

# VACCINE PREVENTABLE DISEASES IN SAN DIEGO COUNTY



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**BSPC Meeting**  
**19 March 2019**



Image Credit: CDC



**Influenza**

**Mumps**

**Hepatitis A**

**Pertussis**

**Varicella**

**Measles**

# INFLUENZA



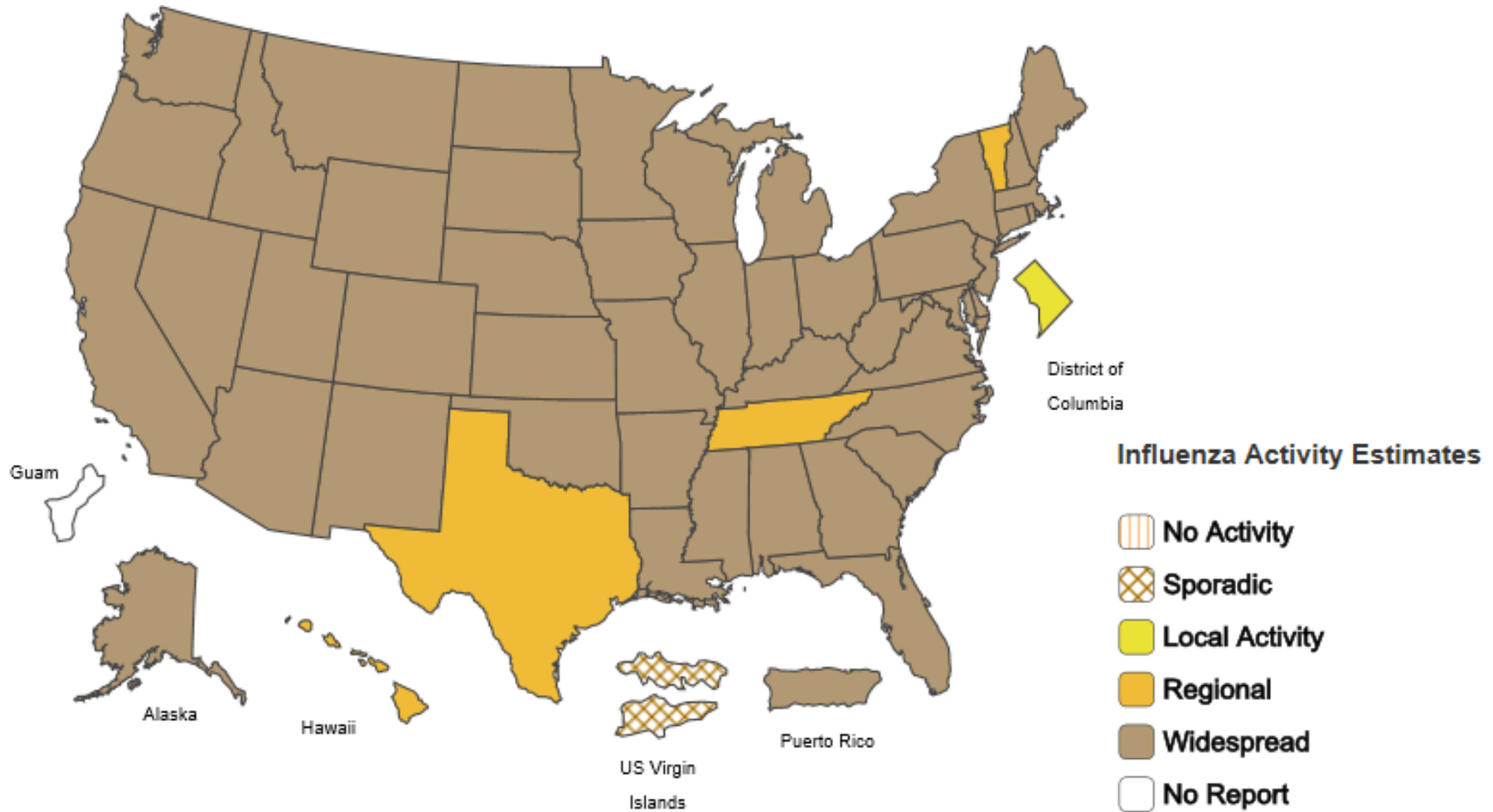
Image Credit: CDC



LIVE WELL  
SAN DIEGO

# 2018-19 Influenza Season Week 10 ending March 9, 2019

## Weekly Influenza