaccination can be given after this window, but would only be expected to protect from future exposures and is not considered “adequate PEP”

Immunoglobulin

- Needs to be given within 6 days of initial exposure
- Can be given intramuscularly (IMIG) or intravenously (IVIG)
  - IVIG should be prioritized for adults at high risk of severe disease

Vaccination is key for measles prevention

- Vaccination before international travel
  - Age 6–11 months: 1 dose prior to departure
  - Age ≥12 months: 2 doses prior to departure (separated by at least 28 days)
- Outbreak response: If preschool-aged children are at risk due to outbreak location and transmission settings
  - A 2nd dose early between age 1 and 4 years could be considered*
  - Adults in these settings could be considered for a 2nd dose (at least 28 days after a prior dose)
- Outbreak response: If infants <12 months of age are at risk, consider vaccination of infants 6–11 months of age

*Any MMR dose should be given at least 28 days after a prior dose. 2 MMR doses are considered fully protective, but some states or territories may require an additional dose between ages 4–6 years in accordance with the usual schedule

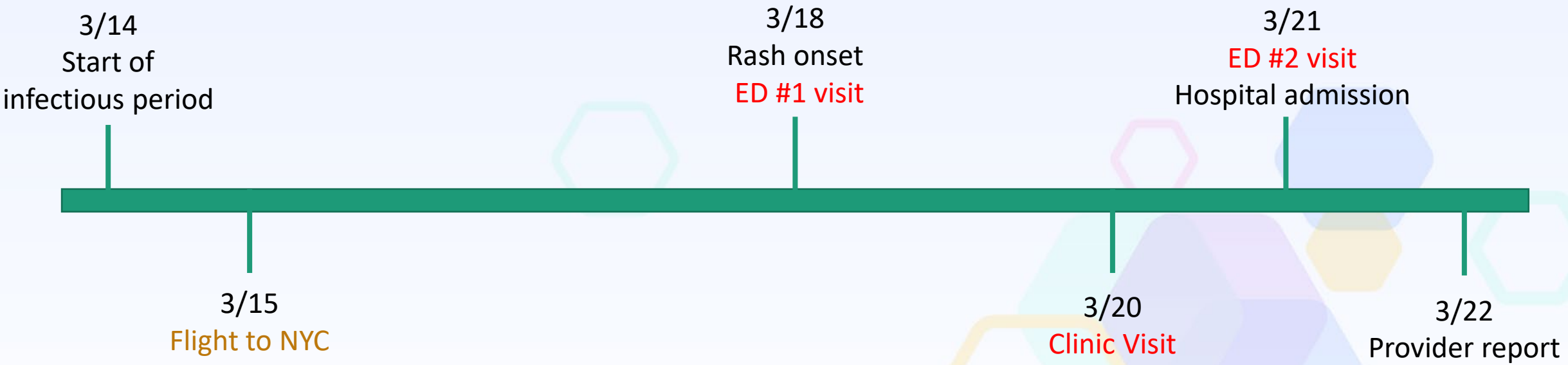
Measles Case Presentation - NYC

NYC Department of Health and Mental Hygiene

Timeline

Friday 3/22: Provider reports suspect measles case

10-month-old infant
Patient has fever (102.4), rash, cough, coryza
Recent international travel



Measles Diagnostic Testing

- Nasopharyngeal swab for measles PCR
- Serology for measles IgM and IgG
- Tested at the NYC Public Health Lab

Control Measures

- Assess measles immunity of household members
- Evidence of immunity
  - 2 documented MMR doses
  - Measles IgG positive
  - Birth before 1957
- All household members were past measles post-exposure prophylaxis (PEP) windows
- Recommended quarantine if immune status is unknown or non-immune

Control Measures

Post-exposure prophylaxis (PEP) for measles exposures who are NOT pregnant or immunocompromised*

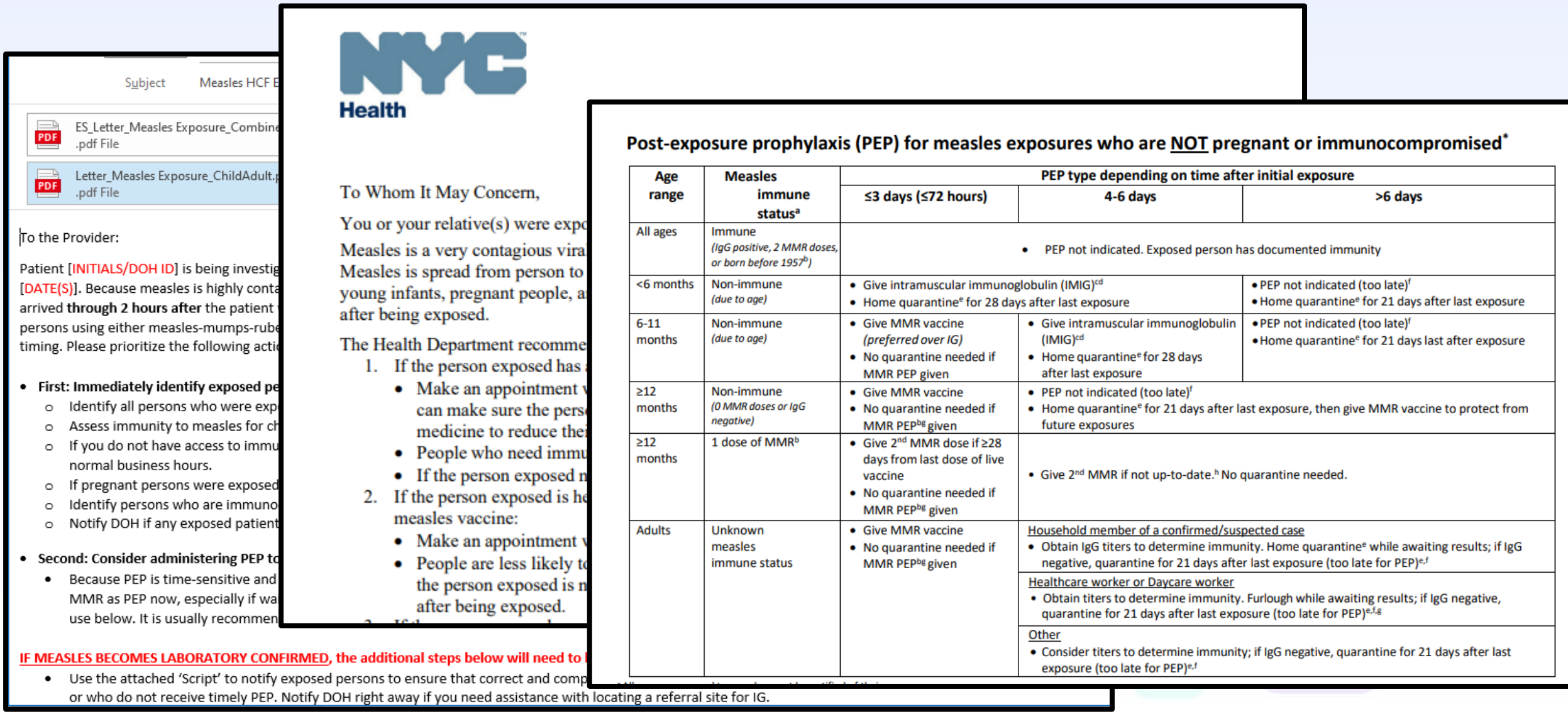
Age range	Measles immune status[a]	PEP type depending on time after initial exposure		
		≤3 days (≤72 hours)	4-6 days	>6 days
All ages	Immune *(IgG positive, 2 MMR doses, or born before 1957[b])*		• PEP not indicated. Exposed person has documented immunity	
<6 months	Non-immune *(due to age)*	• Give intramuscular immunoglobulin (IMIG)[cd] • Home quarantine[e] for 28 days after last exposure		• PEP not indicated (too late)[f] • Home quarantine[e] for 21 days after last exposure
6-11 months	Non-immune *(due to age)*	• Give MMR vaccine *(preferred over IG)* • No quarantine needed if MMR PEP given	• Give intramuscular immunoglobulin (IMIG)[cd] • Home quarantine[e] for 28 days after last exposure	• PEP not indicated (too late)[f] • Home quarantine[e] for 21 days last after exposure
≥12 months	Non-immune *(0 MMR doses or IgG negative)*	• Give MMR vaccine • No quarantine needed if MMR PEP[bg] given	• PEP not indicated (too late)[f] • Home quarantine[e] for 21 days after last exposure, then give MMR vaccine to protect from future exposures	
≥12 months	1 dose of MMR[b]	• Give 2nd MMR dose if ≥28 days from last dose of live vaccine • No quarantine needed if MMR PEP[bg] given	• Give 2nd MMR if not up-to-date.[h] No quarantine needed.	
Adults	Unknown measles immune status	• Give MMR vaccine • No quarantine needed if MMR PEP[bg] given	<u>Household member of a confirmed/suspected case</u> • Obtain IgG titers to determine immunity. Home quarantine[e] while awaiting results; if IgG negative, quarantine for 21 days after last exposure (too late for PEP)[e,f]	
			<u>Healthcare worker or Daycare worker</u> • Obtain titers to determine immunity. Furlough while awaiting results; if IgG negative, quarantine for 21 days after last exposure (too late for PEP)[e,f,g]	
			<u>Other</u> • Consider titers to determine immunity; if IgG negative, quarantine for 21 days after last exposure (too late for PEP)[e,f]	

Control Measures

Post-exposure prophylaxis (PEP) for measles exposures who ARE pregnant or immunocompromised

Category	Age range	Measles immune status[a]	PEP type depending on time after initial exposure		
			≤3 days (≤72 hours)	4-6 days	>6 days
Severely Immuno-compromised[b]	<12 months	Will need IG regardless of measles immune status	• Give intramuscular immunoglobulin (IMIG)[cd] • Home quarantine[e] for 28 days after last exposure		• PEP not indicated (too late)[f] • Home quarantine[e] for 21 days after last exposure
	≥12 months		• Give intravenous immunoglobulin (IVIG)[cd] • Home quarantine[e] for 28 days after last exposure		
Pregnant	n/a	Immune *(IgG positive or 2 MMR doses)*	• PEP not indicated Exposed person has documented immunity.		
		Non-immune *(IgG negative)*	• Give intravenous immunoglobulin (IVIG)[cd] • Home quarantine[e] for 28 days after last exposure		• PEP not indicated (too late)[f] • Home quarantinee for 21 days after last exposure
		Unknown immunity	• Draw titers (measles IgG) STAT to determine immunity; proceed as above based on titer results		• PEP not indicated (too late)[f] • Consider titers to determine risk of infection/risk to infant; proceed as above based on titer result

Guidance & Templates



Subject Measles HCF E

ES_Letter_Measles Exposure_Combine
.pdf File

Letter_Measles Exposure_ChildAdult.p
.pdf File

To the Provider:

Patient [INITIALS/DOH ID] is being investig
[DATE(S)]. Because measles is highly conta
arrived **through 2 hours after** the patient
persons using either measles-mumps-rube
timing. Please prioritize the following acti

- **First: Immediately identify exposed pe**
  - Identify all persons who were exp
  - Assess immunity to measles for ch
  - If you do not have access to immu
    normal business hours.
  - If pregnant persons were exposed
  - Identify persons who are immuno
  - Notify DOH if any exposed patient
- **Second: Consider administering PEP to**
  - Because PEP is time-sensitive and
    MMR as PEP now, especially if wa
    use below. It is usually recommen

IF MEASLES BECOMES LABORATORY CONFIRMED, the additional steps below will need to

- Use the attached 'Script' to notify exposed persons to ensure that correct and comp
  or who do not receive timely PEP. Notify DOH right away if you need assistance with locating a referral site for IG.

NYC Health

To Whom It May Concern,

You or your relative(s) were expo
Measles is a very contagious viral
Measles is spread from person to
young infants, pregnant people, a
after being exposed.

The Health Department recomme

1. If the person exposed has
   - Make an appointment
     can make sure the pers
     medicine to reduce the
   - People who need immu
   - If the person exposed n
2. If the person exposed is h
   measles vaccine:
   - Make an appointment
   - People are less likely t
     the person exposed is n
     after being exposed.

Post-exposure prophylaxis (PEP) for measles exposures who are NOT pregnant or immunocompromised*

Age range	Measles immune status[a]	PEP type depending on time after initial exposure		
		≤3 days (≤72 hours)	4-6 days	>6 days
All ages	Immune *(IgG positive, 2 MMR doses, or born before 1957[b])*	• PEP not indicated. Exposed person has documented immunity		
<6 months	Non-immune *(due to age)*	• Give intramuscular immunoglobulin (IMIG)[cd] • Home quarantine[e] for 28 days after last exposure		• PEP not indicated (too late)[f] • Home quarantine[e] for 21 days after last exposure
6-11 months	Non-immune *(due to age)*	• Give MMR vaccine *(preferred over IG)* • No quarantine needed if MMR PEP given	• Give intramuscular immunoglobulin (IMIG)[cd] • Home quarantine[e] for 28 days after last exposure	• PEP not indicated (too late)[f] • Home quarantine[e] for 21 days last after exposure
≥12 months	Non-immune *(0 MMR doses or IgG negative)*	• Give MMR vaccine • No quarantine needed if MMR PEP[bg] given	• PEP not indicated (too late)[f] • Home quarantine[e] for 21 days after last exposure, then give MMR vaccine to protect from future exposures	
≥12 months	1 dose of MMR[b]	• Give 2nd MMR dose if ≥28 days from last dose of live vaccine • No quarantine needed if MMR PEP[bg] given	• Give 2nd MMR if not up-to-date.[h] No quarantine needed.	
Adults	Unknown measles immune status	• Give MMR vaccine • No quarantine needed if MMR PEP[bg] given	Household member of a confirmed/suspected case • Obtain IgG titers to determine immunity. Home quarantine[e] while awaiting results; if IgG negative, quarantine for 21 days after last exposure (too late for PEP)[e,f] Healthcare worker or Daycare worker • Obtain titers to determine immunity. Furlough while awaiting results; if IgG negative, quarantine for 21 days after last exposure (too late for PEP)[e,f,g] Other • Consider titers to determine immunity; if IgG negative, quarantine for 21 days after last exposure (too late for PEP)[e,f]	

Results and Notification

3/22 evening

5pm: Specimens received at PHL
9pm: PHL called with results

Measles PCR positive
Measles confirmed

3/22 evening

Shared results with healthcare facilities

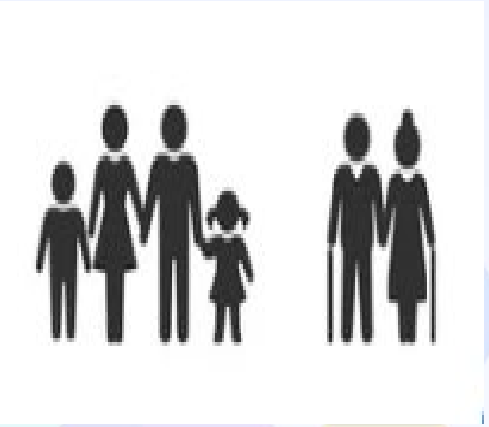
Reiterated control measures to take

Checked in on healthcare facilities progress with notifying and recalling contacts for PEP, if indicated

