Measles, Mumps, and Rubella Vaccines

Pink Book Web-on-Demand Series

August 30, 2022

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LCDR, U.S. Public Health Service

NCIRD, CDC

Learning Objectives

- Describe the Advisory Committee on Immunization Practices General Best Practice Guidelines on Immunization.
- Describe an emerging immunization issue.
- For each vaccine-preventable disease, identify those for whom routine immunization is recommended.
- For each vaccine-preventable disease, describe characteristics of the vaccine used to prevent the disease.
- Locate current immunization resources to increase knowledge of team's role in program implementation for improved team performance.
- Implement disease detection and prevention health care services (e.g., smoking cessation, weight reduction, diabetes screening, blood pressure screening, immunization services) to prevent health problems and maintain health.

Continuing Education Information

- **CE credit, go to**: https://tceols.cdc.gov/
- **Search course number: WD4564-083022**
- **CE credit expires: July 1, 2024**
- **CE instructions are available on the Pink Book Web-on-Demand Series web page**
- **Questions and additional help with the online CE system, e-mail** CE@cdc.gov

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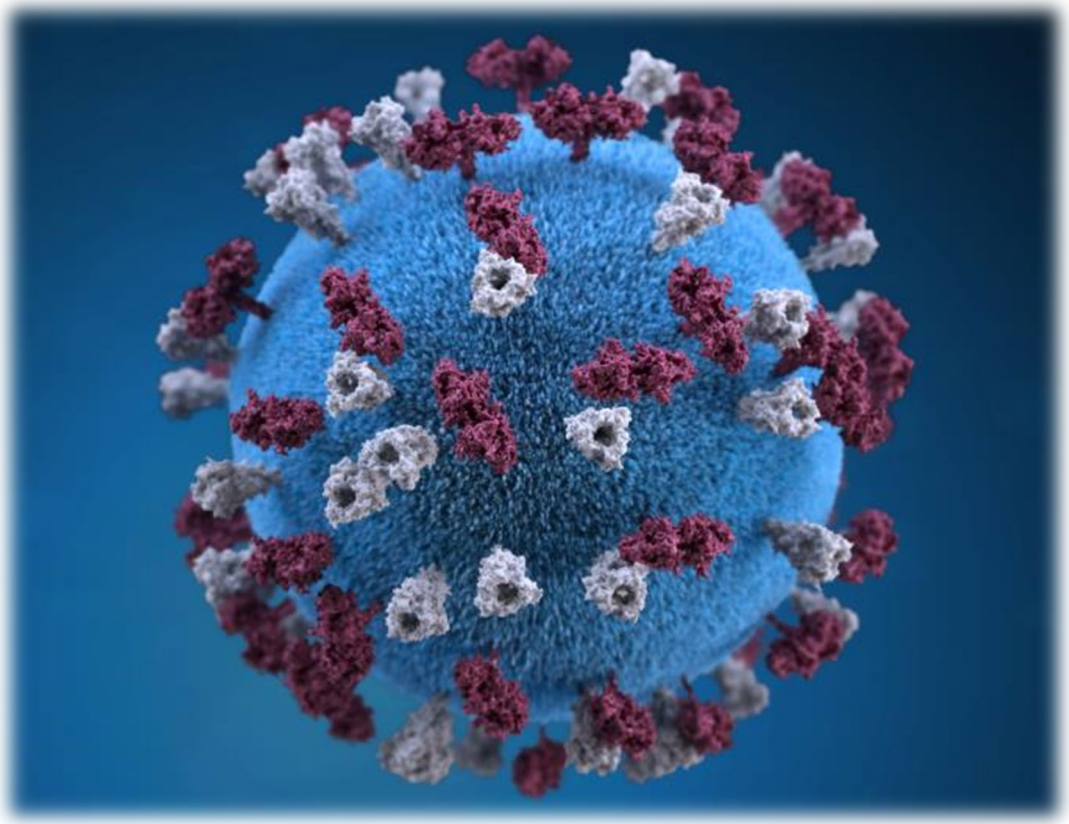
Disclosure Statements

The findings and conclusions in this presentation are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

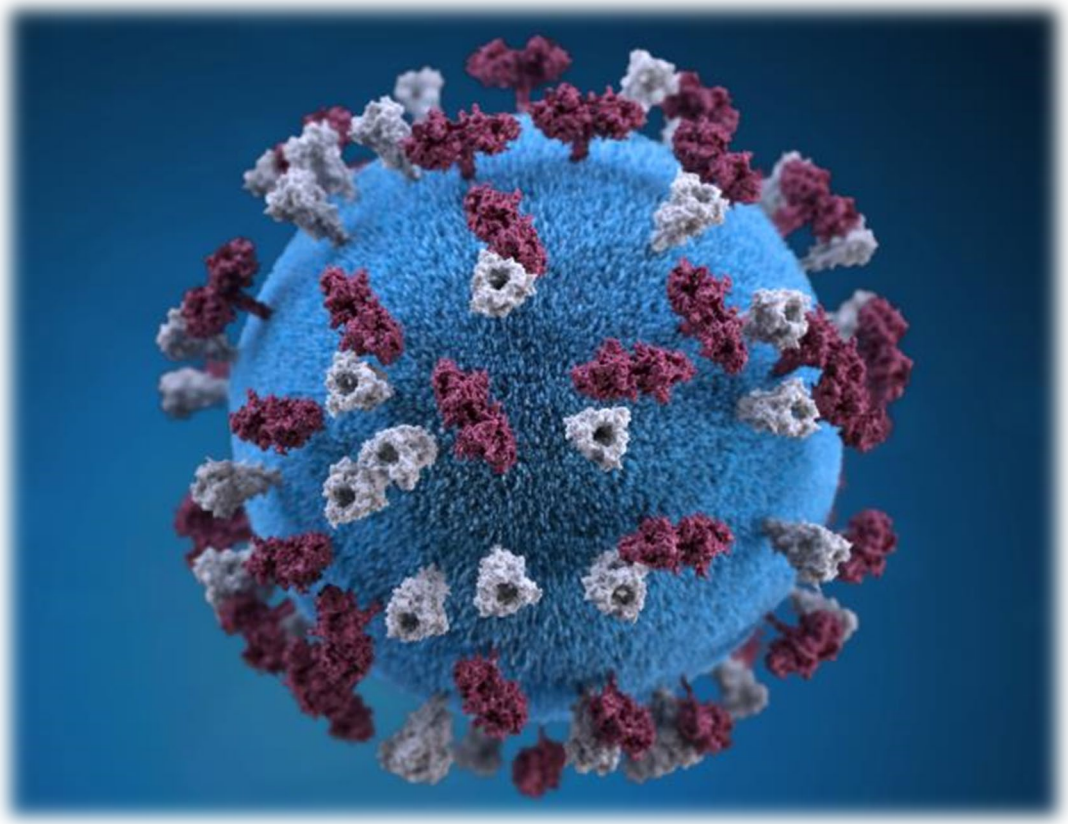
1

Measles Disease

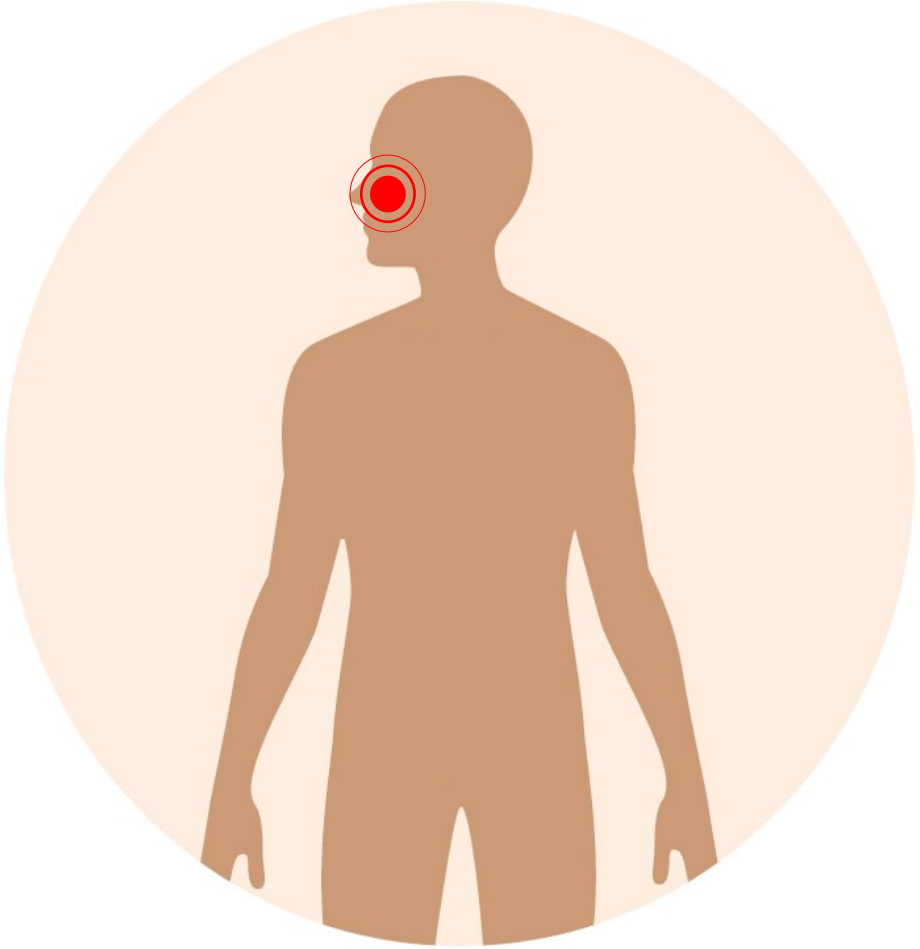
Measles



Measles



Paramyxovirus



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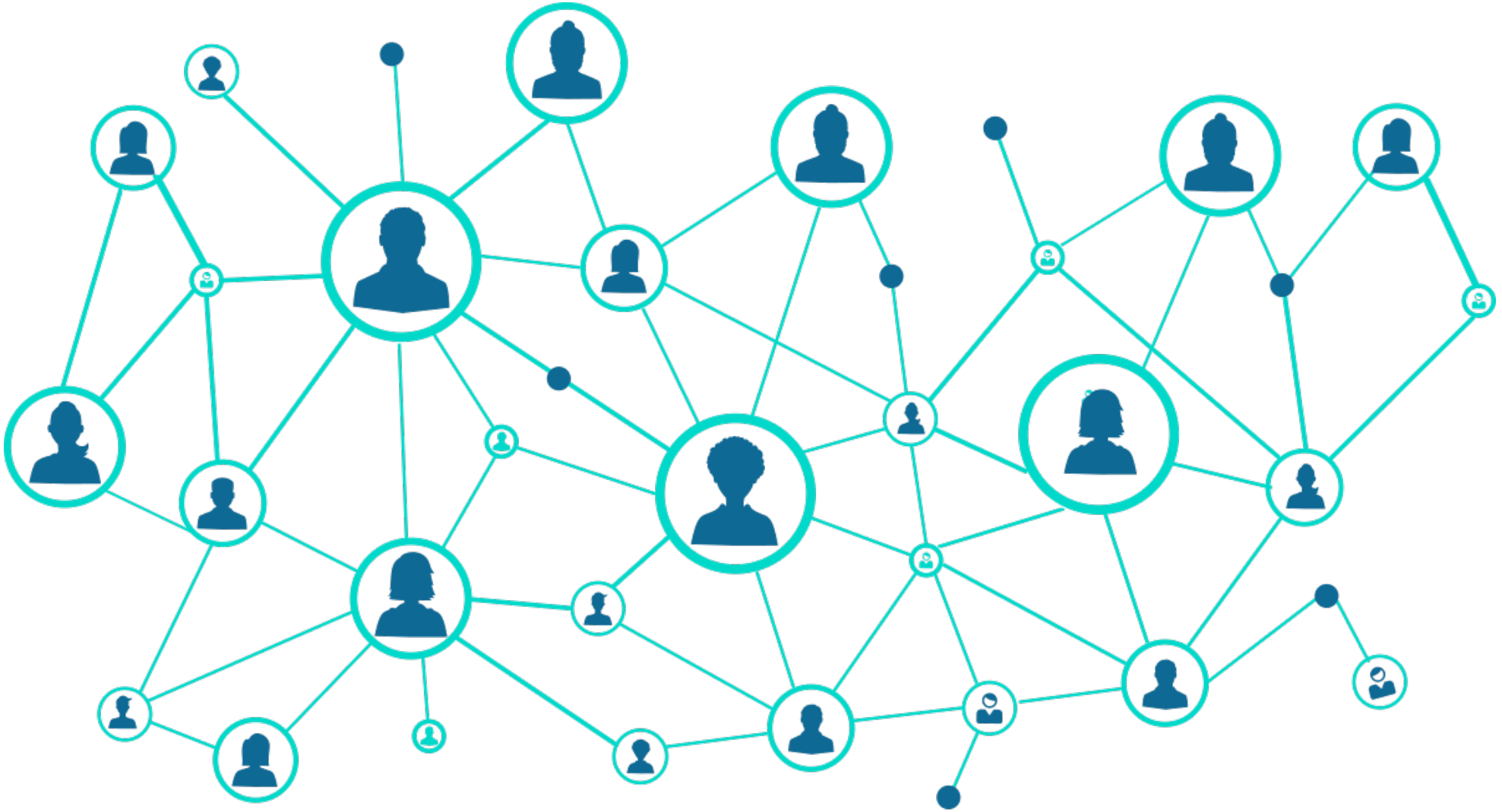
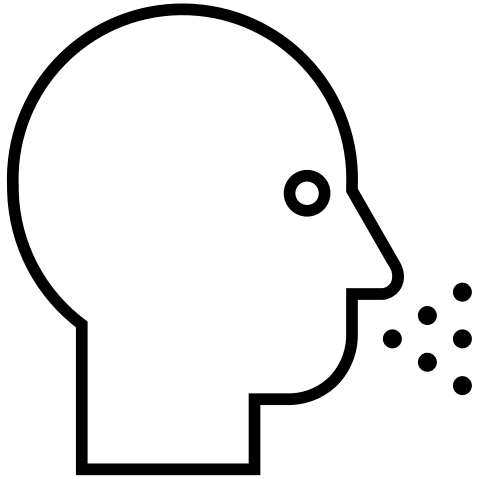


Measles

- **Incubation period: 10–12 days**

Measles

- **Prodrome is 2–4 days – characterized by the 3 Cs:**



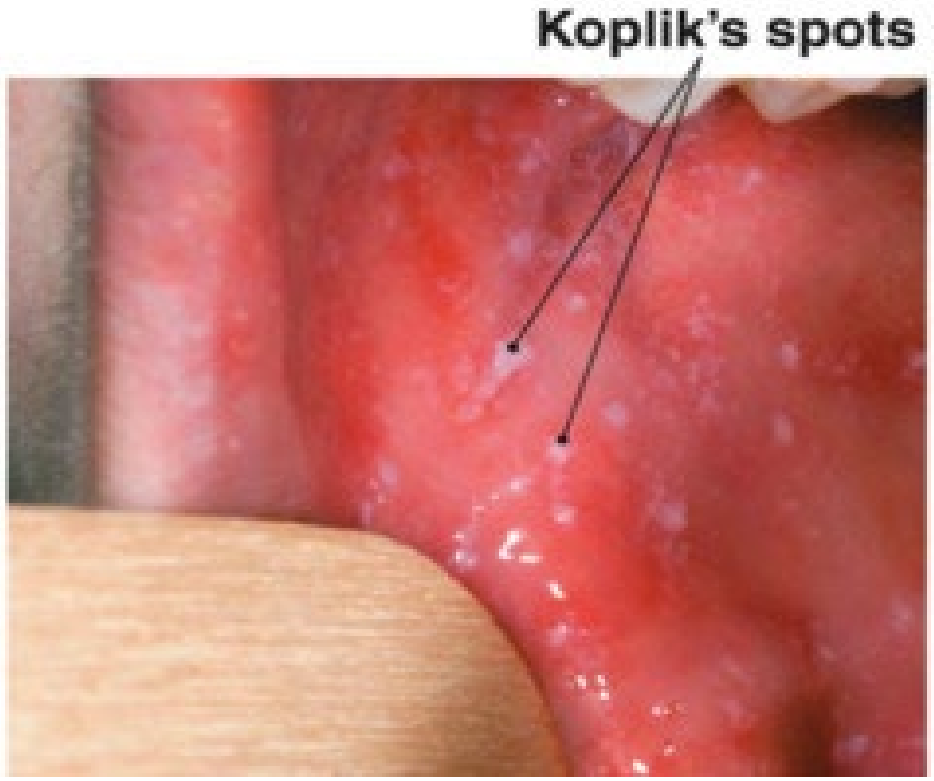
Cough

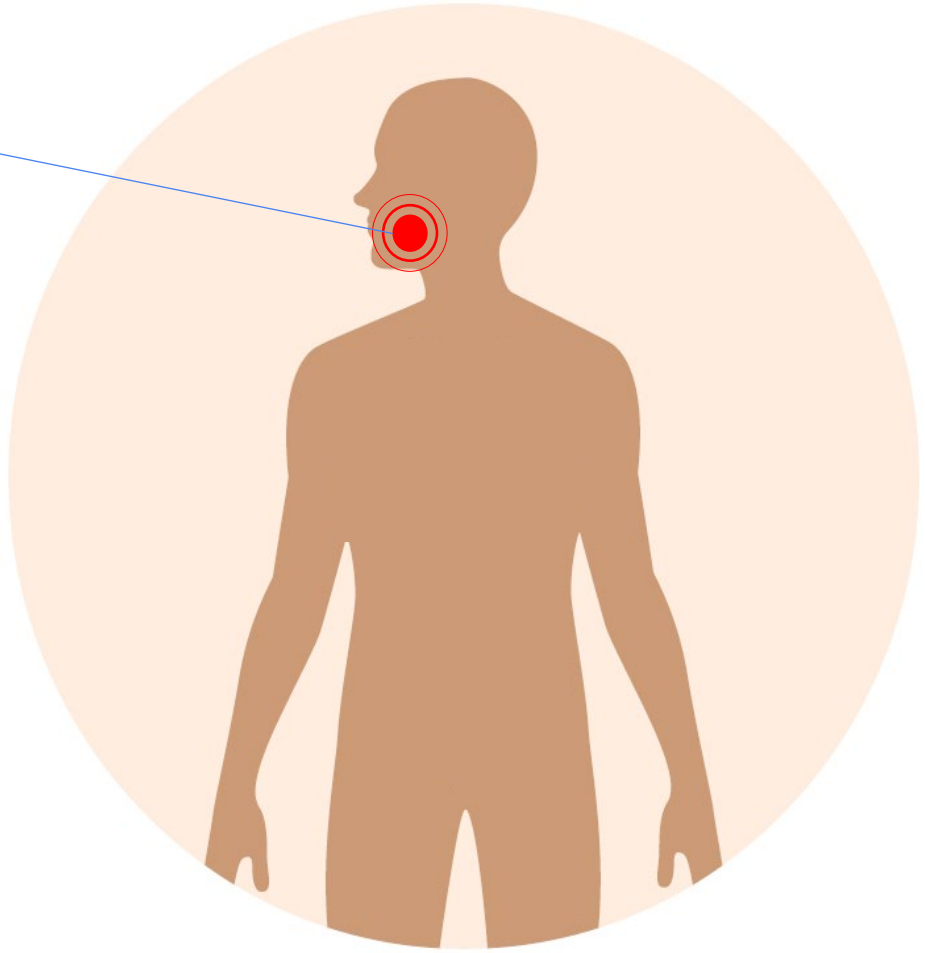
Coryza

Conjunctivitis

Measles

- **Prodrome is 2–4 days**





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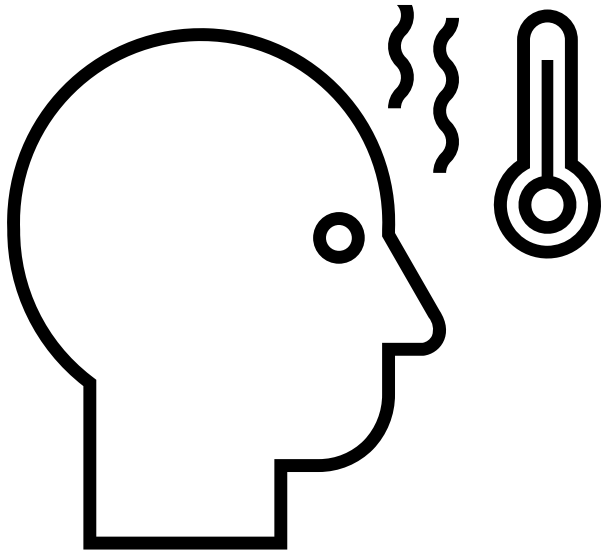

103°F to 105°F

Measles

- **Rash**
  - Occurs 2–4 days after prodrome
  - 14 days after exposure
  - Persists 5–6 days
  - Maculopapular, becomes confluent

Measles

- **Rash**
  - Begins on face and upper neck
  - Fades in order of appearance

Measles Complications

Complication	Rate
Diarrhea	8%
Otitis media	7%
Pneumonia	6%
Encephalitis	0.1%
Seizures	0.6%–0.7%
Death	0.2%

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Measles Risk for Complications

Infants and Children

Pregnant women

Adults

Immunocompromised

Measles Risk for Complications

Infants and Children

Pregnant women

Adults

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Measles Risk for Complications

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Measles Risk for Complications

Infants and Children

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Adults

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Measles

10M Cases

110,000 Deaths

Yeung KHT, Duclos P, Nelson EAS, Hutubessy RCW. An update of the global burden of pertussis in children younger than 5 years: a modelling study. Lancet Infect Dis. 2017 Sep;17(9):974-980. doi: 10.1016/S1473-3099(17)30390-0. Epub 2017 Jun 13. PMID: 28623146.