Activity Estimates Reported by State and Territorial Epidemiologists

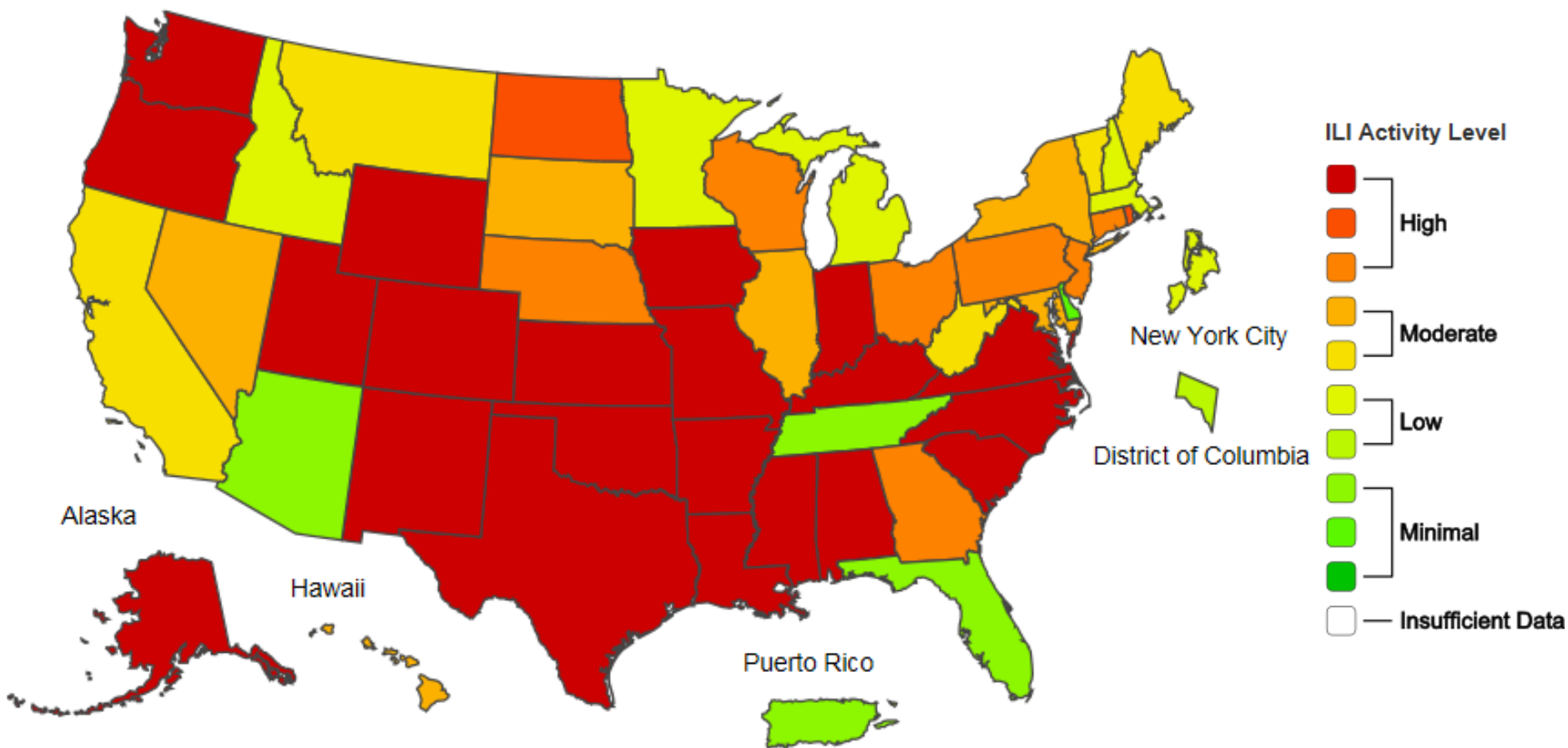


**Source: CDC.** Downloaded 3/18/19 from:  
<https://www.cdc.gov/flu/weekly/usmap.htm>

# 2018-19 Influenza Season Week 10 ending March 9, 2019

## Influenza-Like Illness (ILI) Activity Level Indicator

### Determined by Data Reported to ILINet

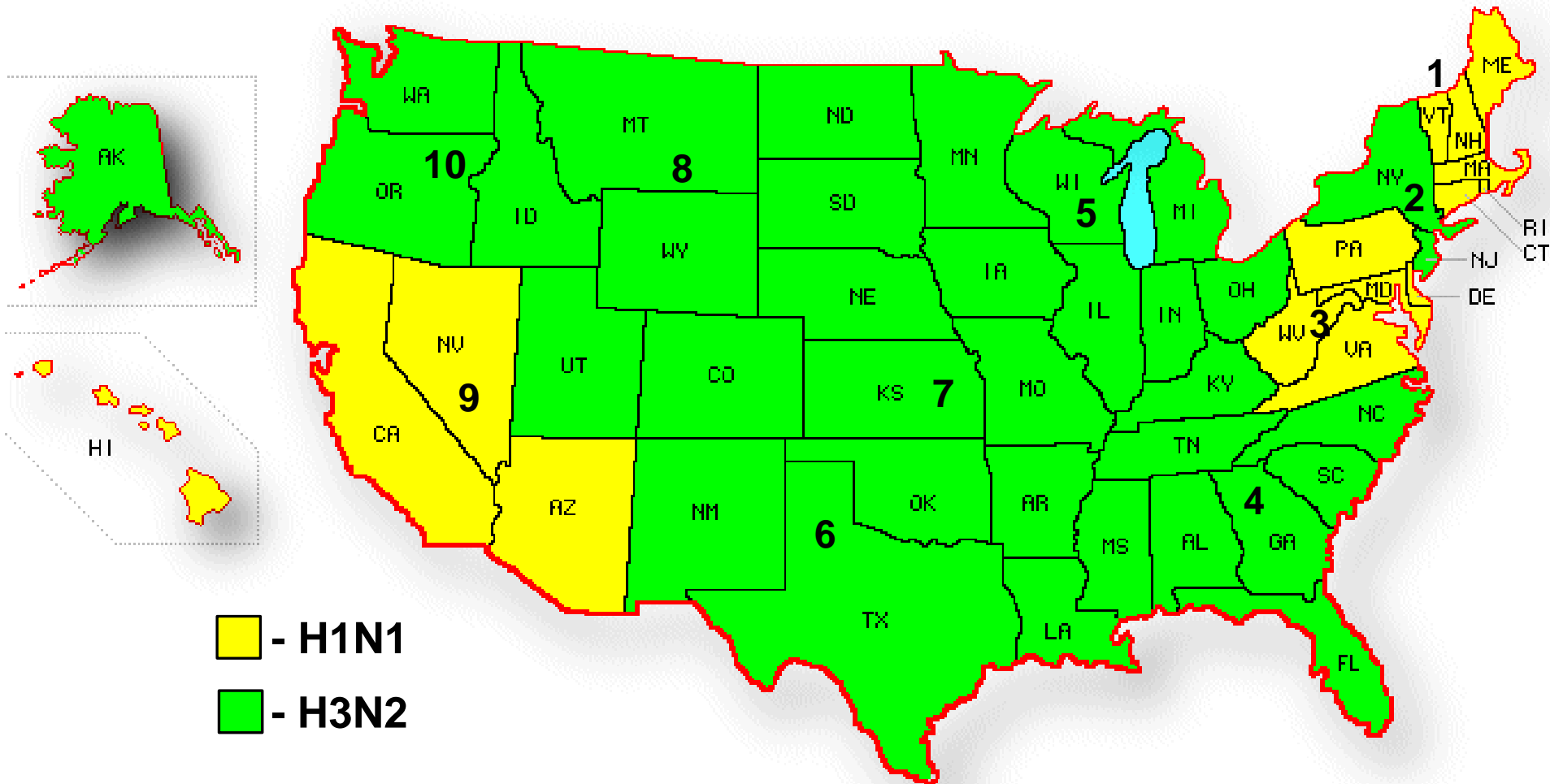


Source: CDC. Downloaded 3/18/19 from:

<https://www.cdc.gov/flu/weekly/index.htm>

# 2018-19 Influenza Season Week 10 ending March 9, 2019

## Dominant Influenza Strain by HHS Region



Map prepared on 3/18/19 using data from CDC website

<https://www.cdc.gov/flu/weekly/index.htm>

and software on: <http://diymaps.net/>

# CURRENT UPDATE

Reported Since July 1, 2018

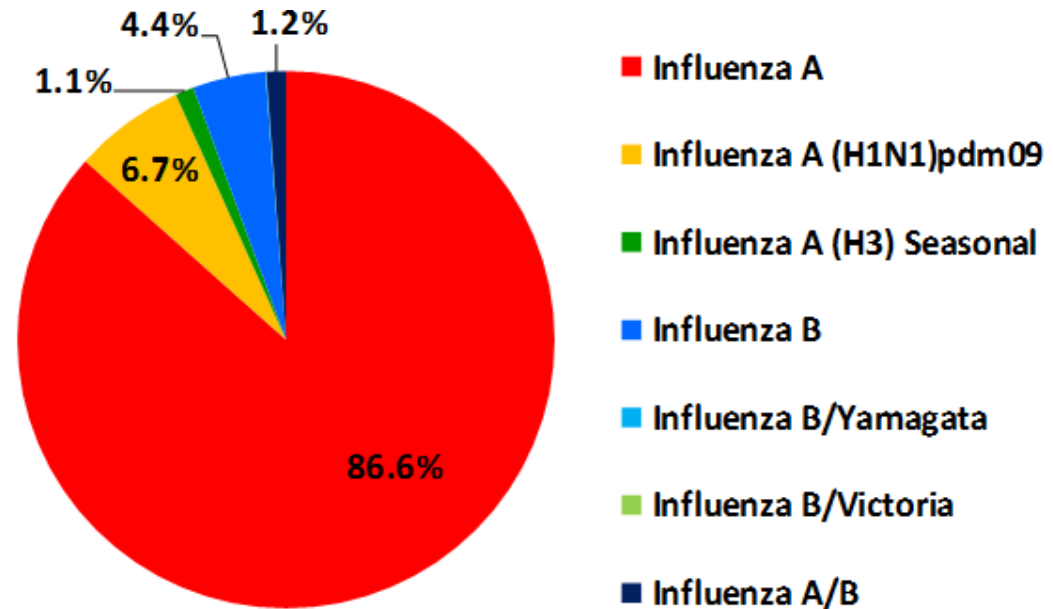


LIVE WELL  
SAN DIEGO

6,660 CASES

47 DEATHS

17 OUTBREAKS



Preliminary Results as of 3/13/19

Data Source: Reported Influenza Case Reports

Prepared by County of San Diego, Health & Human Services Agency,  
Public Health Services, Epidemiology and Immunization Services Branch

# INFLUENZA SURVEILLANCE UPDATE, 2018-19 YTD



**Table 1. Influenza Surveillance Indicators.**

Indicator	2018-19 Season			2017-18 Season		Prior 3-Year Average**	
	Week 10	Week 9	Total To Date	Week 10	Total To Date	Week 10	Total To Date
All influenza detections reported (rapid or PCR)	564	618	6,660	621	18,758	458	9,484
Percent of emergency department visits for ILI	5%	6%		5%		5%	
Percent of deaths registered with pneumonia and/or influenza	5%	6%		9%		10%	
Number of influenza-related deaths reported <sup>^</sup>	2	3	47	13	301	12	137

Influenza season is July 1 - June 30, Weeks 27-26. Total deaths reported in prior seasons: 342 in 2017-18, 87 in 2016-17, and 68 in 2015-16.

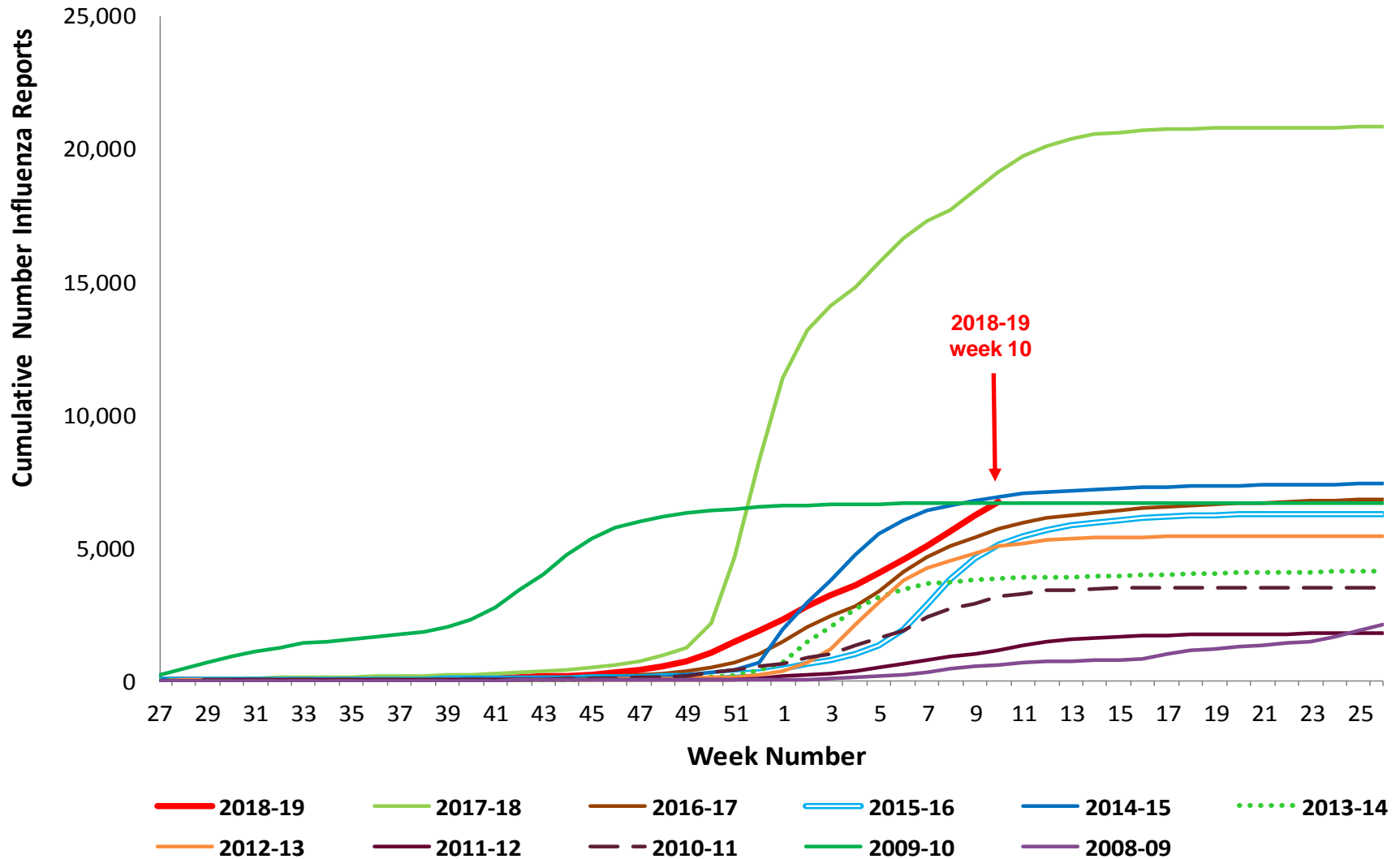
\* Previous weeks case counts or percentages may change due to delayed processing or reporting.

\*\* Includes FYs 2015-16, 2016-17, and 2017-18.

<sup>^</sup> Current FY deaths are shown by week of report; by week of death for prior FYs.

