

Measles Update

March 16, 2015

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- Presenters have no conflicts of interest or disclosures

Background

- Measles is a highly contagious, viral disease characterized by fever, cough, coryza, conjunctivitis, and a maculopapular rash.
- Before a vaccine was available, infection with measles was nearly universal during childhood, and more than 90% of persons were immune by age 15 years.
- Until 2011, there were only about 50 cases a year reported in the United States, and most of these originated outside the country.



Image courtesy of CDC

Clinical Features - Prodrome

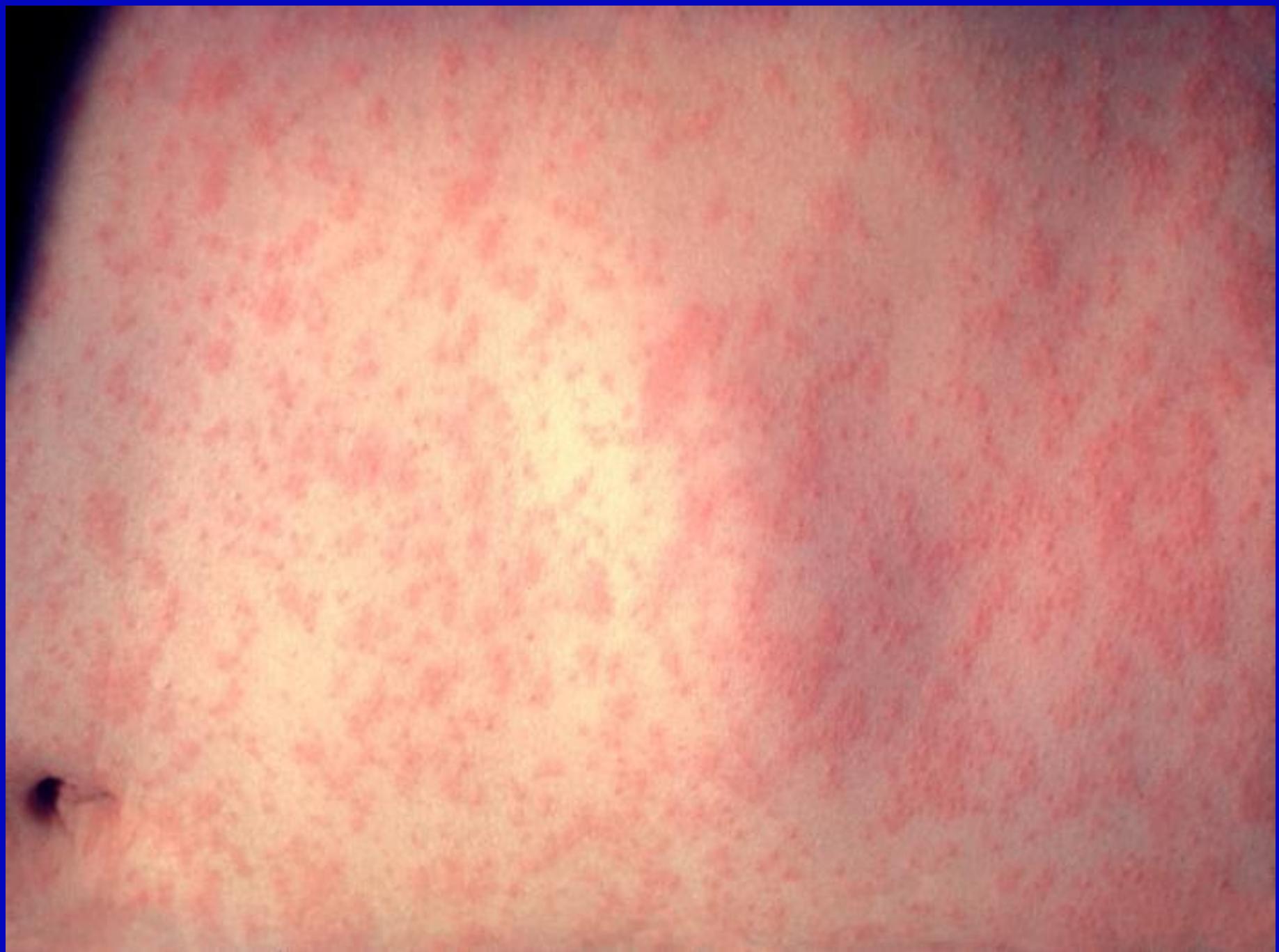
- High fever (>101 degrees), malaise, cough, coryza, and conjunctivitis.



Clinical Features - Rash

- The maculopapular rash typically appears 2-4 days into the illness and usually lasts 5 – 6 days.
- Rash begins at the hairline then involves the face and upper neck.
- It gradually spreads downwards and outward, eventually reaching the hands and feet.
- Fades in order of appearance





Clinical Features – Koplik Spots

- Small white spots present on mucous membranes and occur 2-3 days after symptoms begin



Source: CDC, Epidemiology and Prevention of Vaccine-Preventable Diseases, "The Pink Book," 12th Edition, 2011

Complications

- Approximately 30% of cases have one or more complications.
- Complications are more common in children <5 yrs and adults \geq 20 yrs.
- Complications :
 - Diarrhea (8%)
 - Otitis media (7%)
 - Pneumonia (6%)
 - Acute encephalitis (0.1%)
 - Death (0.2%)
 - Subacute sclerosing panencephalitis (fatal degenerative disease of the CNS 7-10 yrs after measles (.001%)

