

Outbreaks and Their Consequences

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Medical Director

March, 2016





Orange County

Mosquito and Vector Control District

A Public Health Agency Serving Orange County Since 1947

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Vectors



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The Invasive Aedes mosquitoes that can transmit Zika virus are now found in Orange County.

[Learn more!](#)



Town Hall Meeting: Invasive Aedes Mosquitoes and Zika Virus

Meetings scheduled for March and April 2016 [Details](#)

Please report **day-biting mosquitoes** (Yellow fever mosquitoes) by calling or click [here](#)!

New Policy on Rodenticides ([click here](#))



VECTOR
EMPLOYEE
HAS CANCER
FROM OC
VECTORS
"SAFE"
PESTICIDES
OC JUDGE JUST RULED IN
FAVOR OF EMPLOYEE.

AERIAL SPRAY
NO WAY !!!!


Hi: →
I have
677 & 1289
MTHFR gene
mutation. And so do
many of you. dreaded genes
WE cannot genetically DETOX
make me very sick! PESTICIDE
SPRAYS!

← if its so
safe
WILL YOU SPRAY?
IT ON YOUR face
???

OUR (SIC)
GENERA
KIDS D



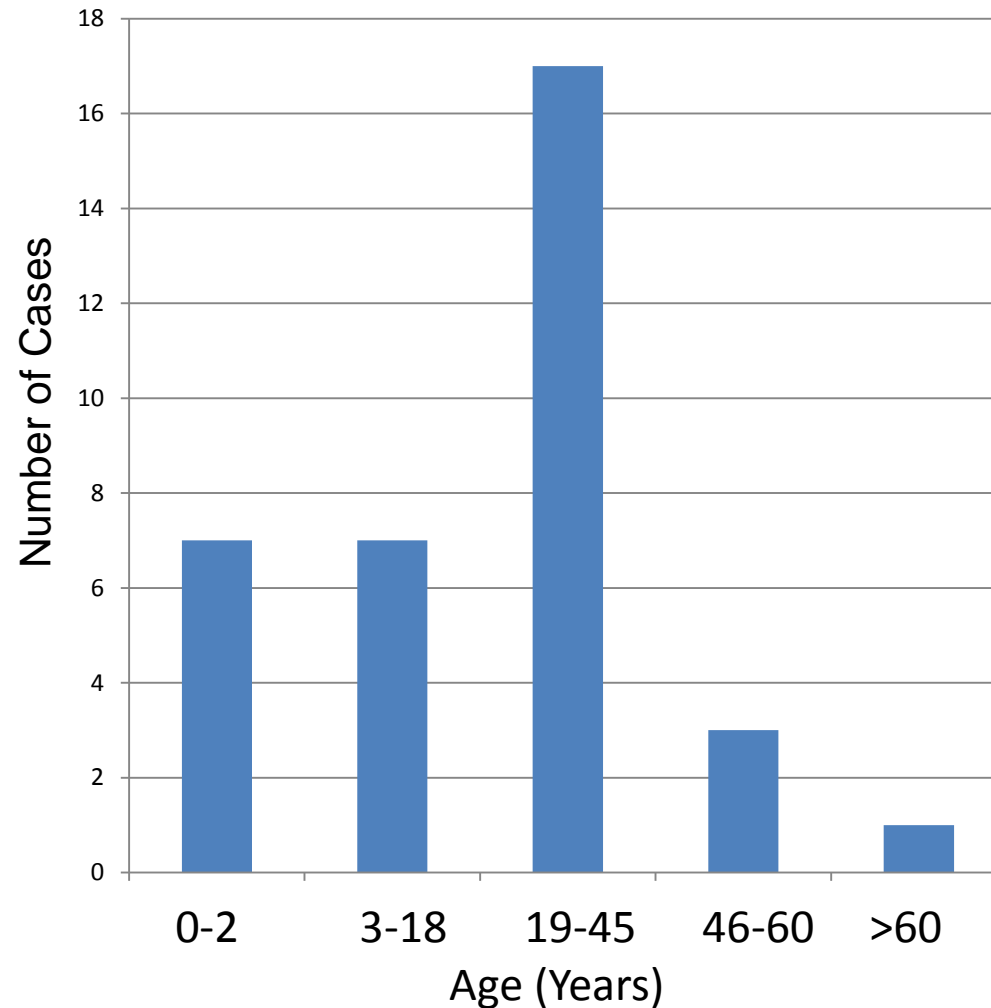


Goals of My Talk:

- Talk through the consequences of outbreaks
- Recognize the costs of vaccine hesitancy
- **Remember Why We Do What We Do**

Measles in Orange County, 2015

- 35 cases
- 17 females
- Age range 9 months-70 years
- 14 children
- 5 hospitalized
- 22 cases in our County in first three months of 2014

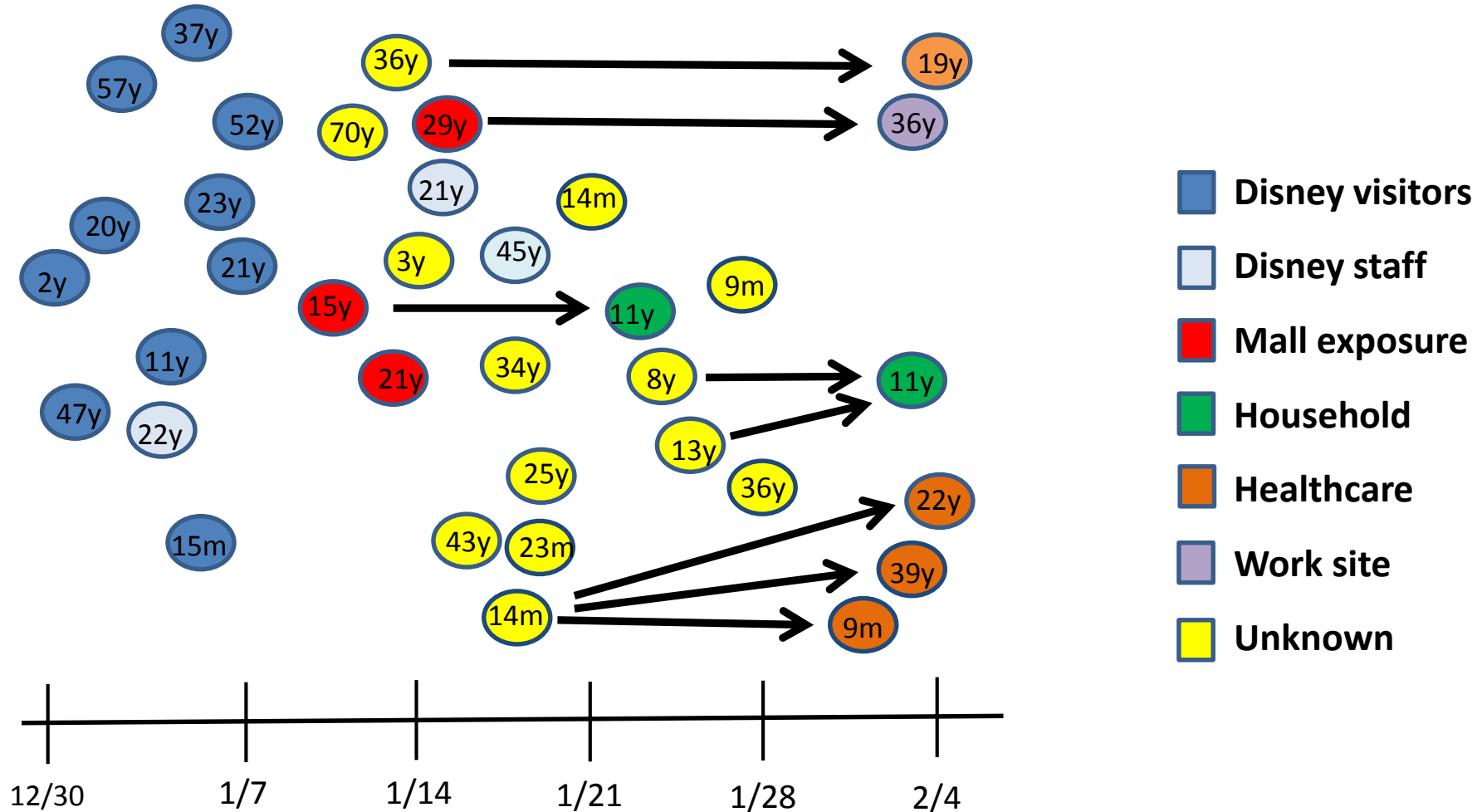




Immunization Status of Orange County Cases, 2014 and 2015

- 9 with 2 MMRs
- 2 with 1 MMRs
- 3 with evidence of seroimmunity
- 23 with uncertain immunization status
- 20 with no immunizations
 - 18 of 19 pediatric cases with no MMR
 - Two under one year of age
 - 10 vaccine refusers