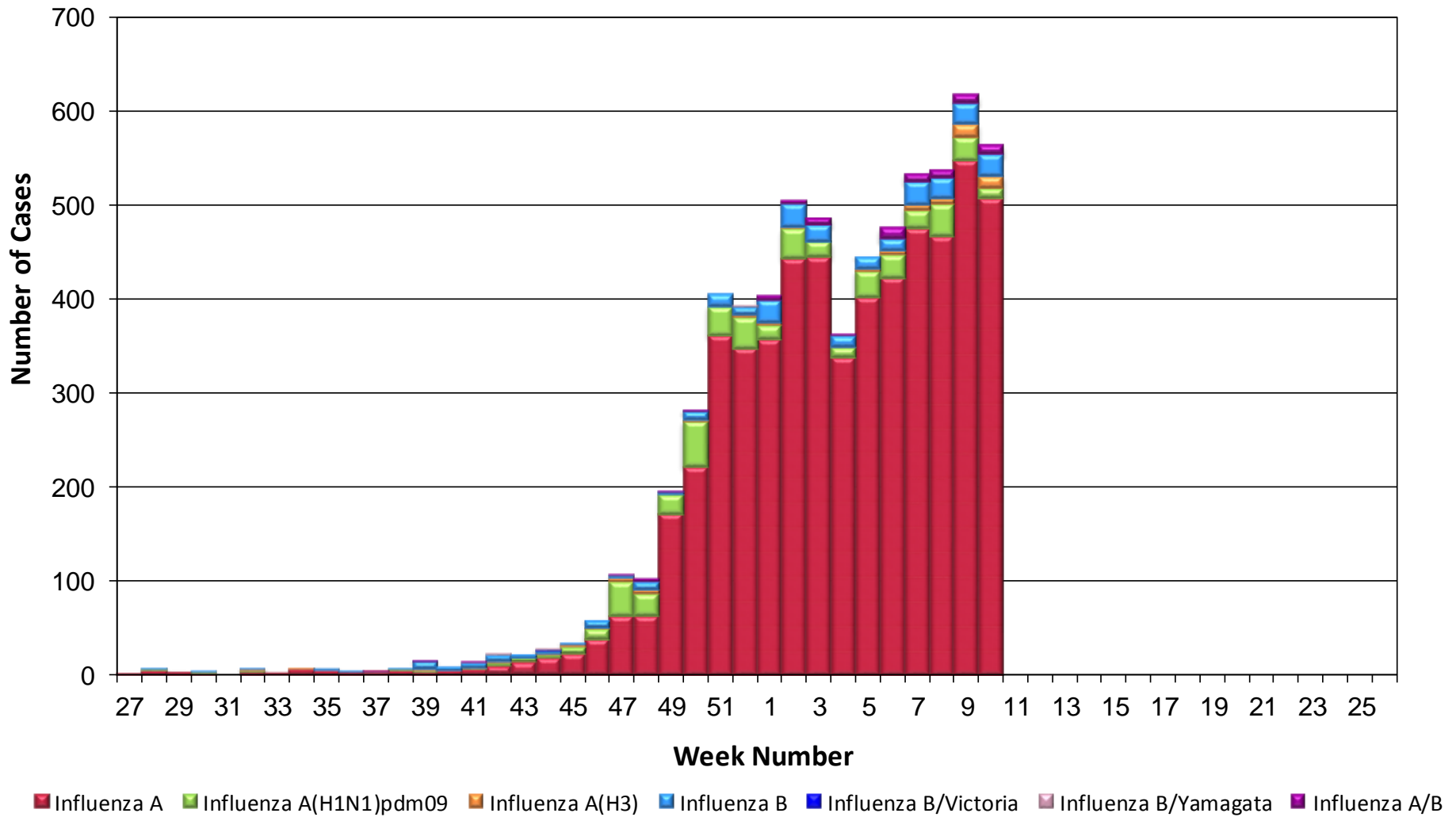


# Figure 5. Cumulative Influenza Case Reports by Episode Week & Season.



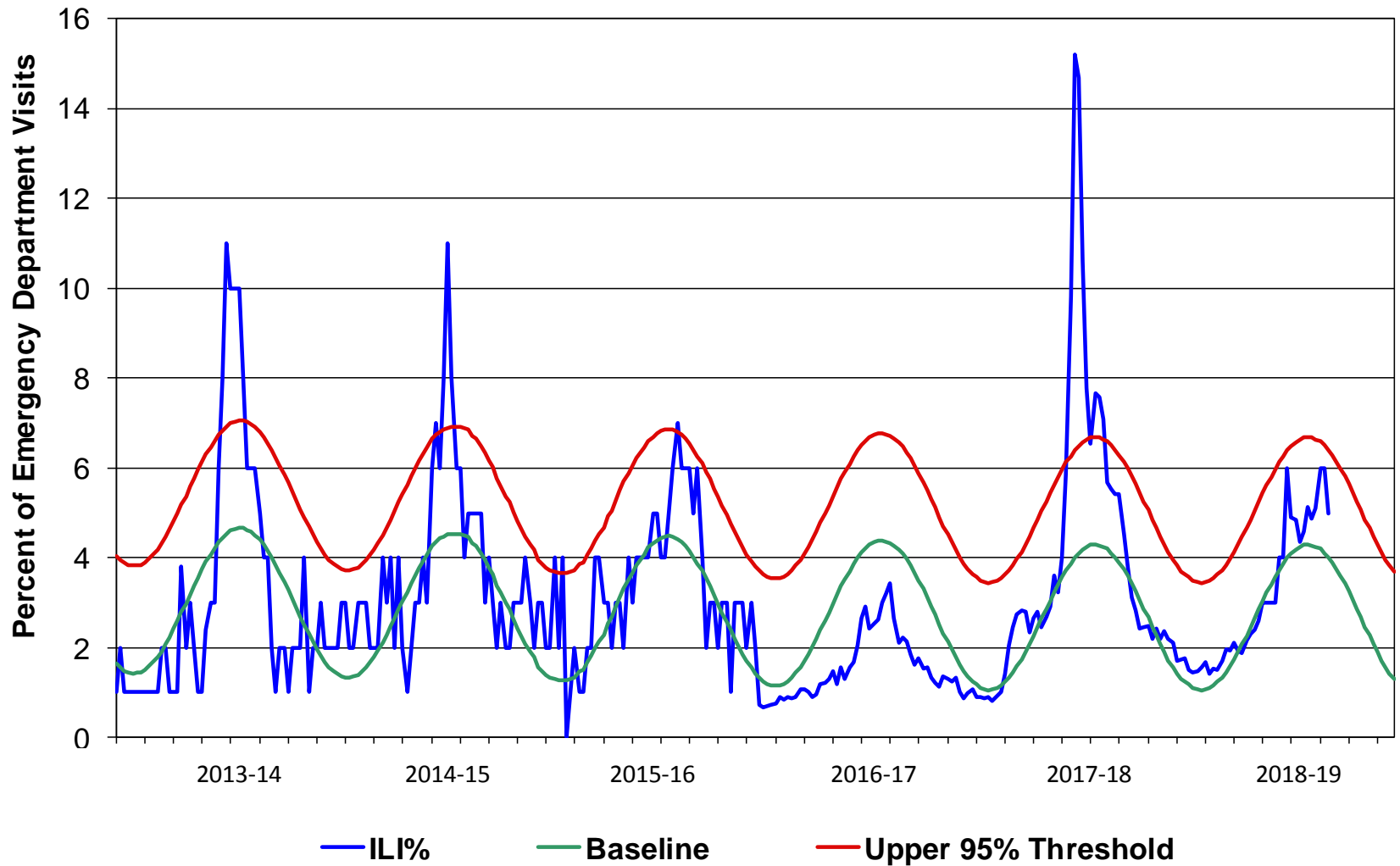
Preliminary Results as of 3/13/19  
 Data Source: Reported Influenza Case Reports  
 Prepared by County of San Diego, Health & Human Services Agency,  
 Public Health Services, Epidemiology and Immunization Services Branch