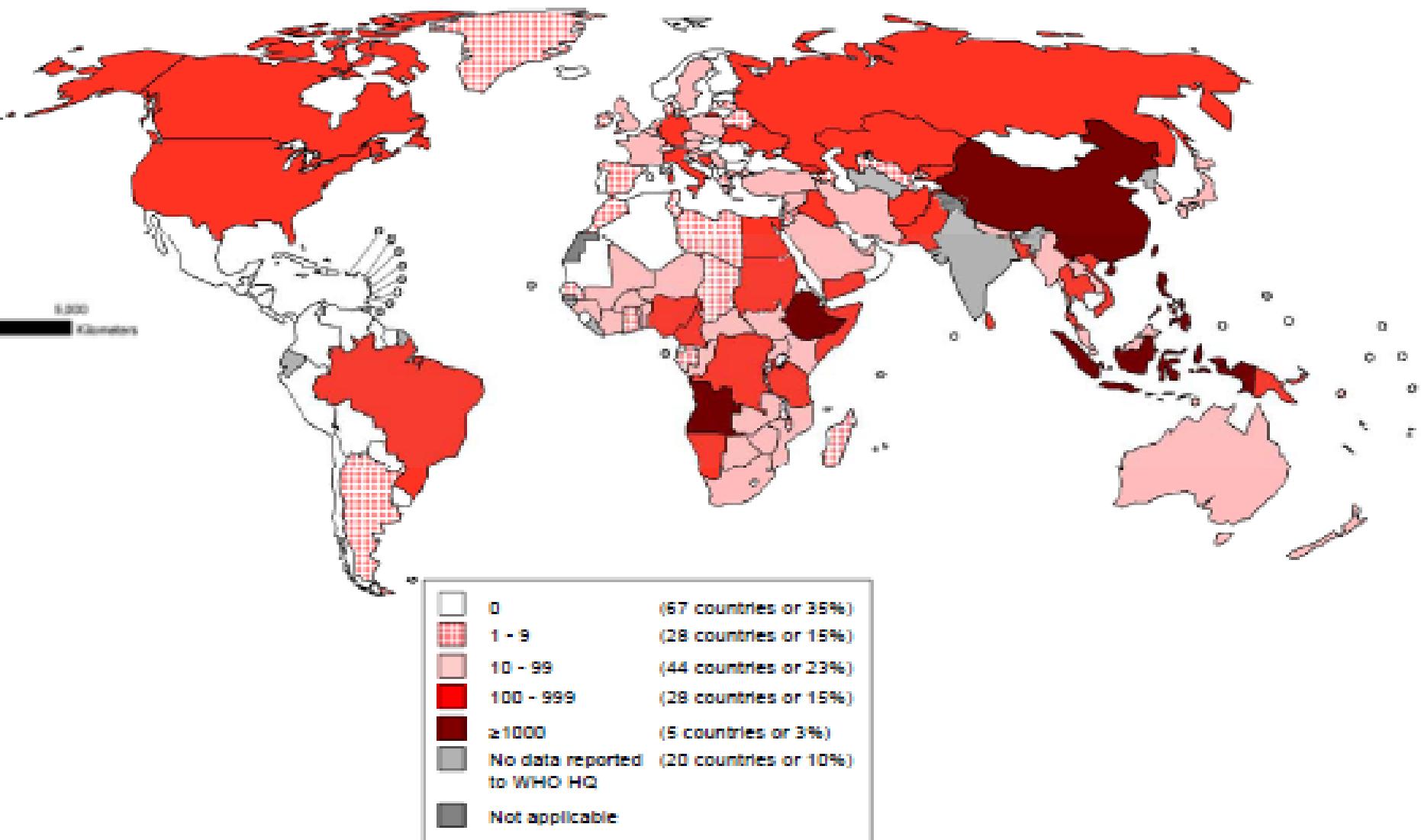
Epidemiology

- Reservoir: Human. No known asymptomatic carrier state.
- Transmission: Respiratory droplets. Airborne transmission via aerosolized droplets has been documented in closed areas up to 2 hours after a person with measles occupied the area.
- Communicability: Highly communicable. Secondary attack rate up to 90%. People with measles are contagious 4 days before to 5 days after rash onset.
- Avg Incubation: 14 days (range 7-21).

Worldwide Trends

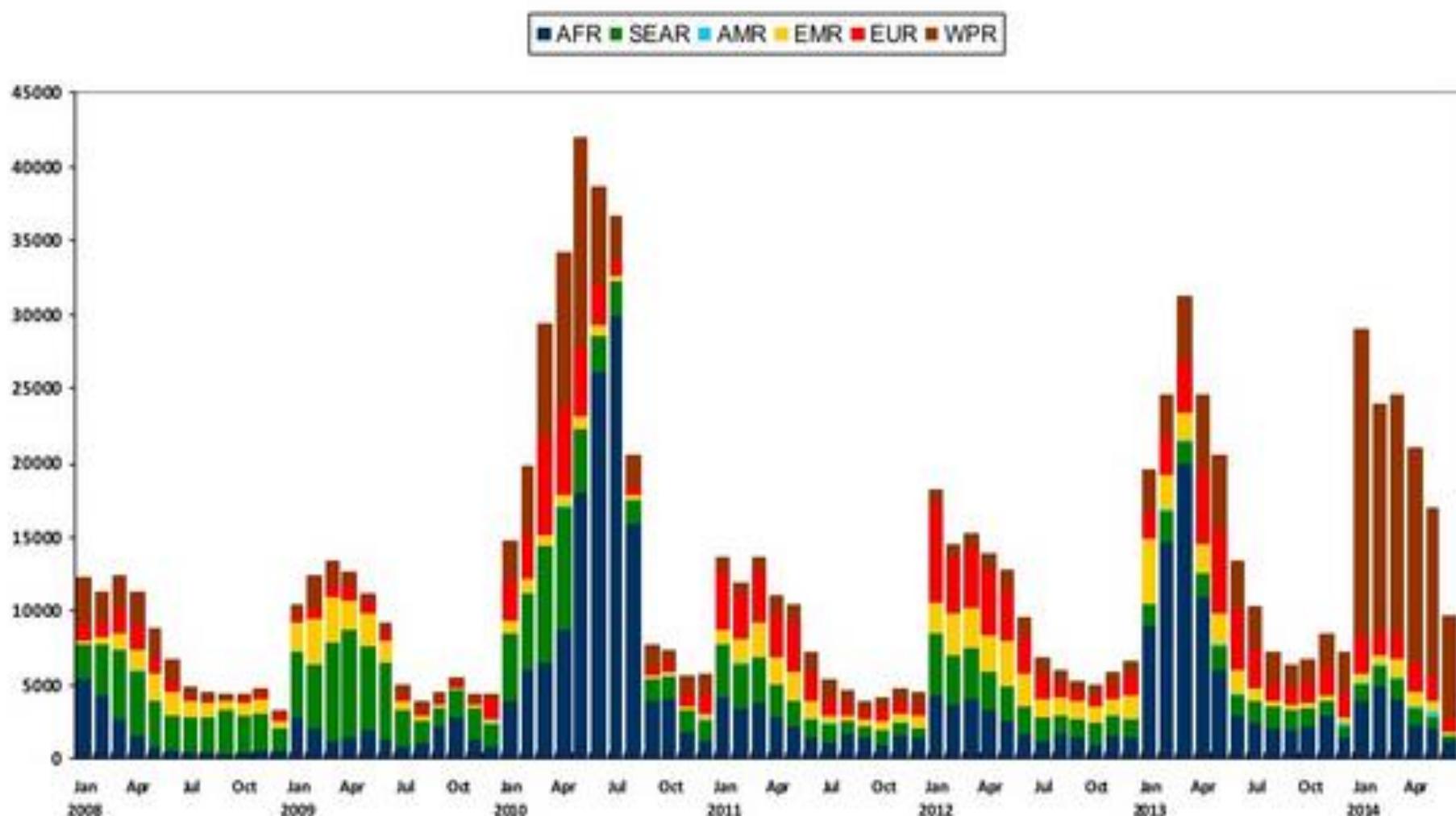
- Measles is still a common in many parts of the world and often fatal disease in developing countries
- Over 22,000 cases were reported in Europe in 2014-2015
- 122,000 estimated deaths (2012)