Epidemiology

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Reservoir	Human
Transmission	Direct contact with infectious droplets or by airborne spread
Temporal Pattern	Peaks in late winter/spring
Communicability	4 days before to 4 days after rash onset

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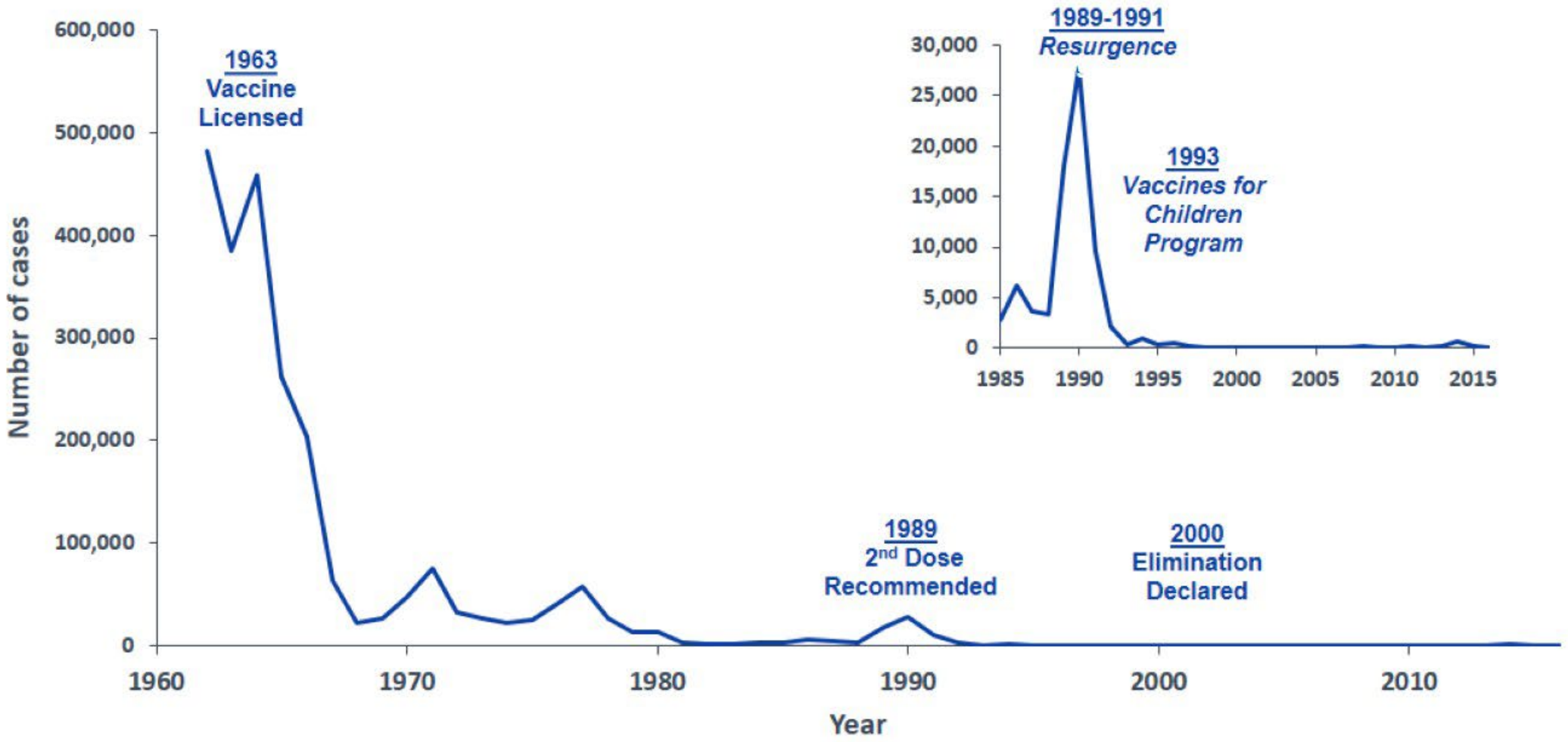

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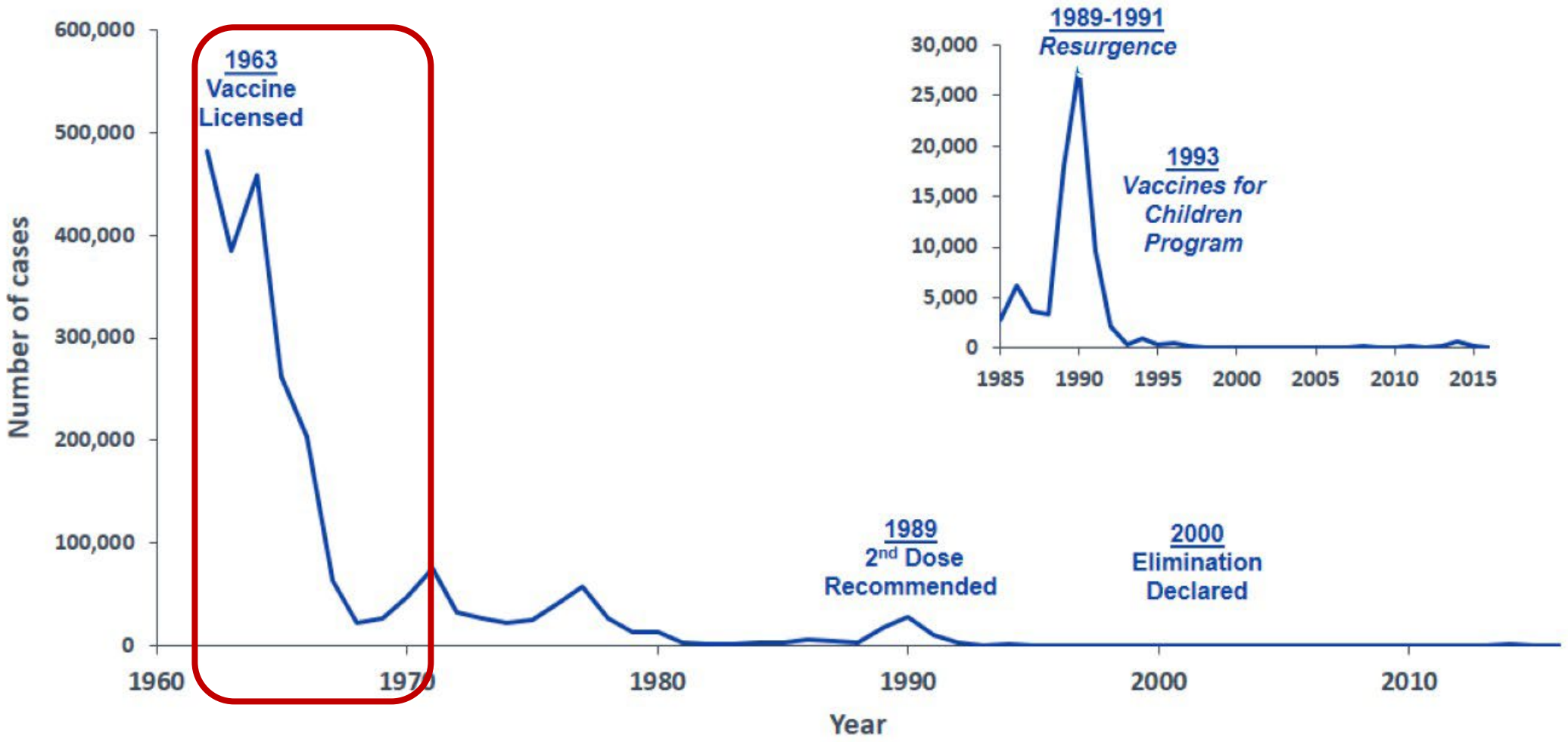

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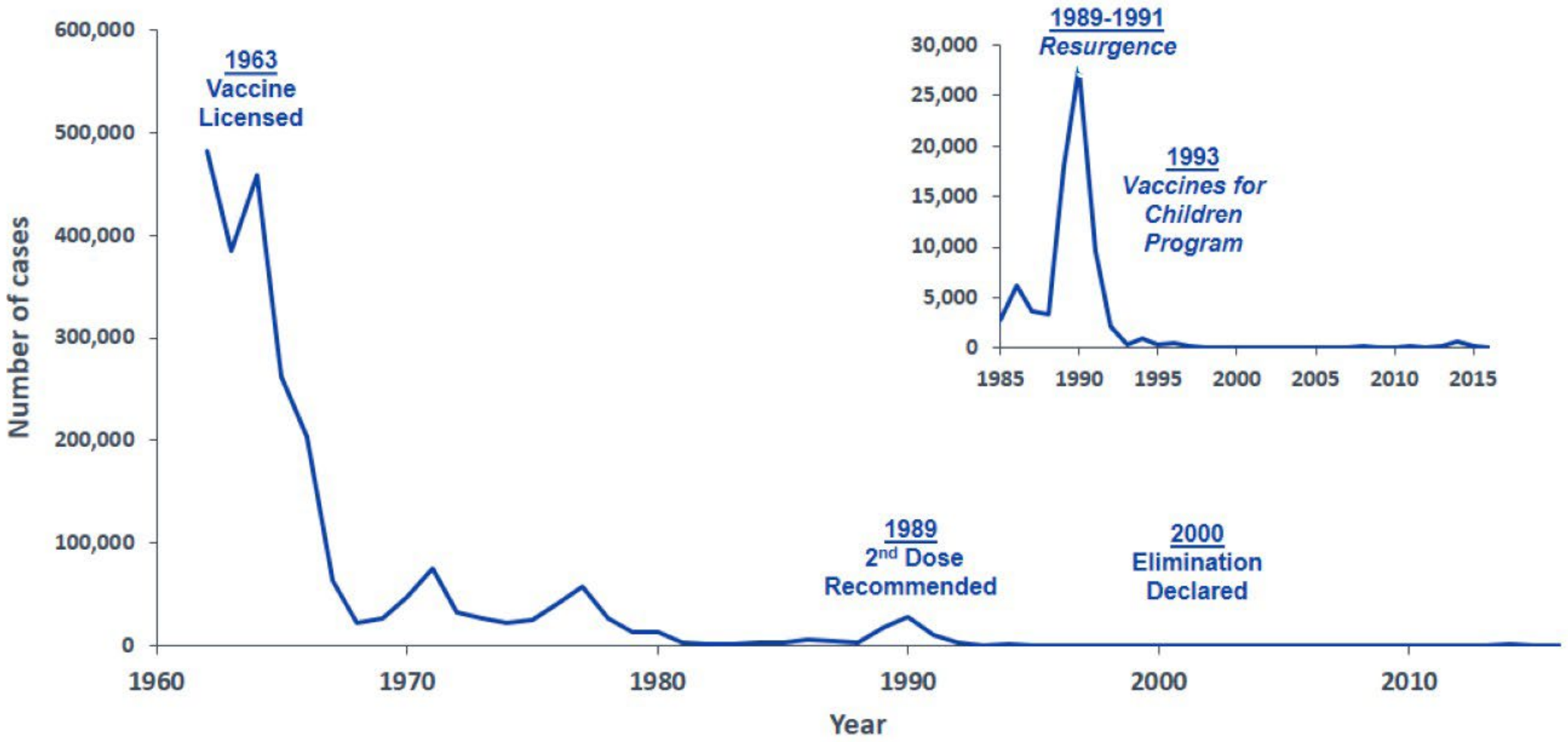

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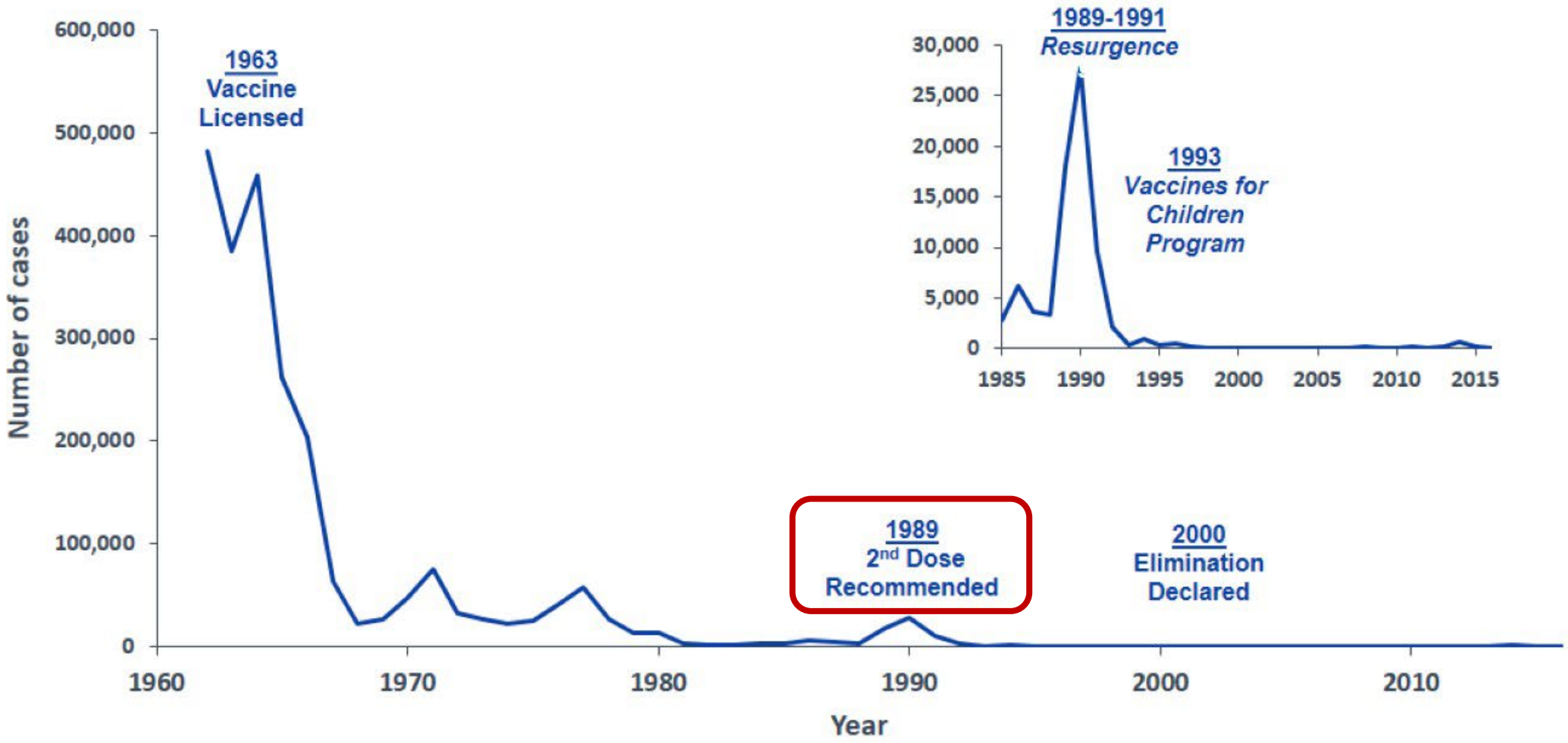

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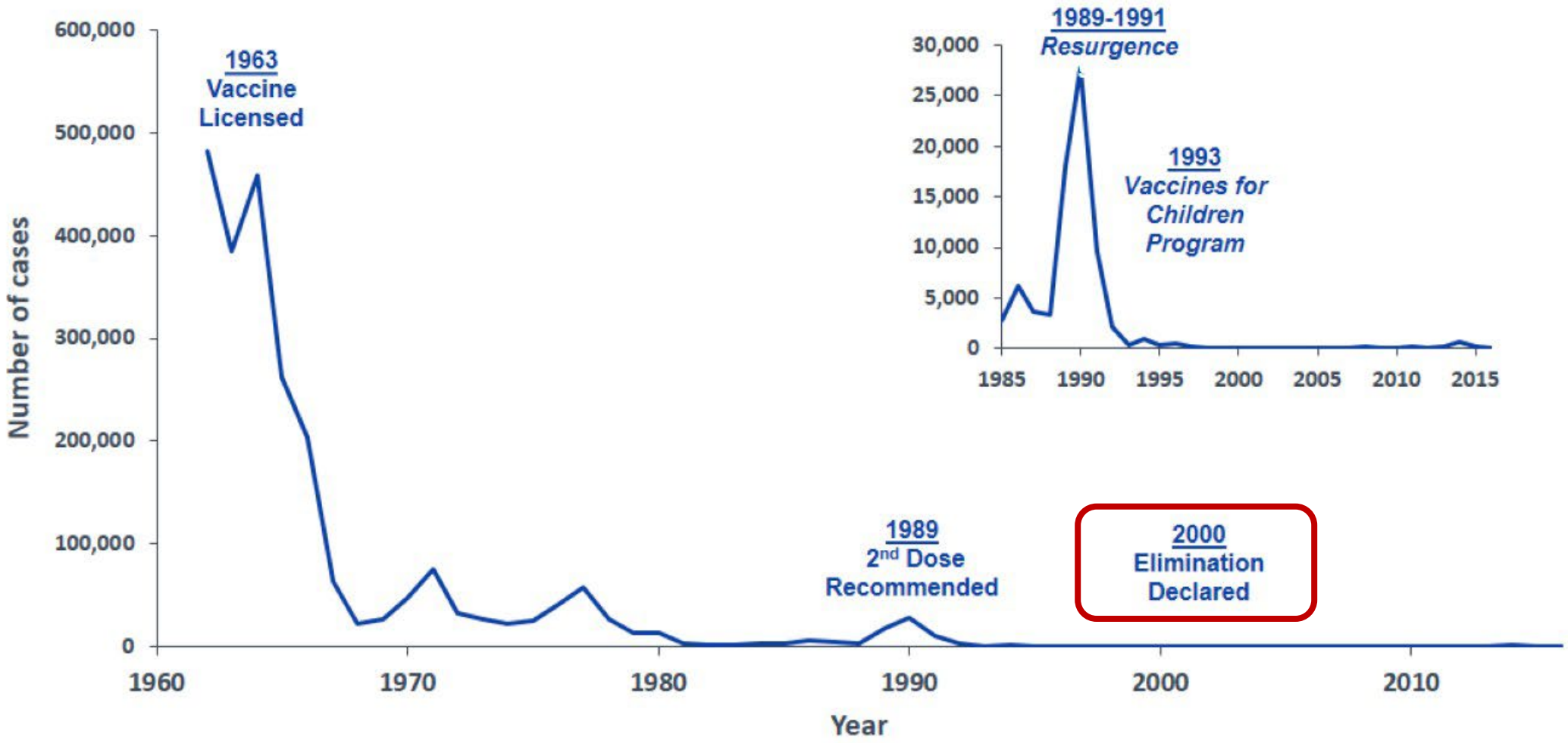

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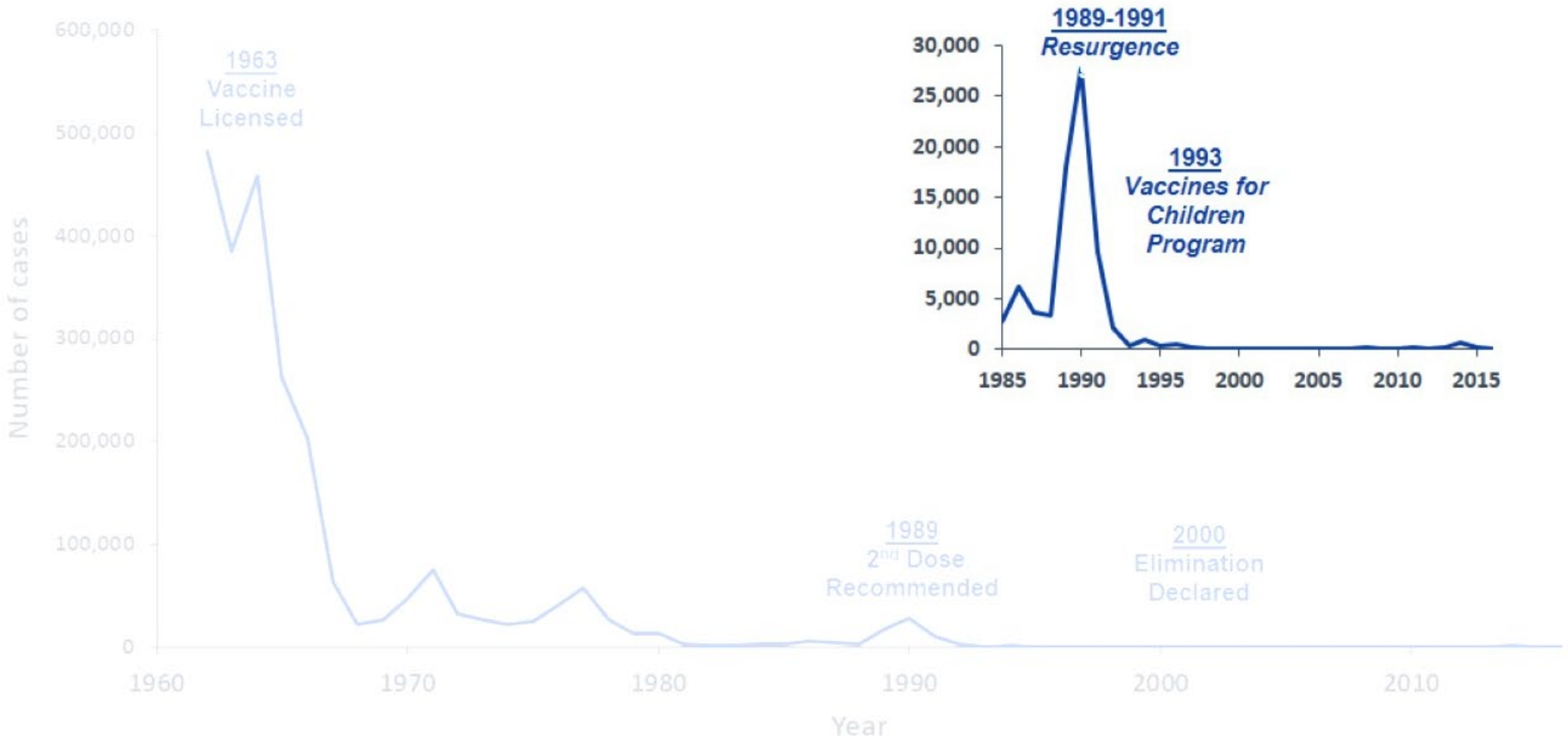

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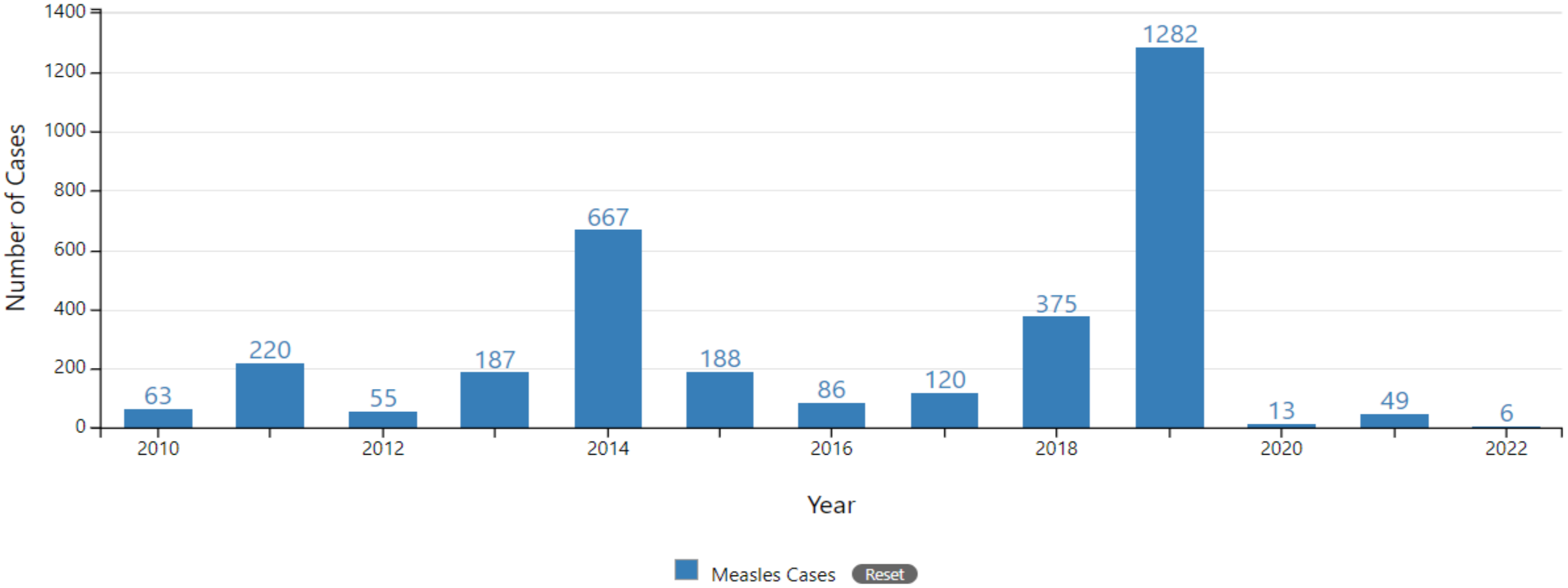

https://www.cdc.gov/measles/cases-outbreaks.html

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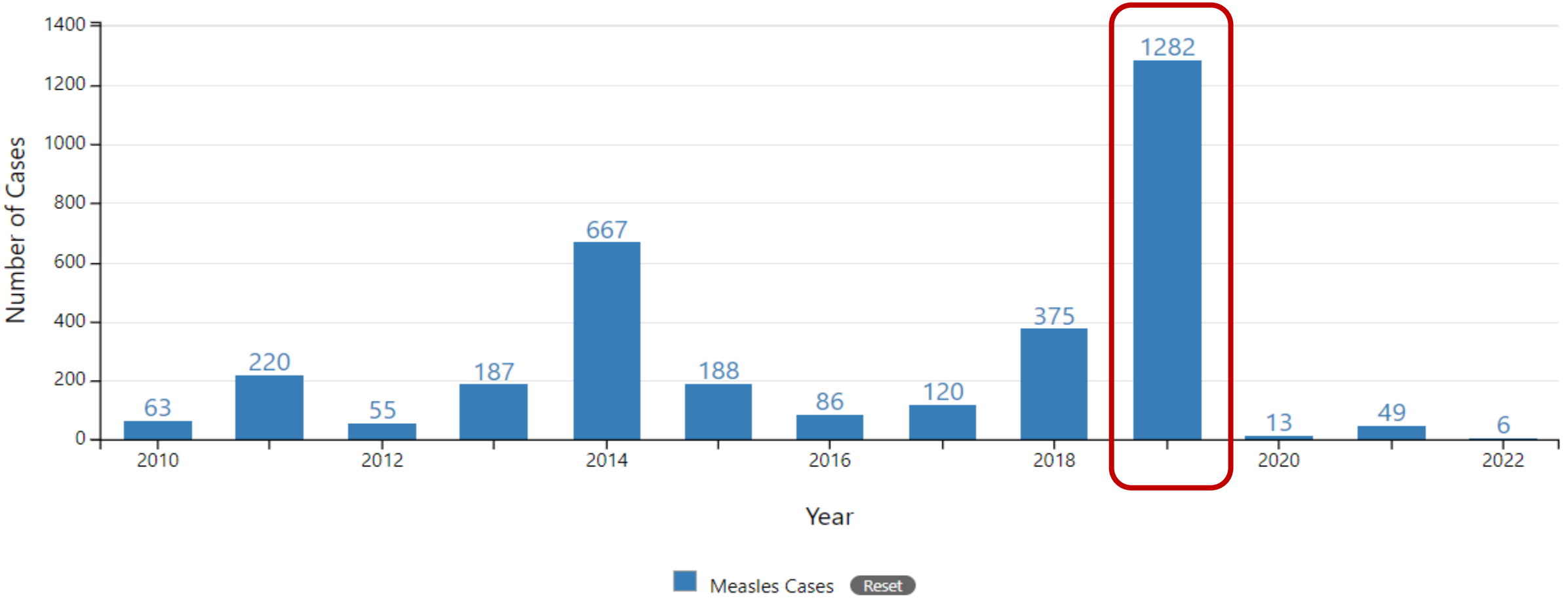

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Morbidity and Mortality Weekly Report (*MMWR*)

CDC

National Update on Measles Cases and Outbreaks — United States, January 1–October 1, 2019