# Figure 3. San Diego County Influenza Detections by Type and Week of Report, 2018-19 FYTD (N=6,660).



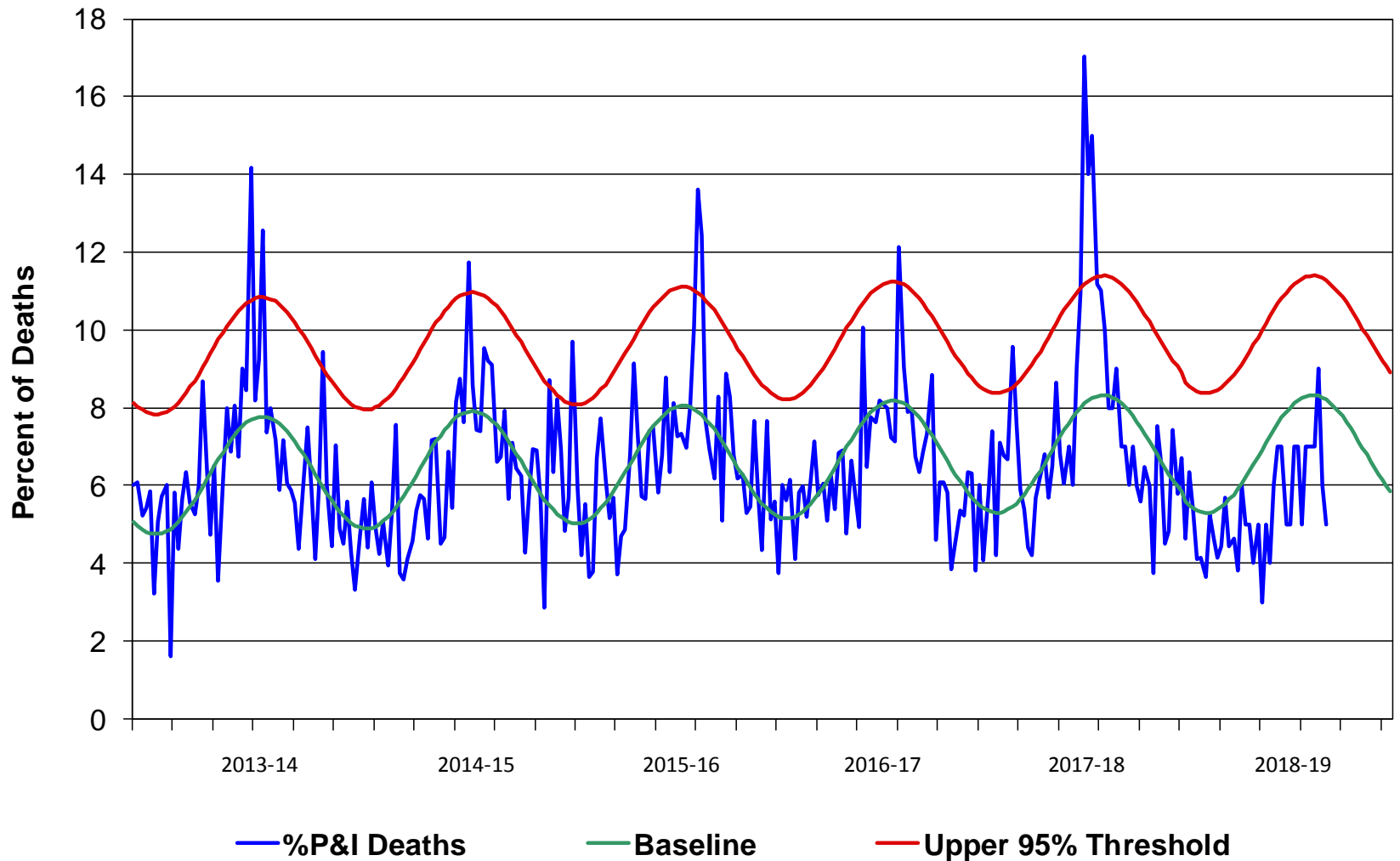
Preliminary Results as of 3/13/19  
 Data Source: Reported Influenza Case Reports  
 Prepared by County of San Diego, Health & Human Services Agency,  
 Public Health Services, Epidemiology and Immunization Services Branch

**Figure 6. Percent of San Diego County Emergency Department Visits for Influenza-like Illness by Week and Season Compared to 5-Year Baseline & Upper 95% Threshold Values (Serfling Method).**



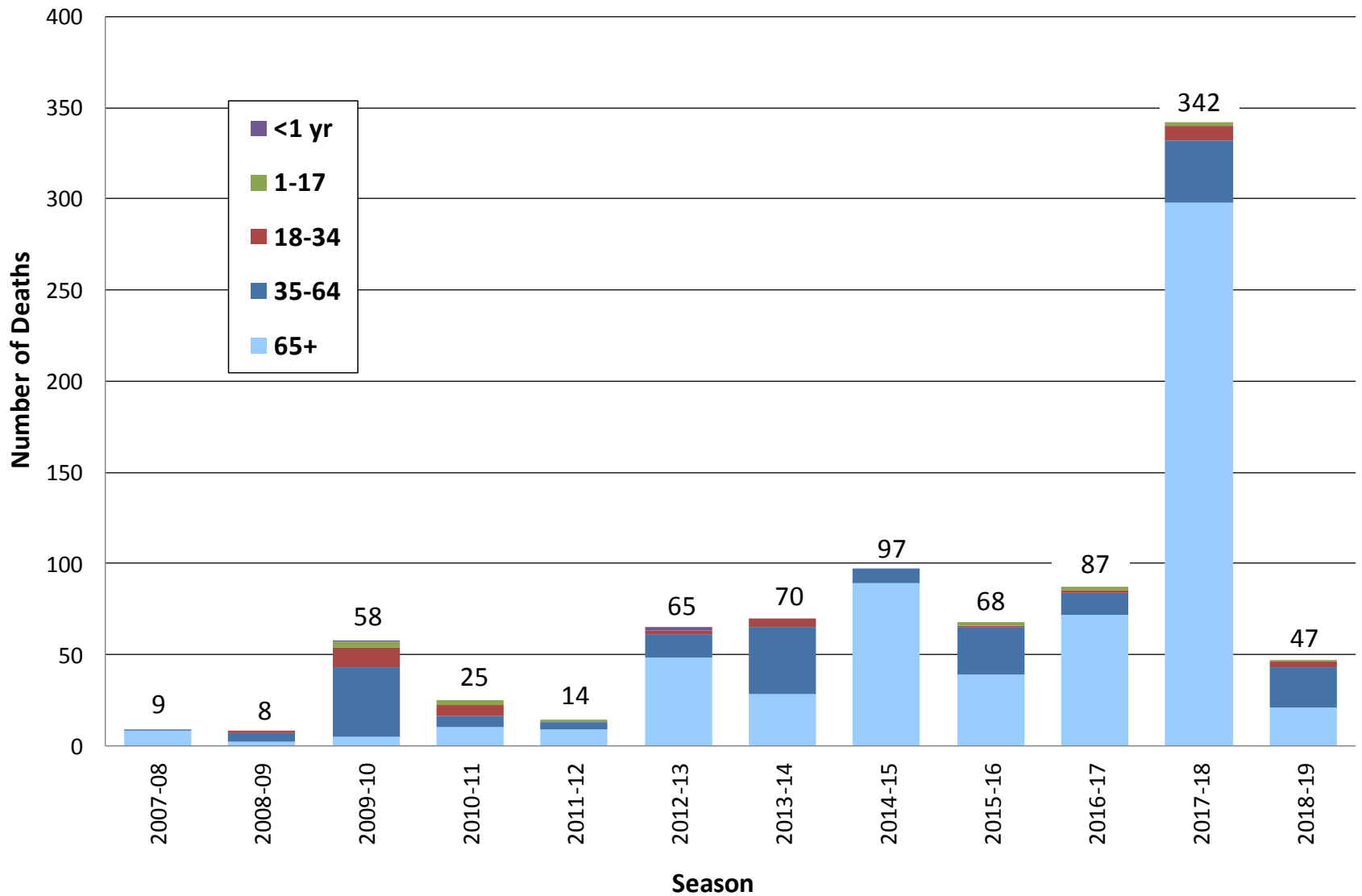
Preliminary Results as of 3/13/19  
Data Source: Reported Influenza Case Reports  
Prepared by County of San Diego, Health & Human Services Agency,  
Public Health Services, Epidemiology and Immunization Services Branch