Measles Contacts

281 Healthcare

8 Flight



6 Household

295 Total Contacts

Rubella

Rubella

- Acute, febrile rash viral illness
- Mild illness, 25-50% may be asymptomatic
- Symptomatic cases:
  - Prodrome (1-5 days before rash) may include low-grade fever, headache, mild pink eye, general discomfort, swollen and enlarged lymph nodes, cough, runny nose
  - Rash (day 0), present for average 3 days, starts on face and then spreads to the body

Incubation ranges from 12-23 days, with an average of 17 days

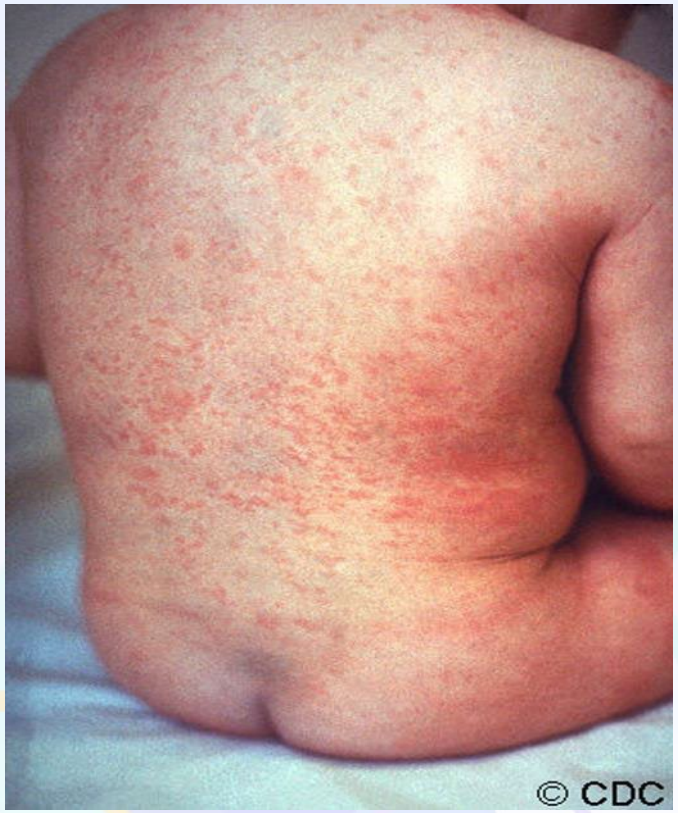
Infectious period is 7 days before and 7 days after rash onset

Prodrome, 1-5 days before rash

Surveillance Clinical Definition*

In the absence of a more likely alternative diagnosis **and**

- Acute onset of generalized maculopapular rash; **and**
- Fever (measured [greater than 99.0°F] or subjective); **and**
- Arthralgia, arthritis, cervical lymphadenopathy, or conjunctivitis



*Clinical definition defined by the Council of State and Territorial Epidemiologists (CSTE) 24-ID-10_Rubella.pdf (ymaws.com)

Rubella Complications

- Arthralgia or arthritis, up to 70% of adult women with rubella
- Rare complications: thrombocytopenic purpura and encephalitis
- During pregnancy, especially first trimester:
  - miscarriages
  - fetal deaths/stillbirths
  - congenital rubella syndrome (CRS): cataracts, heart defects, and hearing impairment

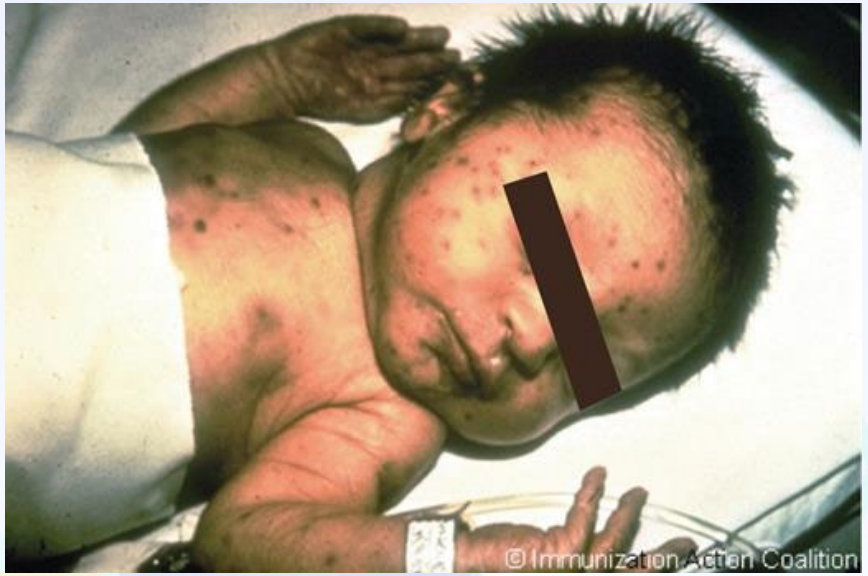
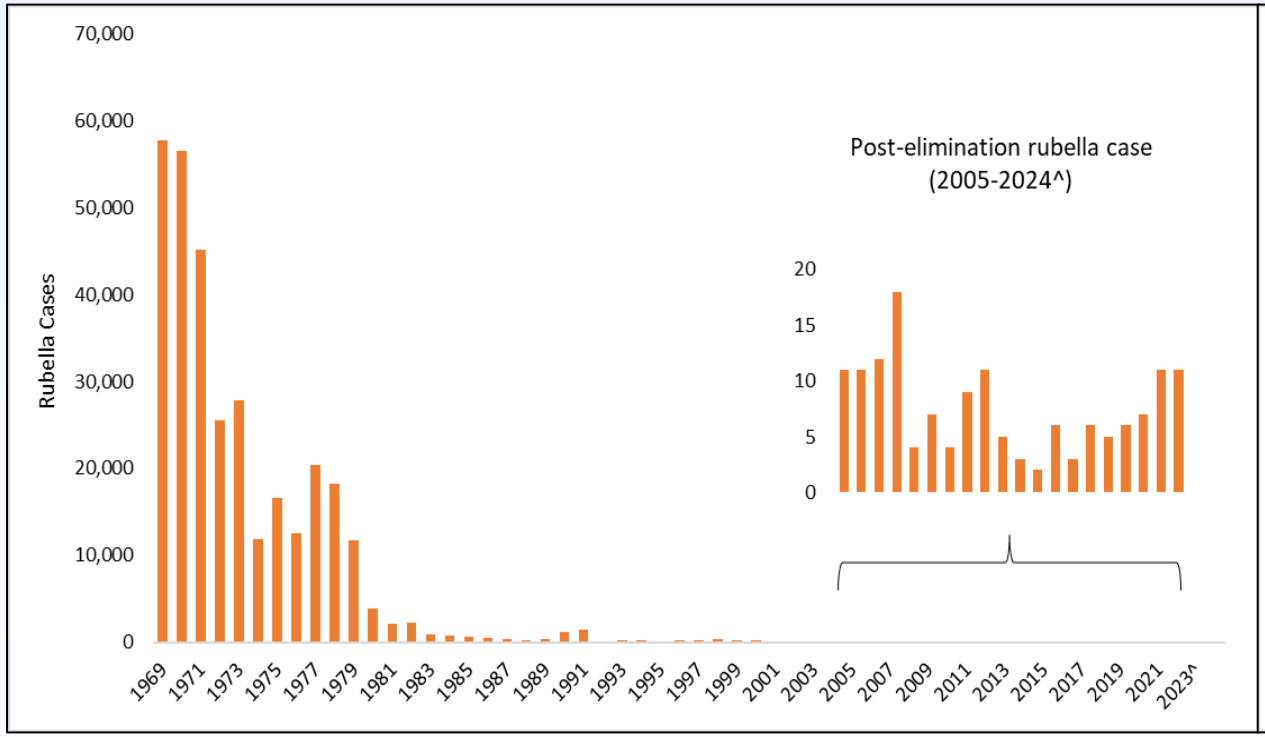


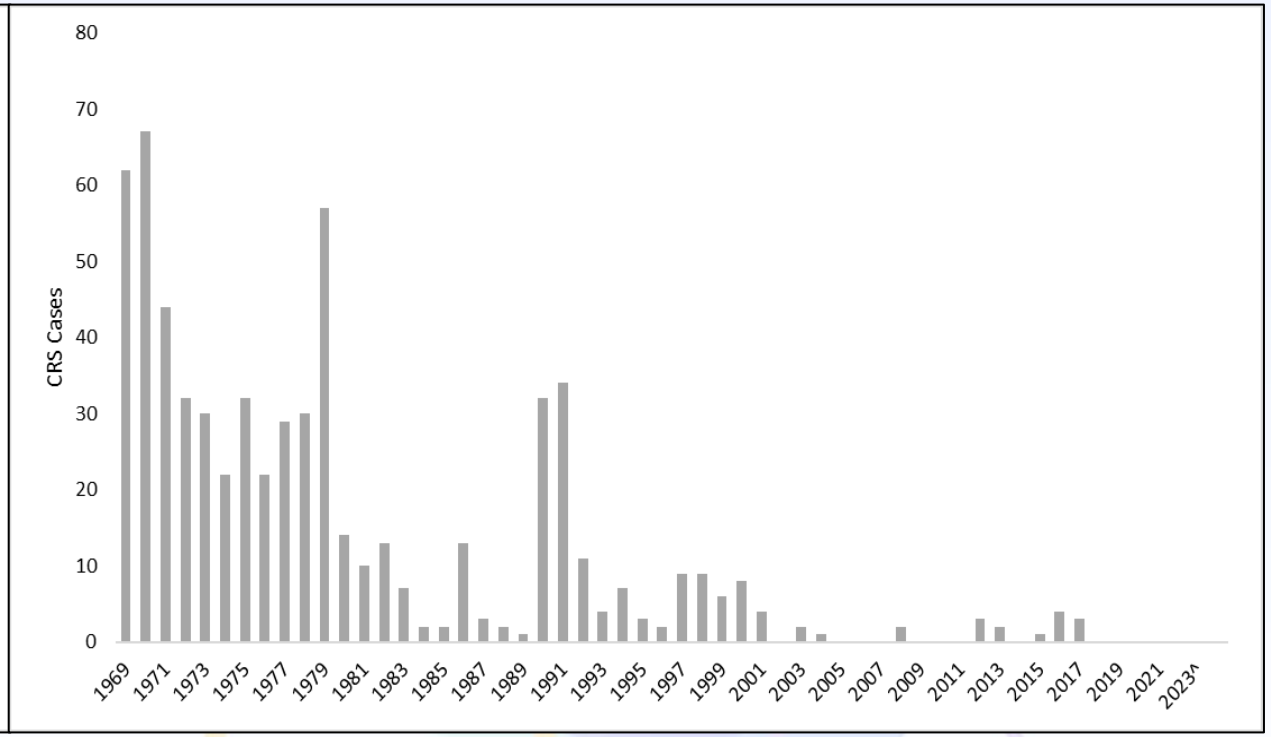
Image Citation: 2021. "Rubella", Red Book: 2021–2024 Report of the Committee on Infectious Diseases, Committee on Infectious Diseases, American Academy of Pediatrics, David W. Kimberlin, MD, FAAP, Elizabeth D. Barnett, MD, FAAP, Ruth Lynfield, MD, FAAP, Mark H. Sawyer, MD, FAAP

Rubella and CRS have been eliminated* in the U.S. since 2004

Rubella



Congenital Rubella Syndrome

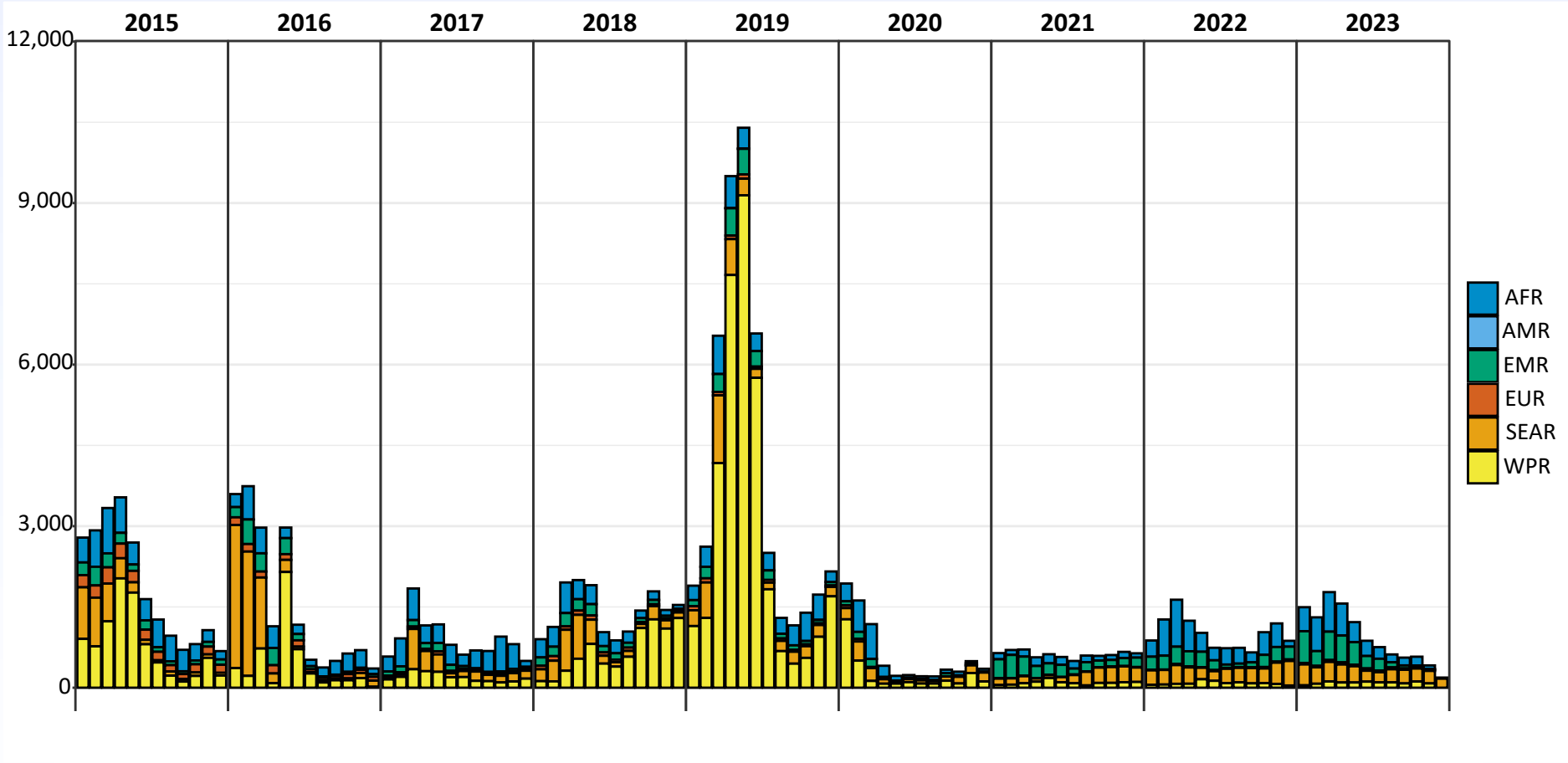


*Elimination is defined as the **absence of endemic transmission** in a region for ≥ 12 months in the presence of a well-performing surveillance system

^Data from 2023 and 2024 are provisional and subject to change

Rubella and CRS continue to occur in many parts of the world

Rubella case distribution by month and WHO Region (2015-2023)



Visual based on data received 2024-01 - Data Source: IVB Database - This is surveillance data, hence for the last month(s), the data may be incomplete.
https://www.cdc.gov/mmwr/volumes/73/wr/mm7308a2.htm

Seroprevalence of Rubella in the U.S., 2009-2010

Table 1. Seroprevalence of Measles, Mumps, Rubella and Varicella Antibodies by Demographic Characteristics: National Health and Nutrition Examination Survey, 2009–2010.