Orange County Cases and Their Connections, 2015



Healthcare Facility Transmission, 2014 and 2015

- 57 cases
- 91 healthcare facility exposure events
- >3000 patients and staff exposed
- 10 total transmissions
- 7 healthcare workers
 - 1 additional healthcare worker developed disease- likely patient exposure, though no source identified
- 3 patients

Cost of Pediatric Measles Exposures at CHOC

- 8 cases in 2015
 - 5 generated exposures
- 501 patients exposed

	Costs	Costs Avoided
IgG (medication + labor)	\$23,573	NA
MMR (medication + labor)	\$1,162	NA
Letters to Families	\$1,580	NA
Manage Exposed Patient Lists/ Call Families/Internal Communication	\$4,386	NA
No furlough of Staff Due to Mandatory Measles Immunity Required Upon Hire	NA	\$78,995*

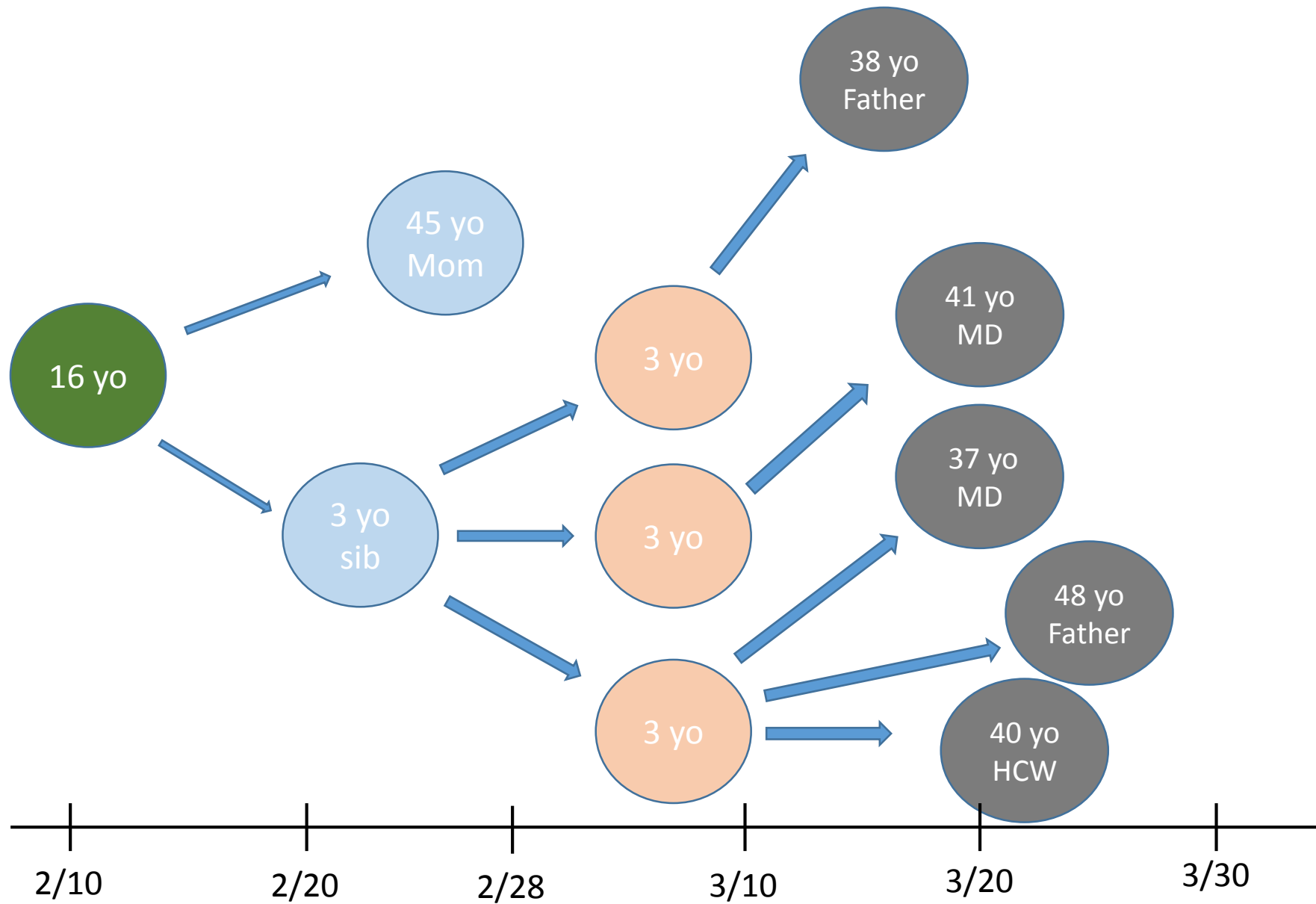
***Assuming 5% non-immune**

One Unimmunized OC High School Student with Measles, 2015

- Attended school 3 days while infectious
- MMR vaccination rate >99% at this school
- >20 students removed from school – no MMR
- Days 7-21 after exposure
- Most missed 10-11 days of school
- >250 missed school days
- >\$13,500 cost of education

Courtesy: Michele Cheung

Measles Cluster, Orange County, 2014



Case Study

- 18 year old Mexican American male
- Exposed while in waiting room with measles case
- Developed fever 9 days after exposure
- Went to medical provider, told likely viral
- Came back when rash developed
- Serum measles IgM and throat and urine PCRs positive