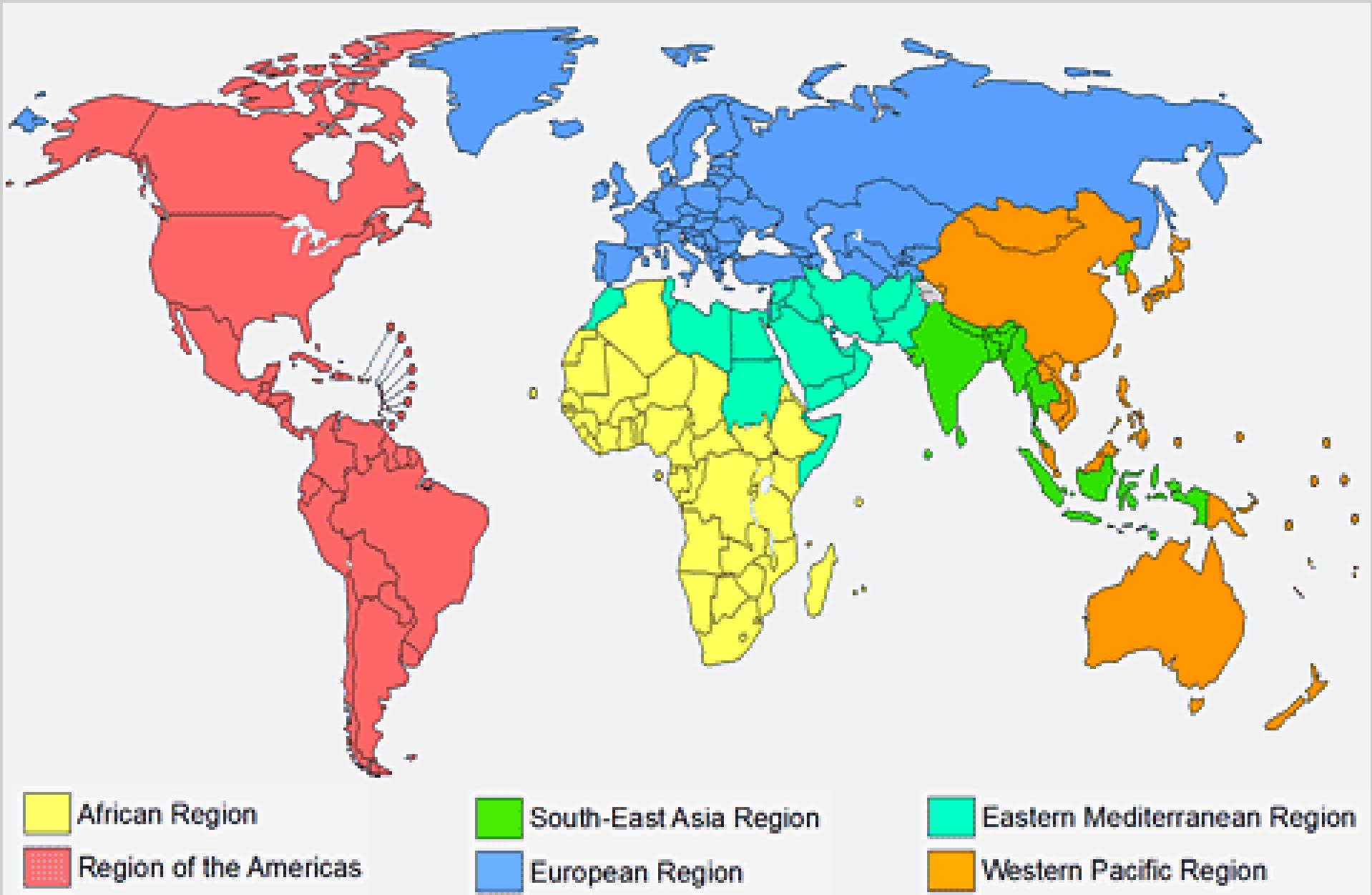
Number of Reported Measles Cases with onset date from Jul 2014 to Dec 2014 (6M period)



The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Contour lines on maps represent approximate border lines for which there may not yet be full agreement. ©WHO 2015. All rights reserved.