		Measles		Mumps		Rubella		Varicella	
	n	% (95% CI)	*P* Value	% (95% CI)	*P* Value	% (95% CI)	*P* Value	% (95% CI)	*P* Value
Overall	5054	92.0 (90.9–93.0)		87.6 (85.8–89.2)		95.3 (94.3–96.2)		97.8 (97.1–98.3)	
Age									
6–11 years (ref)	960	96.8 (94.5–98.4)		91.9 (89.3–94.1)		99.1 (97.9–99.7)[a]		98.0 (96.0–99.1)[b]	
12–19 years	1172	93.2 (89.8–95.7)	<.05	86.9 (83.2–90.1)	<.05	97.0 (95.5–98.2)	<.01	97.1 (95.7–98.2)	NS
20–29 years	950	93.3 (90.9–95.3)	<.05	87.7 (84.8–90.3)	<.05	95.8 (94.2–97.0)	<.001	97.6 (96.0–98.7)	NS
30–39 years	937	87.9 (84.8–90.6)	<.001	85.6 (81.5–89.2)	<.01	93.4 (90.9–95.3)	<.001	97.0 (94.6–98.5)	NS
40–49 years	1035	91.2 (89.0–93.2)	<.001	87.8 (84.9–90.2)	<.05	93.8 (91.8–95.4)	<.001	98.9 (97.8–99.6)[b]	NS
Sex									
Male	2483	91.5 (89.2–93.5)	NS	86.8 (84.8–88.7)	NS	93.5 (92.2–94.6)	<.001	97.6 (96.8–98.3)	NS
Female	2571	92.4 (91.0–93.7)		88.4 (86.3–90.2)		97.2 (96.1–98.0)		97.9 (97.2–98.4)	
Race/Ethnicity									
Non-Hispanic white (ref)	1971	91.3 (89.5–92.9)		85.8 (83.1–88.1)		95.0 (93.6–96.2)		98.5 (97.9–99.0)	
Non-Hispanic black	928	96.2 (94.9–97.2)	<.001	92.0 (89.1–94.3)	<.001	97.2 (95.9–98.2)	<.01	96.3 (95.0–97.4)	<.01
Mexican American	1232	87.0 (84.9–88.9)	<.01	89.0 (87.3–90.6)	<.05	94.2 (92.0–95.9)	NS	97.8 (96.6–98.7)	NS
Birthplace									
Non-US	1099	92.2 (89.6–94.3)	NS	92.3 (89.9–94.2)	<.001	95.8 (94.1–97.2)	NS	95.6 (93.7–97.1)	<.01
US	3951	91.9 (90.5–93.2)		86.6 (84.7–88.4)		95.2 (94.0–96.2)		98.2 (97.6–98.7)	

Abbreviations: CI, confidence interval; NS, not significant (*P* > .05); ref, reference group.

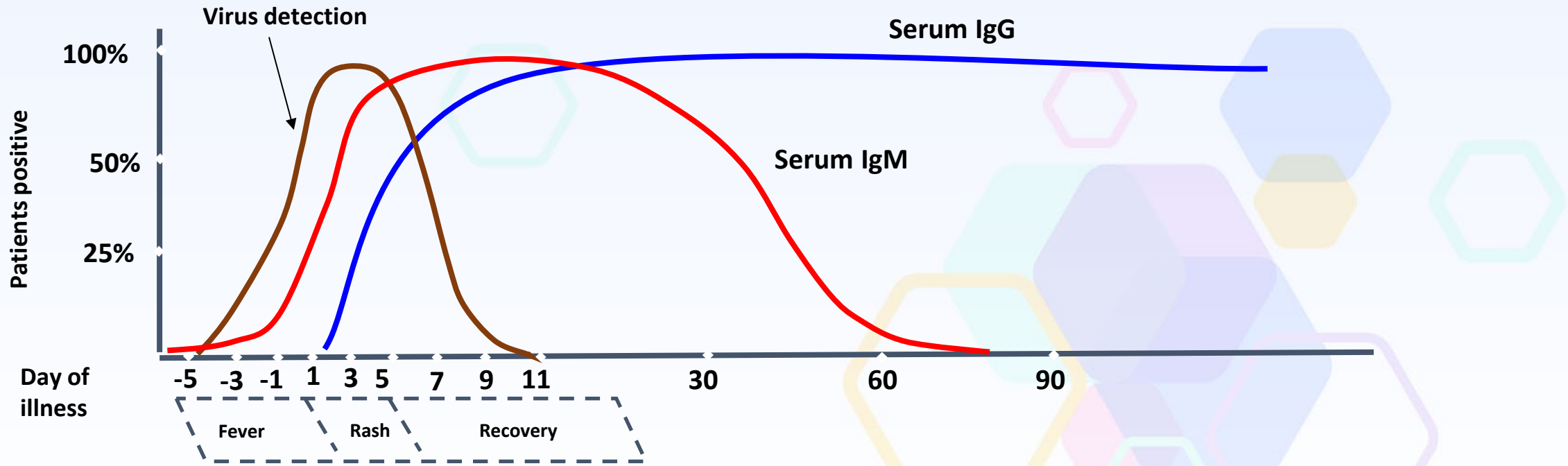
[a] Estimates unstable based on <10 negative sample persons and relative standard error >40%.

[b] Estimates unstable relative standard error >30%.

Source: Seroprevalence of Measles, Mumps, Rubella and Varicella Antibodies in the United States Population, 2009–2010 - PMC (nih.gov)

Rubella Diagnosis

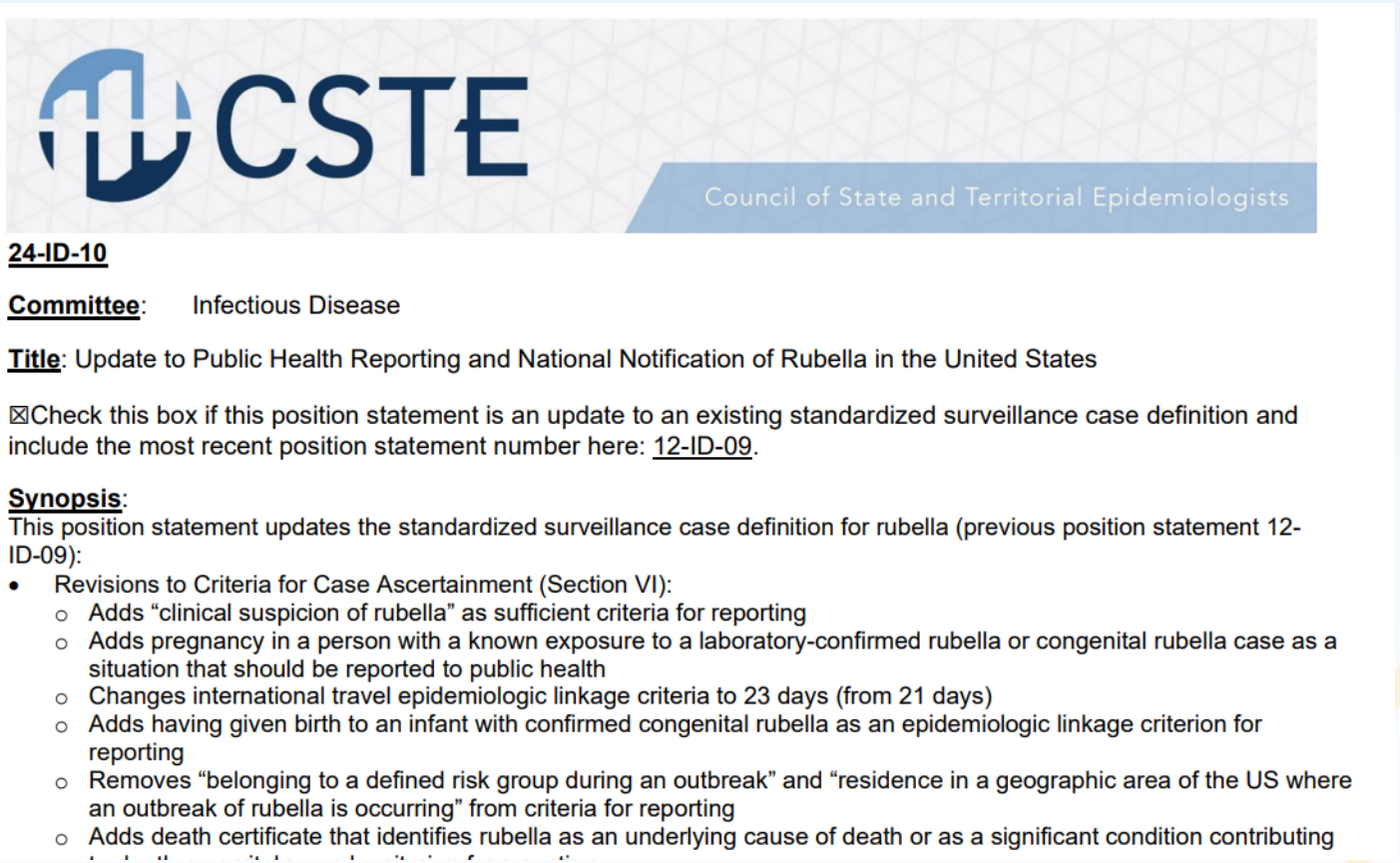
- Clinical diagnosis of acute cases of rubella is unreliable, laboratory testing is needed
- **Ideally, RT-PCR and serology (IgM) should be performed for all suspect cases**



Inappropriate Inclusion of IgM in Immunity Testing

- Public health jurisdictions report inappropriate IgM testing for rubella at commercial labs
  - Clinicians order inappropriately when testing was to determine immunity
  - Many commercial labs offer IgG, IgM, and IgG/IgM tests, but not always clear that only IgG should be ordered for immunity testing
- False-positive IgM results very likely in setting of low incidence, may indicate cross-reactivity
- False positive rubella IgM may result in inappropriate diagnosis and management, and unnecessary public health investigations
- CDC collaborating with several agencies to try and limit inappropriate IgM testing at commercial labs; CDC cannot regulate the testing protocols of commercial labs

Updated Case Definition: Overall Goal



CSTE

Council of State and Territorial Epidemiologists

24-ID-10

Committee: Infectious Disease

Title: Update to Public Health Reporting and National Notification of Rubella in the United States

☒Check this box if this position statement is an update to an existing standardized surveillance case definition and include the most recent position statement number here: 12-ID-09.

Synopsis:
This position statement updates the standardized surveillance case definition for rubella (previous position statement 12-ID-09):

- Revisions to Criteria for Case Ascertainment (Section VI):
  - Adds "clinical suspicion of rubella" as sufficient criteria for reporting
  - Adds pregnancy in a person with a known exposure to a laboratory-confirmed rubella or congenital rubella case as a situation that should be reported to public health
  - Changes international travel epidemiologic linkage criteria to 23 days (from 21 days)
  - Adds having given birth to an infant with confirmed congenital rubella as an epidemiologic linkage criterion for reporting
  - Removes "belonging to a defined risk group during an outbreak" and "residence in a geographic area of the US where an outbreak of rubella is occurring" from criteria for reporting
  - Adds death certificate that identifies rubella as an underlying cause of death or as a significant condition contributing

To increase specificity in the reporting and classification criteria for rubella*, while maintaining high sensitivity.

* All updates to rubella case definition can be found here: Council of State and Territorial Epidemiologists (CSTE) 24-ID-10_Rubella.pdf (ymaws.com)

Updated Case Definition: Suspect and Probable Classification

Clinical Definition:

- In the absence of a more likely alternative diagnosis and
  - Acute onset of generalized maculopapular rash; and
  - Fever (measured [greater than 99.0°F] or subjective); and
  - Arthralgia, arthritis, cervical lymphadenopathy, or conjunctivitis

Suspect: Removed suspect definition

Probable:

A case that meets all the following criteria:

- Has clinical evidence; and
- Positive serologic test for rubella IgM antibody*; and
- Lacks presumptive evidence of rubella immunity

* Outcomes of testing conducted as part of routine immunity screening (e.g., titers for employment documentation) need not be reported to public health authorities or investigated once reason for testing is identified

Updated Case Definition: Confirmed Classification

A case with or without clinical evidence and one of the following pieces of laboratory evidence:

- Detection of rubella virus (e.g., RT-PCR, culture, next generation sequencing [NGS])
- Significant rise, defined as seroconversion or at least a 4-fold rise in titer, observed in paired acute and convalescent serum rubella IgG antibody levels

OR

A case with a positive serologic test for rubella IgM antibody* and one of the following pieces of evidence(s):

- Low avidity rubella IgG;
- Contact with a laboratory-confirmed rubella or congenital rubella case during the case's likely infectious period;
- Clinical evidence and international travel in the 23 days prior to rash onset and lacks presumptive evidence of immunity

OR

A case with clinical evidence and close contact (e.g., household contact) with a laboratory-confirmed rubella or congenital rubella case during the case's likely infectious period