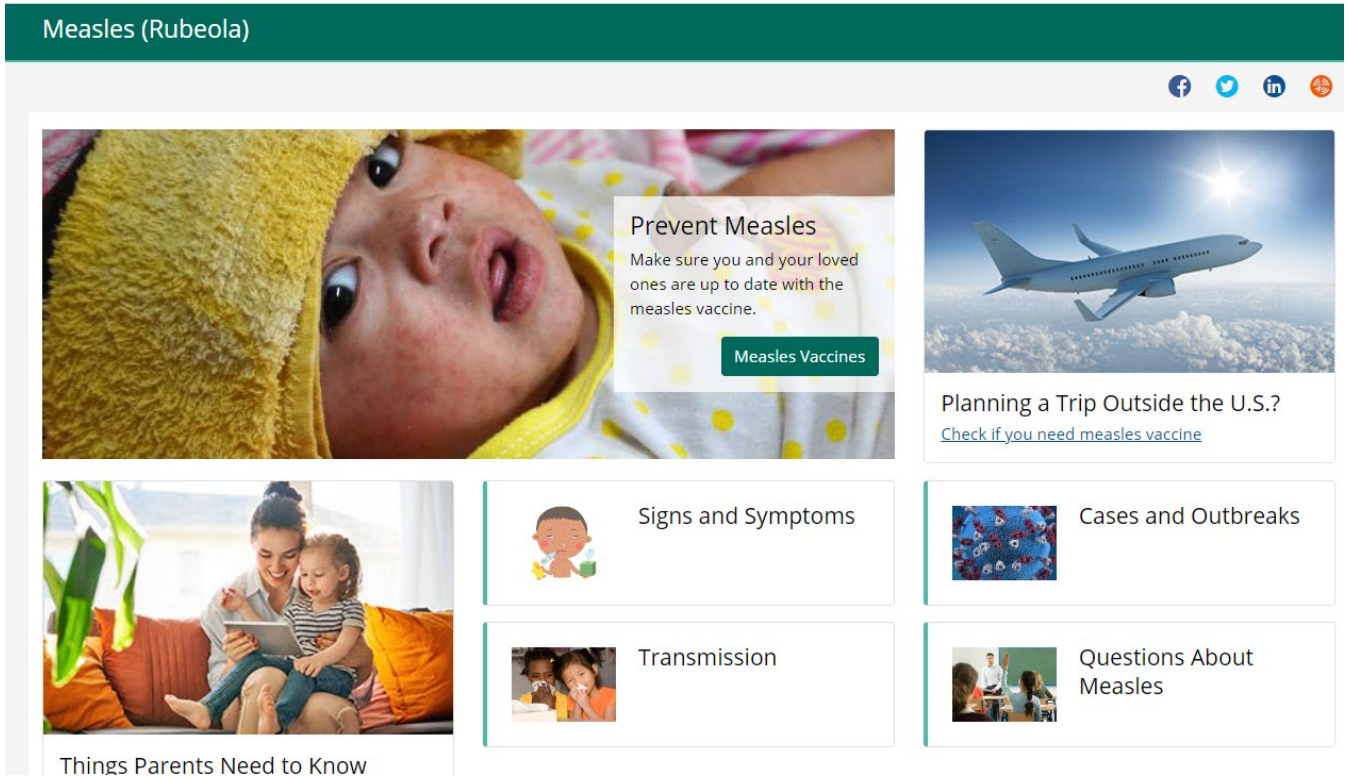
Weekly / October 11, 2019 / 68(40);893–896

On October 4, 2019, this report was posted online as an MMWR *Early Release.*

Manisha Patel, MD[1]; Adria D. Lee, MSPH[1]; Nakia S. Clemmons, MPH[1]; Susan B. Redd[1]; Sarah Poser[1]; Debra Blog, MD[2]; Jane R. Zucker, MD[3,4]; Jessica Leung, MPH[1]; Ruth Link-Gelles, PhD[1]; Huong Pham, MPH[1]; Robert J. Arciuolo, MPH[3]; Elizabeth Rausch-Phung, MD[2]; Bettina Bankamp, PhD[1]; Paul A. Rota, PhD[1]; Cindy M. Weinbaum, MD[4]; Paul A. Gastañaduy, MD[1] (View author affiliations)

https://www.cdc.gov/mmwr/volumes/68/wr/mm6840e2.htm

Measles Resources



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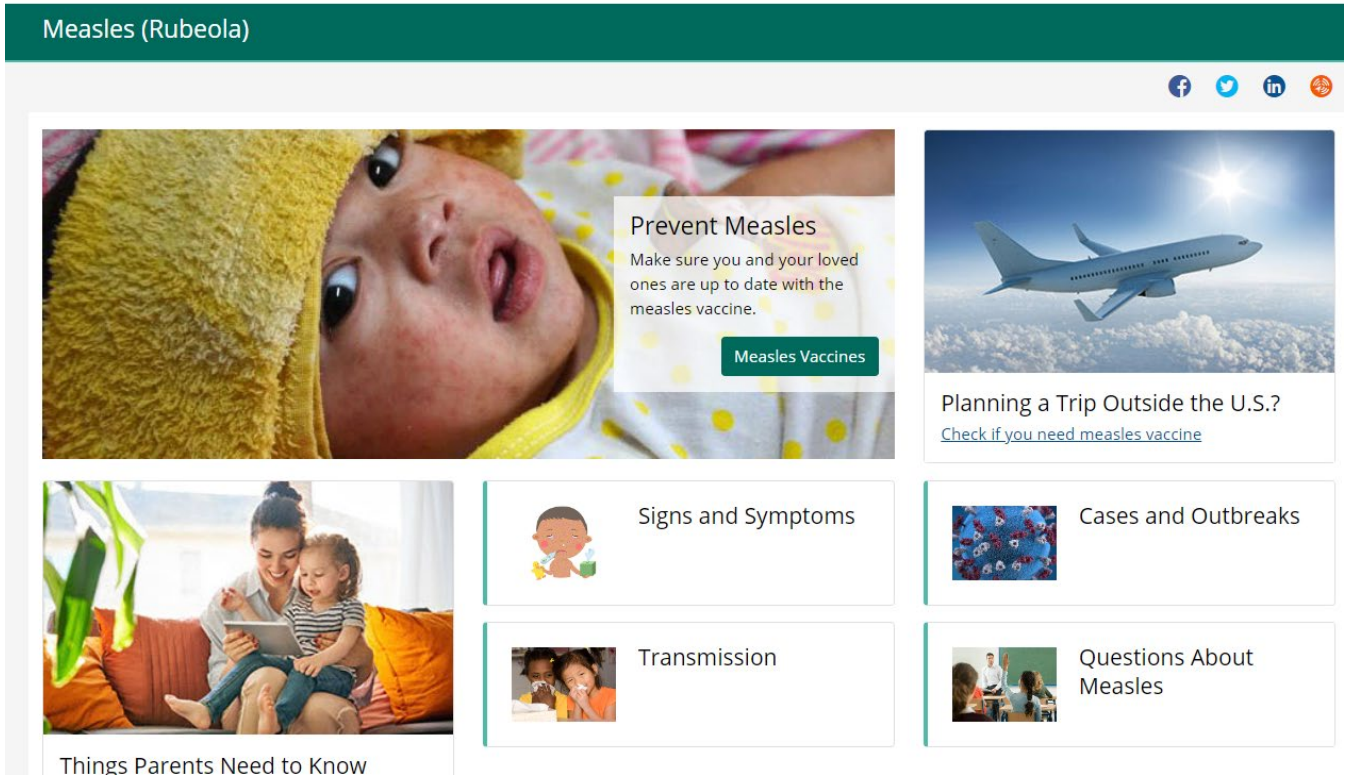

cdc.gov/measles

Measles Resources

cdc.gov/measles/toolkit/index.html

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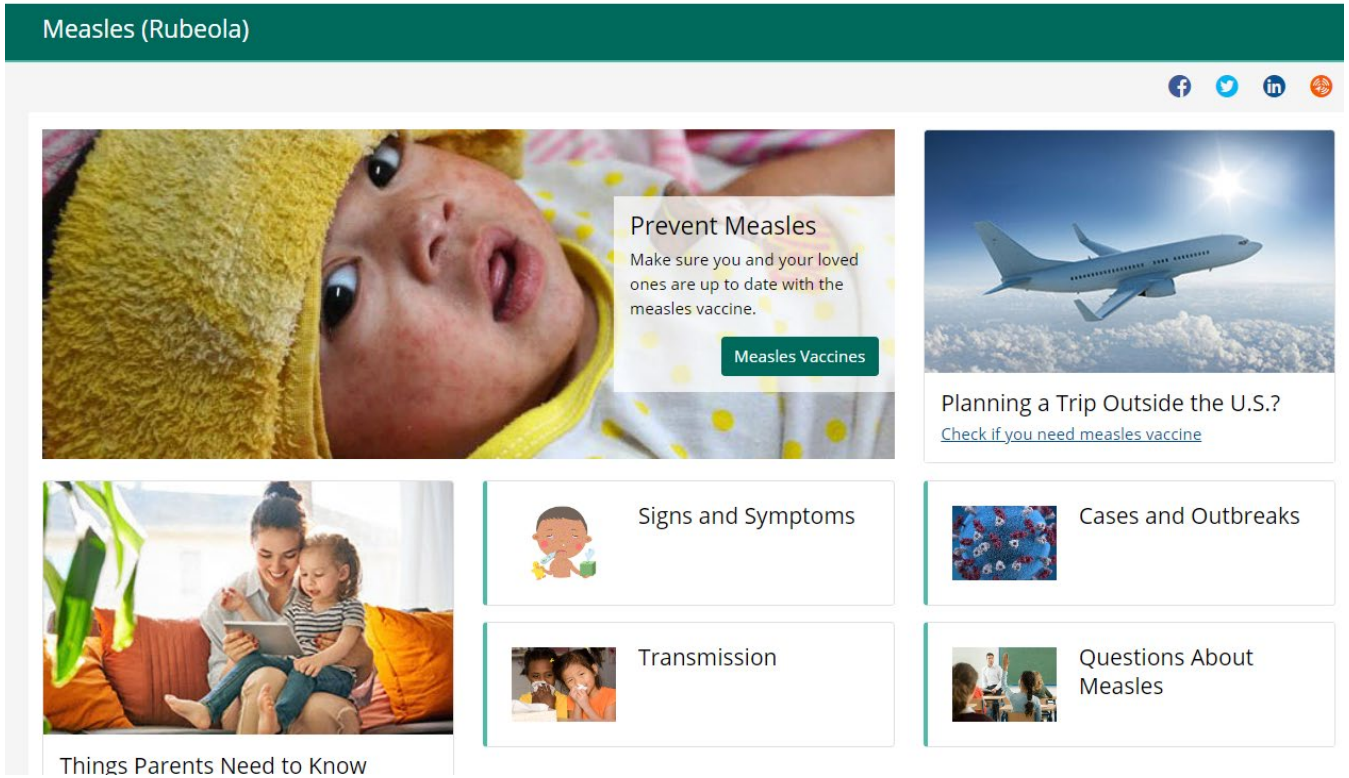

Measles Resources

Measles Multimedia

Videos

Get vaccinated and prevent measles

cdc.gov/measles/resources/multimedia.html

Guidance for Health Care Personnel

- **Be vigilant about measles**
- **Ensure *EVERYONE* is up to date on MMR vaccination**
  - Staff and patients–children, adolescents, and adults
- **Consider measles in patients with febrile rash illness and clinically compatible measles symptoms (cough, coryza, and conjunctivitis)**
- **Ask patients about:**
  - Recent travel internationally
  - Recent travel to domestic venues frequented by international travelers
  - Recent contact with international travelers
  - History of measles in the community
- **Promptly isolate patients with suspected measles**

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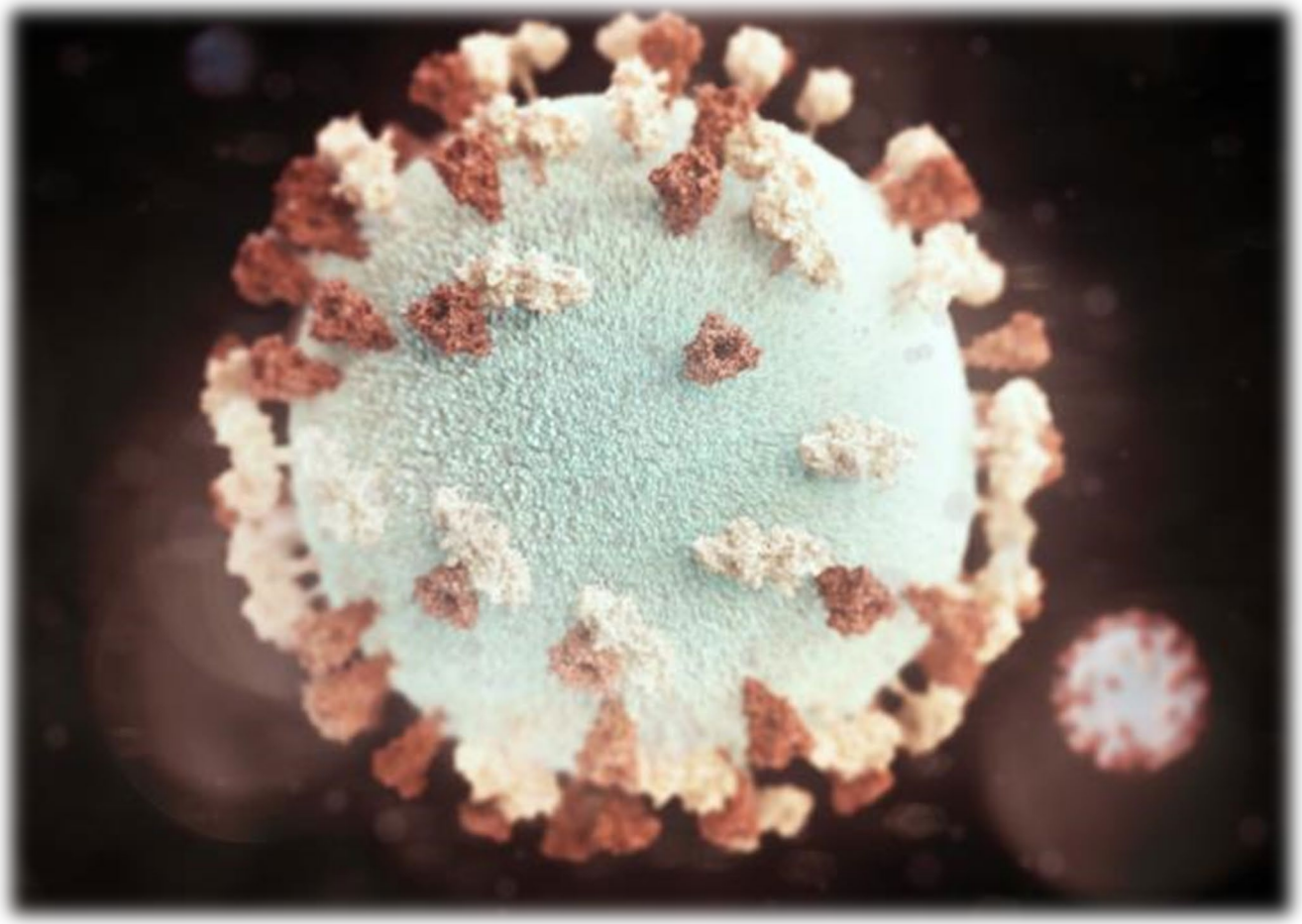
2

Mumps Disease

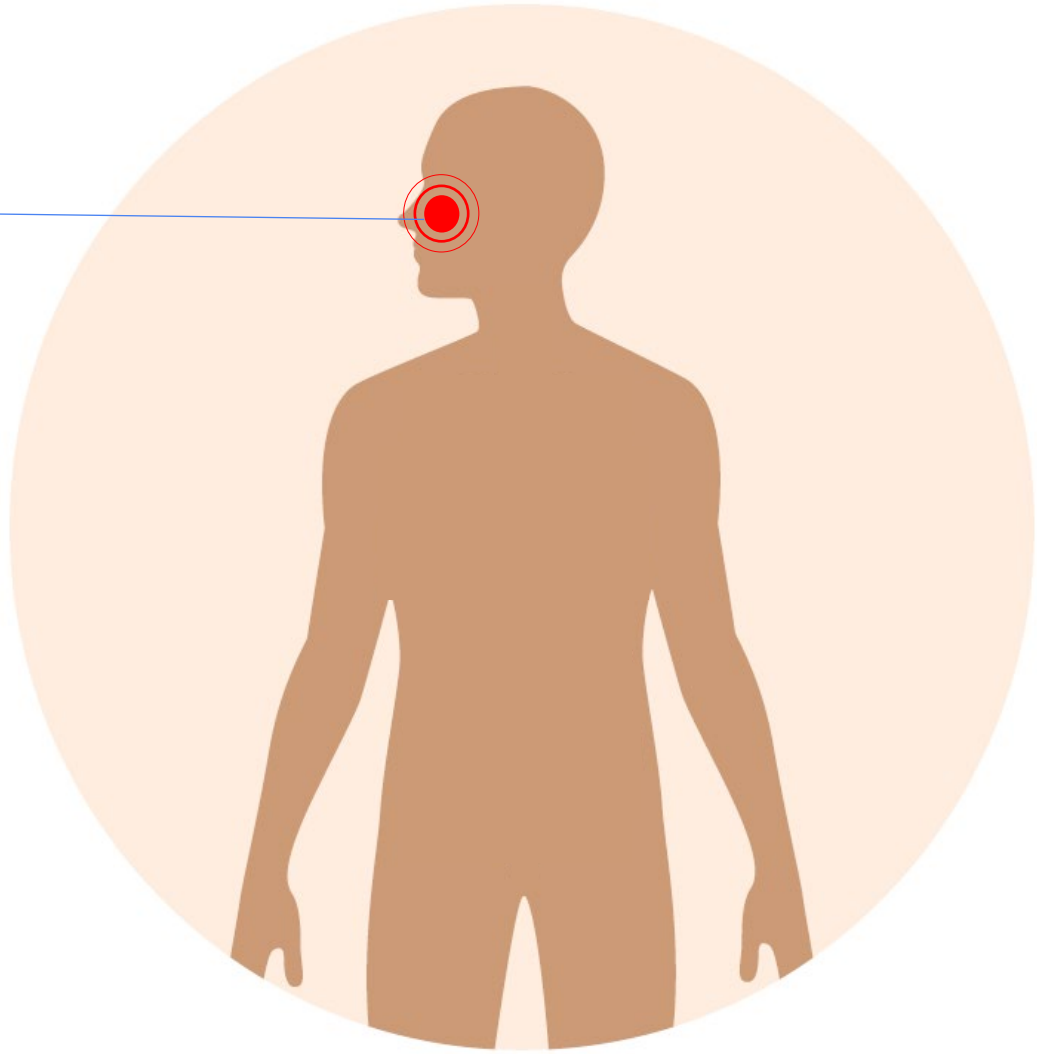
Mumps



Paramyxovirus

Mumps

Nasopharynx



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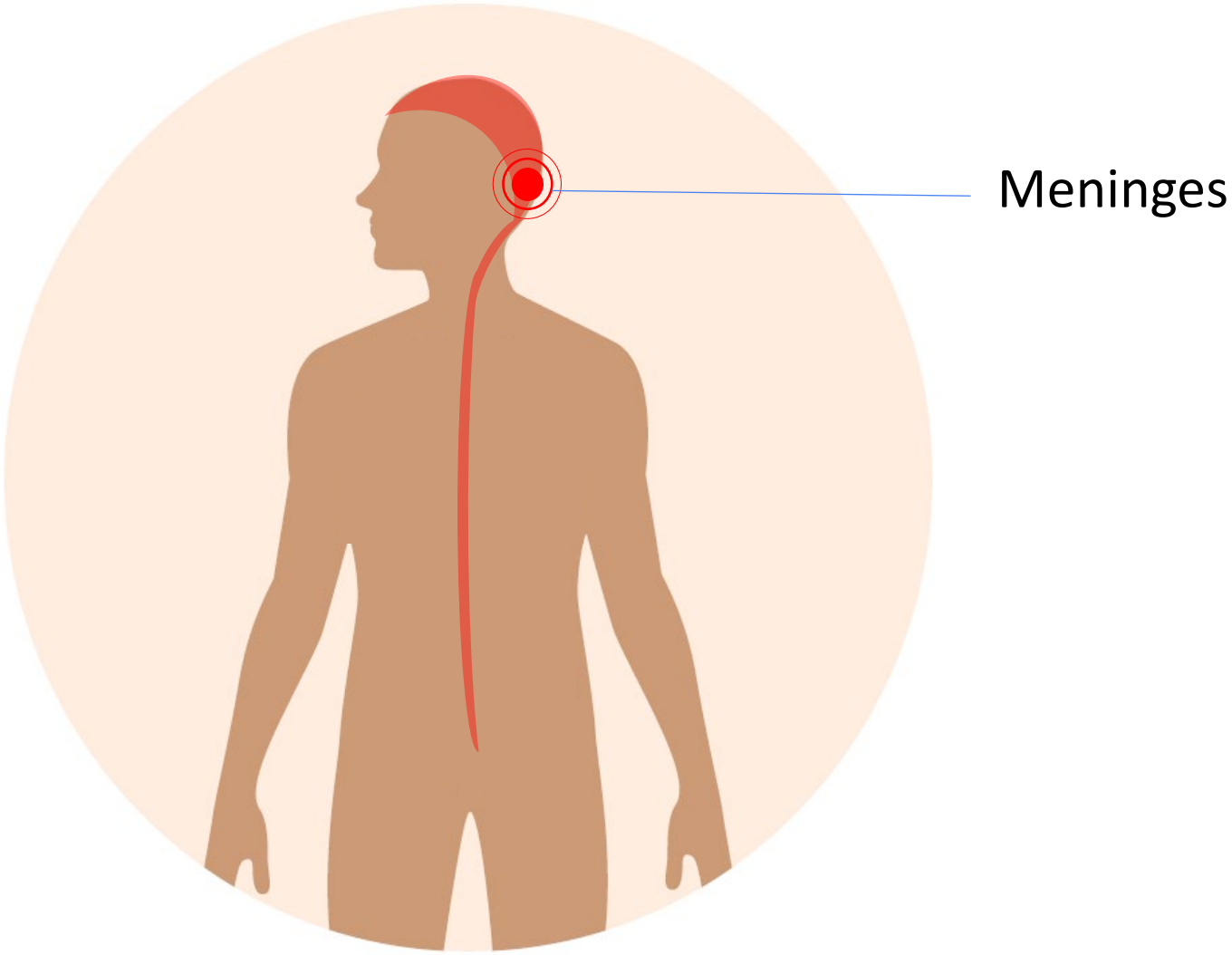

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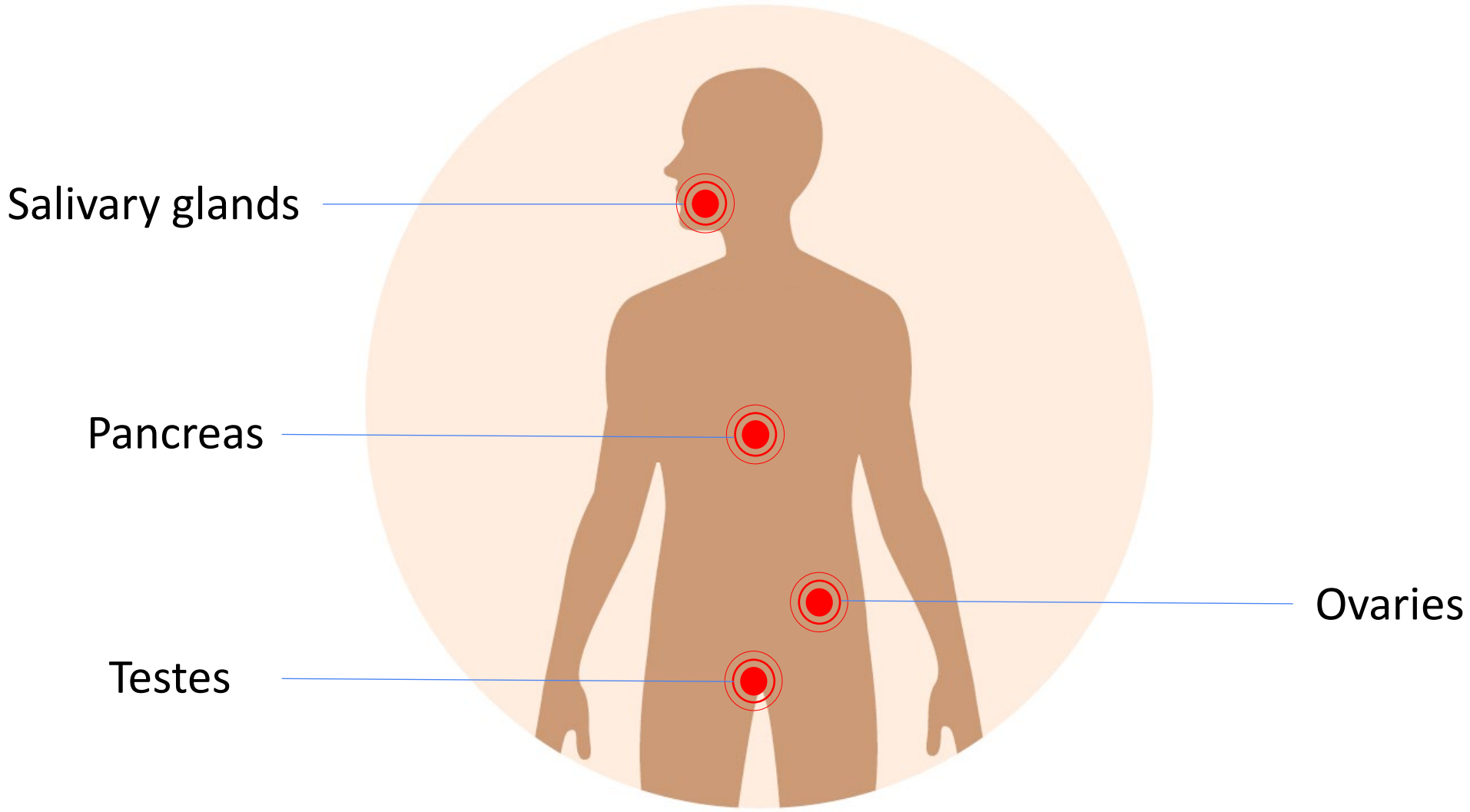