Measles Case Distribution by Month and WHO Regions, 2008-2014

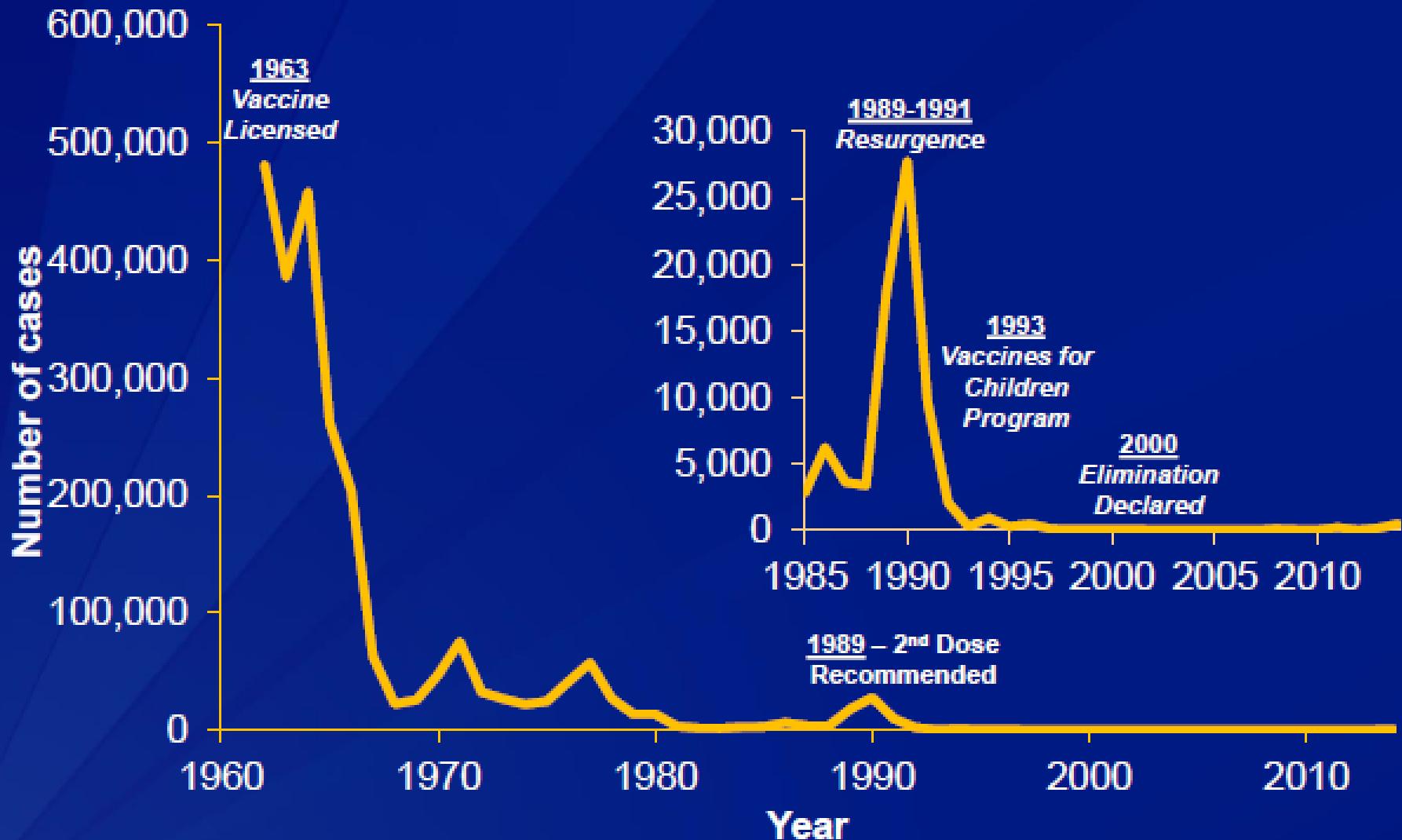




U.S. Trends



Measles Cases, United States, 1962-2014*



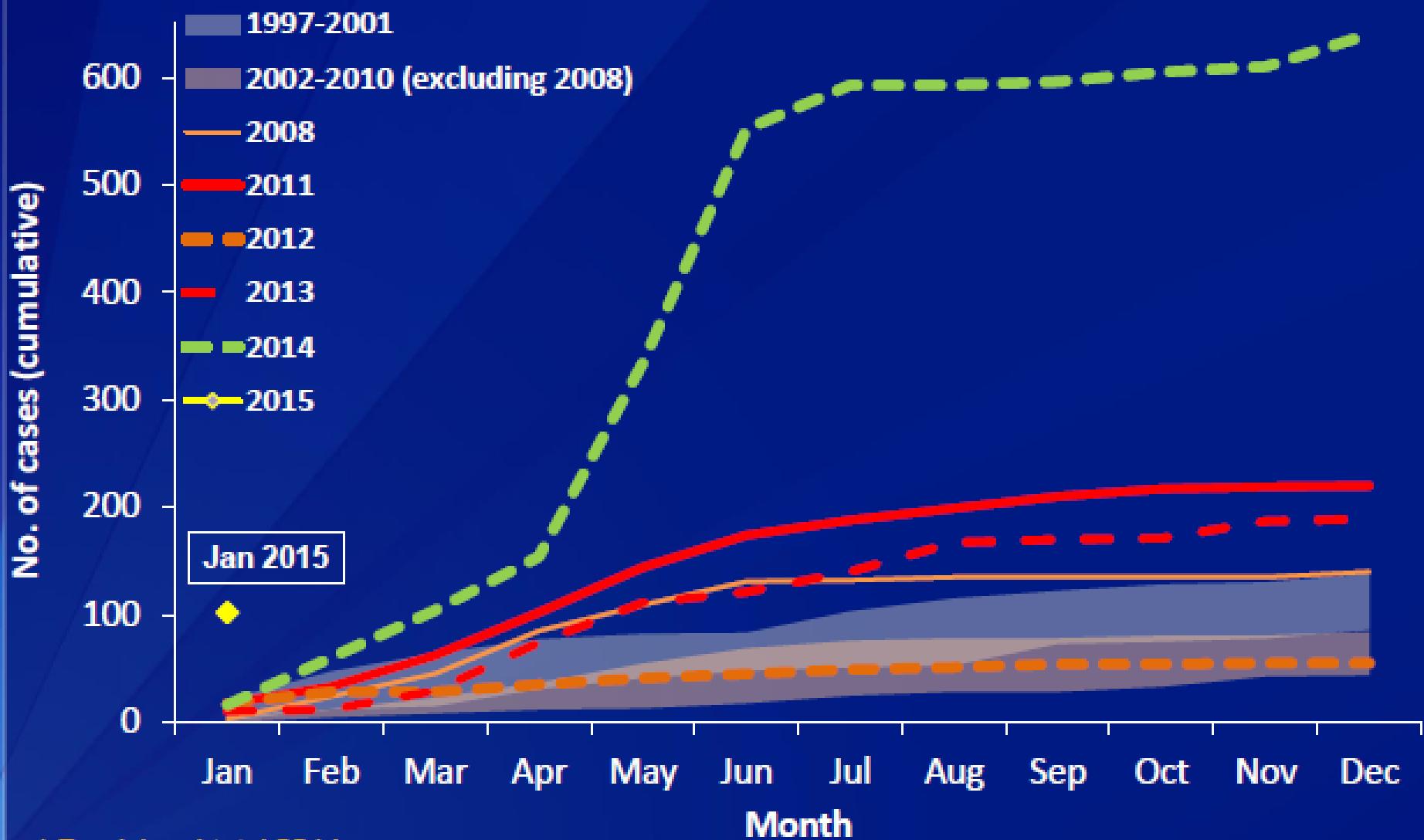
*2014 case count preliminary as of June 20

Measles Elimination* in the U.S.