OR

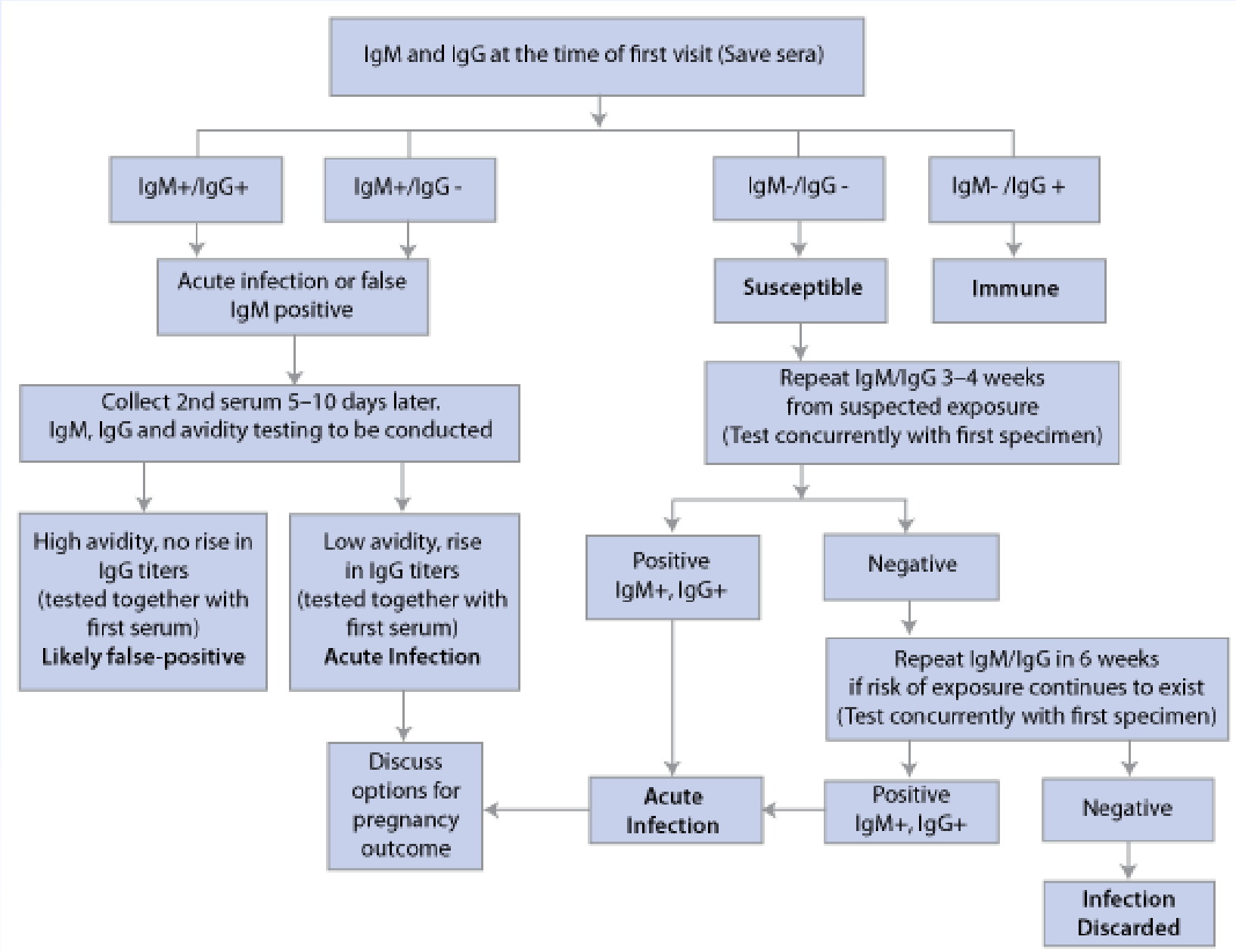
A case with or without clinical evidence who gave birth to an infant with confirmed congenital rubella

* Outcomes of testing conducted as part of routine immunity screening (e.g., titers for employment documentation) need not be reported to public health authorities or investigated once reason for testing is identified

Rubella Prevention and Control

- **Investigation:** All suspected rubella cases should be immediately investigated
  - Clinical and lab data
  - Reason for testing
  - Pregnancy status
  - Vaccination history
  - Travel or exposure 23 days before rash
- **Isolation of cases:** Droplet and standard precautions until 7 days post-rash onset
- **Identification and prioritization of contacts:** Identify all potential exposures 7 days before to after rash onset; prioritize those with higher risk of severe disease (infants <1 year of age, pregnant women, and people with immunocompromising conditions)
- **Quarantine and exclusion of contacts:** Quarantine or exclusion of susceptible contacts from high-risk settings for 23 days after exposure may be warranted for exposed contacts without evidence of immunity
- **Post Exposure Prophylaxis:** Not recommended

Algorithm for serologic evaluation of pregnant women exposed to rubella



Source: [Chapter 22: Laboratory Support for Surveillance of Vaccine-Preventable Diseases | Manual for the Surveillance of Vaccine-Preventable Diseases | CDC]

Control Measures: High-Risk Settings

- In settings where pregnant women may be exposed, outbreak control measures should begin as soon as rubella is suspected and should not be postponed until laboratory confirmation of cases.
- Daycare centers, schools, and other educational institutions:
  - Exclusion of persons without acceptable evidence of rubella immunity may limit disease transmission and should be considered through 23 days after last exposure
  - Unvaccinated persons who receive MMR vaccine as part of the outbreak control may be immediately readmitted to school provided all persons without documentation of immunity have been excluded
- Healthcare:
  - Exposed healthcare personnel without adequate presumptive evidence of immunity should be excluded from duty beginning 7 days after exposure to rubella and continuing through 23 days after last exposure

Rotavirus

Rotavirus

- Incubation period of 1–3 days
- Vomiting often precedes the onset of diarrhea
- Severe, dehydrating infection occurs primarily among children 3–35 months of age
- Gastrointestinal symptoms generally resolve in 3–7 days

Rotavirus

- Shed in high concentrations in the stool
- Transmitted primarily by the fecal-oral route
- Highly communicable

Rotavirus Vaccine in the U.S.

- Live, oral, human-bovine reassortant rotavirus vaccine
  - RV5 (RotaTeq) licensed in the U.S. in 2006
  - Recommended for routine vaccination of infants at 2, 4, and 6 months of age
- Live, oral, attenuated monovalent rotavirus vaccine
  - RV1 (Rotarix) licensed in the U.S. in 2008
  - Recommended for routine vaccination of infants at 2 and 4 months of age

Rotavirus Surveillance in the U.S.

- Surveillance is needed to:
  - Monitor the impact of vaccination
  - Evaluate vaccine effectiveness in field use
  - Identify and determine the causes of vaccine failure
  - Monitor possibly emerging strains
  - Identify groups in which vaccination coverage may be inadequate
  - Monitor the safety of rotavirus vaccines
- Surveillance at national level should focus on:
  - Monitoring trends of severe rotavirus disease
  - Viral strain surveillance

Rotavirus Surveillance in the U.S.

- New Vaccine Surveillance Network (NVSN)
  - Conduct active, population-based surveillance for rotavirus-associated medical encounters among children
  - 7 medical centers in Tennessee, New York, Ohio, Texas, Missouri, Washington State, and Pennsylvania
  - Identification and investigation of acute gastroenteritis cases
  - Analyses to estimate disease burden, vaccine impacts, and vaccine effectiveness

Rotavirus Surveillance in the U.S.

- Laboratory-based sentinel surveillance systems
  - National Respiratory and Enteric Virus Surveillance System
  - National Rotavirus Strain Surveillance System
- National health utilization datasets

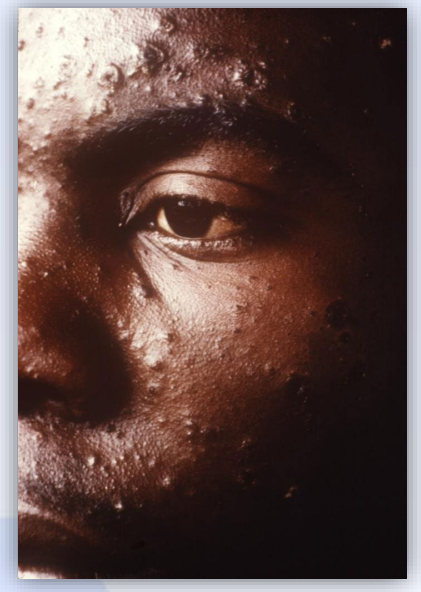
Documentation of Rotavirus Vaccine Impact

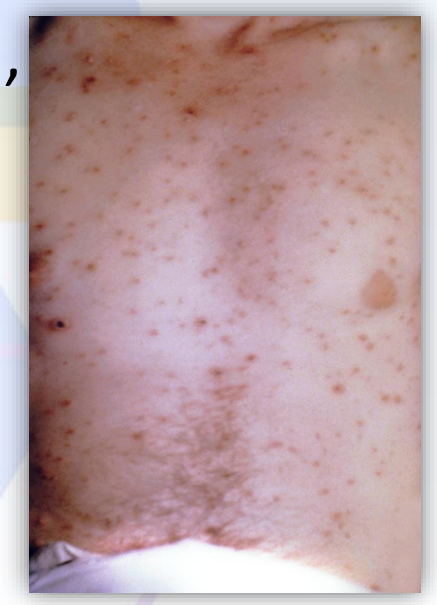
- Decreases in rates for acute, all-cause gastroenteritis hospitalization for children <5 years of age
- Decreases in rotavirus-coded hospitalization for children <5 years of age
- Decreases in rotavirus gastroenteritis emergency department visits
- Lower rate of rotavirus- or unspecified-gastroenteritis hospitalization among household members having a vaccinated child
- Biennial disease pattern observed following rotavirus vaccine introduction
- Rotavirus case investigations are usually not warranted, however, outbreaks among childcare or school settings could indicate vaccine coverage gaps and possible waning immunity
- Surveillance will continue to adapt to new epidemiologic and surveillance trends

Varicella

Varicella: clinical description

- Febrile rash illness caused by primary infection with varicella-zoster virus (VZV)
- Characterized by pruritic (itchy), maculopapular and vesicular rash
  - Usually 250–500 skin lesions
  - Simultaneous presence of skin lesions in various stages
- Usually, mild disease but complications can occur at any age
- Severity is increased in immunocompromised persons, pregnant women, children aged <1 year, and adults
- Deaths are rare but can occur, including in previously healthy persons
- Varicella in vaccinated persons is termed Breakthrough (BT) varicella
  - Usually milder presentation (“atypical”) than in unvaccinated persons



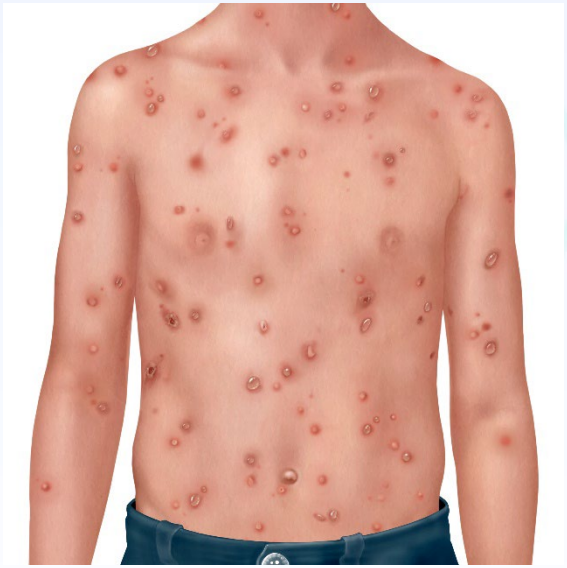


Source: Chapter 17: Varicella | Manual for the Surveillance of Vaccine-Preventable Diseases | CDC

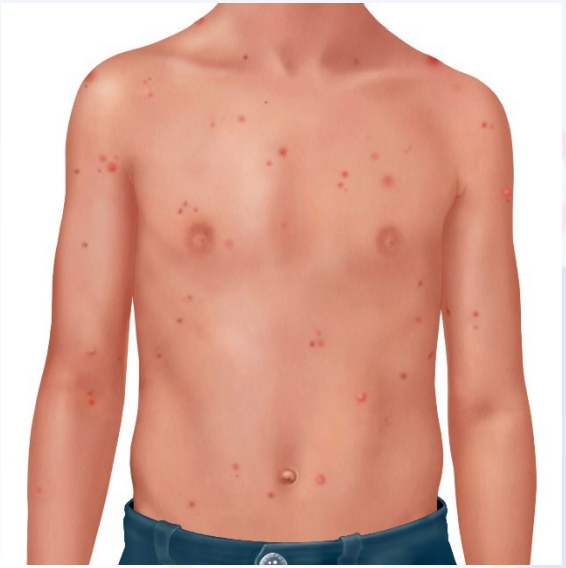
Breakthrough (BT) varicella: clinical diagnosis is challenging in cases with mild rash, few lesions, or no vesicles

Unvaccinated Person

250-500 lesions
Mostly vesicular
Fever
Illness for 5-7 days



Breakthrough Varicella



<50 lesions
Few or no vesicles
No or low fever
Shorter duration of illness

BT Varicella is contagious.
May develop in 15-20% of 1-dose vaccinated and less than 5%-8% of 2-dose vaccinated persons

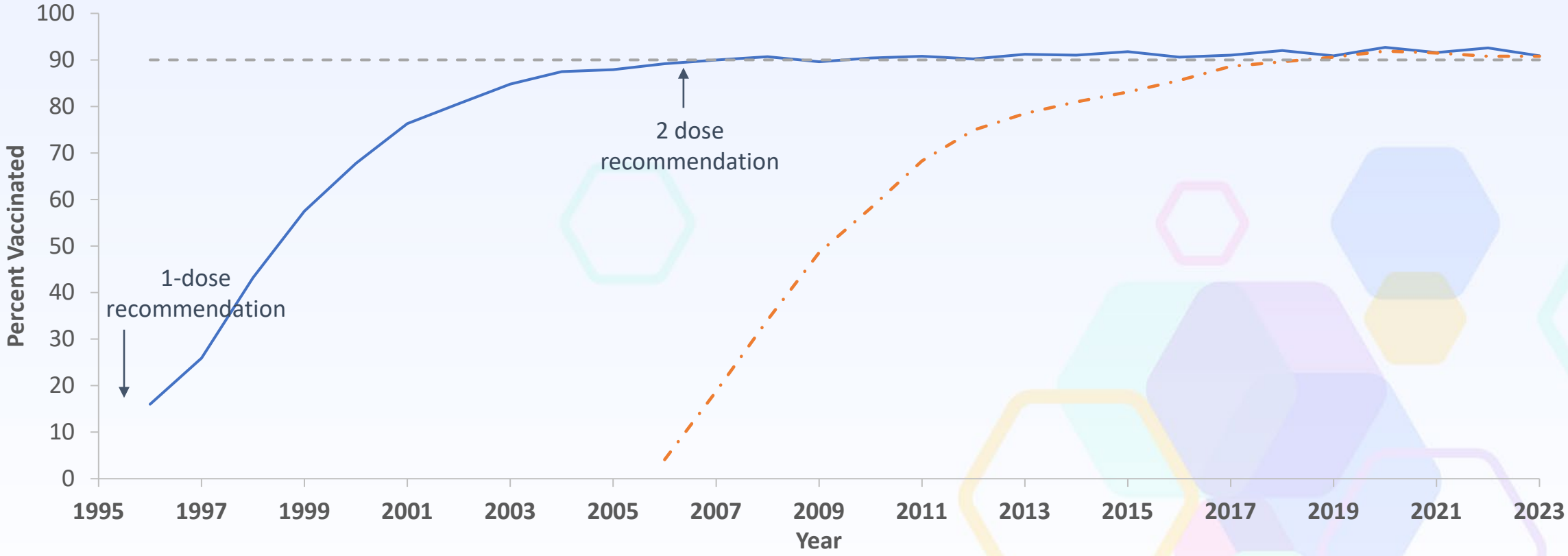
Source: https://www.cdc.gov/chickenpox/downloads/Fact-sheet-Breakthrough-Varicella-508.pdf

U.S. varicella vaccine policy

- Annual varicella disease burden in the U.S. pre-vaccine (1990-1994)
  - About 4 million cases
  - >10,000 hospitalizations
  - 100–150 deaths
- Routine varicella vaccination program implemented in 1995 as a 1-dose program
  - Since 2007, two doses recommended routinely for children
    - First dose: 12–15 months of age
    - Second dose: 4–6 years of age

Sources: Chapter 17: Varicella | Manual for the Surveillance of Vaccine-Preventable Diseases | CDC
Prevention of Varicella: Recommendations of the Advisory Committee on Immunization Practices (ACIP)