**Figure 7. Percent of San Diego County Deaths Registered with Pneumonia and/or Influenza by Week and Season Compared to Prior 5-Year Baseline & Upper 95% Threshold Values (Serfling Method).**



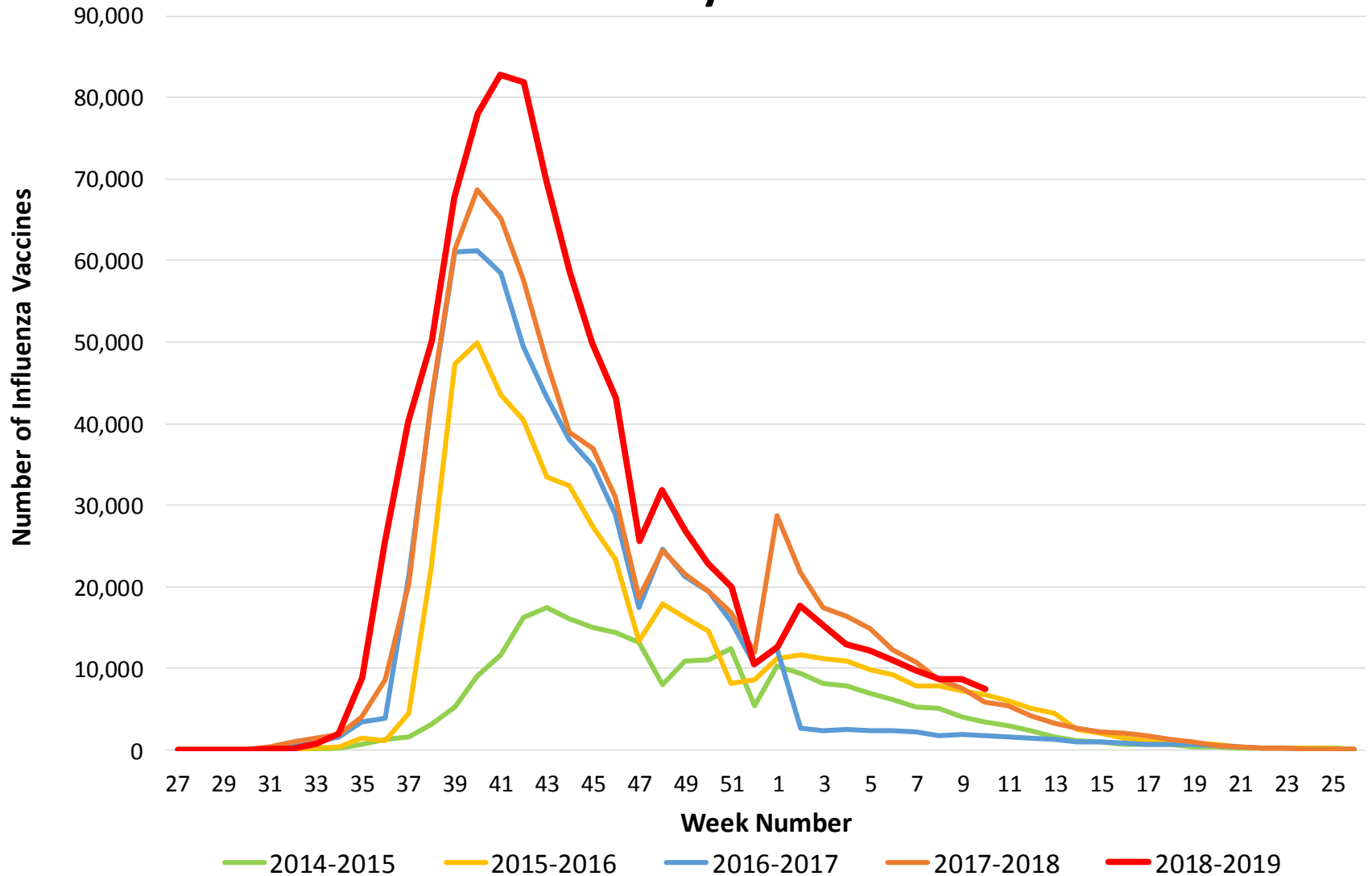
Preliminary Results as of 3/13/19  
Data Source: Reported Influenza Case Reports  
Prepared by County of San Diego, Health & Human Services Agency,  
Public Health Services, Epidemiology and Immunization Services Branch