- Declared in 2000 and achieved due to:
 - High two-dose vaccine coverage
 - High quality measles surveillance and response
 - Improved measles control in the World Health Organization Region of the Americas
- Elimination does not mean “gone forever” - imported cases and limited spread occur every year

* Defined as interruption of continuous measles transmission for lasting > 12 months

Measles, U.S., 1997-2015* Cumulative Number by Month of Rash Onset



* Provisional total 2014

* 2015 data through Jan 30

Measles U.S. 2014*

- 644 cases reported from 27 states including 23 outbreaks
 - 60 importations
 - 25 from the Philippines and 9 from India
 - 54 (91%) among US residents
 - 98% cases import-associated
 - 78 cases (12%) hospitalized
- Cases in US residents (N=635)
 - 77% unvaccinated
 - 15% unknown vaccination status (most are adults)
 - 8% vaccinated
 - Among unvaccinated
 - 79% were personal belief exemptors
 - 3% travelers age 6 months to 4 years
 - 8% were too young to be vaccinated
 - 10% unknown/misc

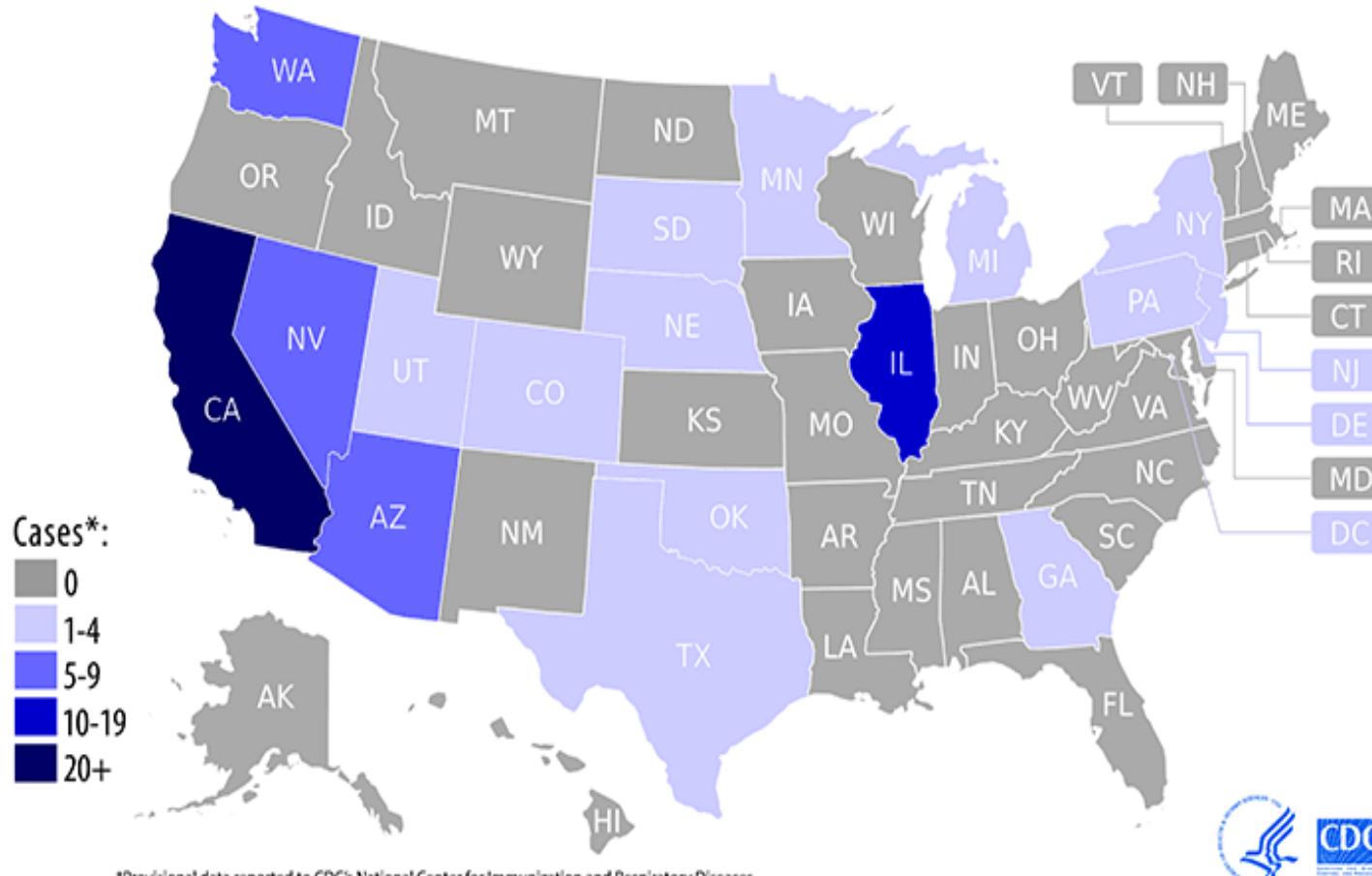


Measles Cases

From January 1 to April 3, 2015, 159 people from 18 states and the District of Columbia were reported to have measles [AZ (7), CA (101), CO (1), DC (2), DE (1), GA (1), IL (15), MI (1), MN (1), NE (2), NJ (2), NY (3), NV (9), OK (1), PA (1), SD (2) TX (1), UT (2), WA (7)]†. Most of these cases [117 cases (74%)] are part of a large [multi-state outbreak linked to an amusement park in California](#). This week, 19 previously reported measles cases in California were reclassified from 2015 cases to 2014 cases.