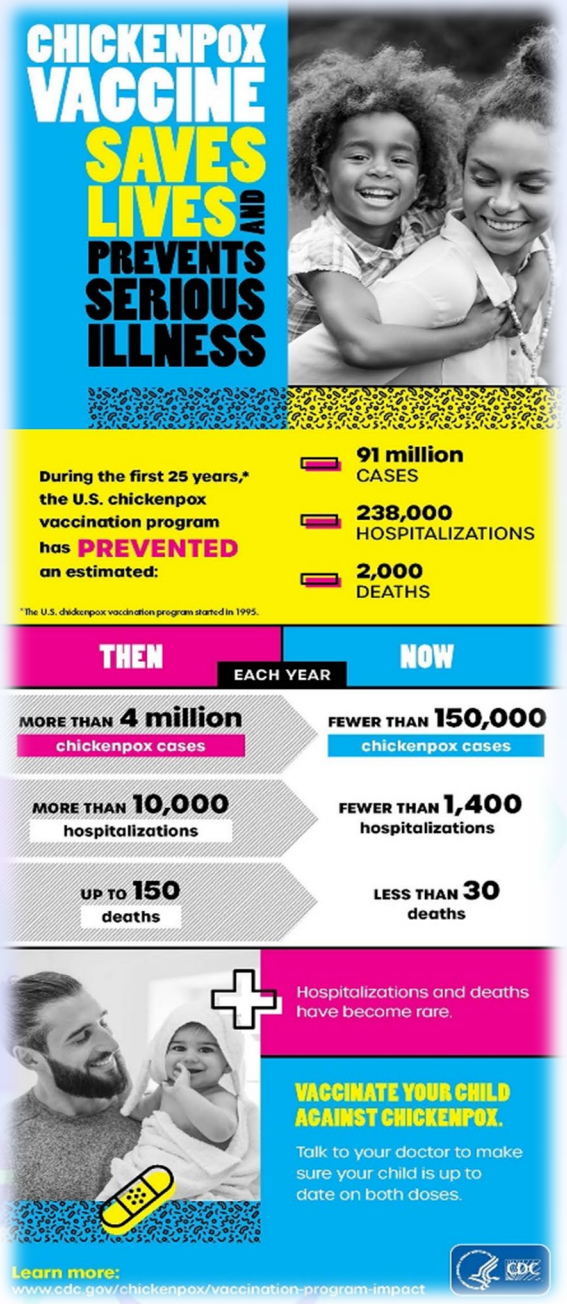
Program implementation was highly successful: ≥1 dose coverage among young children 90%-93% since 2007, 2 dose coverage among teens 90%-91% since 2018



Source: National Immunization Survey children and teens. Elam-Evans et al. JID 2022.

Impact of the US varicella vaccination program

- 97% reduction in incidence
  - Decline in all age groups
- 90% decline in hospitalizations and deaths
  - 96%-99% decline in persons aged <20 years, born during the varicella vaccination program
- Varicella outbreaks declined in
  - Size: from 15 to 7 cases/outbreak
  - Duration: from 45 to 30 days
  - Number: 82% during the 2-dose program in 7 states with consistent reporting
- Currently, fewer than 150,000 varicella cases, 1,400 hospitalizations, and 30 deaths per year are occurring



Sources: Marin et al. JID 2022; Leung et al. JID 2022.

Chickenpox Vaccine Saves Lives Infographic | Chickenpox (Varicella) | CDC

Laboratory confirmation of varicella is increasingly important to understand the true burden of disease

- Modified presentation of varicella in vaccinated persons and unfamiliarity of providers and public with the presentation of varicella
- Virologic methods are recommended for both vaccinated and unvaccinated persons
  - PCR is the diagnostic method of choice
    - Highly sensitive and specific in confirming modified disease if adequate samples are collected
- Specimens
  - Vesicular fluid or scabs from skin lesions
    - Scraping of maculopapular lesions in the absence of vesicles or scabs
- Serologic testing, including IgM is not useful or recommended for confirmation of acute disease

Sources: Chickenpox 2024 Case Definition | CDC

- Laboratory Testing for Varicella-Zoster Virus (VZV) | Chickenpox (Varicella) | CDC
- Chapter 22: Laboratory Support for Surveillance of Vaccine-Preventable Diseases | Manual for the Surveillance of Vaccine-Preventable Diseases | CDC

Varicella surveillance is critical for monitoring the varicella vaccination program in the U.S. and to further guide prevention efforts

- Monitor impact of vaccination program
  - Need nationwide data given the low number of cases occurring
- Characterize and understand changes in the burden of disease, including severe disease
- Characterize populations requiring additional disease control measures
- Detect and respond to outbreaks
- Evaluate vaccine effectiveness

Improving national varicella surveillance

- **40** states and DC are conducting varicella case-based surveillance
- **65*** jurisdictions are funded through CDC's Epidemiology and Laboratory Capacity (ELC) cooperative agreement to conduct varicella outbreak surveillance as part of prioritized activities to improve surveillance for vaccine preventable diseases
- To improve the completeness of data available to monitor severe varicella, reporting of varicella hospitalizations is included as a voluntary ELC activity for about 27 states.

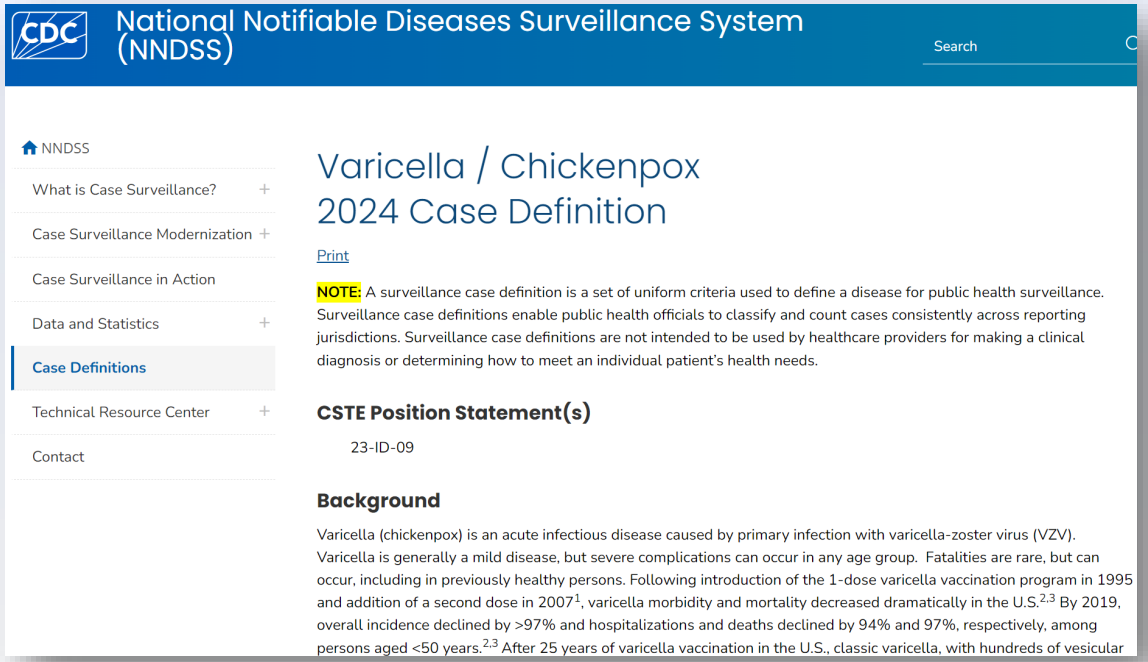
*Includes states, local and U.S. territory and affiliate health departments.
Source: The Epidemiology and Laboratory Capacity (ELC) Program | Epidemiology and Laboratory Capacity | CDC

Updates for Varicella Surveillance in 2024

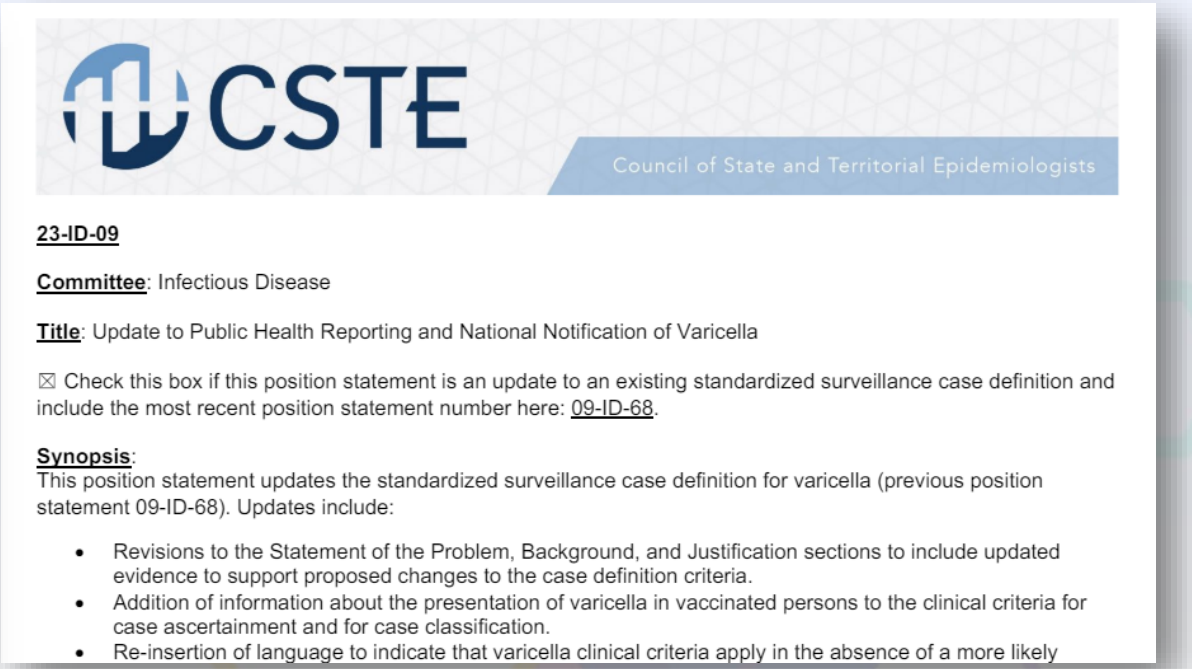
New 2024 varicella CSTE Case definition

- Effective January 2024

CDC Webpage



CSTE Webpage



Sources: https://ndc.services.cdc.gov/case-definitions/varicella-2024/
https://cdn.ymaws.com/www.cste.org/resource/resmgr/ps/ps_2023/23-ID-09_Varicella.pdf

Why update the previous (2009) CSTE position statement

Need to account for current varicella epidemiology and clinical presentation

- Varicella vaccine program was implemented in 1995. Since then, incidence declined >97%
- Presentation in vaccinated persons usually modified
  - Makes clinical diagnosis less reliable
- 2009 case definition did not address classification of cases without vesicles or with a provider diagnosis and no rash description

Why update the previous (2009) CSTE position statement

Need to account for current varicella epidemiology and clinical presentation

- Varicella vaccine program was implemented in 1995. Since then, incidence declined >97%
- Presentation in vaccinated persons usually modified
  - Makes clinical diagnosis less reliable
- 2009 case definition did not address classification of cases without vesicles or with a provider diagnosis and no rash description

2009 varicella case definition likely picked up non-varicella cases

- About half of all cases reported through national surveillance in recent years were in vaccinated persons with modified presentation (fewer lesions, mostly maculopapular)
  - Therefore, lab confirmation increasingly important
- Need to increase the specificity of the case definition

Why update the previous (2009) CSTE position statement

Need to account for current varicella epidemiology and clinical presentation

- Varicella vaccine program was implemented in 1995. Since then, incidence declined >97%
- Presentation in vaccinated persons usually modified
  - Makes clinical diagnosis less reliable
- 2009 case definition did not address classification of cases without vesicles or with a provider diagnosis and no rash description

2009 varicella case definition likely picked up non-varicella

- About half of all cases reported through national surveillance in recent years were in vaccinated persons with modified presentation (fewer lesions, mostly maculopapular)
  - Therefore, lab confirmation increasingly important
- Need to increase the specificity of the case definition

Herpes zoster not included as a source of exposure in 2009 position statement

- Herpes zoster is becoming important source of exposure for varicella cases given the low incidence of varicella

Why update the previous (2009) CSTE position statement

Need to account for current varicella epidemiology and clinical presentation

- Varicella vaccine program was implemented in 1995. Since then, incidence declined >97%
- Presentation in vaccinated persons usually modified
  - Makes clinical diagnosis less reliable
- 2009 case definition did not address classification of cases without vesicles or with a provider diagnosis and no rash description

2009 varicella case definition likely picked up non-varicella

- About half of all cases reported through national surveillance in recent years were in vaccinated persons with modified presentation (fewer lesions, mostly maculopapular)
  - Therefore, lab confirmation increasingly important
- Need to increase the specificity of the case definition

Herpes zoster not included as a source of exposure in 2009 position statement

- Herpes zoster is becoming important source of exposure for varicella cases given the low incidence of varicella

Jurisdictions inquired about the role and utility of IgM testing (not in the 2009 statement)

- Clarify role of IgM in case ascertainment and case classification

Main changes to the varicella case definition and classification

Increases specificity of confirmed cases

- Including only cases that are lab-confirmed themselves and
- Cases with generalized rash with vesicles AND confirmatory epi-linkage evidence
- 2 probable epi-linked cases no longer considered confirmed

Main changes to the varicella case definition and classification

Increases specificity of confirmed cases

- Including only cases that are lab-confirmed themselves and
- Cases with generalized rash with vesicles AND confirmatory epi-linkage evidence
- 2 probable epi-linked cases no longer considered confirmed

Addresses classification of varicella cases with generalized maculopapular rash without vesicles

- Confirmed case if confirmatory lab evidence
- Probable case if epi-linkage to: probable case with generalized rash with vesicles, confirmatory epi-linkage evidence or positive IgM

Main changes to the varicella case definition and classification

Increases specificity of confirmed cases

- Including only cases that are lab-confirmed themselves and
- Cases with generalized rash with vesicles AND confirmatory epi-linkage evidence
- 2 probable epi-linked cases no longer considered confirmed

Addresses classification of varicella cases with generalized maculopapular rash without vesicles

- Confirmed case if confirmatory lab evidence
- Probable case if epi-linkage to: probable case with generalized rash with vesicles, confirmatory epi-linkage evidence or positive IgM

Addresses classification of varicella cases with only a provider diagnosis and no rash description

- Probable if confirmatory lab evidence, epi-linkage to probable case with generalized rash with vesicles, confirmatory epi-linkage evidence or positive IgM

Main changes to the varicella case definition and classification

Increases specificity of confirmed cases

- Including only cases that are lab-confirmed themselves and
- Cases with generalized rash with vesicles AND confirmatory epi-linkage evidence
- 2 probable epi-linked cases no longer considered confirmed

Addresses classification of varicella cases with generalized maculopapular rash without vesicles

- Confirmed case if confirmatory lab evidence
- Probable case if epi-linkage to: probable case with generalized rash with vesicles, confirmatory epi-linkage evidence or positive IgM

Addresses classification of varicella cases with only a provider diagnosis and no rash description

- Probable if confirmatory lab evidence, epi-linkage to probable case with generalized rash with vesicles, confirmatory epi-linkage evidence or positive IgM