Mumps

- **Incubation period: 12–25 days**

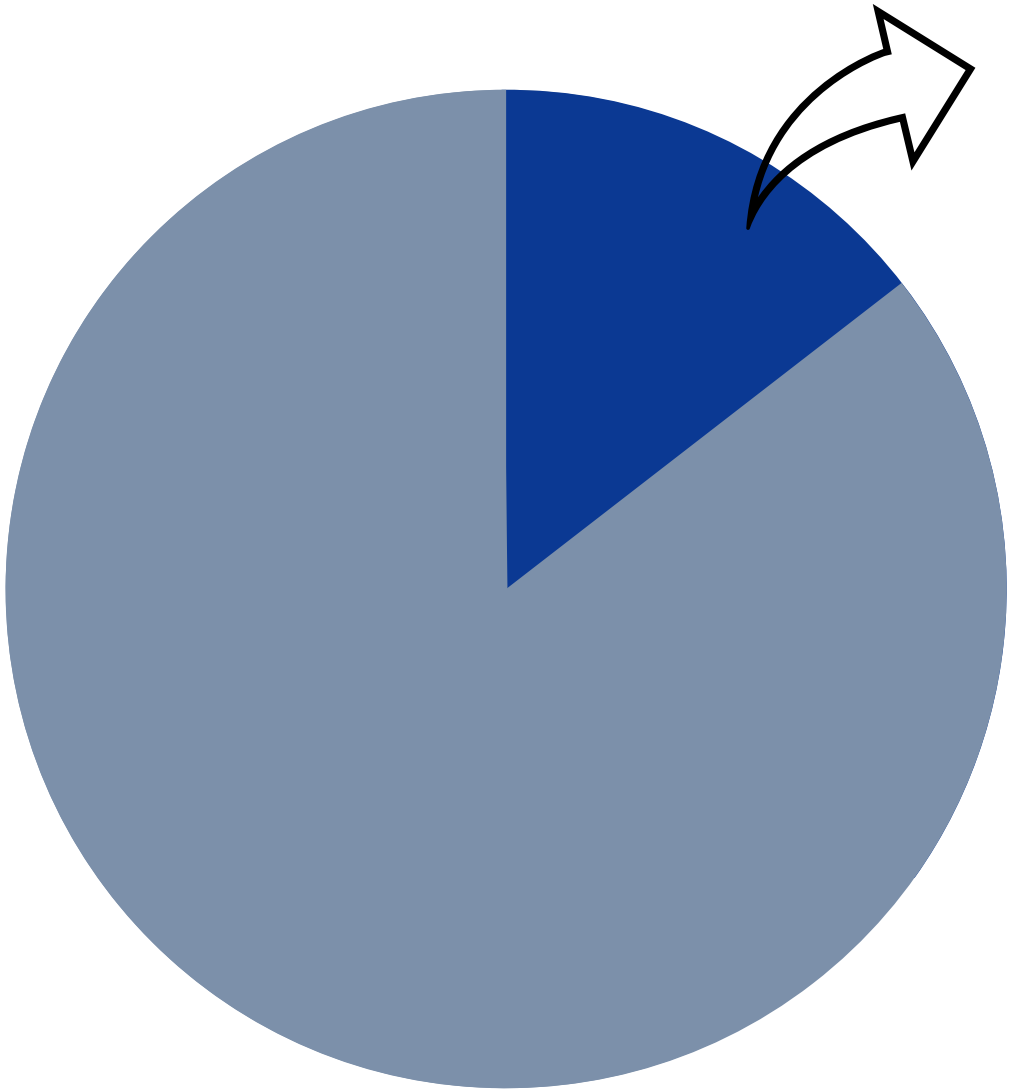
Mumps

- **Prodrome is nonspecific**
  - Myalgia
  - Anorexia
  - Malaise
  - Headache
  - Low-grade fever

Mumps Parotitis

Parotitis in 9% –94% of cases, typically occurs within 16 –18 days

Mumps



Pre-vaccine era: **15%–24%** of infections were **asymptomatic**

Mumps Complications

Complication	Est. frequency among unvaccinated (%)	Est. frequency among vaccinated (%)
Orchitis	30	6
Oophoritis	7	≤1
Mastitis	30	≤1
Pancreatitis	4	<1
Hearing loss	4	<1
Meningitis	<1–10	≤1
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During 1962–1967, there were **3 deaths** per 10,000 reported mumps cases.

Epidemiology

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Reservoir	Human
Transmission	Direct contact with saliva or respiratory droplets
Temporal Pattern	Peaks in late winter/spring
Communicability	Several days before and after onset of parotitis

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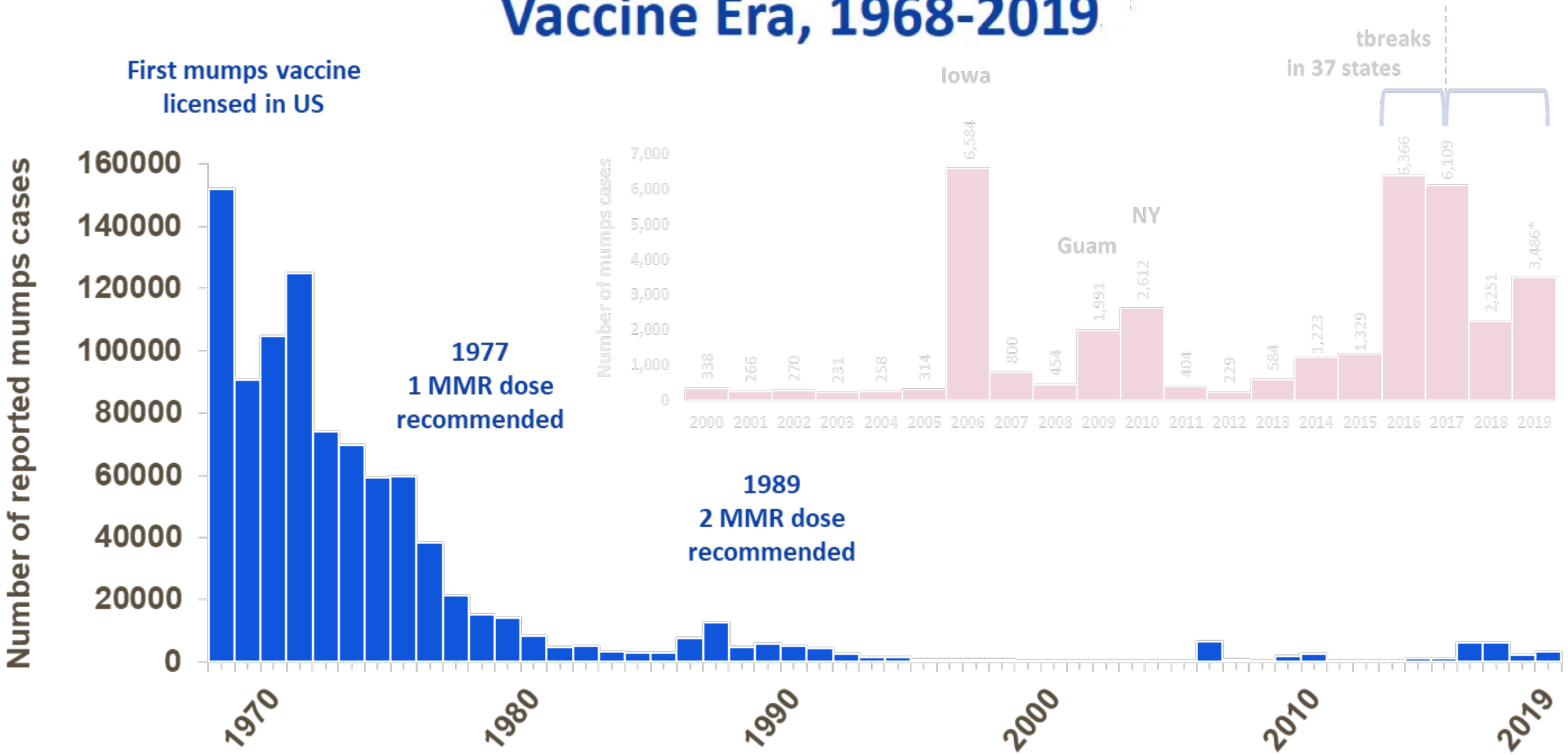
Reported Mumps Cases, United States, Vaccine Era, 1968-2019



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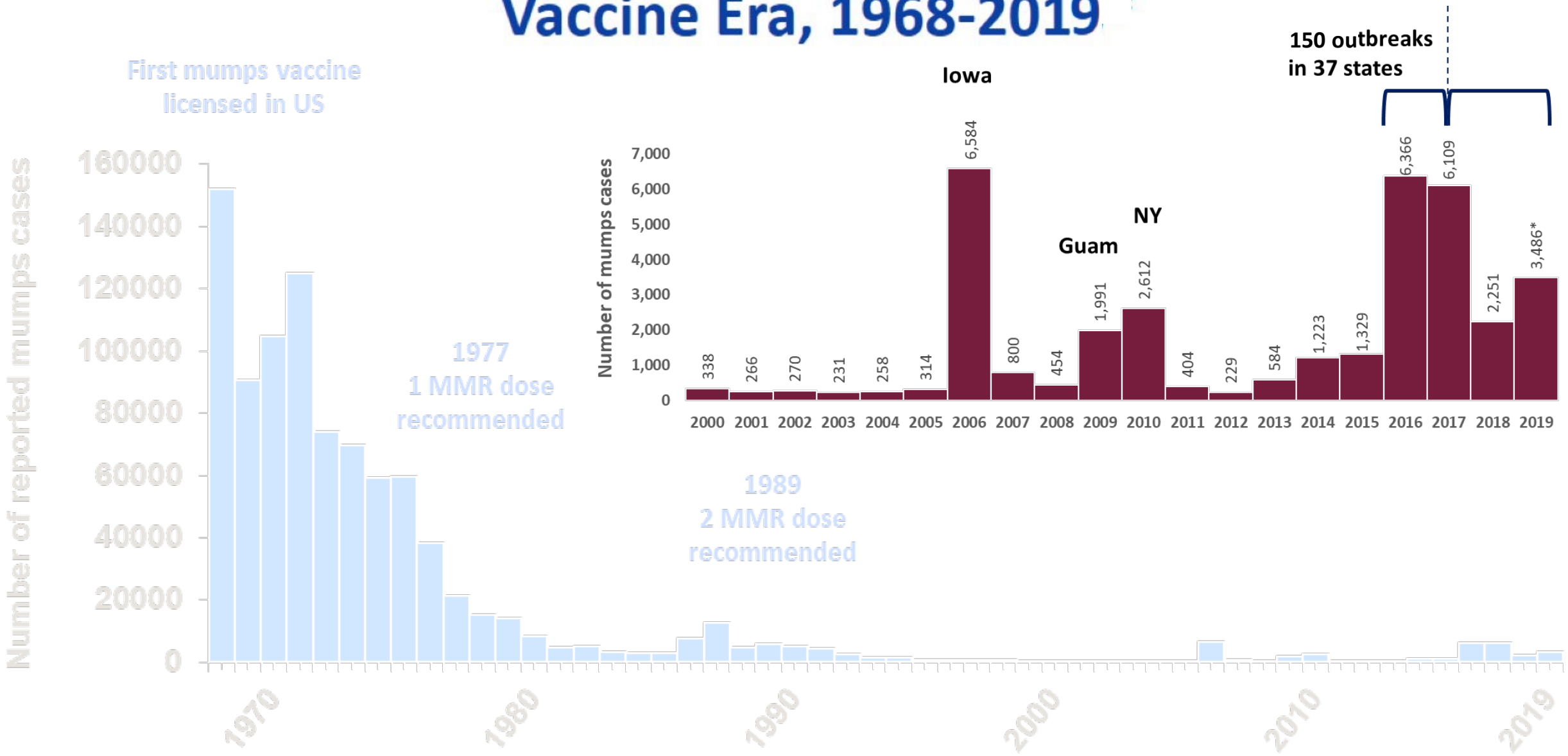

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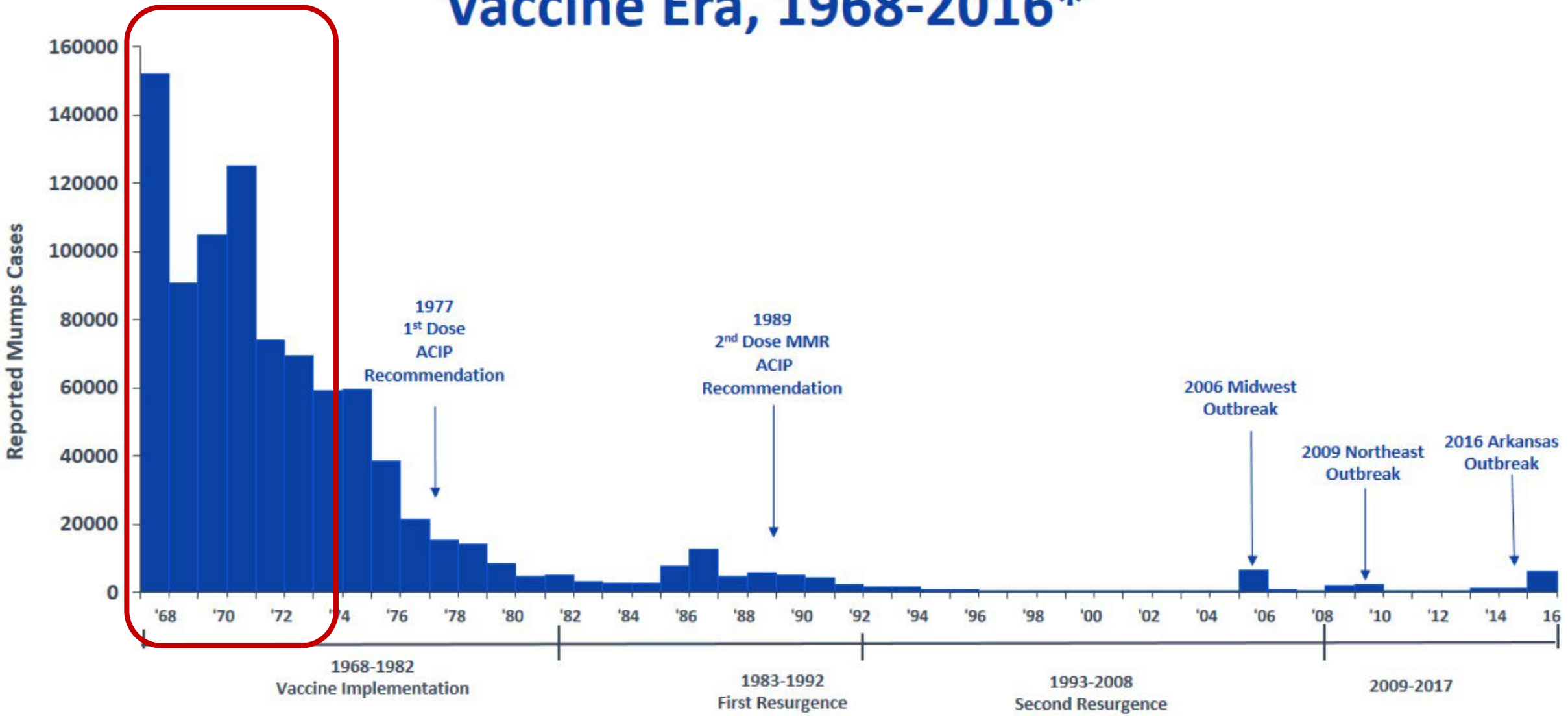

Source: National Notifiable Disease Surveillance System (passive surveillance); 2016 data is preliminary and subject to change

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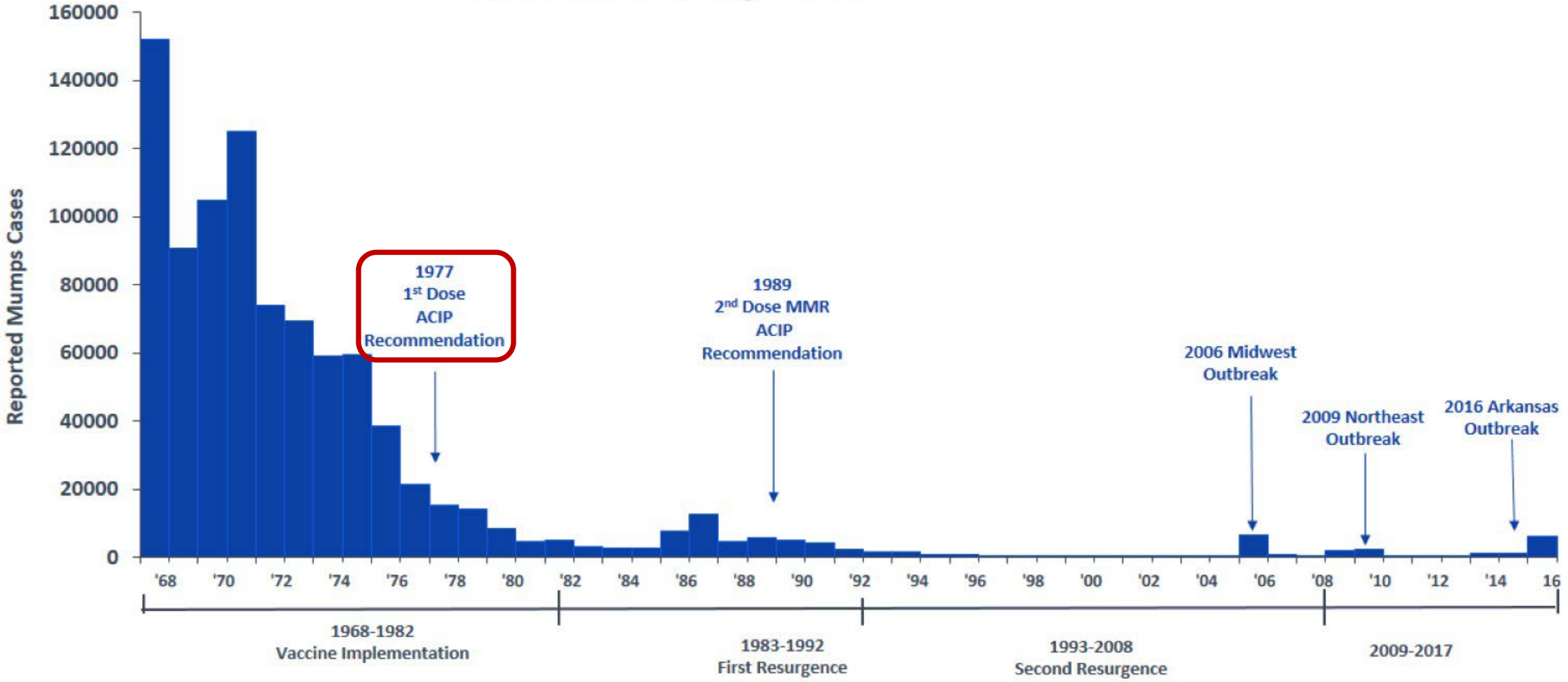

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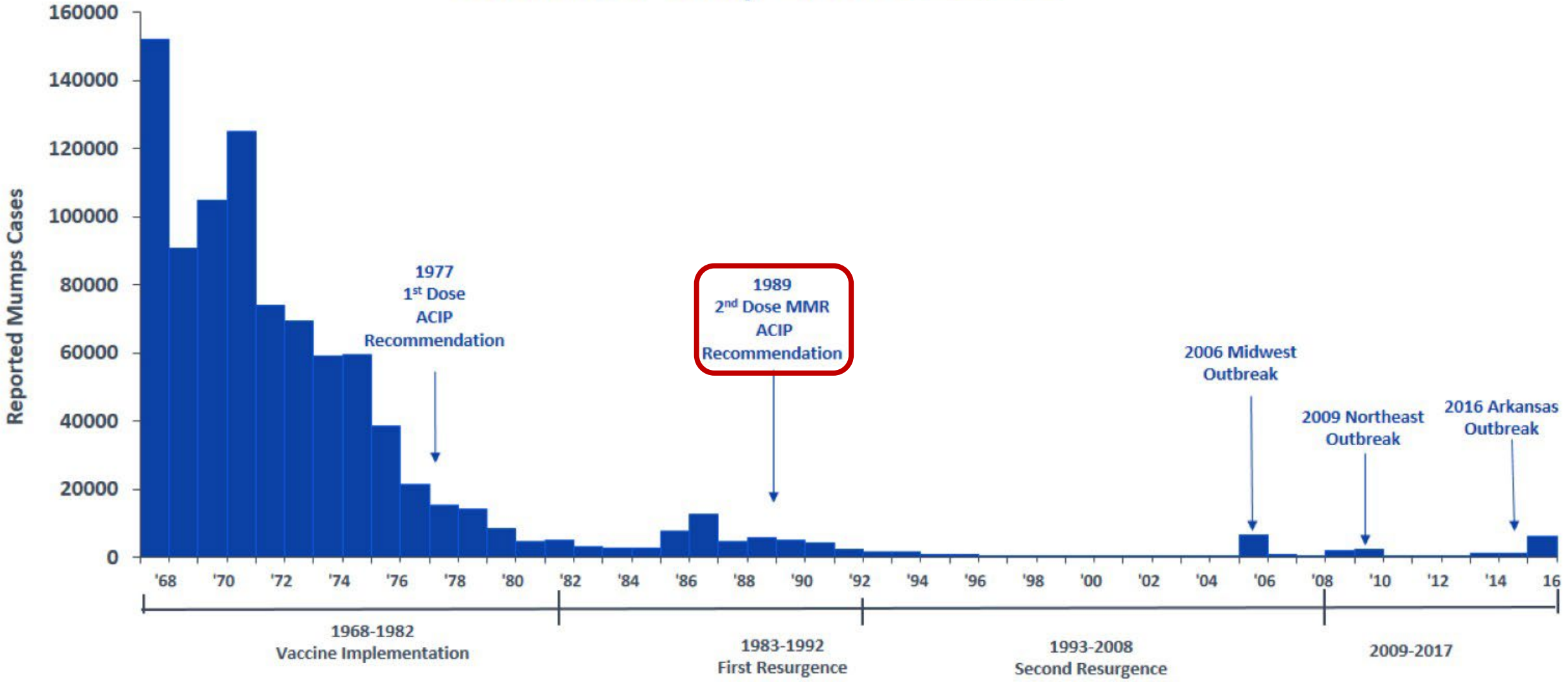

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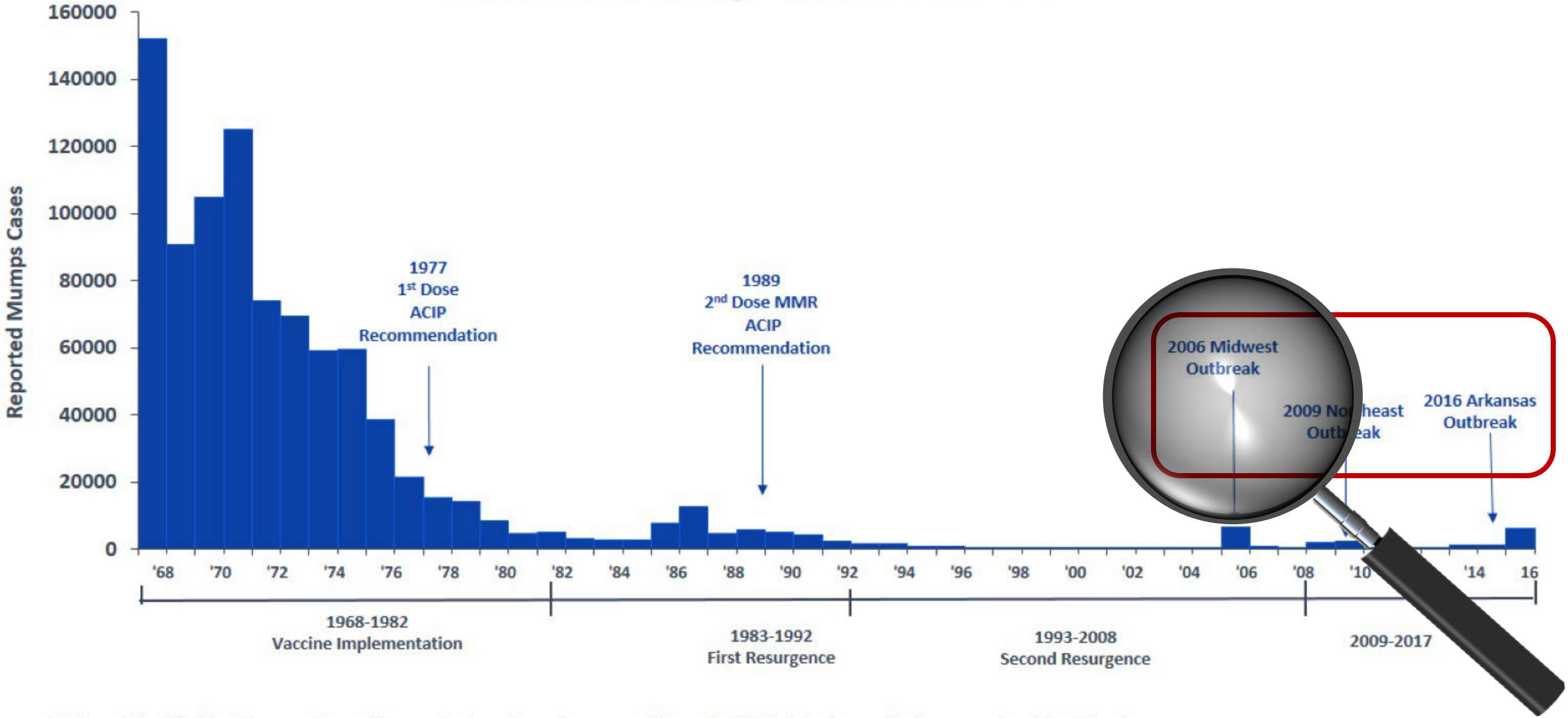