2015 Measles Cases in the U.S.

January 1 to April 3, 2015



*Provisional data reported to CDC's National Center for Immunization and Respiratory Diseases

Immunization Status of Outbreak CA Measles Cases, 2014-15

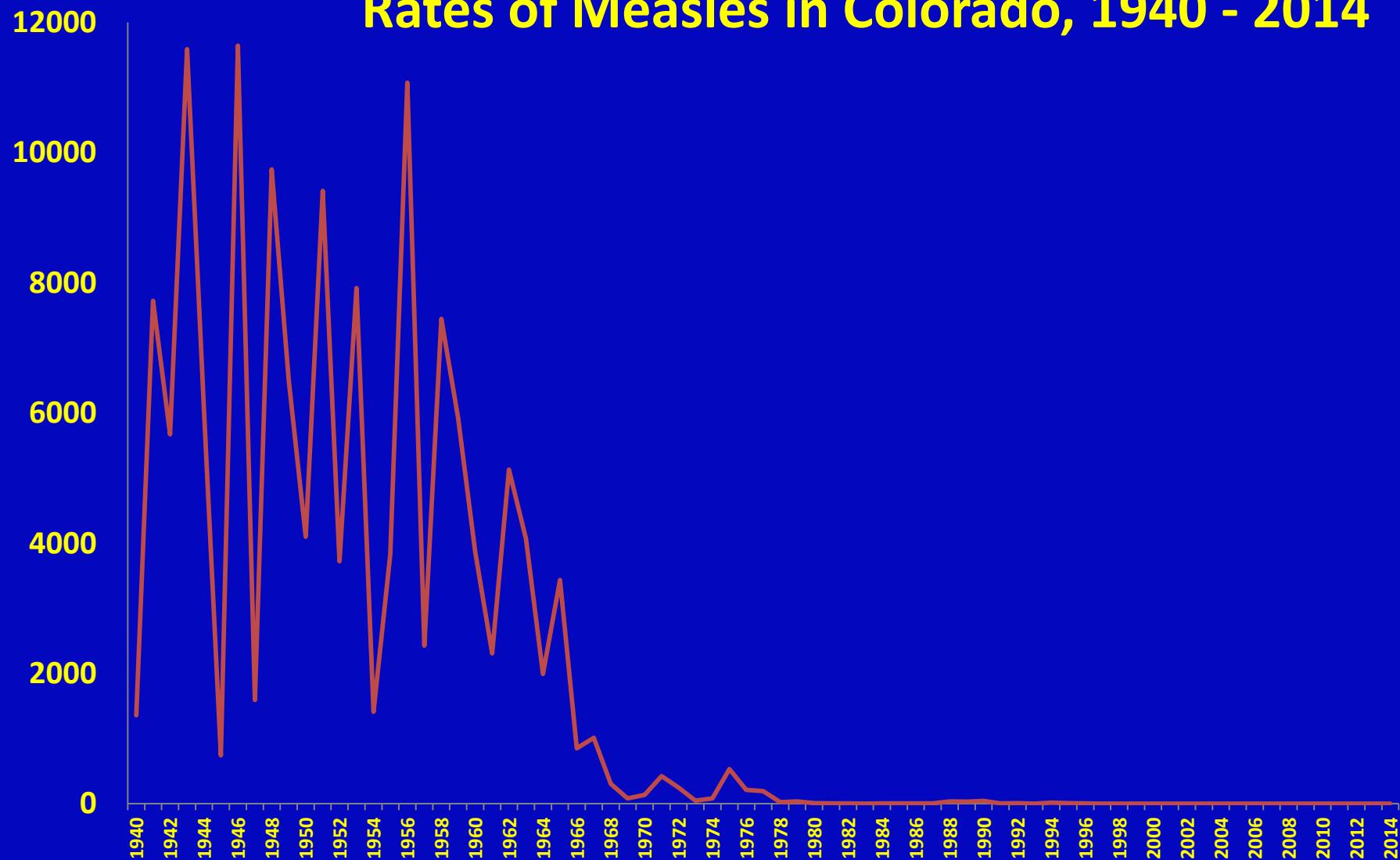
- Of 110 CA cases
 - 49 (45%) unvaccinated
 - 12 too young
 - 28 unvacc due to personal belief
 - 1 on alt schedule
 - 47 (43%) unknown or undocumented vaccination
 - 5 (5%) one dose
 - 7 (6%) two doses
 - 1 (1%) three doses
 - 1 (1%) IgG positive

April 10 Update

- Since 12/14, 134 confirmed measles cases in CA residents
- The latest case rash onset 3/2/15
- The outbreak over when 42 days have elapsed from the end of the infectious period of the last known B3 measles cases that was a not a new importation (4/17/15)
- Of the confirmed cases:
 - 40 cases visited Disneyland during December 17th-20th, 2014 where they are presumed to have been exposed to measles
 - 30 are household or close contacts to a confirmed case
 - 11 were exposed in a community setting (e.g., emergency room) where a confirmed case was known to be present
 - 50 have unknown exposure source but presumed linked to the outbreak based descriptive epidemiology or strain type
 - 3 cases are known to have a different genotype from the outbreak strain
- Among measles cases with vaccination documentation, 57 were unvaccinated and 25 had 1 or more doses of MMR

Colorado Trends

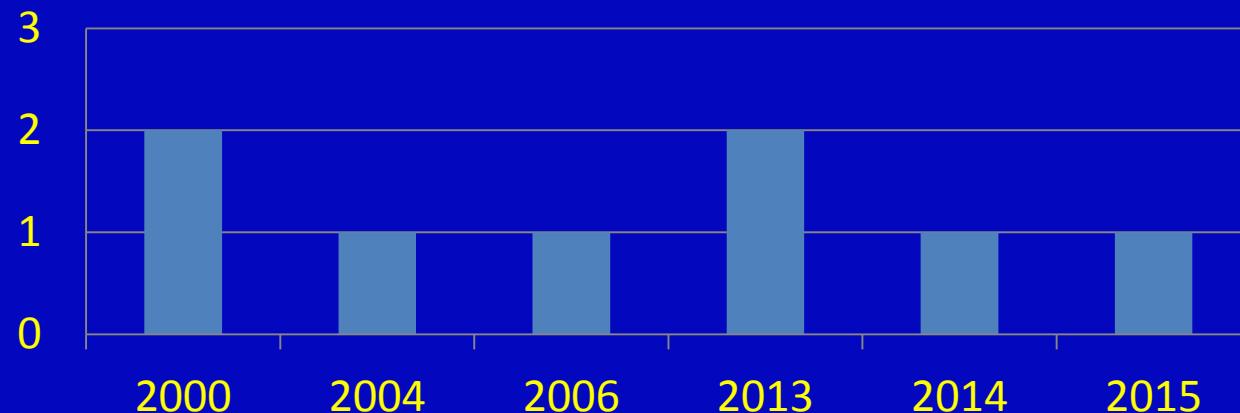
Rates of Measles in Colorado, 1940 - 2014



*Per 100,000 population

Measles in Colorado

- Measles outbreaks occurred in Colorado 1988-1990 (1988/115 cases, 1989/101 cases & 1990/138)
- During the past 15 years (2000-2015), 8 cases of measles were reported in Colorado.