- Had two documented MMRs

Case Study Exposures

- Family
 - Parents, sister, brother-in-law, 3 year old nephew
- Urgent Care
 - 10 patients
- Local ED
 - 5 patients
- Work site
- School

Case Attended Anaheim High School

- 2700 children at this school
- Attended school for one day while infectious
- 4 of 2700 students did not have two documented MMRs by school
 - On further examination, only one of these four did not have some evidence of MMR
- No further cases documented at school

Case Study Workplace Exposure

- Worked at a fast food facility two times during infectious period
- 17 coworkers were exposed
 - Required proof of immunization with two MMRs OR
 - Serologic measles IgM positive
 - Quarantined until proof of immunity
- All staff tested serologically positive

Association Between Vaccine Refusal and Vaccine Preventable Diseases in the United States

- Reviewed 18 published studies of measles outbreaks
 - 1416 measles cases
 - 56.8% had no history of measles vaccination
- 32 reports of pertussis outbreaks
 - 24-45% of cases were unvaccinated or undervaccinated cases
- Vaccine refusal was associated with pertussis and measles in some populations

Childhood Vaccine Exemption Policy: The Case for a Less Restrictive Alternative

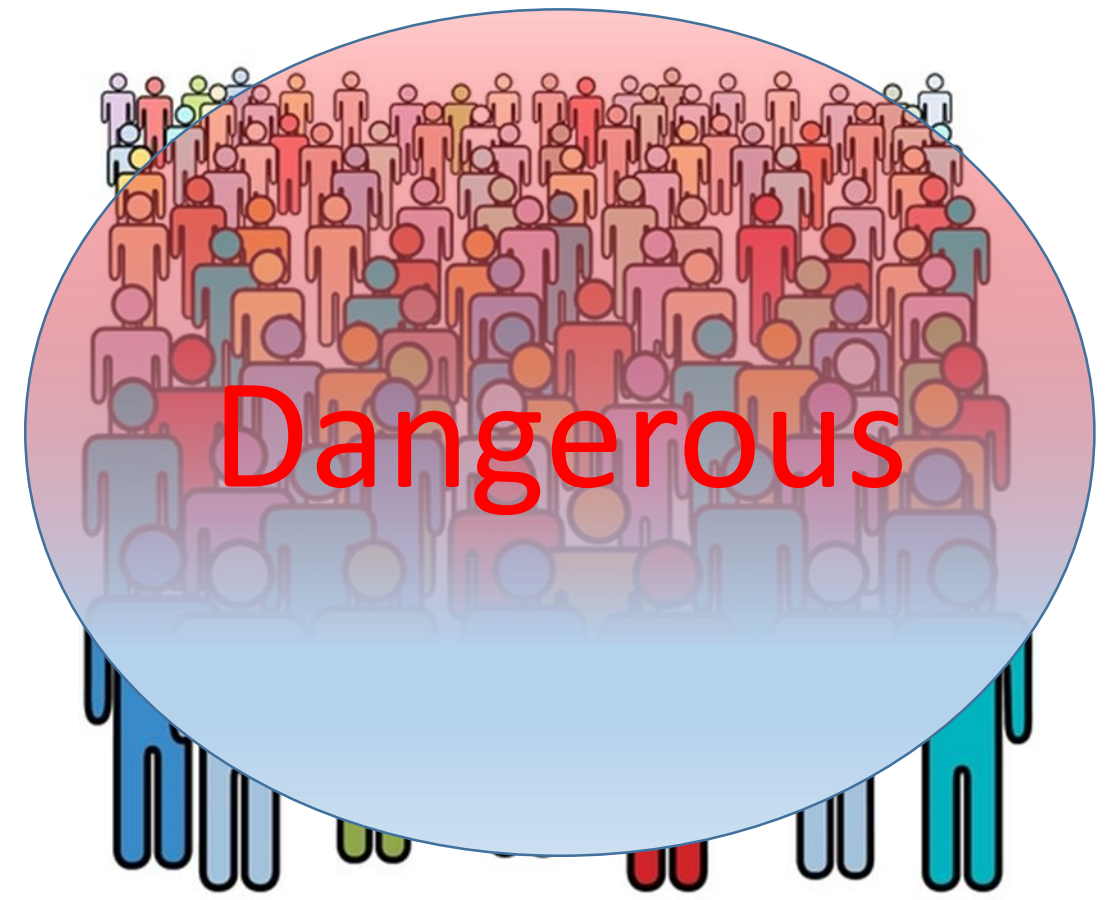
Douglas J. Opel, MD, MPH,^{a,b} Matthew P. Kronman, MD, MSCE,^d Douglas S. Diekema, MD, MPH,^{a,b,c} Edgar K. Marcuse, MD, MPH,^d Jeffrey S. Duchin, MD,^{d,e,f} Eric Kodish, MD^g