# Figure 9. Influenza Deaths by Age and Season.



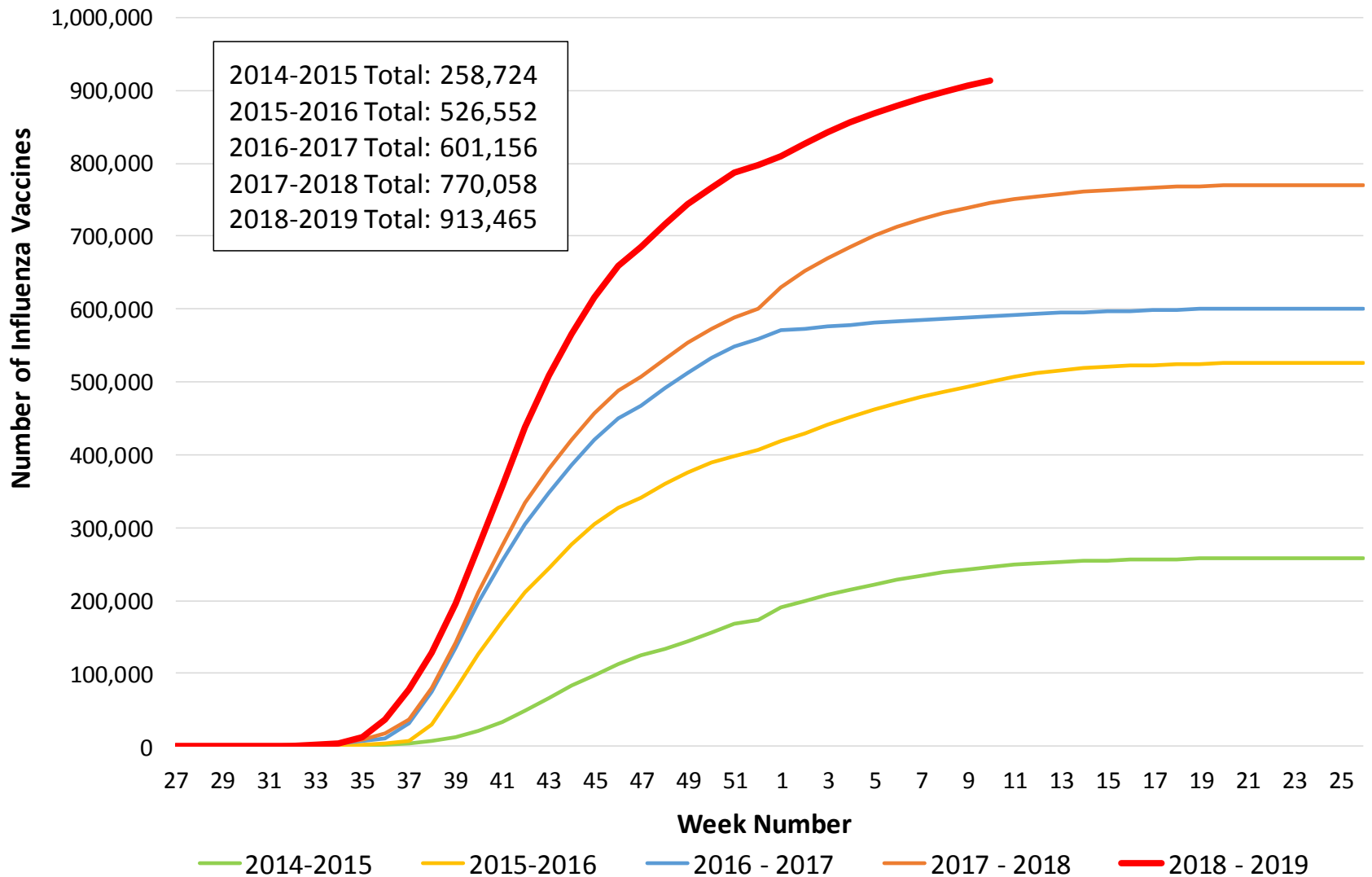
Preliminary Results as of 3/13/19  
Data Source: Reported Influenza Case Reports  
Prepared by County of San Diego, Health & Human Services Agency,  
Public Health Services, Epidemiology and Immunization Services Branch

# Figure 10. Number of Influenza Vaccinations Administered\* by Week and Season.



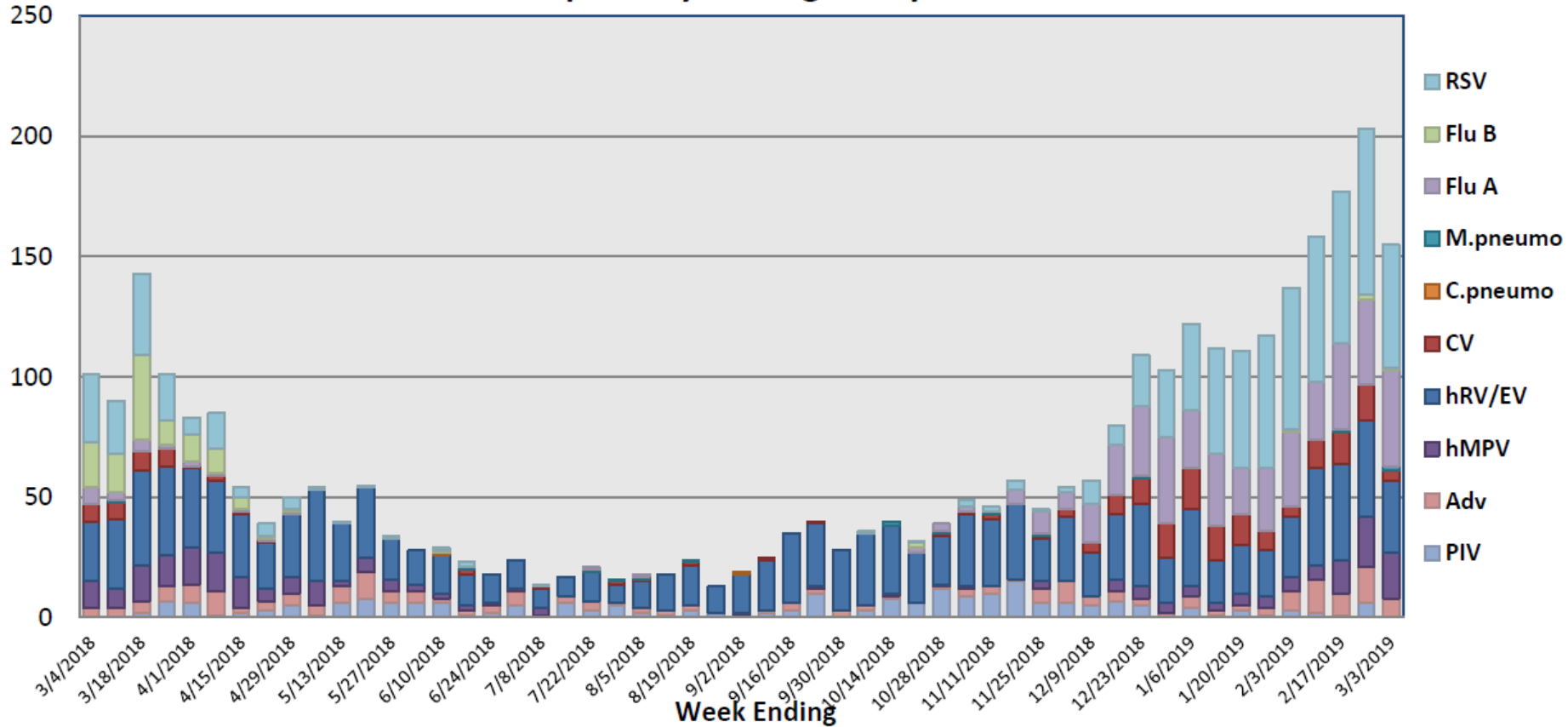
Preliminary Results as of 3/13/19  
 Data Source: San Diego Immunization Registry  
 Prepared by County of San Diego, Health & Human Services Agency,  
 Public Health Services, Epidemiology and Immunization Services Branch

# Figure 11. Cumulative Number of Influenza Vaccinations Administered\* by Week and Season.



Preliminary Results as of 3/13/19  
 Data Source: San Diego Immunization Registry  
 Prepared by County of San Diego, Health & Human Services Agency,  
 Public Health Services, Epidemiology and Immunization Services Branch

## Respiratory Pathogens by Week



Data through 3/17/19.