Includes herpes zoster as a source of exposure

Main changes to the varicella case definition and classification

Increases specificity of confirmed cases

- Including only cases that are lab-confirmed themselves and
- Cases with generalized rash with vesicles AND confirmatory epi-linkage evidence
- 2 probable epi-linked cases no longer considered confirmed

Addresses classification of varicella cases with generalized maculopapular rash without vesicles

- Confirmed case if confirmatory lab evidence
- Probable case if epi-linkage to: probable case with generalized rash with vesicles, confirmatory epi-linkage evidence or positive IgM

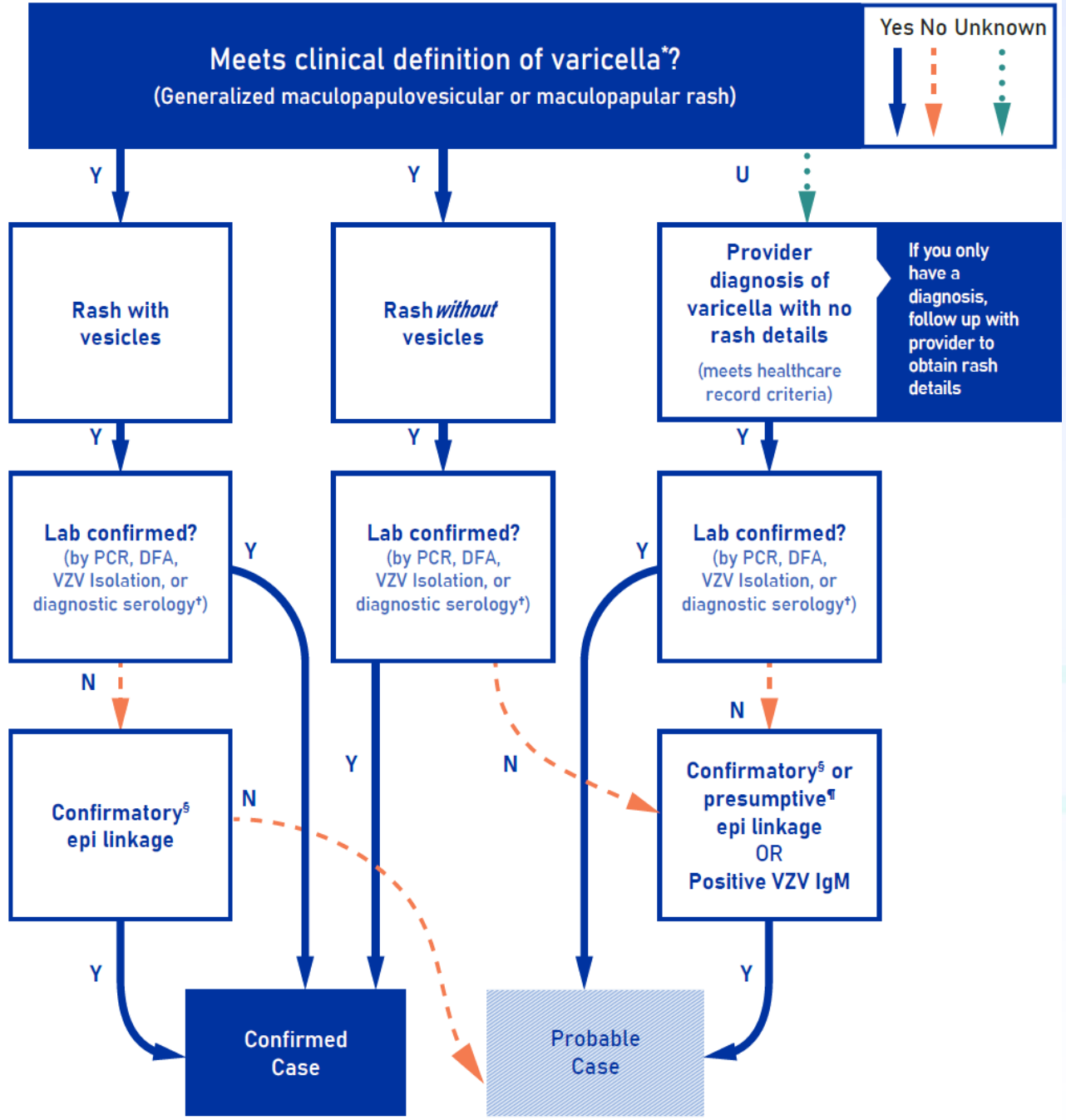
Addresses classification of varicella cases with only a provider diagnosis and no rash description

- Probable if confirmatory lab evidence, epi-linkage to probable case with generalized rash with vesicles, confirmatory epi-linkage evidence or positive IgM

Includes herpes zoster as a source of exposure

Clarifies role of IgM in case ascertainment and case classification

Varicella case classification infographic



*In the absence of a more likely alternative diagnosis.

† Diagnostic serology includes a significant rise (i.e., at least a 4-fold rise or seroconversion) in paired acute and convalescent serum VZV IgG antibody.

§ Confirmatory epi-linkage evidence is an epi-linkage to a: lab-confirmed case, OR varicella cluster/outbreak with at least 1 lab-confirmed case, OR person with herpes zoster (regardless of lab confirmation).

¶ Presumptive epi-linkage evidence is an epi-linkage to a probable case with generalized rash with vesicles

Source: [Classifying Varicella Cases Flowchart | Chickenpox (Varicella) | CDC]

Varicella outbreak definition (updated March 2024)

An outbreak of varicella is defined as the occurrence of **≥3 varicella cases** that are related in place and are epidemiologically linked.

≥5 cases

Before 2024

≥3 cases

Starting 2024

Source: Chapter 17: Varicella | Manual for the Surveillance of Vaccine-Preventable Diseases | CDC

Key variables for varicella case-based surveillance

- Age
- Vaccination status
  - Number of doses, dates of vaccination
- Rash Description
  - Generalized Y/N, vesicles present, number of lesions (to assess disease severity), only provider diagnosis without rash description
- Outcome
  - Hospitalization, death
- Laboratory information
  - Test type, dates, and results
- Epidemiologic data
  - Transmission setting
  - Source of transmission (contact with a person with varicella or herpes zoster, and whether they were laboratory-confirmed)
  - Association with a varicella outbreak and whether there was at least one laboratory-confirmed case

Source: Chapter 17: Varicella | Manual for the Surveillance of Vaccine-Preventable Diseases | CDC (updated 2023)

New tool available: Recommendations for testing for clinicians

Varicella – Recommendations for Testing for Clinicians

Varicella is a routinely notifiable disease. Please report confirmed and probable cases of varicella to your local health department.

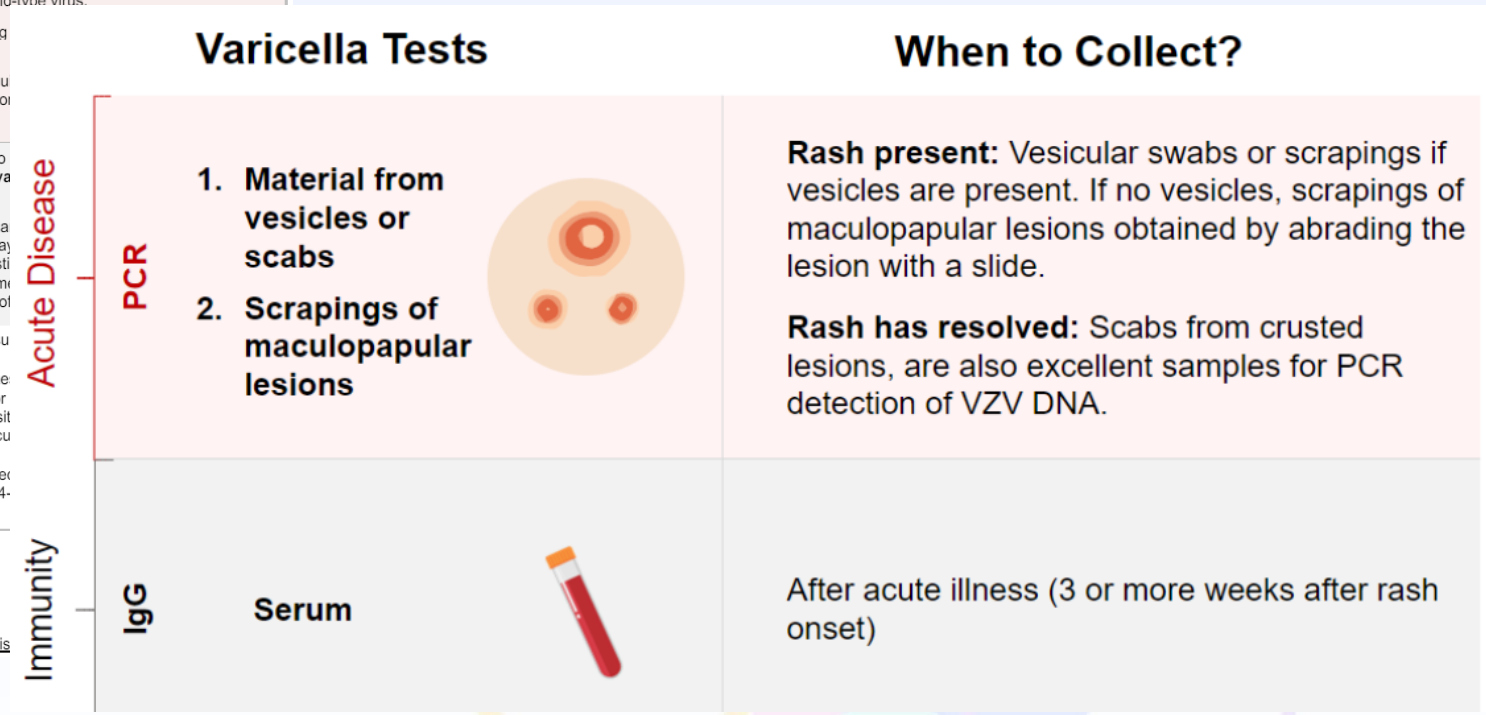
	Preference	Test	Specimen	Indication	Timing	Notes
ACUTE DISEASE	Preferred test for acute disease	PCR	Material from skin lesion specimen (vesicles or scabs [*preferred*], scrapings of maculopapular lesions if vesicles or scabs are not present)	Acute Disease (confirmatory)	• During acute illness when the rash is present. • If rash has resolved, scabs from crusted lesions are also excellent samples for PCR detection of VZV DNA.	• In vaccinated persons who do not have vesicles or scabs, adequate collection of specimens from maculopapular lesions can be challenging. Scrapings of maculopapular lesions can be collected by abrading the lesions. • Rashes within 42 days after vaccination have been reported; only genotyping can confirm if rash is vaccine-strain or wild-type virus. • Contact your health department regarding genotyping, if appropriate. • A positive VZV PCR alone cannot distingu zoster as both are caused by VZV; additio information is needed.
IMMUNITY	Only test for immunity	IgG	Serum	Evidence of Immunity	• After acute illness (3 or more weeks after rash onset).	• A single serologic IgG test can be used to to VZV **from past varicella disease or va confirm acute disease.** • Commercially available VZV IgG assays a seroconversions after vaccination and may varicella vaccinated persons. Routine testi vaccination is **not recommended,** docume varicella vaccine supersedes the results of

Other diagnostic techniques are available commercially to confirm cases of varicella however, they are not recommended because they have su compared with PCR.

- Viral culture is a valid way to confirm cases of varicella; however, it is not recommended because it is less sensitive than PCR and take
- IgM serology has limited diagnosing value for varicella and it is not recommended for laboratory confirmation of varicella. IgM has poor transiently produced during primary infection (varicella), reinfection, or reactivation from latency (herpes zoster). Additionally, false-posit in the presence of high levels of IgG antibodies. An IgM positive result in the presence of varicella-like symptoms can indicate likely acu IgM result in the absence of clinical disease is not considered indicative of active varicella.
- A significant rise (i.e., at least a 4-fold rise in IgG titer or seroconversion) of acute and convalescent phase serum specimens (separate confirm cases of varicella but it is not recommended since it is not practical for immediate management and in vaccinated persons, a 4-

Useful References:

- CDC Varicella page for Healthcare Providers: Chickenpox (Varicella) for Healthcare Professionals | CDC
- CDC Varicella Clinical Factsheet: English | Spanish
- CDC Varicella Breakthrough Infographic: Do You Know What Breakthrough Varicella (Chickenpox) Looks Like?
- CDC Laboratory Support for Surveillance of Vaccine-Preventable Diseases: Laboratory Support for Surveillance of Vaccine-Preventable Dis



Source: Test Types Typically Available to Clinicians and Descriptions for Measles, Mumps, Rubella and Varicella

Thank you!

Acute Flaccid Myelitis (AFM) & Polio

Outline

- Clinical background and case definition
- Epidemiology and surveillance
- Laboratory investigation and specimen collection
- Conclusions
- Updates to case definition for paralytic poliomyelitis

Acute Flaccid Myelitis (AFM)

- Rare condition that affects the nervous system, specifically the spinal cord
- Characterized by sudden onset of weakness or loss of muscle tone in one or more arms or legs
- May also present with facial droop or weakness, difficulty moving eyes, droopy eyes, difficulty swallowing, or slurred speech
- Specifically involves neurons (gray matter) of the spinal cord
- Can have many causes:
    - Viral infections (e.g., poliovirus, West Nile virus)
    - Non-infectious neurological disorders

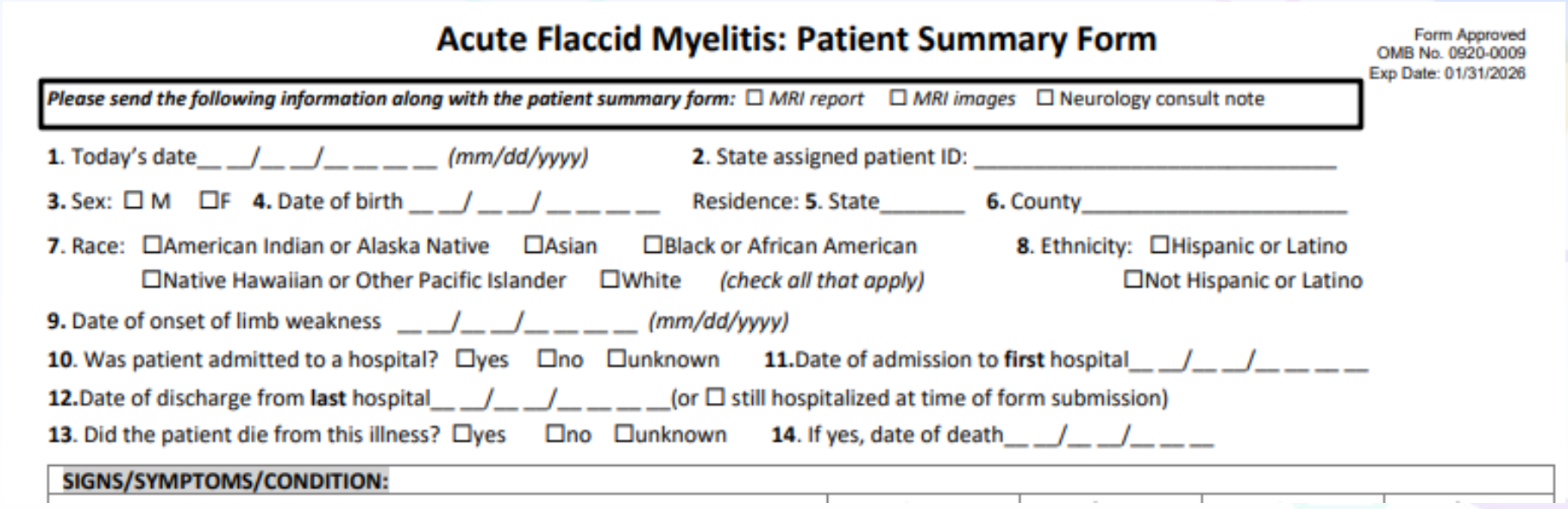
AFM Surveillance Case Definition

- Case definition modified from the initial 2014 investigation to better determine occurrence of AFM and to add sensitivity
- AFM surveillance case definition may differ from clinical diagnoses and should not replace clinical diagnosis or change patient care
- National standardized case definition adopted by CSTE in 2015 and last updated in 2021
    - Reporting criteria: patient with acute onset of flaccid limb weakness AND an MRI showing a spinal cord lesion in at least some gray matter and spanning one or more spinal segments
        - Confirmed case of AFM: a patient with acute onset of flaccid limb weakness, AND an MRI showing a spinal cord lesion with **predominant gray matter involvement** and spanning one or more spinal segments. A normal MRI performed in the first 72 hrs of limb weakness does not rule out AFM.