“A sweeping policy that eliminates NMEs from all vaccines is that it violates the ethical principal of least restriction”



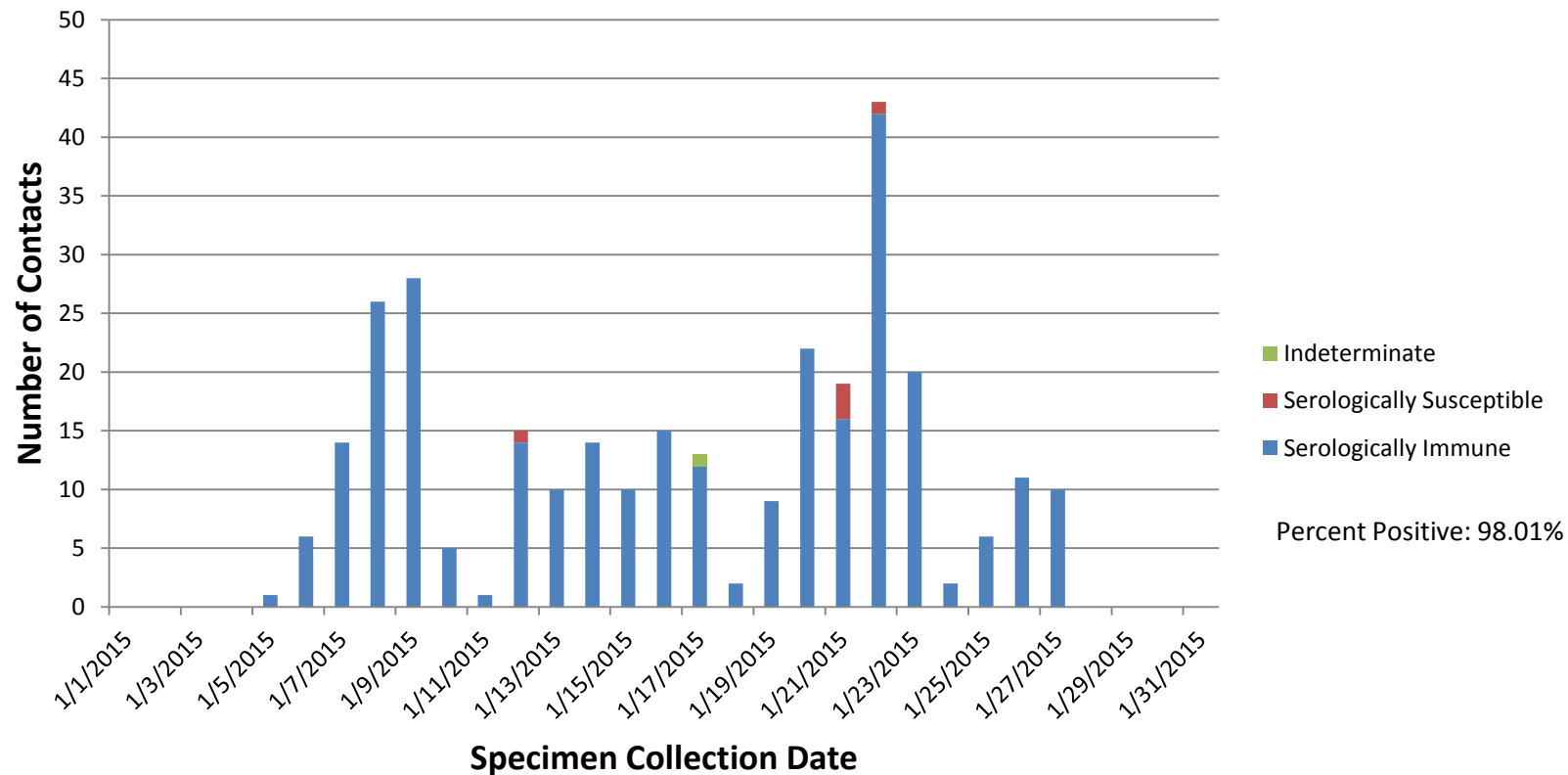


Safe

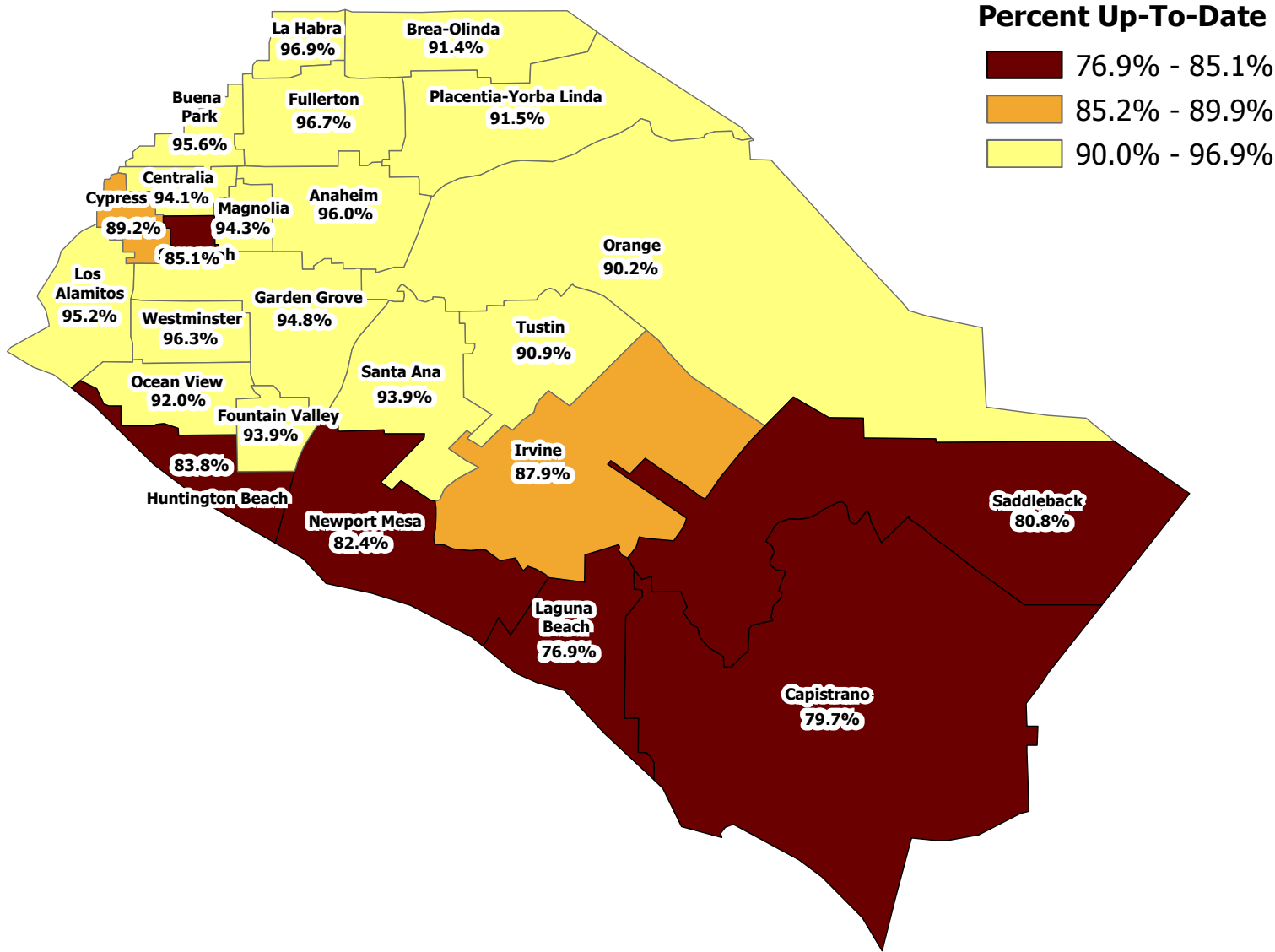


Dangerous

Contacts Tested for Measles Immunity by Specimen Collection Date (n=301)



Up-to-Date Immunizations at Kindergarten Enrollment, Private and Public Schools Within Each School District, 2014-15



Zika, 2015-16



Rubella

- Congenital rubella can cause:
 - Deafness
 - Cardiac disease
 - Cataracts
- Prevented by MMR vaccination
- Disease rates radically decreased since institution of vaccine campaigns in 1970-71



The History and Medical Consequences of Rubella

In New York, of 333 women with rubella in pregnancy who were reported to the New York City Department of Health, 251 (75%) did not carry their infants to term: 213 of these women (64%) had therapeutic abortions, and 38 of the remaining women aborted spontaneously [25]. In spite of abortion and considerable mortality due to congenital rubella, subsequent correlation of clinical lists from the New York Rubella Project with student rosters in schools for the deaf and blind in metropolitan New York supported the conclusion that >1,000 