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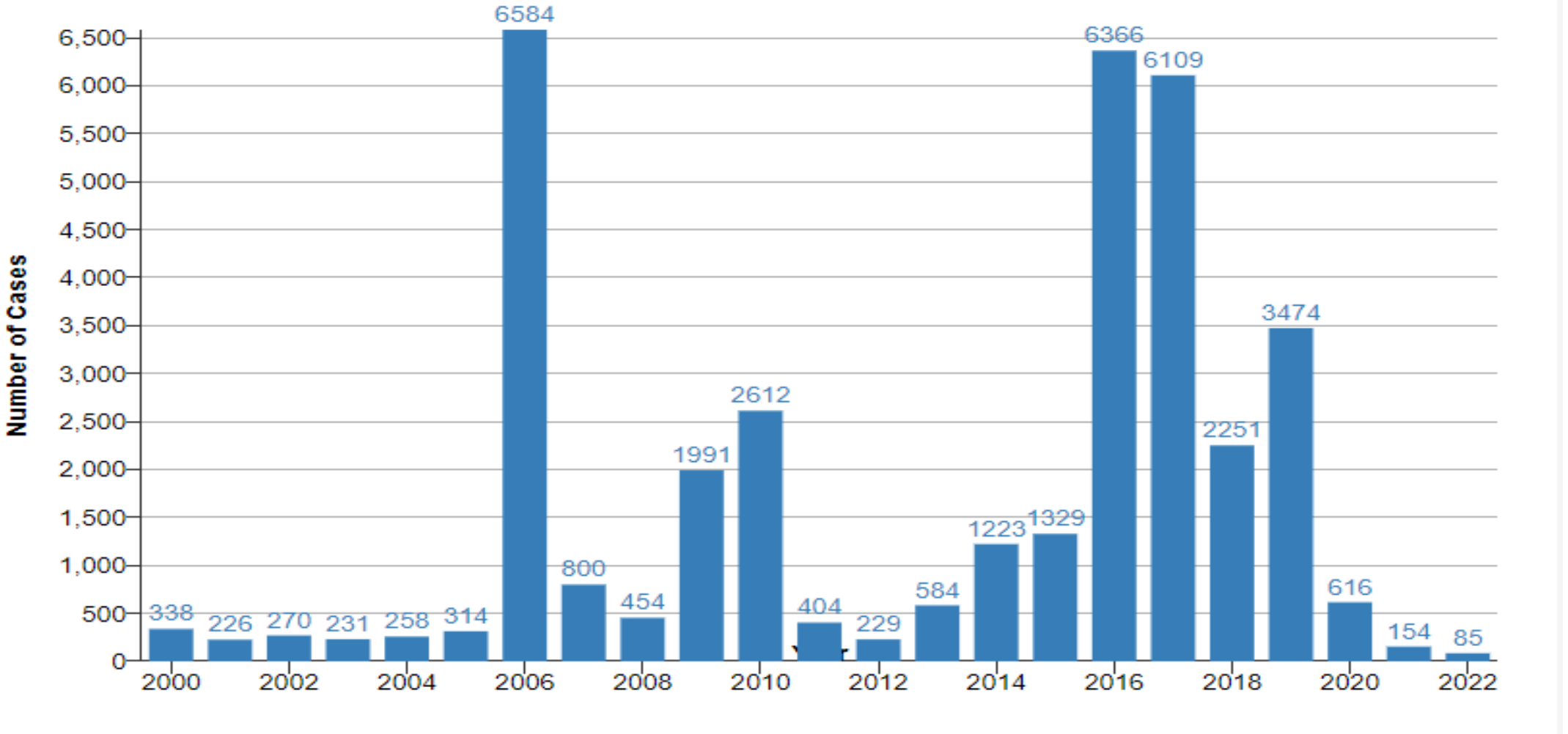

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https://www.cdc.gov/mumps/outbreaks.html

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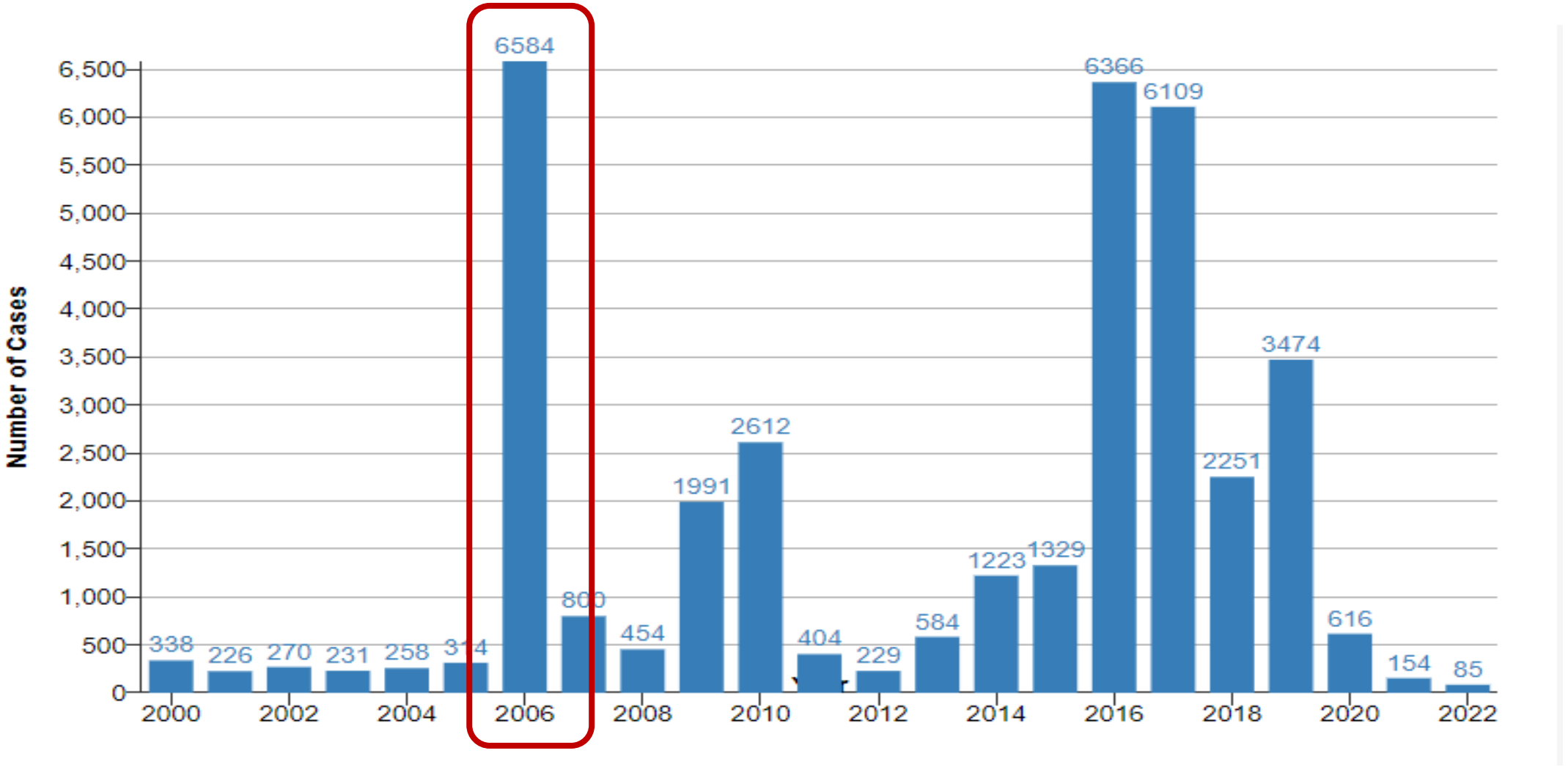

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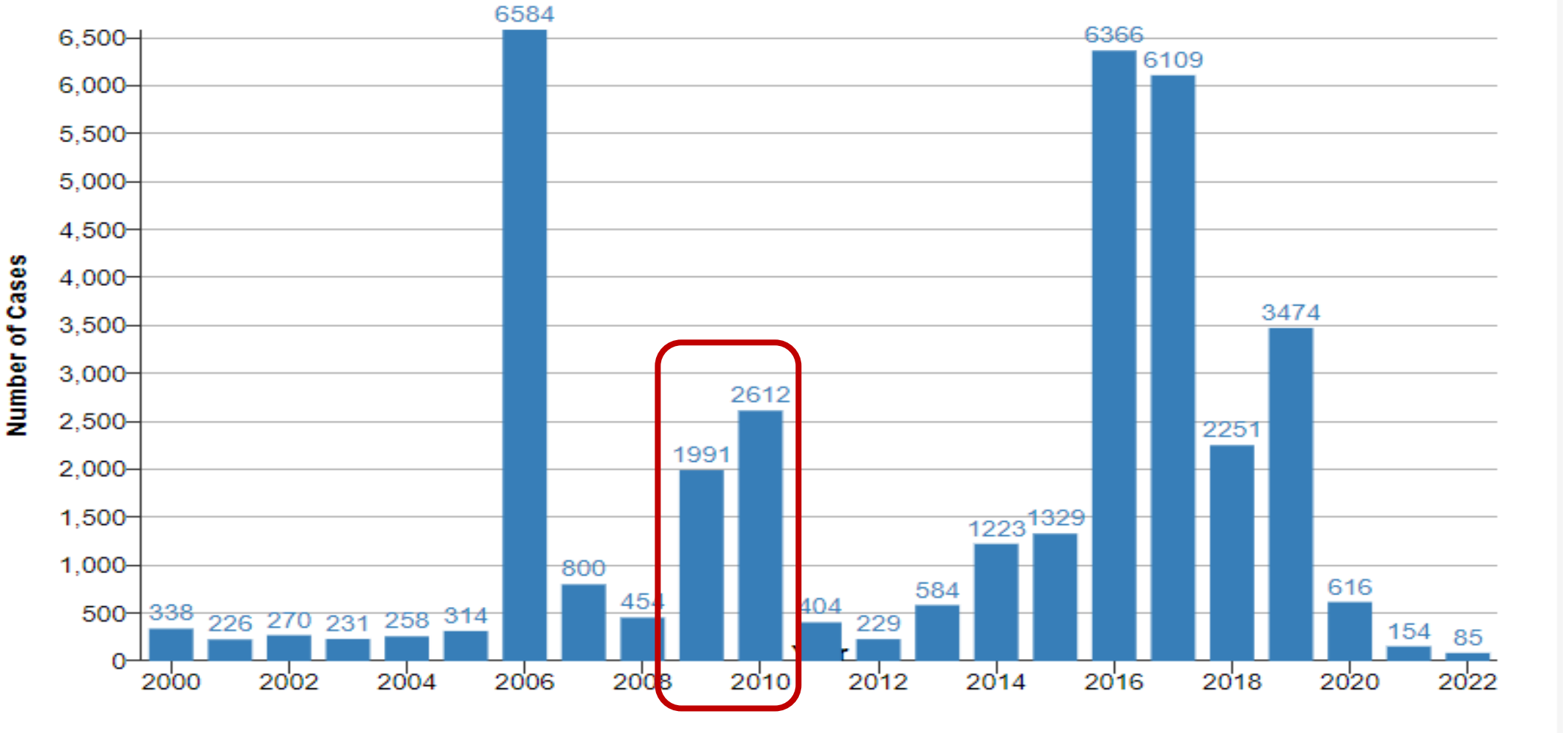

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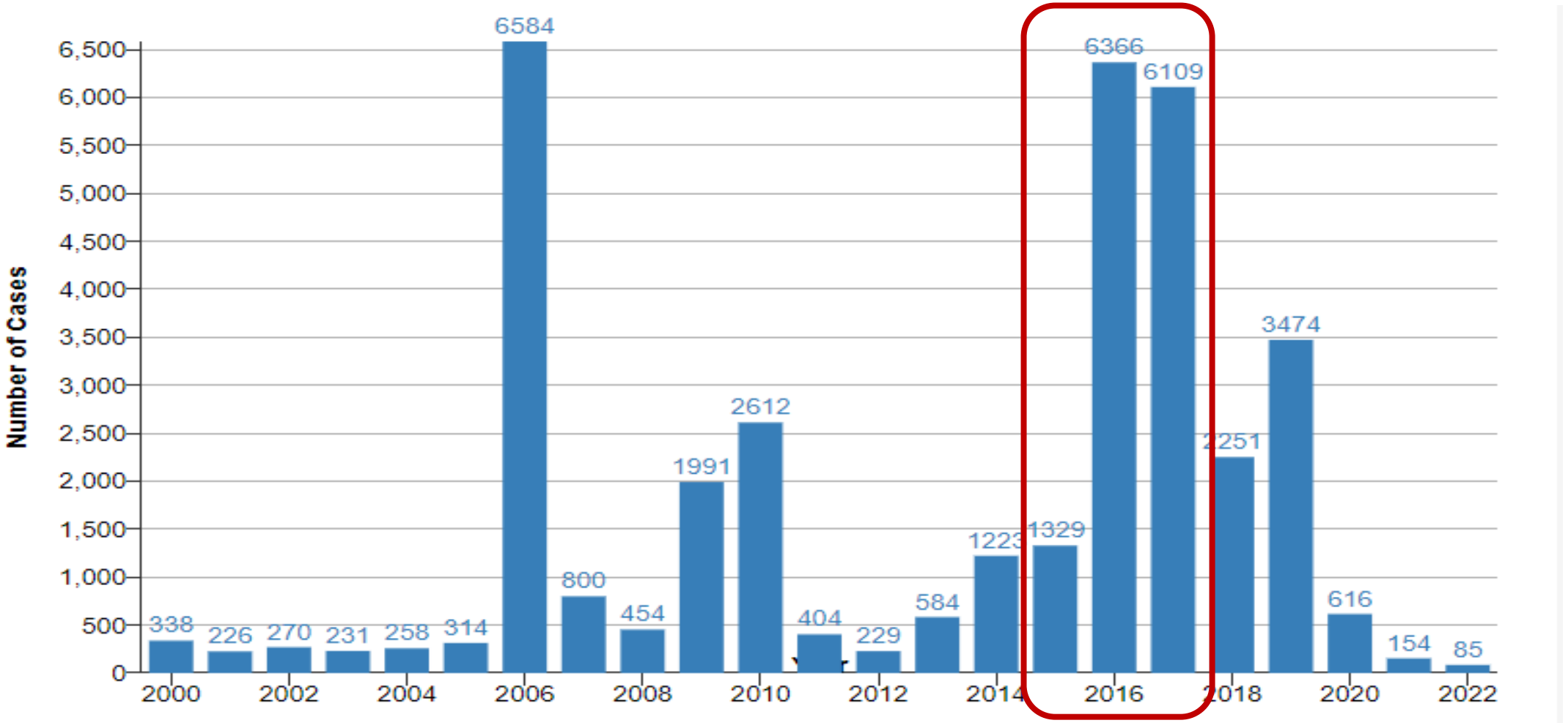

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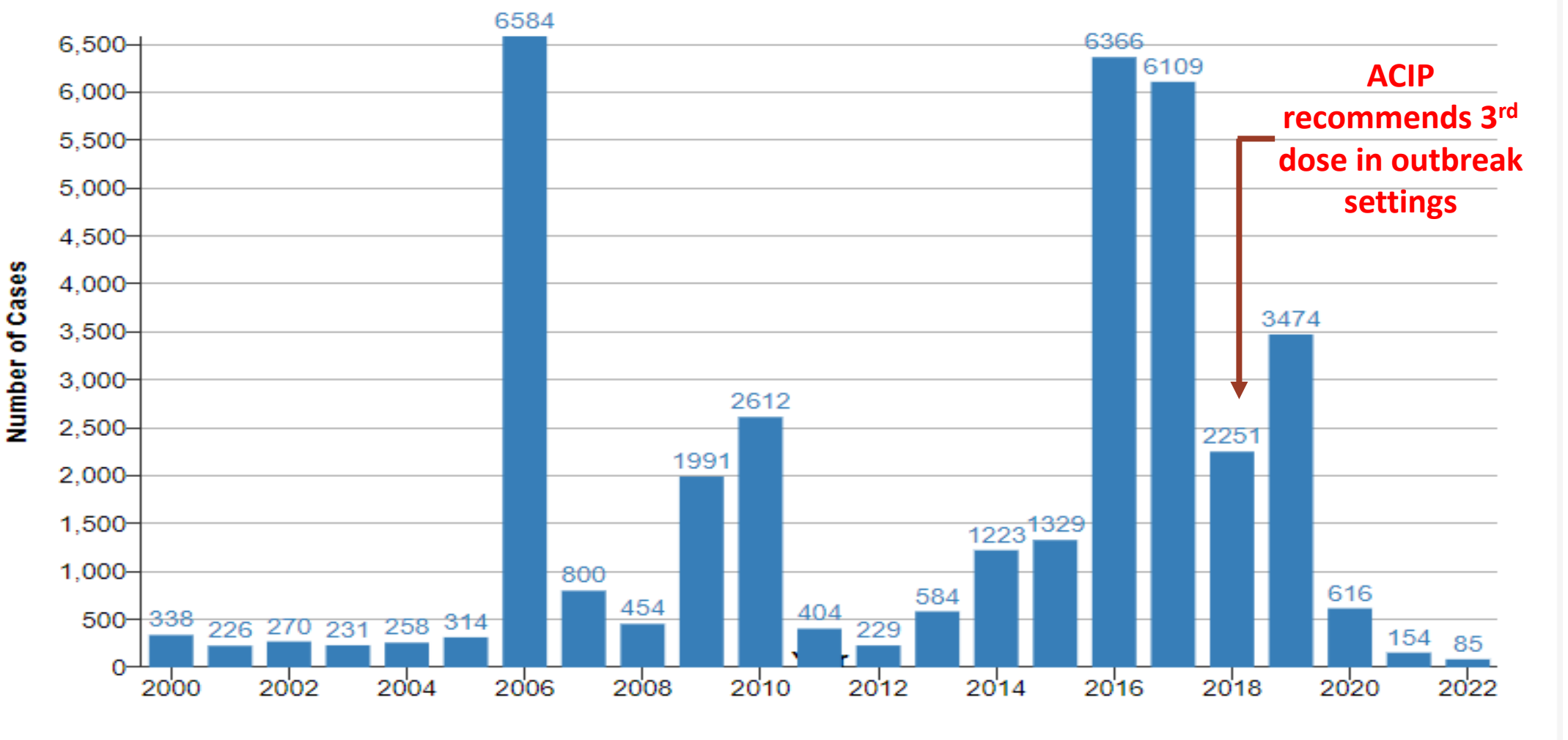

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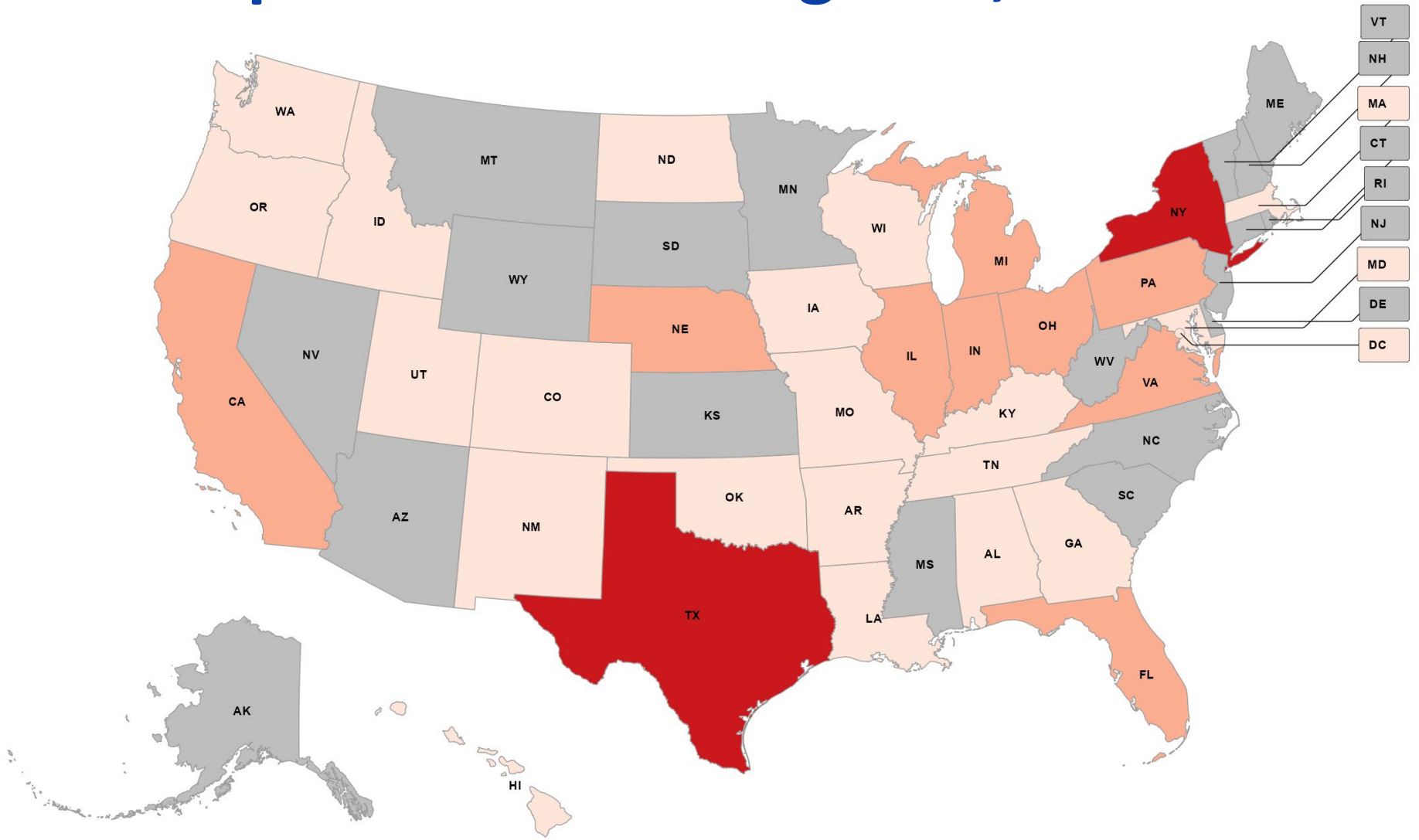
U.S. Mumps Cases as of August 5, 2022**



*Jurisdictions refer to any of the 50 states, New York City, and the District of Columbia.

**2022 map represents cases reported to CDC as of July 1, 2022; 2021 and 2022 case counts are preliminary and subject to change.

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Suspect Mumps?