Public Health Response

- Requires clinical recognition – challenge
- Suspected cases must be reported to public health within 24 hours
- 72 cases ruled out since January
- Laboratory testing
 - IgM: May be neg in first 72 hrs; false positives also possible
 - PCR: throat, NP, urine; may be positive after vaccination
- Post-exposure vaccination within 72 hrs or IG within 6 days (children < 1 yr, pregnant, or immunocompromised)

Public Health Response - Case

- Cases isolated through 4 days after rash (onset of rash day 0)
- Airborne isolation or private room with door closed, mask if feasible
- Ensure healthcare personnel have evidence of immunity

Public Health Response - Contacts

- Contact investigation
- Susceptible, exposed individuals monitored, may be quarantined through 21 days after exposure
- Costly

RECOMMENDED FOLLOW-UP FOR HIGH-RISK ¹ MEASLES CONTACTS				
Category	IgG testing	Postexposure prophylaxis ²	Quarantine ³	Symptom watch
Two documented doses of MMR vaccine (~1% will be susceptible)	No	No	No	Passive
Measles IgG positive (<1% will be susceptible)	No	No	No	Passive
Have 1 documented dose of MMR vaccine (5% will be susceptible) <u>or</u> no documented doses of MMR	Yes	No ⁴	Yes	Active
Born before 1957 (5% will be susceptible)	Yes	No ⁴	Yes	Active
History of measles disease	Yes	No ⁴	Yes	Active
Unknown or no documentation of measles immunity status	Yes	No ⁴	Yes	Active
Measles IgG negative or known to be unvaccinated	-	Yes	Yes	Active
Received MMR vaccine <72 hours of exposure ⁵	-	-	Yes	Active
Received immune globulin ≤6 days of exposure	-	-	Yes	Active

RECOMMENDED FOLLOW-UP FOR NON-HIGH-RISK MEASLES CONTACTS

Two documented doses of MMR vaccine (~1% will be susceptible)	No	No	No	Passive
Measles IgG positive (<1% will be susceptible)	No	No	No	Passive
Have 1 documented dose of MMR vaccine (5% will be susceptible) <u>or</u> no documented doses of MMR but are presumed to be immune to measles ⁶	If desired	No	No	Passive
Born before 1957 (5% will be susceptible)	No	No	No	Passive
Unknown immune status; no presumption of immunity	Yes	No ⁴	Yes	Active
Measles IgG negative or known to be unvaccinated	-	Yes	Yes	Active
Received MMR vaccine <72 hours of exposure ⁵	-	-	No	Active
Received immune globulin ≤6 days of exposure	-	-	No	Active

Utah Experience – 3 cases, 2015

- 1,600 calls to 117 individuals on voluntary quarantine
- 586 doses of the measles, mumps, rubella (MMR) vaccine in Jan
- > 600 staff hours
- Direct cost for outbreak ~ \$115,000
- 3,000 staff hours

Source: Utah Department of Health Press Release, February 25, 2015

Measles Vaccine

- The first measles vaccines were licensed in 1963 and included an inactivated (“killed”) vaccine and a live attenuated vaccine. The inactivated vaccine was withdrawn in 1967 because it did not protect against measles infection.
- The measles vaccine is combined with mumps and rubella (MMR) or mumps, rubella, and varicella (MMRV). The combined MMR was licensed in 1971. The MMRV vaccine was licensed in 2005.
- 2 doses are routinely recommended - at age 12-15 months, and 4 – 6 years.

Measles Vaccine

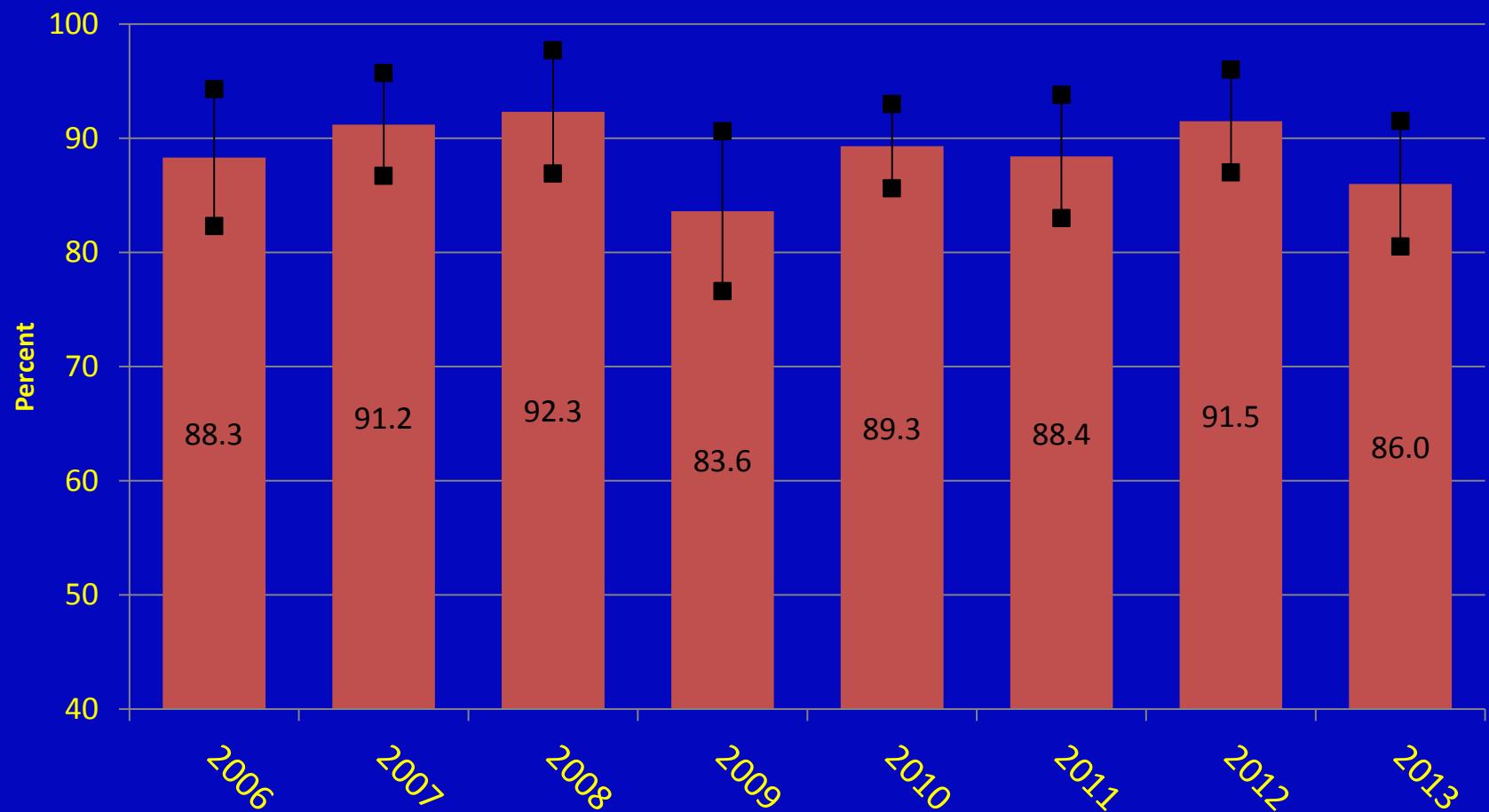
- Measles, mumps, and rubella (MMR) vaccine is highly effective in preventing measles and its complications.
- Measles antibodies develop in approximately 95% of children vaccinated with one dose and 98% of children vaccinated with two doses.
- Serologic and epidemiologic evidence indicate that vaccine-induced immunity appears to be life-long in most persons.
- Over 575 million doses of MMR vaccine have been given worldwide, and the vaccine is safe and well tolerated.