children were born with congenital rubella in New York as a result of the 1964 epidemic. This represented ~1% of the births during that period. When these data are extrapolated to the United States, they support the estimate that nationally there were ~30,000 victims of rubella embryopathy.

Measles

- Causes fever and a rash
- Can also cause:
 - Encephalitis
 - Pneumonia
- Death occurs in 1 in 1000 persons infected
- After vaccine introduction, indigenous measles eliminated in US



Measles Death in Washington State

- Adult female with multiple underlying medical conditions
- Infected by exposure in a healthcare facility
- First measles death in 11 years in the United States

The screenshot shows the Washington State Department of Health website. The header includes the logo and navigation links for Home, Newsroom, Topics A-Z, and Search. A secondary navigation bar lists categories: You and Your Family, Community and Environment, Licenses, Permits and Certificates, Data and Statistical Reports, and Emergencies. The breadcrumb trail reads: Home > Newsroom > 2015 News Releases > 15-119-WA-MeaslesRelatedDeath. A dropdown menu for '2015 News Releases' is open, showing a list of years from 2016 to 2009, Media Contacts, and Public Service Announcements. The main content area is titled 'News Release' and contains the following text:

For immediate release: July 2, 2015 (15-119)

Contacts: [Donn Moyer](#), Communications Office 360-236-407

Measles led to death of Clallam Co. woman; first in US in a c

Tragic outcome for immunocompromised patient shows need for community pro

OLYMPIA — The death of a Clallam County woman this spring was due to an u infection that was discovered at autopsy.

The woman was most likely exposed to measles at a local medical facility during Clallam County. She was there at the same time as a person who later developed contagious for measles. The woman had several other health conditions and wa that contributed to a suppressed immune system. She didn't have some of the c measles such as a rash, so the infection wasn't discovered until after her death. was pneumonia due to measles.

This tragic situation illustrates the importance of immunizing as many people as high level of community protection against measles. People with compromised immune often cannot be vaccinated against measles. Even when vaccinated, they may not immune response when exposed to disease: they may be especially vulnerable