- **Health care professionals should be vigilant about mumps:**
  - Consider mumps in patients presenting with fever and parotitis regardless of age, vaccination status or travel history
  - Promptly isolate patients for 5 days after the glands begin to swell
  - Immediately report the suspect mumps case to the health department
  - Obtain specimens for testing from patients with suspected mumps, including a blood specimen and a buccal or oral swab specimen, which confirms the diagnosis

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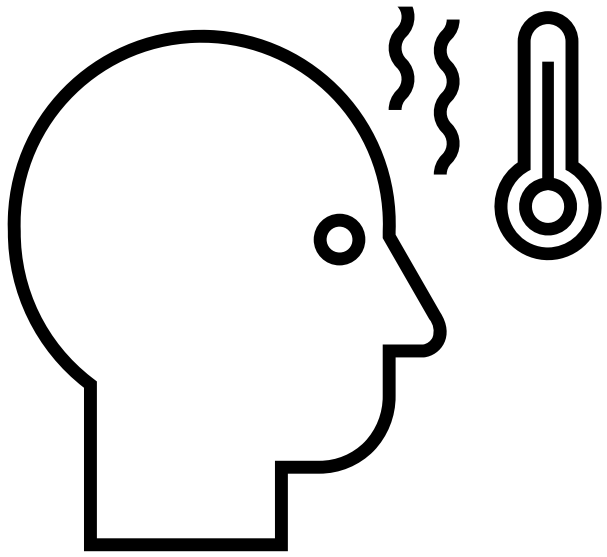

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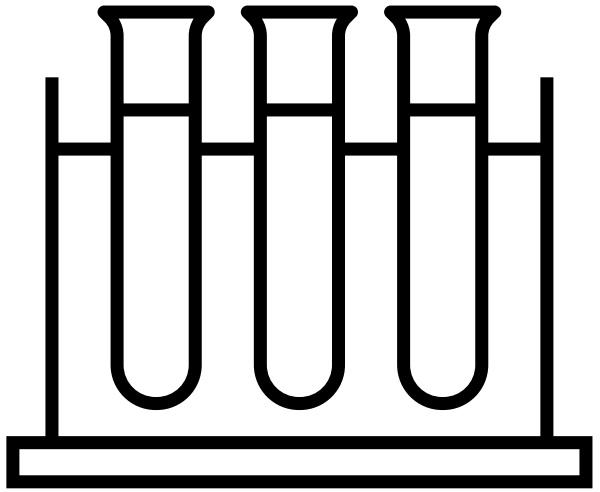


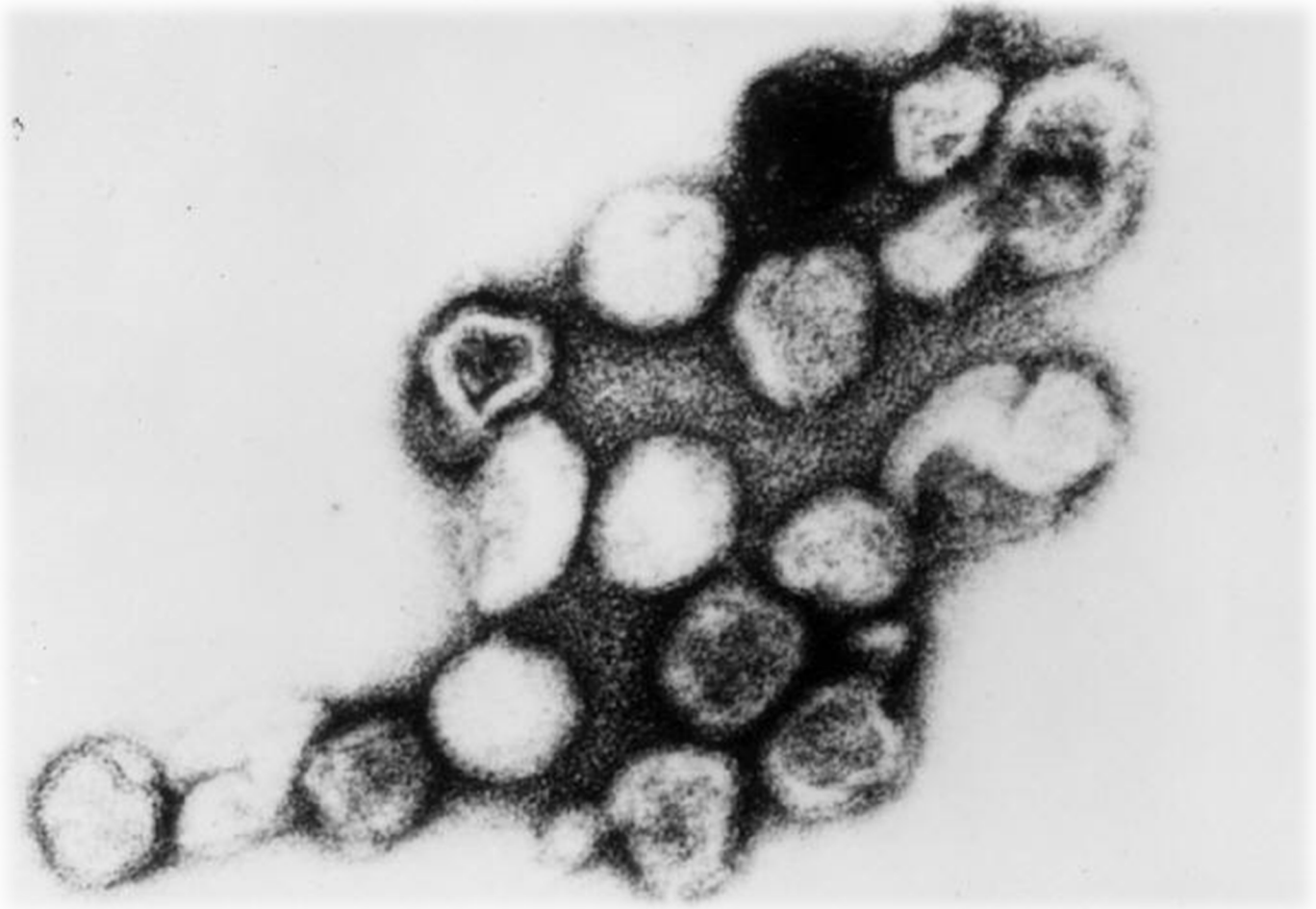
Suspect Mumps?

- **Health care personnel should have documented evidence of immunity**
  - Refer to “Immunization of Health-Care Personnel: Recommendations of the Advisory Committee on Immunization Practices” (https://www.cdc.gov/mmwr/pdf/rr/rr6007.pdf)

4

Rubella Disease

Rubella



Togavirus

Rubella

- **Incubation period: 12–23 days; average 14 days**

Rubella

- **Prodrome is nonspecific**
  - Malaise
  - Fever

Rubella

Maculopapular rash **14-17 days** after exposure

Rubella Complications

Complication	Rate
Arthritis or arthralgia	May occur in up to 70% of adult women, but is rare in children and adult males
Encephalitis	1/6,000 cases
Hemorrhagic manifestations (e.g., thrombocytopenic purpura)	1/3,000 cases
Orchitis, neuritis, progressive panencephalitis	Rare

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Congenital Rubella Syndrome

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Congenital Rubella Syndrome

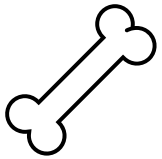
- **Rubella is associated with many birth defects**

Hearing impairment

Eye Defects

Cardiac Defects

Microcephaly & Intellectual disabilities



Bone Alterations

Liver & Spleen Damage

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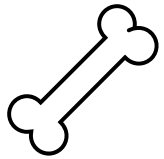

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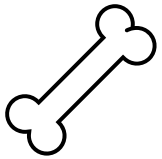

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- The earlier the infection in pregnancy, the more serious the outcomes for the baby
- May lead to fetal death or preterm delivery

Congenital Rubella Syndrome

Epidemiology

Rubella	
Reservoir	Human
Transmission	Direct or droplet contact from nasopharyngeal secretions
Temporal Pattern	Peaks in late winter/spring
Communicability	7 days before to 5–7 days after rash onset

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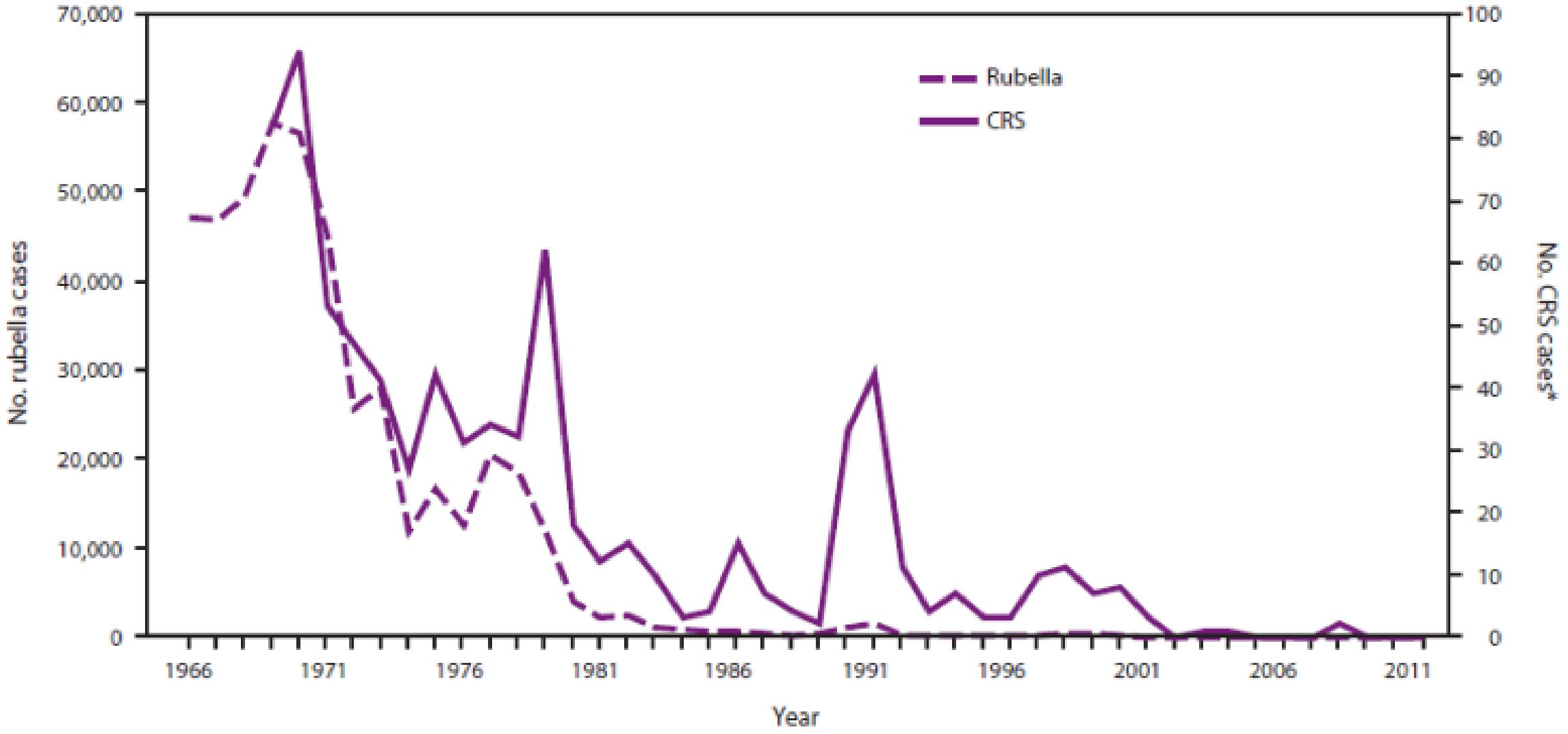
Reported Rubella and CRS Cases – United States, 1966 - 2011



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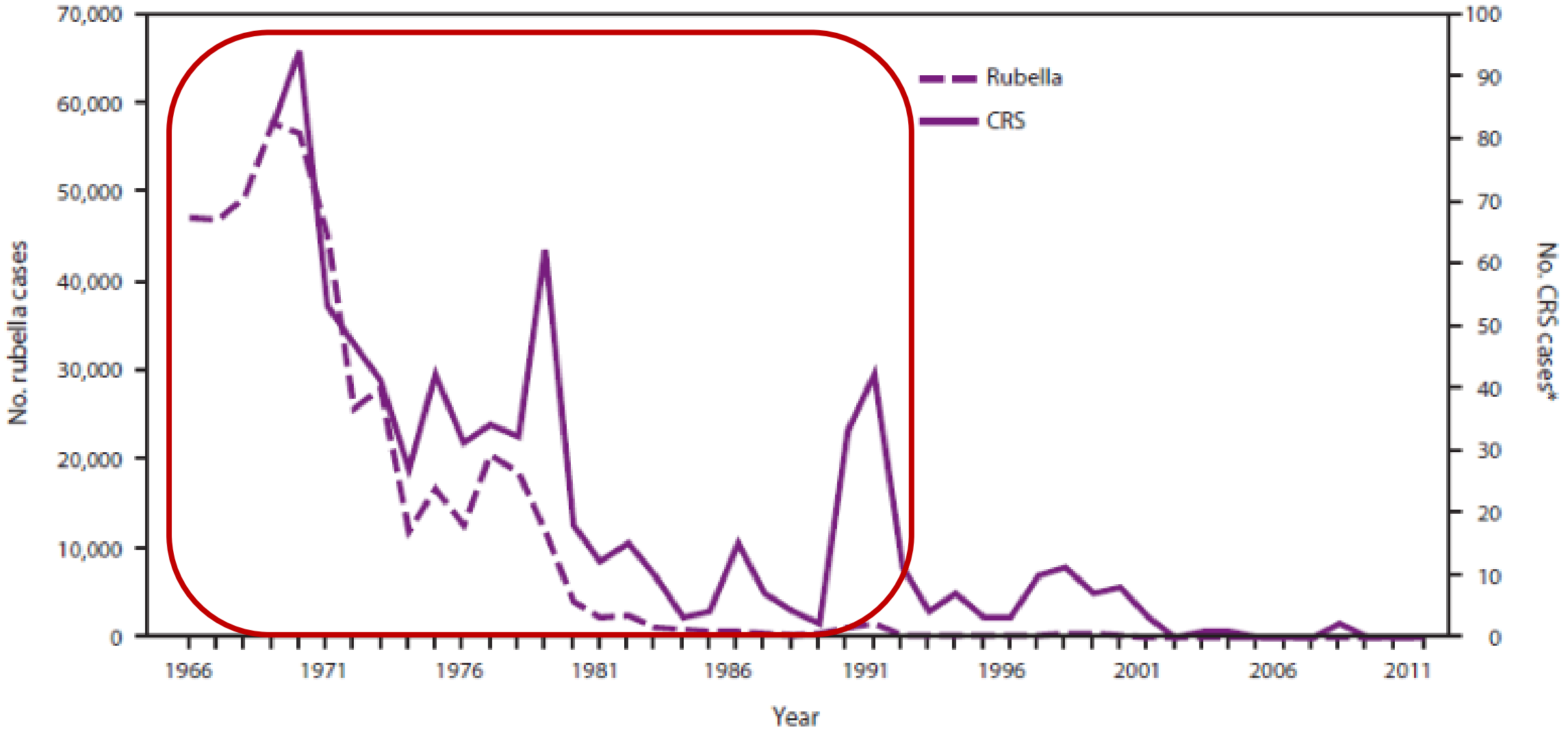


Reported in the United States

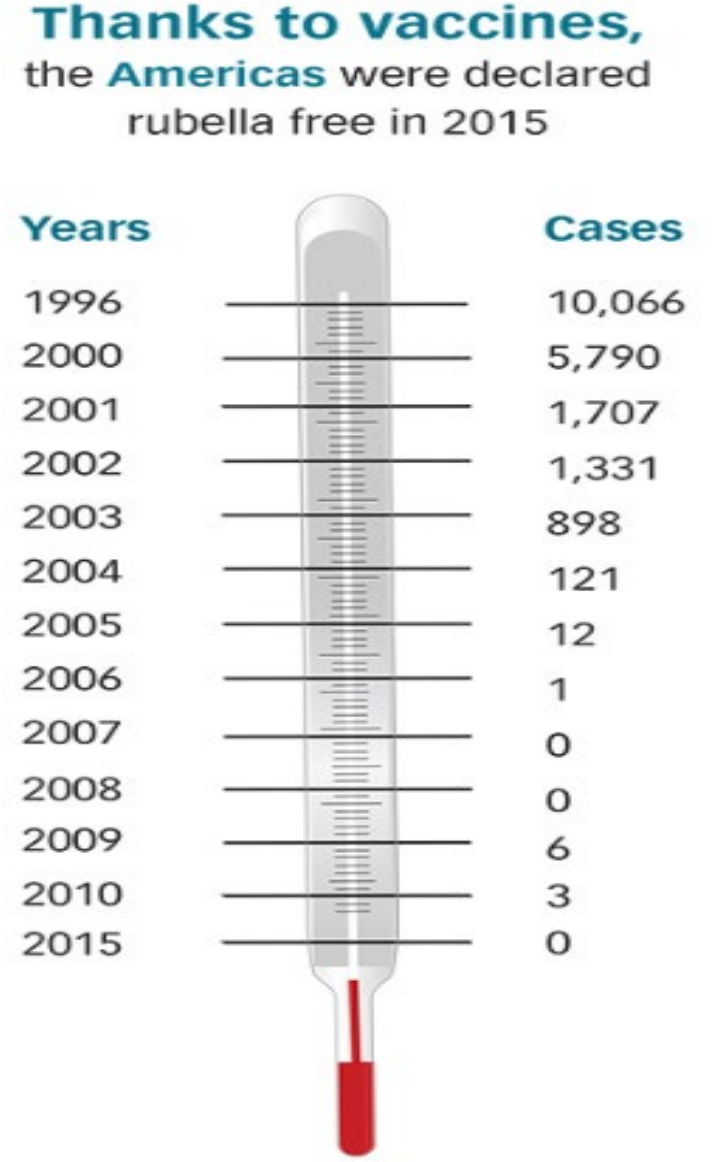
Rubella

PAHO

Pan American Health Organization

World Health Organization

Regional Office for the Americas



5

MMR Vaccine

MMR Vaccines

- **Two products:**
  - M-M-R II
  - Priorix
- Live, attenuated vaccines
- Administered by SC (subcutaneous) injection
- Approved for pediatric and adult populations
- No single antigen vaccines in the United States

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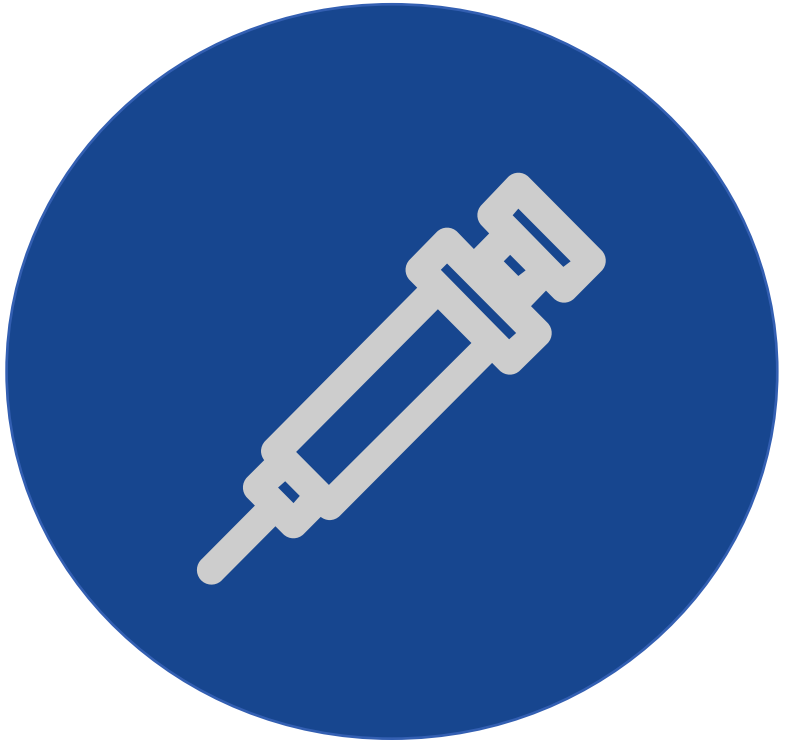
M-M-R II Vaccine

- **Licensed in 1971**
- **Highly effective**
- **Safe (over 50 years of use)**
  - Low risk of febrile seizures in children 12–23 months (1 in 3,000 doses)
  - Temporary pain/stiffness in joints (teens or adult women)
  - Temporary low platelet count (1 in 30,000 doses)

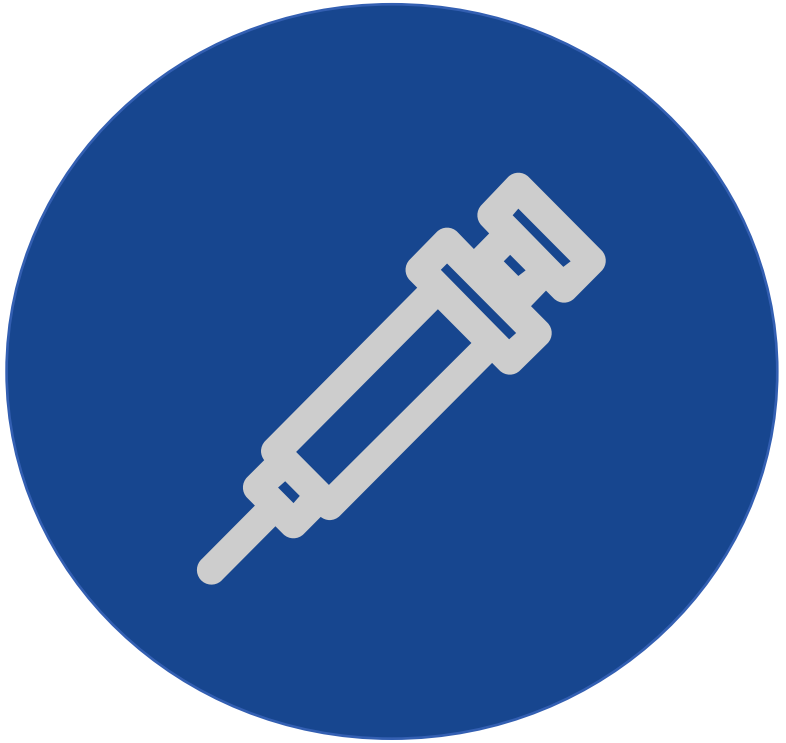


M-M-R II Vaccine

- **Efficacy**
  - Measles: 95% at 12 months; 98% at 15 months
  - Mumps: 88% (range: 31%–95%) (2 doses)
  - Rubella: 95% or more (1 dose)

- **Preparation**
  - Single dose vials
  - Reconstitute with diluent

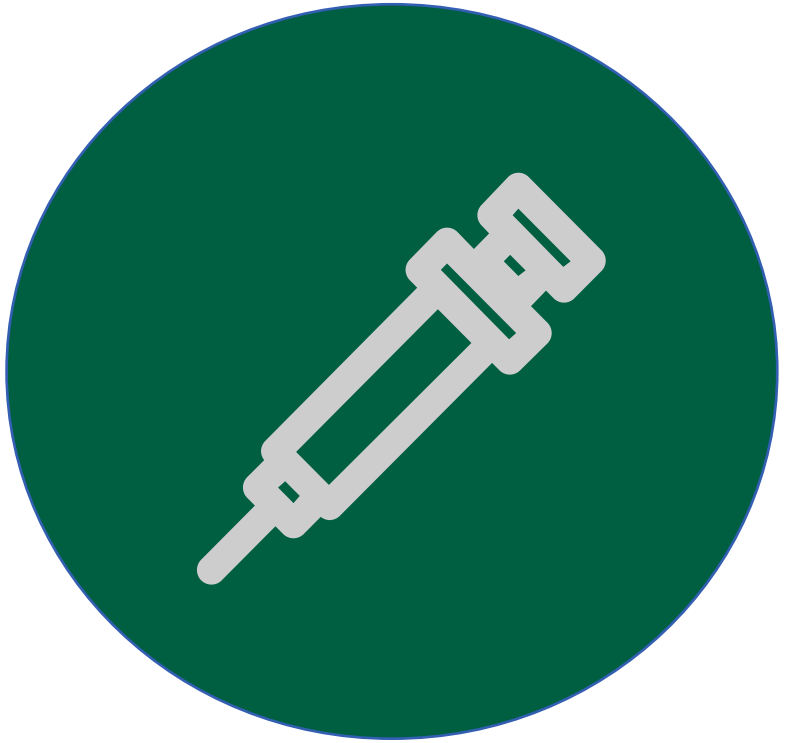
- **Administration**
  - Subcutaneously



https://emergency.cdc.gov/coca/ppt/2019/slides_052119_Measles.pdf

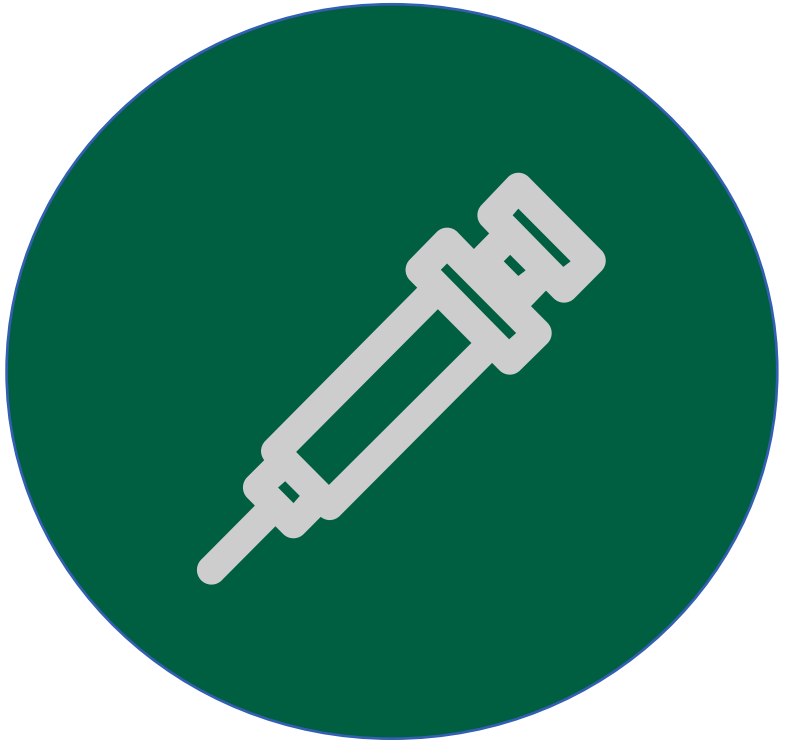
Priorix Vaccine

- **Licensed in 2022 in the United States**
- **Highly effective**
- **Similar safety profile as M-M-R II**
  - Similar rates of febrile seizures
  - Similar rates of low platelet count



Priorix Vaccine

- **Immunogenicity**
  - No significant difference in geometric mean concentration for measles, mumps, or rubella between Priorix and M-M-R II
- **Preparation**
  - Single dose vials
  - Reconstitute with diluent
- **Administration**
  - Subcutaneously



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M-M-R II versus Priorix

	M-M-R II[1]	Priorix[2]	Component Similarity
Measles	**Enders' Edmonston** strain	**Schwarz** strain	**100% identical on a nucleotide level**
Mumps	**Jeryl Lynn™ (B level))**	**RIT4385**	**100% identical on a protein level[3]**
Rubella	**Wistar RA 27/3** strain	**Wistar RA 27/3** strain	**100% identical on a nucleotide level**