Sources:
Council of State and Territorial Epidemiologists. Standardized case definition for acute flaccid myelitis. Position Statement 15-ID-01; 2015. http://c.ymcdn.com/sites/www.cste.org/resource/resmgr/2015PS/2015PSFinal/15-ID-01.pdf
Council of State and Territorial Epidemiologists. Revision to the standardized surveillance and case definition for acute flaccid myelitis. Position Statement 21-ID-02; 2021. https://cdn.ymaws.com/www.cste.org/resource/resmgr/ps/ps2021/21-ID-02_AFM.pdf

Report All Suspected AFM Cases to the Health Department

- Clinicians should report all suspected cases of AFM to local or state health departments, who will share the information with CDC
  - Use the patient summary form (type “CDC AFM data collection form” into your search engine) and include reports of the MRI findings and other clinical information like neurology consult notes and MRI images
  - All case classification will be done at CDC by national experts in AFM surveillance for consistency



Acute Flaccid Myelitis: Patient Summary Form

Form Approved
OMB No. 0920-0009
Exp Date: 01/31/2026

Please send the following information along with the patient summary form: ☐ *MRI report* ☐ *MRI images* ☐ Neurology consult note

1. Today’s date__ __/__ __/__ __ __ __ *(mm/dd/yyyy)* **2**. State assigned patient ID: _____

3. Sex: ☐ M ☐F **4**. Date of birth __ __/ __ __/ __ __ __ __ Residence: **5**. State_____ **6**. County_____

7. Race: ☐American Indian or Alaska Native ☐Asian ☐Black or African American ☐Native Hawaiian or Other Pacific Islander ☐White *(check all that apply)* **8**. Ethnicity: ☐Hispanic or Latino ☐Not Hispanic or Latino

9. Date of onset of limb weakness __ __/__ __/__ __ __ __ *(mm/dd/yyyy)*

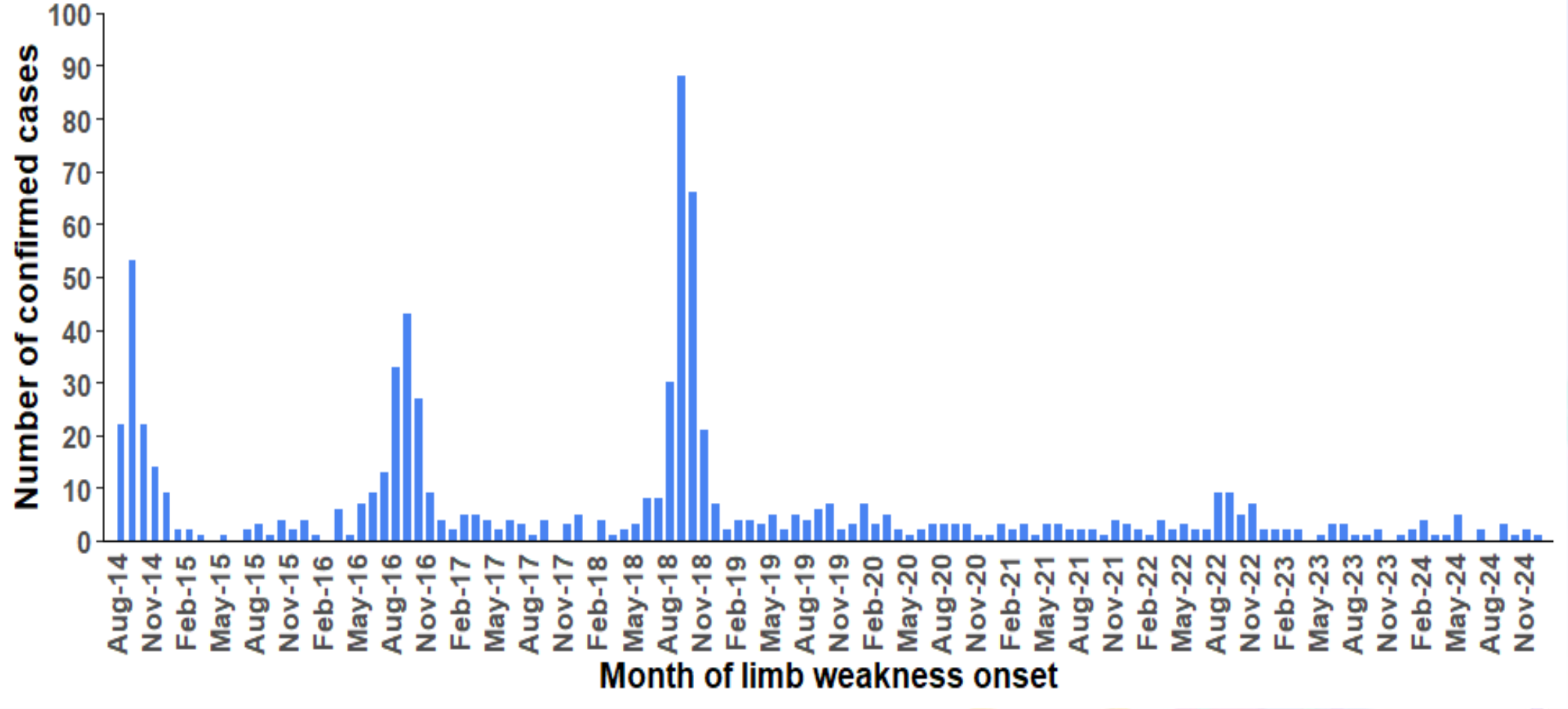
10. Was patient admitted to a hospital? ☐yes ☐no ☐unknown **11**.Date of admission to **first** hospital__ __/__ __/__ __ __ __

12.Date of discharge from **last** hospital__ __/__ __/__ __ __ __(or ☐ still hospitalized at time of form submission)

13. Did the patient die from this illness? ☐yes ☐no ☐unknown **14**. If yes, date of death__ __/__ __/__ __ __

SIGNS/SYMPTOMS/CONDITION:

Number of Confirmed U.S. AFM Cases Reported by Month of Onset, August 2014 – December 2024 (N=769)



Source: CDC AFM surveillance (passive surveillance); https://www.cdc.gov/acute-flaccid-myelitis/cases/index.html

Clinician Specimen Collection

- When a suspect case of AFM is identified:
  - Clinicians should collect specimens as early in course of illness as possible for diagnosis and clinical management
  - Clinicians should work with their local or state health departments to submit additional specimens to CDC

Specimen Collection

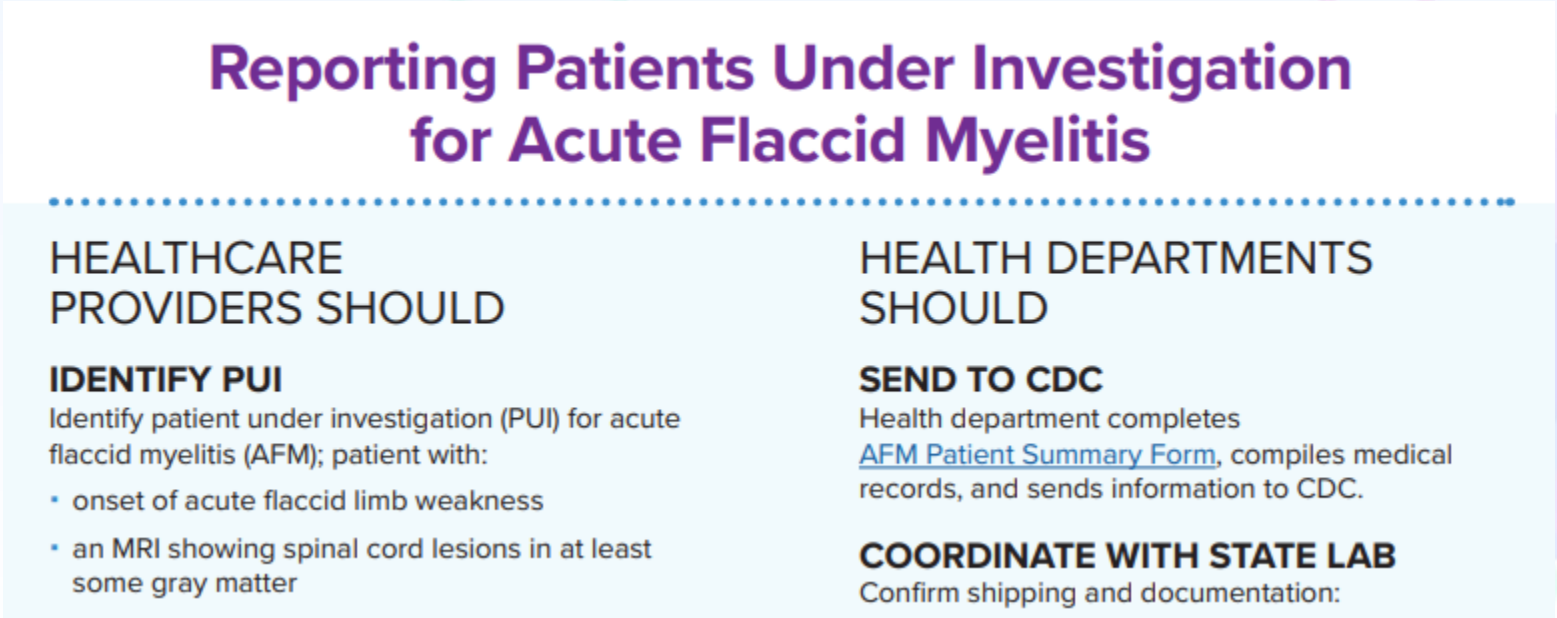
- CSF
- Respiratory (nasopharyngeal/oropharyngeal swab)
- Serum
- Two stool samples, collected 24 hours apart to rule out polio

Clinicians should collect specimens for AFM as early as possible. Early specimen collection has the best chance to yield a cause of AFM. CSF, respiratory (NP/OP), serum, and stool specimens should be sent to CDC for testing. Contact your health department to coordinate sending of specimens to CDC.

Source: CDC Specimen collection instructions for clinicians: https://www.cdc.gov/acute-flaccid-myelitis/hcp/diagnosis-testing/specimen-collection-for-afm.html

Specimen Collection and Shipping

- Detailed information on specimen collection and shipping can be found on the CDC AFM website:
  - https://www.cdc.gov/acute-flaccid-myelitis/hcp/diagnosis-testing/specimen-collection-for-afm.html
- Clinician specific resource is available on website to help with the process



AFM Summary

- Accumulated data indicates that enteroviruses, specifically EV-D68, are responsible for increases in AFM since 2014
- No specific risk factors have yet been identified
- Measures to prevent polio and West Nile virus are encouraged
    - Make sure patients are up to date on polio vaccination
    - Use mosquito repellent
    - Practice good hand hygiene
- Surveillance data demonstrate low level baseline rate of AFM that likely includes mixture of infections and neuroinflammatory conditions that look like AFM
- AFM, characterized by flaccid weakness and involvement of the spinal cord grey matter, remains a rare condition
- Vigilance in identification and reporting cases to the health department and CDC will improve understanding of this condition

Polio case definition

- AFM and paralytic polio look similar clinically
- Case definition was updated in 2023 to better differentiate AFM from paralytic polio
  - Confirmed case of paralytic polio: a patient with acute onset of flaccid paralysis with decreased or absent tendon reflexes in affected limbs **AND**
    - Poliovirus detected by sequencing of the capsid region of the genome by the CDC Poliovirus Laboratory, **OR**
    - Poliovirus identified in an appropriate clinical specimen (e.g., stool [preferred], cerebrospinal fluid, oropharyngeal secretions) using a properly validated assay, AND specimen is not available for sequencing by the CDC Poliovirus Laboratory
- Testing for poliovirus among AFM patients is important while poliovirus circulating in other parts of the world

Source: Council of State and Territorial Epidemiologists. Update to public health reporting and national notification for paralytic poliomyelitis and nonparalytic poliovirus infection. Position Statement 23-ID-07; 2023
https://cdn.ymaws.com/www.cste.org/resource/resmgr/ps/ps_2023/23-ID-07_Polio.pdf

Surveillance of Vaccine-Preventable Diseases: Epidemiology and Laboratory Overview

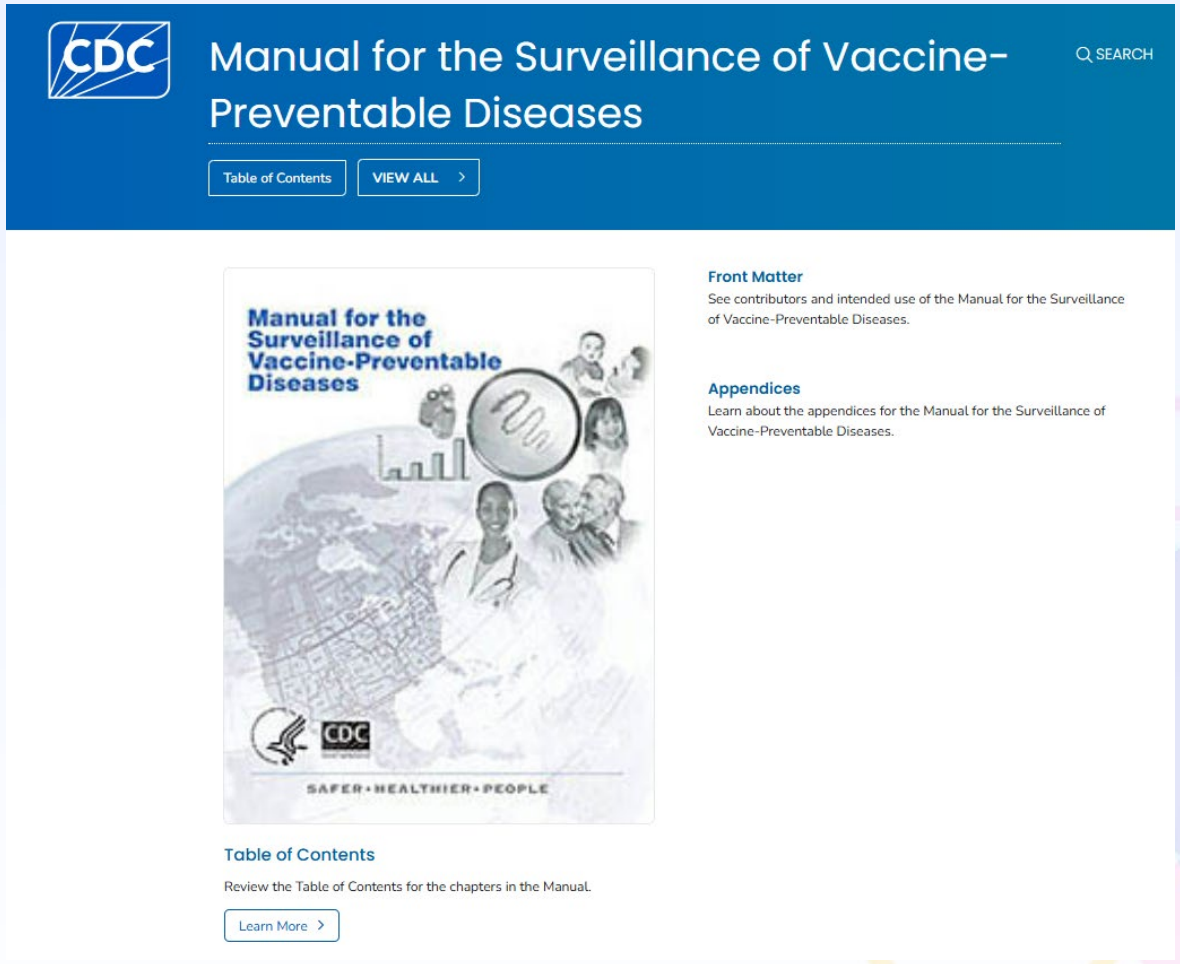
Vaccine-Preventable Diseases

- Due to effective immunization programs, diseases that were once major causes of death and morbidity among children in the United States have decreased in frequency.
- A remaining challenge is to identify factors that allow remaining cases of vaccine-preventable diseases to occur.
- It is important to extend the success of eliminating endemic measles, rubella, and polio to other vaccine-preventable diseases.