After Enterovirus 68 Outbreak, a Paralysis Mystery

By CATHERINE SAINT LOUIS JAN. 12, 2015



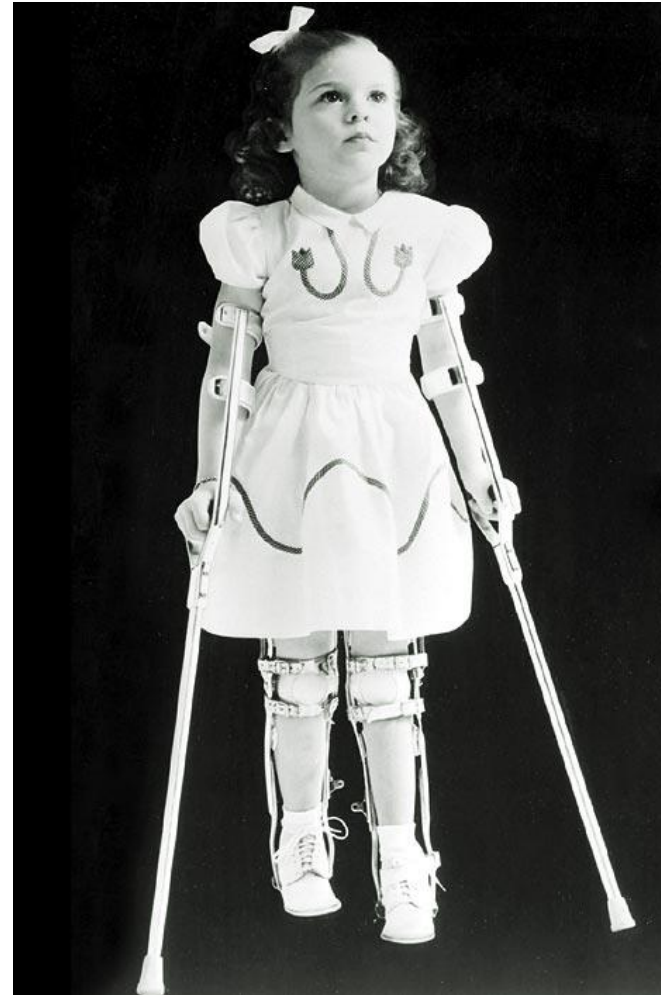
Jack Wernick, a first grader from Kingsport, Tenn., cannot lift his right arm. He has never tested positive for infection with enterovirus 68. Billy Weeks for The New York Times

A nationwide [outbreak of a respiratory virus](#) last fall sent droves of children to emergency departments. The infections have now subsided, as researchers knew they would, but they have left behind a frightening mystery.

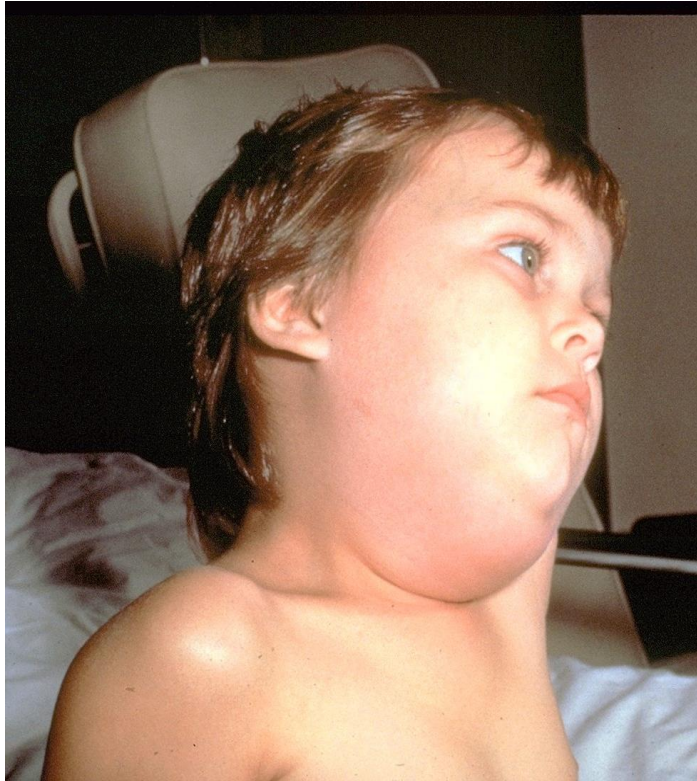
Since August, 103 children in 34 states have had an unexplained, polioliike [paralysis](#) of an arm or leg. Each week, roughly three new cases of so-called [acute flaccid myelitis](#) are still reported to the Centers for Disease Control

Polio

- Poliovirus causes fever and GI symptoms in most cases
- 57,879 cases reported in the United States in 1952
- 1 to 2 percent of those infected get poliomyelitis during outbreaks
- Vaccine use has eliminated polio in all but 3 countries worldwide



Mumps



- Causes fever and gland swelling
- Was most common cause of viral meningitis in children before vaccine
- With mumps vaccine use, incidence of mumps has decreased 98% in the United States

Pertussis

- Highest case count in the United States in 1934: 260,000 cases
- Highest death count in the United States in 1923: 9000 deaths
- 1 pertussis death in California in 2015