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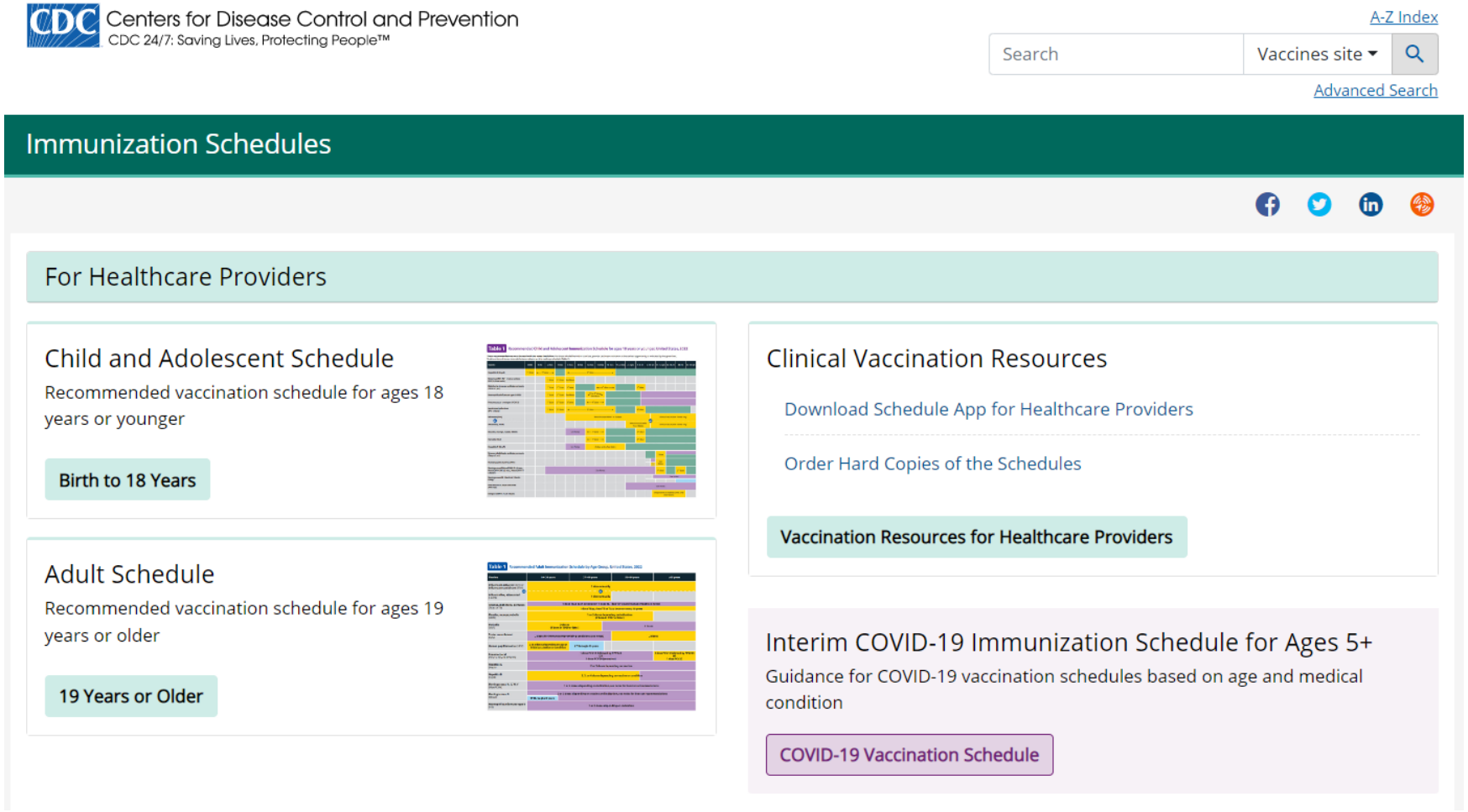
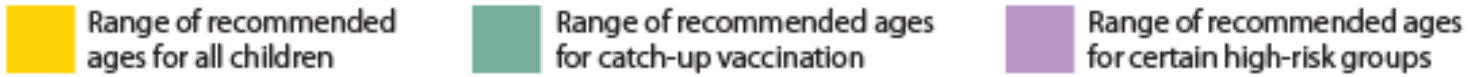
MMR Vaccine Recommendations



https://www.cdc.gov/vaccines/schedules/index.html

Child/Adolescent Schedule

Vaccine	Birth	1 mo	2 mos	4 mos	6 mos	9 mos	12 mos	15 mos	18 mos	19–23 mos	2–3 yrs	4–6 yrs	7–10 yrs	11–12 yrs	13–15 yrs	16 yrs	17–18 yrs
Measles, mumps, rubella (MMR)					See Notes		◄--- 1st dose ---►					2nd dose					



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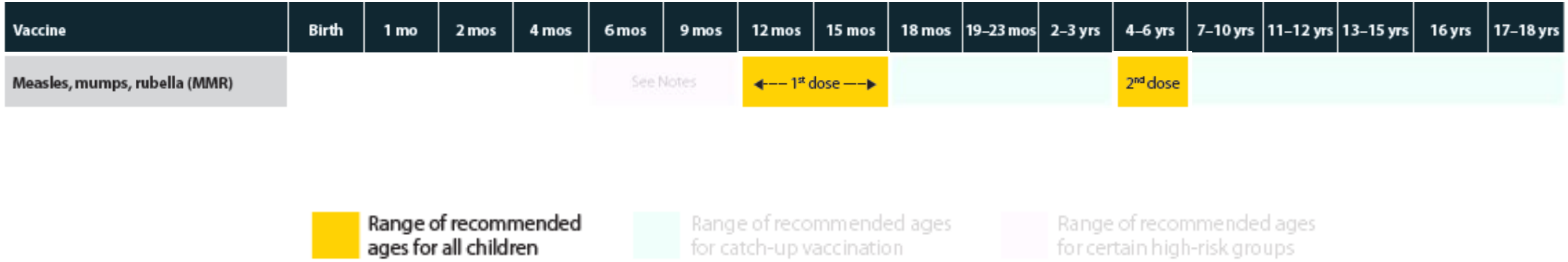
Range of recommended ages for all children

Range of recommended ages for catch-up vaccination

Range of recommended ages for certain high-risk groups

Child/Adolescent Schedule

12 months



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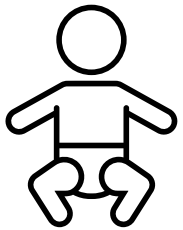

6-11 months

International travel

Child/Adolescent Schedule

12 months

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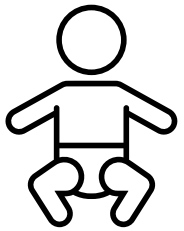
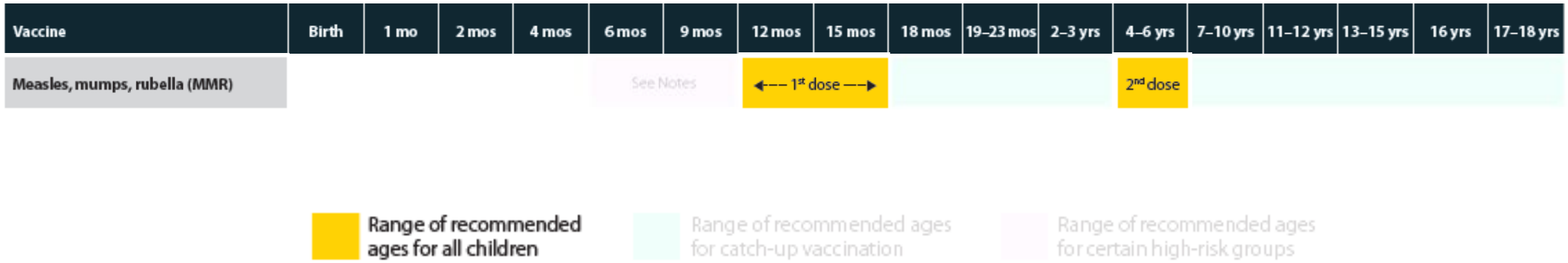


Child/Adolescent Schedule

4-6 years



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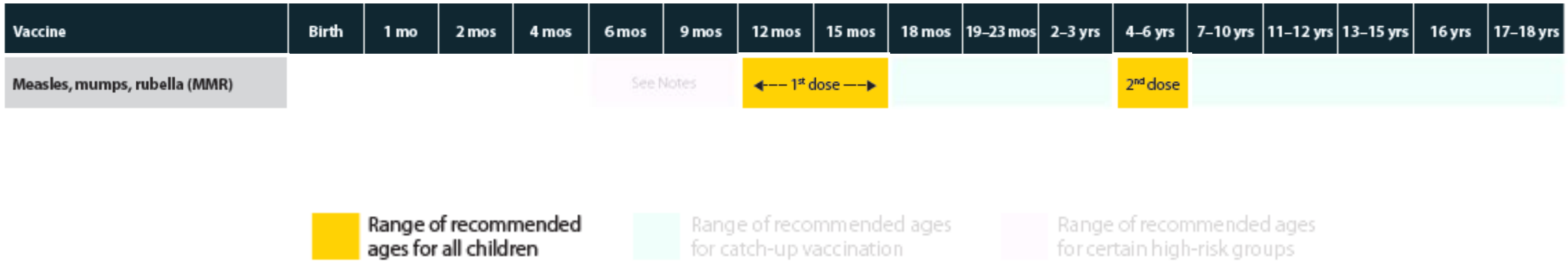
Child/Adolescent Schedule

4-6 years



Second dose **produces immunity** in persons who didn't respond to the first dose

Child/Adolescent Schedule

2nd dose may be given earlier

Vaccine	Birth	1 mo	2 mos	4 mos	6 mos	9 mos	12 mos	15 mos	18 mos	19–23 mos	2–3 yrs	4–6 yrs	7–10 yrs	11–12 yrs	13–15 yrs	16 yrs	17–18 yrs
Measles, mumps, rubella (MMR)					See Notes		◄--- 1st dose ---►					2nd dose					

Range of recommended ages for all children

Range of recommended ages for catch-up vaccination

Range of recommended ages for certain high-risk groups

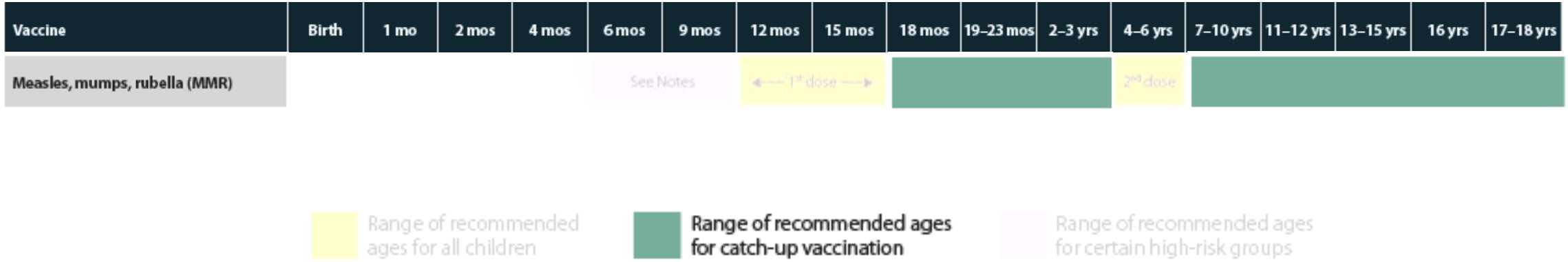
<4 years old

International travel

Child/Adolescent Schedule

If school law requires a dose on or after 4th birthday, then **another dose** should be administered

Child/Adolescent Schedule



Child/Adolescent Schedule – Medical Indications

VACCINE	Pregnancy	Immunocompromised status (excluding HIV infection)	HIV infection CD4+ count[1]		Kidney failure, end-stage renal disease, or on hemodialysis	Heart disease or chronic lung disease	CSF leak or cochlear implant	Asplenia or persistent complement component deficiencies	Chronic liver disease	Diabetes
			<15% or total CD4 cell count of <200/mm³	≥15% and total CD4 cell count of ≥200/mm³						
Measles, mumps, rubella	*									

Contraindicated or not recommended—vaccine should not be administered

*Vaccinate after pregnancy

Vaccination according to the routine schedule recommended

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MMRV Vaccine

Composition	Live, attenuated measles, mumps, rubella, and varicella vaccines. 7 to 8 times as much vaccine virus as monovalent varicella vaccine
Age	12 months through 12 years
Efficacy	Inferred from that of MMR vaccine and varicella vaccine on the basis of noninferior immunogenicity
Schedule	2 administered
Route	Subcutaneous

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MMRV Vaccine

- **First dose at 12–47 months of age**
  - Minimum age is 12 months
  - Can be given as MMR and VAR separately or MMRV
  - CDC recommends separate MMR and VAR
- **Second dose at 15 months–12 years of age**
  - MMRV generally preferred
  - May be given any time before 13th birthday at least 3 months (minimum interval) after the first dose
  - Not approved for use in persons 13 years of age and older

https://www.cdc.gov/mmwr/pdf/rr/rr5903.pdf

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Adult MMR Schedule

- **Routine administration**

Vaccine	19–26 years	27–49 years	50–64 years	≥65 years
Measles, mumps, rubella (MMR)	1 or 2 doses depending on indication (if born in 1957 or later)			

- **Medical Indications**

Vaccine	Pregnancy	Immuno-compromised (excluding HIV infection)	HIV infection CD4 count		Asplenia, complement deficiencies	End-stage renal disease; or on hemodialysis	Heart or lung disease, alcoholism[1]	Chronic liver disease	Diabetes	Health care personnel[2]	Men who have sex with men
			<200	≥200							
MMR	NOT RECOMMENDED				1 or 2 doses depending on indication						

Adult Schedule

Vaccine	19–26 years	27–49 years	50–64 years	≥65 years
Measles, mumps, rubella (MMR)	1 or 2 doses depending on indication (if born in 1957 or later)			

Recommended vaccination for adults who meet age requirement, lack documentation of vaccination, or lack evidence of past infection

No recommendation/ Not applicable

Adult Schedule

Vaccine	19–26 years	27–49 years	50–64 years	≥65 years
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Need Two Doses: 2nd dose 28 days after 1st dose

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No recommendation/ Not applicable

Healthcare Personnel

- **Born before 1957, CANNOT presume immunity**
- **Must have documented evidence of immunity**
- **Healthcare personnel born before 1957 without acceptable evidence of immunity, consider:**
  - 2 doses of MMR for measles or mumps
  - 1 dose for rubella

Adult Schedule – Medical Indications

Vaccine	Pregnancy	Immuno-compromised (excluding HIV infection)	HIV infection CD4 percentage and count		Asplenia, complement deficiencies	End-stage renal disease, or on hemodialysis	Heart or lung disease; alcoholism[1]	Chronic liver disease	Diabetes	Health care personnel[2]	Men who have sex with men
			<15% or <200 mm³	≥15% and ≥200 mm³							
MMR	Contraindicated*	Contraindicated		1 or 2 doses depending on indication							

Contraindicated or not recommended—vaccine should not be administered.

*Vaccinate after pregnancy.

Recommended vaccination for adults who meet age requirement, lack documentation of vaccination, or lack evidence of past infection

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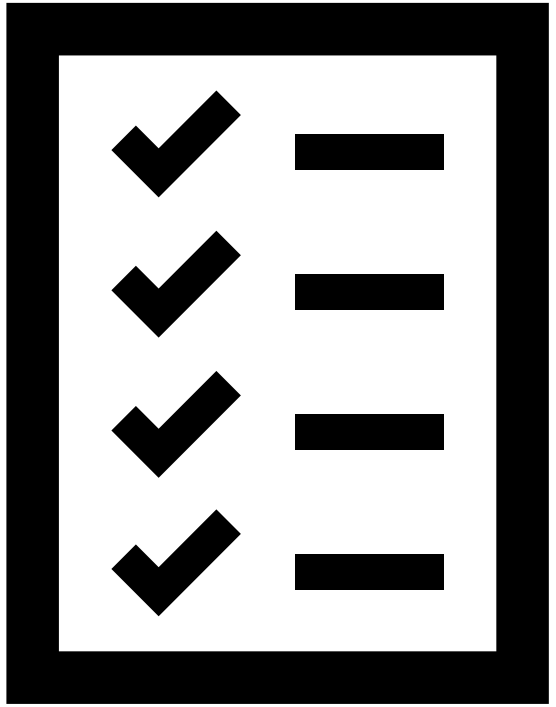
What counts as acceptable evidence of immunity?

Acceptable Evidence of Immunity

- **Documented age-appropriate vaccination with live measles-, mumps-, and rubella-virus- containing vaccines**
- **Laboratory evidence of immunity**
- **Laboratory confirmation of disease**
- **Born before 1957**
  - Except healthcare personnel
  - Except rubella for women of childbearing age who could become pregnant



Is serologic testing necessary for measles, mumps, and rubella?

Measles, Mumps, Rubella Serologic Testing

- **Serologic screening before vaccination is not necessary unless the health care facility considers it cost-effective**
- **Post-vaccination serologic testing to verify immunity is not recommended**
  - Documented, age-appropriate vaccination supersedes the results of subsequent serologic testing
  - MMR vaccination for persons with 2 documented doses of measles- or mumps-containing vaccine or 1 dose of rubella-containing vaccine with a negative or equivocal measles titer is not recommended
  - Exception for women of childbearing age

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6

Clinical Considerations

MMR Revaccination Indications

- Vaccinated before the first birthday
- Vaccinated with inactivated (killed) measles vaccine (KMV) or measles vaccine of unknown type from 1963–1967
- Vaccinated + immune globulin (IG) in addition to a further attenuated strain or vaccine of unknown type (revaccination not necessary if IG given with Edmonston B vaccine)
- Vaccinated before 1979 with either inactivated mumps vaccine or mumps vaccine of unknown type who are at high risk for mumps infection (e.g., work in a health care facility) should be considered for revaccination with 2 doses of MMR

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Mumps Outbreaks

- **Third dose** of MMR during Mumps outbreaks
- For persons identified by public health authorities as being at increased risk
- Third dose mitigates spread during outbreaks

https://www.cdc.gov/vaccines/hcp/acip-recs/vacc-specific/mmr.html

International Travel

- Routinely ask patients about plans for international travel
- Refer to vaccination guidance for international travelers

Health Care Personnel:
MMR Vaccination and Serologic Testing

- HCP with 2 documented, appropriately spaced doses of MMR **do not** need to be serologically tested for immunity
- If they are tested and results are negative or equivocal ***NO*** additional MMR doses are needed
- Born before 1957 is **NOT** presumptive evidence of immunity. Healthcare workers need documented evidence of immunity

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Q&A

- **If a healthcare worker develops a rash and low-grade fever after MMR vaccination, is the healthcare worker infectious?**

  - A. Yes
  - B. No

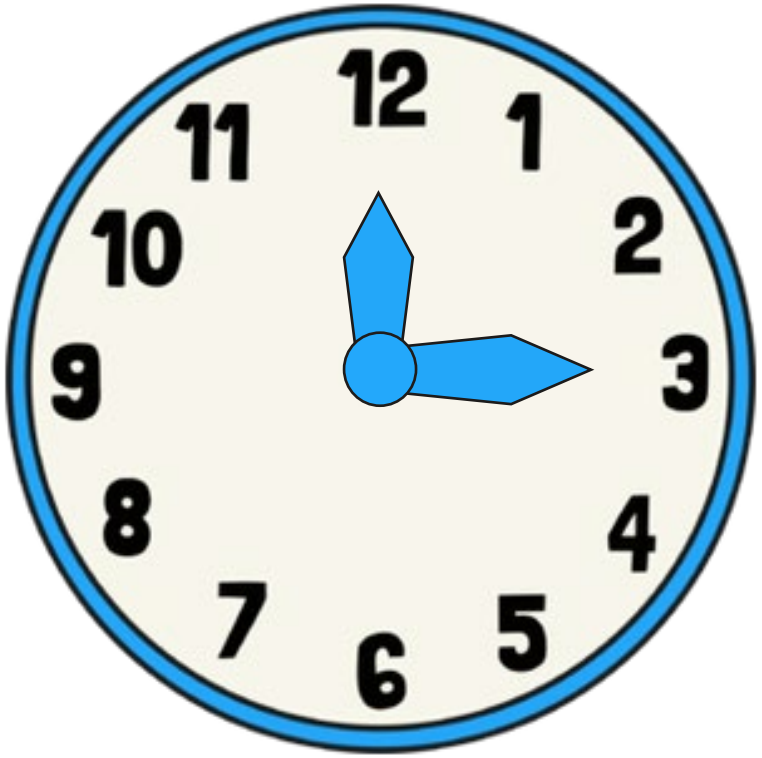
Q&A

- **If a healthcare worker develops a rash and low-grade fever after MMR vaccination, is the healthcare worker infectious?**

  - **B. No.** Approximately 5 to 15% will develop a low-grade fever and/or rash after vaccination. However, the person is not infectious, and no special precautions need to be taken.

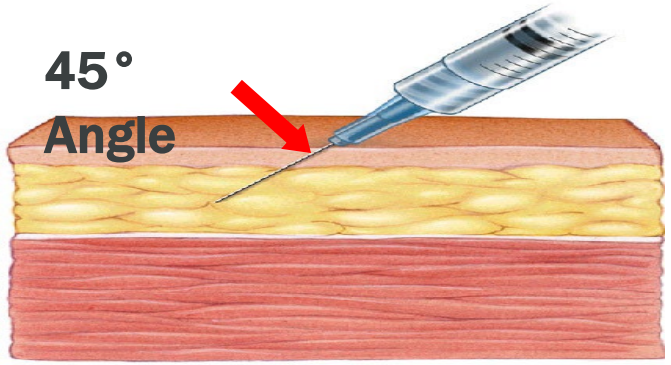
Health Care Personnel and Outbreaks

- Measles, mumps and rubella outbreaks spread **RAPIDLY**
- Healthcare facilities should routinely document adequate evidence of immunity among personnel **BEFORE** an outbreak occurs

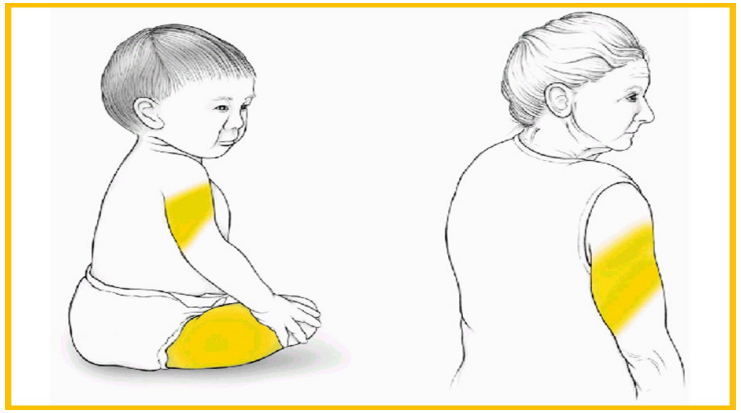


MMR and MMRV Administration

- **Preparation**
  - MMR and MMRV vaccines must be reconstituted BEFORE administering
  - Use ONLY the diluent supplied by the manufacturer



- **Route: Subcutaneous injection**
  - Needle gauge: 23–25 gauge
  - Needle length: 5/8 inch



- **Site:**
  - Infants/toddlers: upper anterolateral thigh
  - Older children/adults: upper outer triceps

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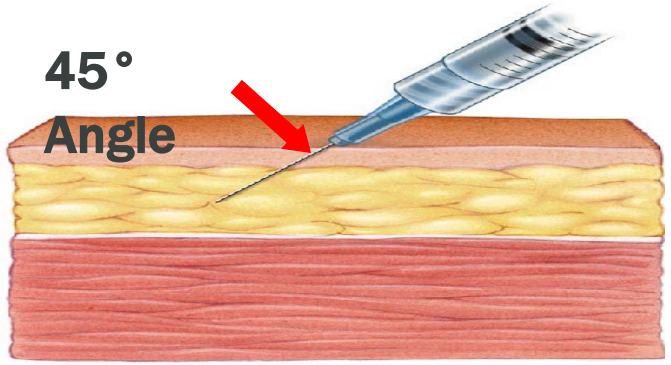

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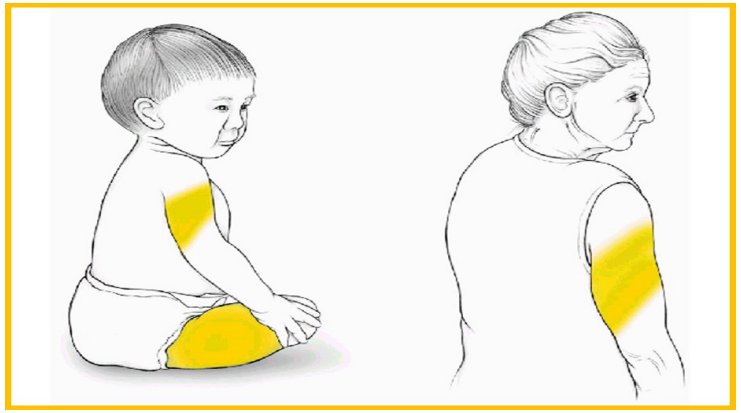

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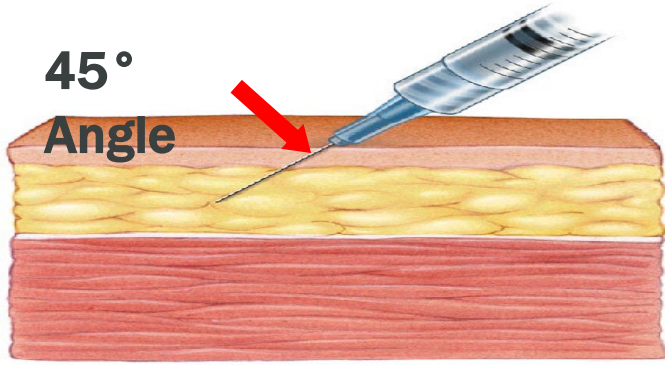