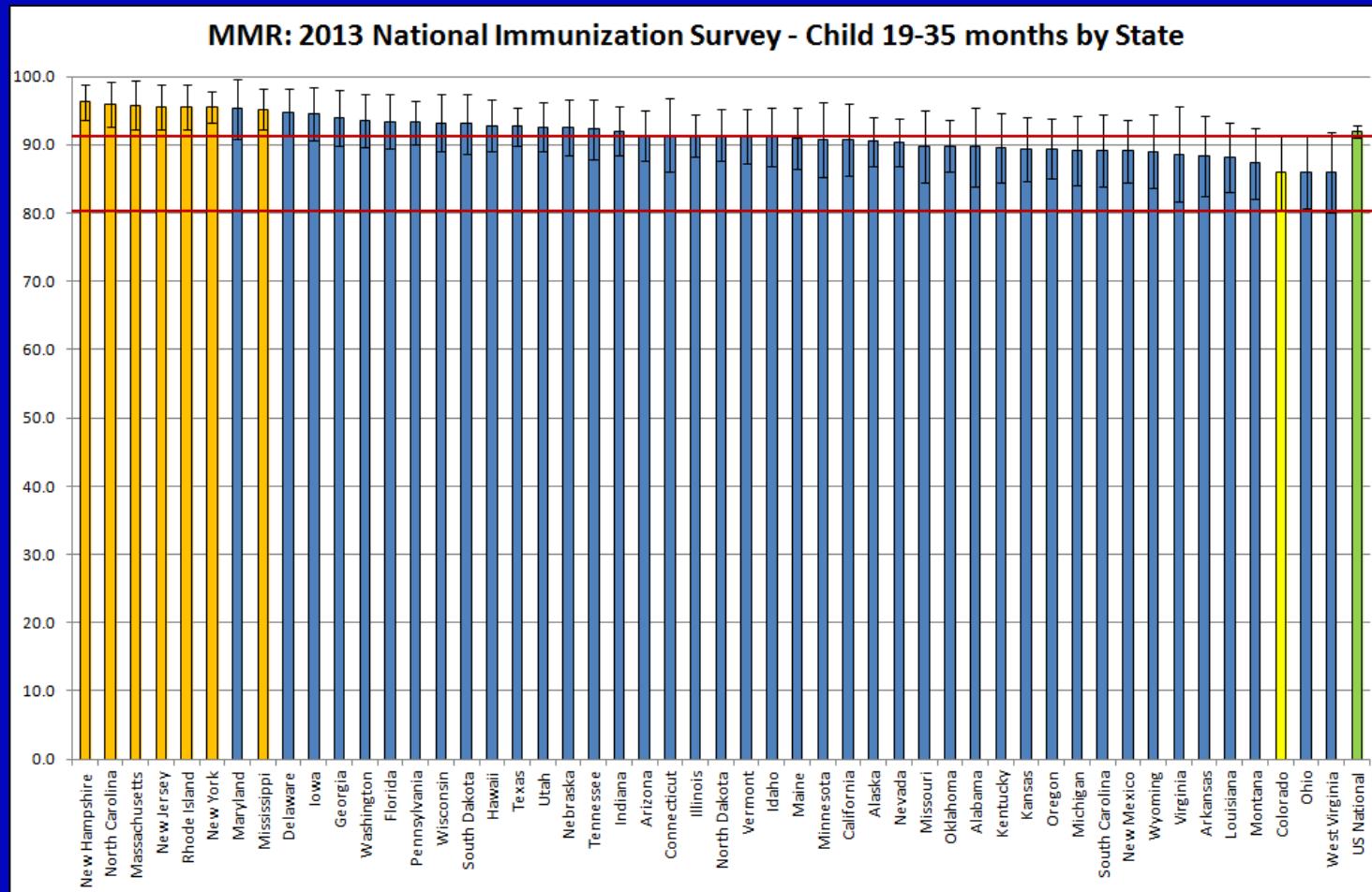
Measles Vaccination Rates

- Using the 2013 National Immunization Survey (NIS), 86.0% of Colorado's children ages 19-35 months have had one dose of MMR vaccine compared with 91.9% for the US National rate.
- As reported in the 10/17/14 MMWR, the median rate for 2 doses of MMR in kindergarteners for the 2013-2014 school year is 94.7%, but the Colorado rate is the lowest reported at 81.7%.

1+ MMR Immunization Rate with 95% Confidence Intervals among Colorado Children 19-35 Months of Age, by Year, National Immunization Survey



Colorado Immunization Rates- MMR



Conclusion

- Measles continues to be a risk to Coloradoans
- MMR vaccine is highly effective in preventing measles.
- High 2-dose MMR vaccine coverage is essential.
- Despite low numbers of measles cases, Colorado's immunization rates have room for improvement.

Questions?