Public Health Uses of Surveillance Data: Local Level

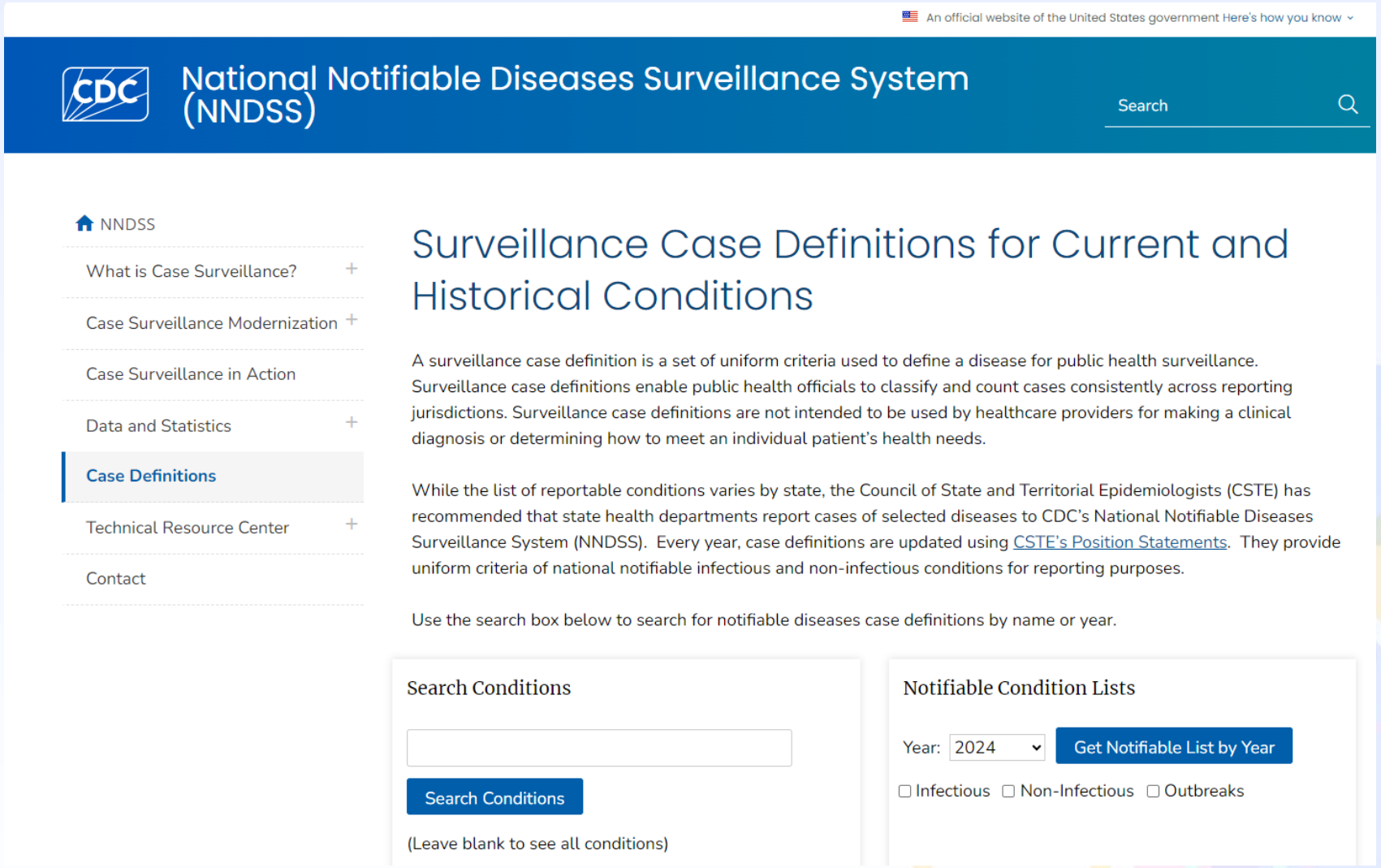
- Disease control activities
  - Prophylaxis
  - Vaccination
- Standardized case definitions

Manual for the Surveillance of Vaccine-Preventable Diseases: Course Text and Reference Material



[Manual for the Surveillance of Vaccine-Preventable Diseases | CDC]

Case Definitions for Public Health Surveillance

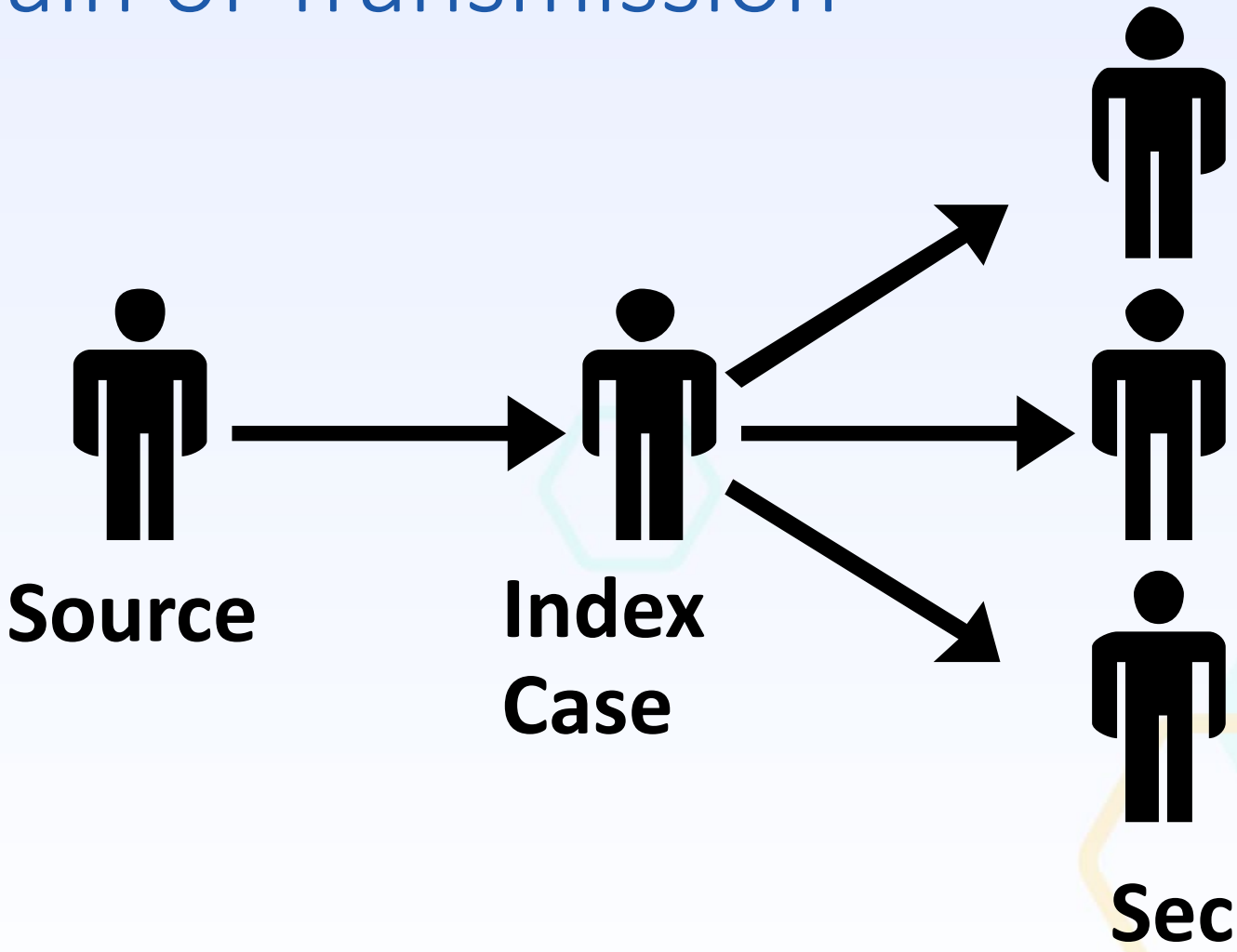


Surveillance Case Definitions for Current and Historical Conditions (cdc.gov)

Critical Data Elements

- Demographic data
- Clinical data
- Vaccination history
- Laboratory test results

Chain of Transmission



Public Health Uses of Surveillance Data: State Level

- Evaluate the effectiveness of disease control programs
- Formulate and evaluate immunization policy

Disease in the Vaccine era

- Warning to public health officials
  - Other susceptible individuals who should have been vaccinated
  - Waning immunity in vaccinated individual
- Public health officials need to ask:
  - Was the person vaccinated? (And if not, why not?)
  - Were there missed opportunities to vaccinate?
  - Is there a more widespread problem?

Uses of Surveillance Data: National Level

- Formulate national immunization policy
- Evaluate the effectiveness of immunization programs
- Evaluate the effectiveness of vaccines
- Document the impact of national immunization efforts

Surveillance Requirements

- Depends on stage of the disease control program
  - Early program needs when there are many cases vs. late program needs when there are only a few cases left
- Regardless of stage of disease control, need to ensure adequate surveillance for vaccine adverse events for any vaccine currently in use

Surveillance Requirements: Before Vaccine Availability

- Baseline of reported disease
- Complete reporting is not essential
- Year-to-year consistency
- Aggregate reporting

Surveillance Requirements: Disease Control

- Enhanced surveillance
  - Document vaccine impact
  - Evaluate effectiveness
  - Monitor progress toward disease elimination
- Detailed information from individual case investigations
  - Vaccination status
  - Laboratory confirmation
- Highly specific case definitions

Enhanced Surveillance: Extremely Low Incidence

- Importance of data quality and completeness
- Organism may no longer be circulating
  - Molecular typing methods can help document this

Disease Specific Chapters Found in the Surveillance Manual

Chapters

Laboratory Support for Vaccine-Preventable Disease Surveillance

- Chapter 22: Laboratory Support for Surveillance of Vaccine-Preventable Diseases | Manual for the Surveillance of Vaccine-Preventable Diseases | CDC
- This chapter describes appropriate pathogen-specific specimen collection, transport, and testing for the vaccine-preventable diseases included in the Manual, including contact information for CDC laboratories and laboratory personnel.

Resources

Manual for the Surveillance of Vaccine-Preventable Diseases

- Guidelines for those directly involved in the surveillance of VPDs
- Includes chapters for each VPD, surveillance indicators and data analyses, laboratory support for surveillance, and appendices with disease-specific worksheets and instructions
- Available on the CDC website: Manual for the Surveillance of Vaccine-Preventable Diseases for Public Health | Manual for the Surveillance of Vaccine-Preventable Diseases | CDC

VPD Reference Centers

- Four public health laboratories that work with APHL and CDC to provide quality testing to other public health jurisdictions free of charge
- Provide testing for measles, mumps, rubella, varicella zoster virus, *Bordetella pertussis*, *Haemophilus influenzae* and *Neisseria meningitides*

National Notifiable Disease Surveillance System (NNDSS)

- Public health case definitions for all infectious conditions under national public health surveillance: Surveillance Case Definitions for Current and Historical Conditions (cdc.gov)

Resources

- Collection of a buccal swab for mumps
  - Mumps Specimen Collection | Mumps | CDC
- Detailed information on specimen collection and shipping can be found on the CDC AFM website:
  - https://www.cdc.gov/acute-flaccid-myelitis/hcp/diagnosis-testing/specimen-collection-for-afm.html
- CDC Varicella Laboratory
  - Laboratory Testing for Varicella-Zoster Virus (VZV) | Chickenpox (Varicella) | CDC

Accreditation Statement

- In support of improving patient care, the Centers for Disease Control and Prevention is jointly accredited by the Accreditation Council for Continuing Medical Education (ACCME), the Accreditation Council for Pharmacy Education (ACPE), and the American Nurses Credentialing Center (ANCC), to provide continuing education for the healthcare team.

CE Accreditation Statements

- CME: The Centers for Disease Control and Prevention designates this activity for a maximum of **1.5** American Medical Association (AMA) Physician's recognition Award (PRA) Category 1 Credits™. Physicians should claim only the credit commensurate with the extent of their participation in the activity.
- CNE: The Centers for Disease Control and Prevention designates this activity for **1.5** nursing contact hours.
- CEU: The Centers for Disease Control and Prevention is authorized by International Accreditors for Continuing Education and Training (IACET) to offer **0.2** CEUs for this program.
- CPH: The Centers for Disease Control and Prevention is a pre-approved provider of Certified in Public Health (CPH) recertification credits and is authorized to offer **2.0** CPH recertification credits for this program.

Instructions for Obtaining Continuing Education (CE) for Web-on-Demand

To receive continuing education credits for this course, activity number [**WD4893-012825**]-[2025 CDC Training for Viral Vaccine-Preventable Disease Surveillance]:

1. Pass the post-assessment at 75%.
2. Complete the evaluation.
3. Visit “Your Learning” to access your certificates and transcript.

U.S. CENTERS FOR DISEASE CONTROL AND PREVENTION

- Centers for Disease Control and Prevention | CDC
- National Center for Immunization and Respiratory Diseases (NCIRD) | NCIRD | CDC