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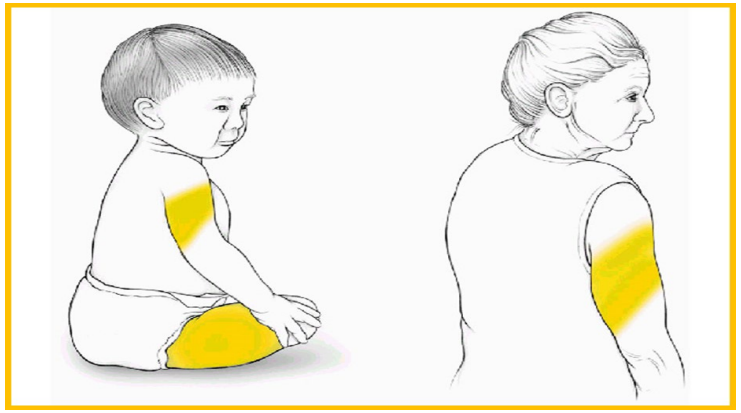

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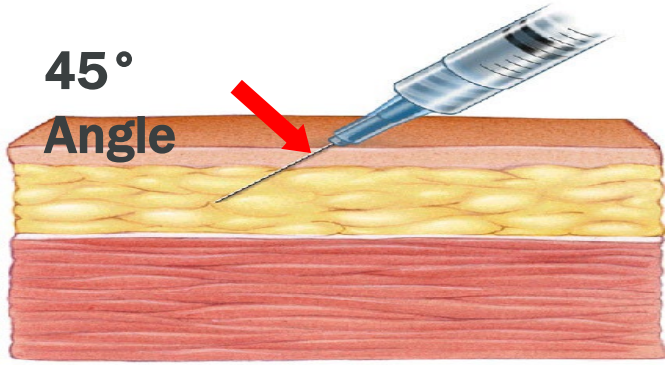

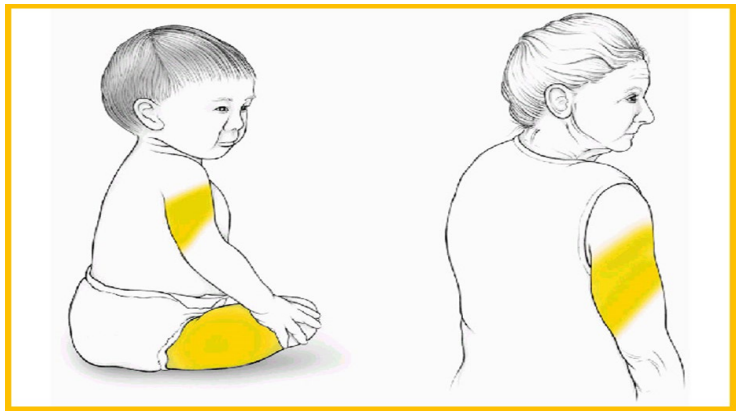

MMR and MMRV Administration Errors

- **Wrong diluent used to reconstitute vaccine**
  - Dose does NOT count and should be repeated ASAP
- **Wrong route**
  - Administered intramuscularly instead of subcutaneously
- **MMRV administered after the age of 12 years**
  - Dose counts if the minimum interval has been met
- **Always remember – store vaccine according to the manufacturer's recommendations and use a new needle and syringe for each patient**

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MMR and MMRV Administration Errors

VAERS

Vaccine Adverse Event Reporting System

www.vaers.hhs.gov

Measles Post-exposure Prophylaxis

Measles	Mumps & Rubella
Within **72 hours** of exposure, MMR vaccine	Post-exposure MMR vaccination or immunoglobulin is NOT recommended
Within **6 days** of exposure, immunoglobulin for non-immune persons*	

*Not indicated for persons who have received 1 dose of measles-containing vaccine at age 12 months or older, unless they are severely immunocompromised

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7

Safety

Contraindications

MMR	MMRV
Severe allergic reaction (e.g., anaphylaxis) after a previous dose or to a vaccine component • If someone is severely allergic to gelatin, do NOT administer M-M-R II	Severe allergic reaction (e.g., anaphylaxis) after a previous dose or to a vaccine component
Pregnancy	Pregnancy
Known severe immunodeficiency (e.g., from hematologic and solid tumors, receipt of chemotherapy, congenital immunodeficiency, long-term immunosuppressive therapy(c) or patients with HIV infection who are severely immunocompromised)	Known severe immunodeficiency (e.g., from hematologic and solid tumors, receipt of chemotherapy, congenital immunodeficiency, long-term immunosuppressive therapy(c) or patients with HIV infection who are severely immunocompromised)
Family history of altered immunocompetence	Family history of altered immunocompetence

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Recent (≤11 months) receipt of antibody-containing blood product (specific interval depends on product)	Recent (≤11 months) receipt of antibody-containing blood product (specific interval depends on product)
History of thrombocytopenia or thrombocytopenic purpura	History of thrombocytopenia or thrombocytopenic purpura
Need for tuberculin skin testing or interferon-gamma release assay (IGRA) testing	Need for tuberculin skin testing or interferon-gamma release assay (IGRA) testing
Moderate or severe acute illness with or without fever	Moderate or severe acute illness with or without fever

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Tuberculin Skin Testing (TST)* or Tuberculosis Interferon-Gamma Release-Assay (IGRA) and MMR or MMRV Vaccines

- **TST or IGRA may be given at same visit as MMR or MMRV**
- **If MMR/MMRV given first, delay TST or IGRA by at least 28 days**
- **If TST given first, administer MMR or MMRV when skin test is read**

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MMR Vaccine Adverse Reactions

Adverse Reactions	
Fever	5%–15% (measles)
Rash, pruritis, purpura	5% (measles)
Thrombocytopenia	1/30,000–40,000 doses (measles)
Lymphadenopathy	Rare (rash, pruritis, purpura)
Allergic reactions	Rare
Parotitis	Rare (mumps)
Hearing loss	Rare (mumps)

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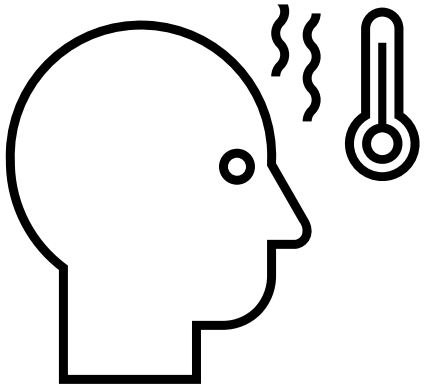

- Adverse reactions are similar to MMR
- Increased risk of fever and febrile seizures with MMRV when used as the first dose (children 12–23 months of age)
- 2X higher compared to MMR and varicella vaccines separately
- Occurs among 8 out of every 10,000 children vaccinated
- No increased risk of febrile seizures when MMRV used as the second dose in the MMR and varicella series
- Children with a personal or family history of seizures should be vaccinated with separate MMR and varicella vaccines

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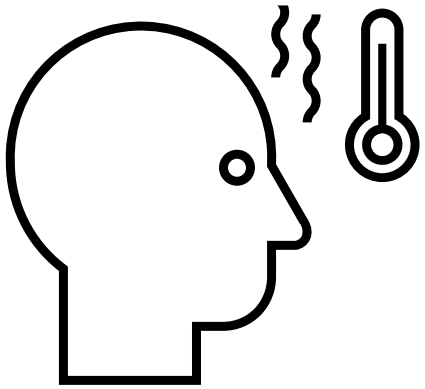

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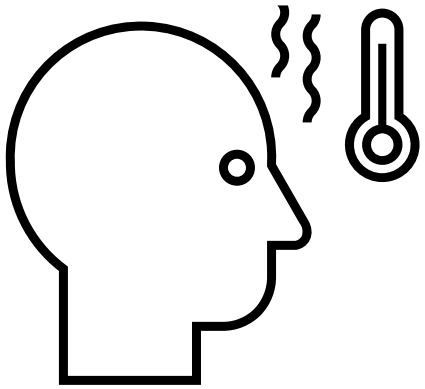

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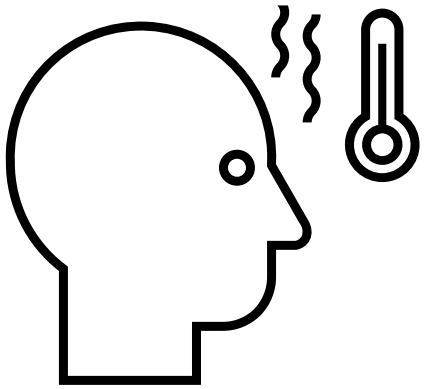

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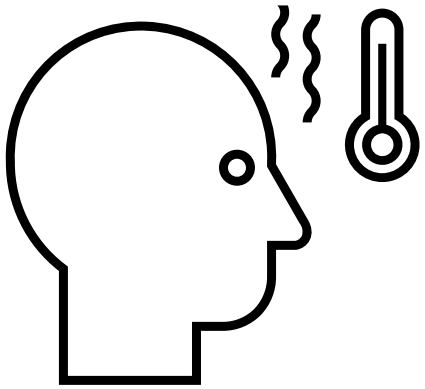

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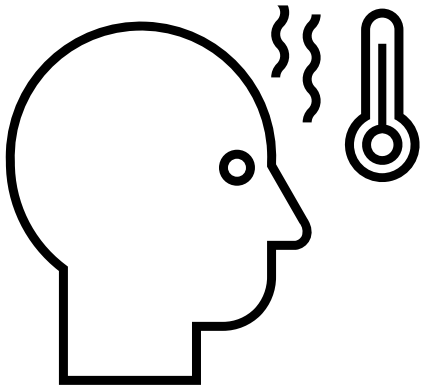

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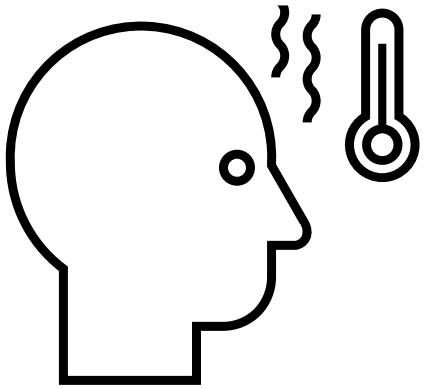

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MMRV Vaccine

Vaccines and Preventable Diseases

Vaccines & Preventable Diseases Home > Vaccines by Disease > Rubella > For Healthcare Professionals

Vaccines & Preventable Diseases Home

Vaccines by Disease

- Chickenpox (Varicella)
- Dengue
- Diphtheria
- Flu (Influenza)
- Hepatitis A
- Hepatitis B
- Hib
- Human Papillomavirus (HPV)
- Measles
- Meningococcal
- Mumps

MMR & Varicella Vaccines or MMRV Vaccine: Discussing Options with Parents

For Healthcare Providers

Two Options for Protection

There are two options for protecting children who are 12 months-12 years old against measles, mumps, rubella, and varicella: using the varicella vaccine and the trivalent measles, mumps, and rubella (MMR) vaccine or using the quadrivalent measles, mumps, rubella, and varicella (MMRV) vaccine. This means that parents and caregivers have a decision to make, and they will rely on you as their child's healthcare provider for help in making that decision.

MMRV Vaccine as the First Dose at Ages 12–47 Months—The Necessary Conversation

As you know, questions or concerns about vaccines can be a source of stress for some parents during a well-child visit. As their child's healthcare provider, you remain parents' most trusted source of information about vaccines. For the first dose of measles, mumps, rubella, and varicella vaccines given at ages 12-47 months, either MMR and varicella vaccines or MMRV vaccine can be used.

On This Page

- Two Options for Protection
- MMRV Vaccine as the First Dose at Ages 12-47 Months--The Necessary Conversation
- Summary of Risks and Benefits
- The Risk of Febrile Seizures
- MMRV Vaccine as a First Dose at Ages 48 Months and Older or as a Second Dose at Any Age
- Successful Communication about the Vaccination Options

www.cdc.gov/vaccines/vpd/mmr/hcp/vacopt-factsheet-hcp.html

Vaccine Safety

CDC > Vaccine Safety > Safety Information by Vaccine > Measles, Mumps, Rubella, Varicella (MMRV) Vaccines

Vaccine Safety

Safety Information by Vaccine

- Chickenpox (Varicella) Vaccines
- Diphtheria, Tetanus, and Pertussis Vaccines
- *Haemophilus influenza* Type b (Hib) Vaccines
- Hepatitis A Vaccines
- Hepatitis B Vaccines
- Human Papillomavirus (HPV) Vaccine
- Influenza (Flu) Vaccines
- Measles, Mumps, Rubella (MMR) Vaccines
- **Measles, Mumps, Rubella, Varicella (MMRV) Vaccines**
  - VSD MMRV Safety Study

MMRV Vaccine and Febrile Seizures

A study showing the risk levels for several health outcomes, including seizures, after measles, mumps, rubella, and varicella (MMRV) combination vaccine in children aged 12 to 23 months has been published in the July 2010 print issue of Pediatrics (published online June 28).

The study, "Measles-Mumps-Rubella-Varicella Combination Vaccine and the Risk of Febrile Seizures" uses computerized information from CDC's Vaccine Safety Datalink (VSD) Project. VSD consists of managed care organizations which gather vaccination and demographic information, as well as health outcomes of their patients (more than 9.2 million across the U.S.)

Researchers examined VSD data on more than 83,000 children who received their first dose of MMRV vaccine and over 376,000 children who received their first doses of MMR and varicella vaccines given at the same visit from the year 2000 to the year 2008.

The Study's Main Findings Report:

For MMRV combination vaccine, there was 1 additional febrile seizure for every 2,300 doses given, compared to separate MMR plus varicella vaccines in the 7 to 10 days following vaccination.

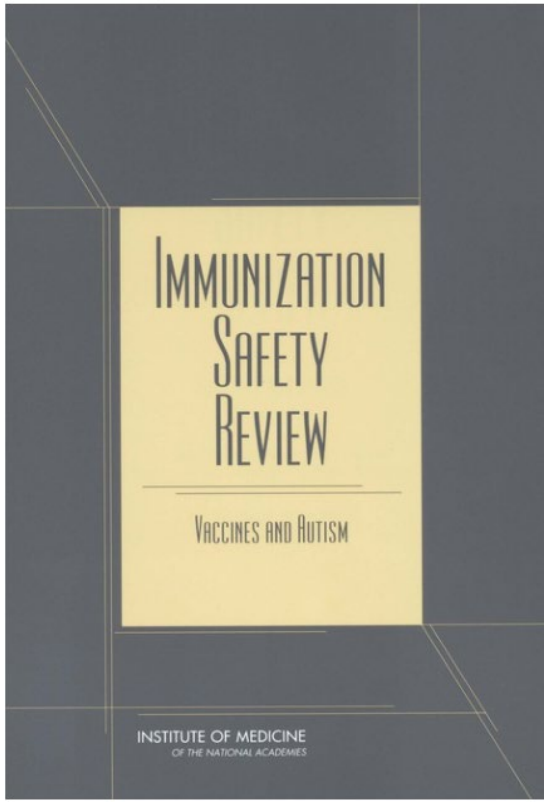
Of the children identified as having seizures following the 7 to 10-day vaccination period, about 90% were found to be febrile seizures.

The rate of seizures in this timeframe was 85 per 1000 person-years in the MMRV vaccine group compared to 42 per 1000 in the MMR and varicella vaccine group. This risk was about 2 times higher in children who received the combination shot (MMRV) versus the single shots (MMR and varicella).

www.cdc.gov/vaccinesafety/vaccines/mmrv/mmrv-febrile-seizures.html

MMR Vaccine Safety

"The committee concludes that the evidence favors **rejection** of a causal relationship between MMR vaccine and autism." Institute of Medicine, 2004



Vaccine safety information: https://www.cdc.gov/vaccinesafety/index.html
https://nap.nationalacademies.org/catalog/10997/immunization-safety-review-vaccines-and-autism
https://www.cdc.gov/measles/cases-outbreaks.html

8

Storage and Handling

MMR Storage and Handling

- **Store in the refrigerator between 2°C and 8°C (36°F and 46°F)**
  - M-M-R II may also be stored in the freezer
  - Protect vaccine from light by keeping in the original packaging with the lid closed
- **Store diluent at room temperature or refrigerate**
- **Discard if not used within 8 hours after reconstitution**
  - Do not fill syringe with reconstituted vaccine until ready to administer

MMR (M-M-R II)

Ages: 12 months and older

Use for: Any dose in the series

Route: Subcutaneous (subcut) injection

Reconstitute MMR powder ONLY with manufacturer-supplied sterile water diluent

Beyond Use Time: If not used immediately after reconstitution, store in vaccine vial in dark place at 2°C to 8°C (36°F to 46°F) and discard if not used within 8 hours.

MMR (M-M-R II)

Lyophilized MMR component + **Manufacturer's sterile water diluent** = **M-M-R II vaccine**

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Beyond Use Time: If not used immediately after reconstitution, store in vaccine vial in dark place at 2°C to 8°C (36°F to 46°F) and discard if not used within 8 hours.

MMRV Storage and Handling

- **Store in the freezer between -50°C and -15°C (-58°F and +5°F)**
  - Do NOT use dry ice
  - Protect vaccine from light
  - Vaccine may be stored at refrigerator temperature (2°C and 8°C or between 36°F and 46°F) for up to 72 continuous hours after removal from freezer
- **Store diluent at room temperature or refrigerate**
- **Use MMRV within 30 minutes of reconstitution or discard it**
  - Do not fill syringe with reconstituted vaccine until ready to administer
  - Do not freeze reconstituted vaccine

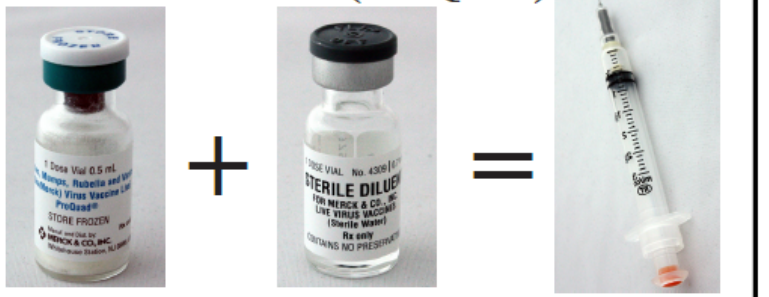
MMRV (ProQuad)

Ages: 12 months through 12 years
Use for: Any dose in the series
Route: Subcutaneous (subcut) injection

Reconstitute MMRV powder ONLY with manufacturer-supplied sterile water diluent

Beyond Use Time: Discard reconstituted vaccine if not used within 30 minutes.

MMRV (ProQuad)



Lyophilized MMRV component + Manufacturer's sterile water diluent = ProQuad vaccine

Beyond Use Time: Discard reconstituted vaccine if not used within 30 minutes.

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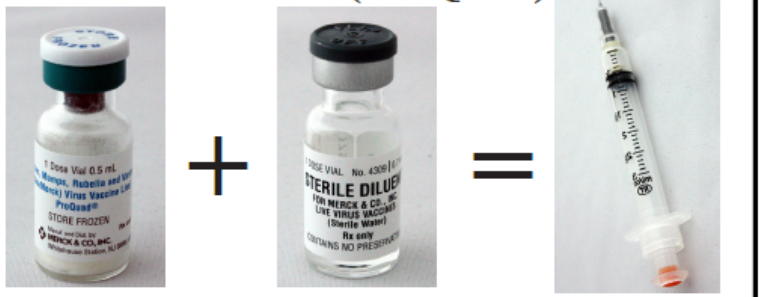

Lyophilized MMRV component | Manufacturer's sterile water diluent | ProQuad vaccine

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MMRV (ProQuad)

Ages: 12 months through 12 years
Use for: Any dose in the series
Route: Subcutaneous (subcut) injection

Reconstitute MMRV powder ONLY with manufacturer-supplied sterile water diluent

Beyond Use Time: Discard reconstituted vaccine if not used within 30 minutes.

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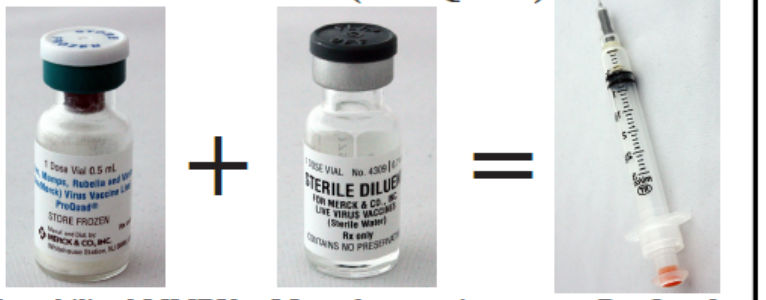

Lyophilized MMRV component | **Manufacturer's sterile water diluent** | **ProQuad vaccine**

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MMRV Storage and Handling

- Store in the freezer between -50°C and -15°C (-58°F and +5°F)
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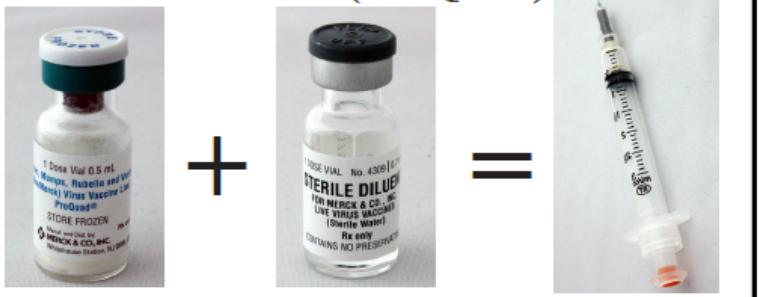

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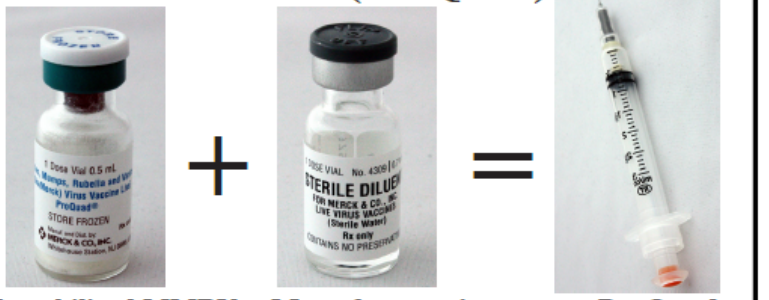

Lyophilized MMRV component + Manufacturer's sterile water diluent = ProQuad vaccine

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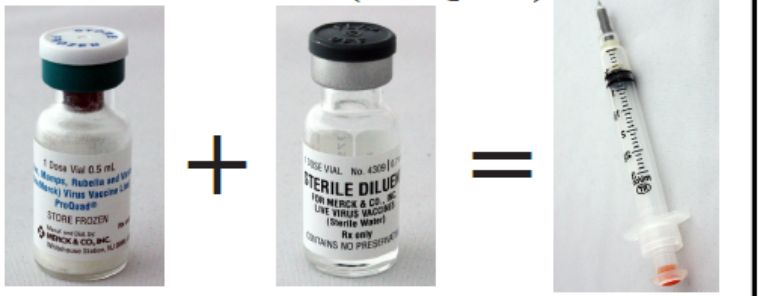

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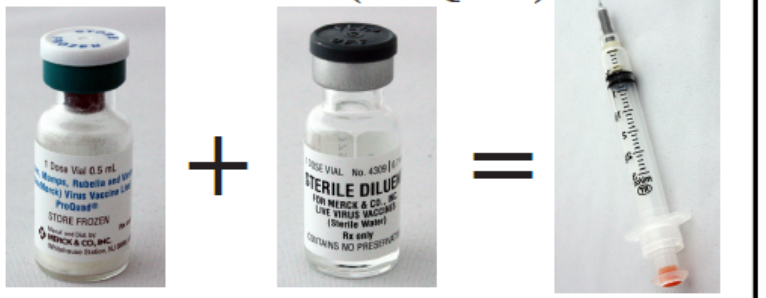

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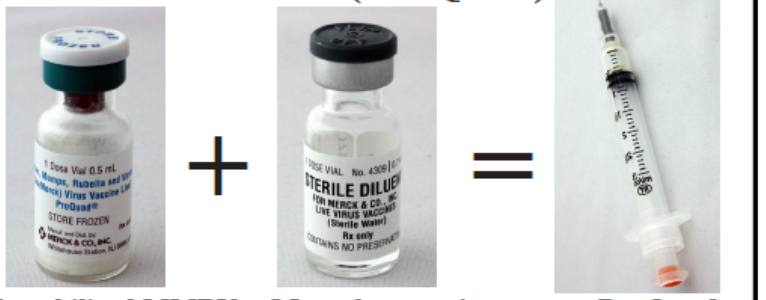

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Q&A

- **A nursing student had MMR titers done before he started school. His titers came back negative. He has 2 documented doses of MMR after 1 year of age, separated by more than 4 weeks. How many doses of MMR should we administer?**

- A. One
- B. Two
- C. None

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  - **C. None**

Continuing Education Information

- **CE credit, go to**: https://tceols.cdc.gov/
- **Search course number: WD4564-083022**
- **CE credit expires: July 1, 2024**
- **CE instructions are available on the Pink Book Web-on-Demand Series web page**
- **Questions and additional help with the online CE system, e-mail** CE@cdc.gov

E-mail Your Immunization Questions to Us

- NIPINFO@cdc.gov

Thank You From Atlanta!