Source: Rady Children's Hospital San Diego weekly pathogens report.

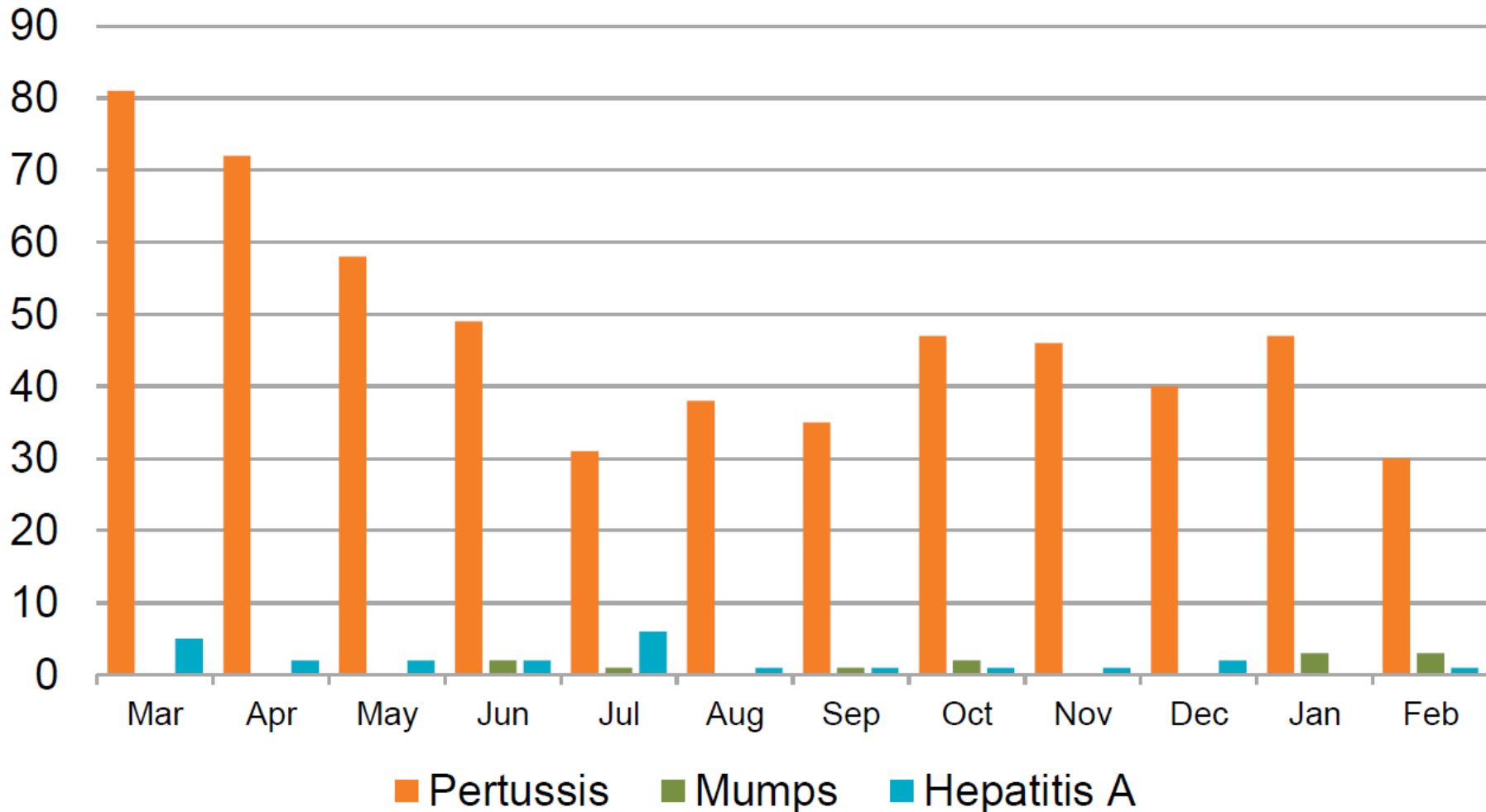




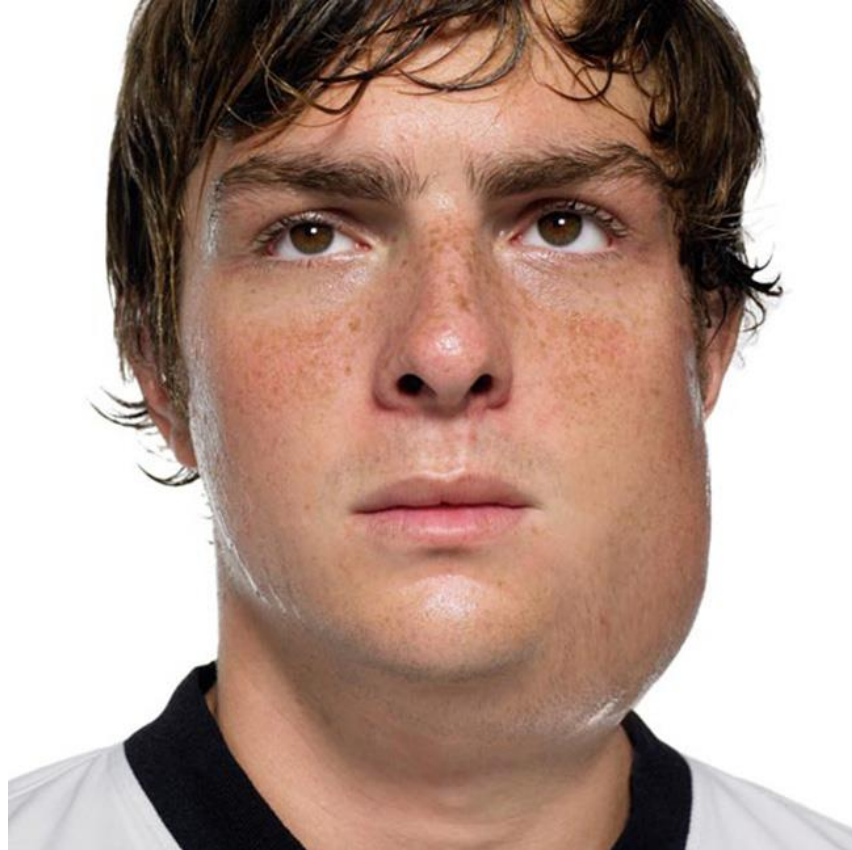
## WHAT CAN YOU DO?

- **Consider testing for novel influenza in patients with travel history, avian or swine contacts**
- **Remember influenza causes disease year-round in San Diego**
- **Report ALL positive flu cases to Epidemiology Program**
- **Sign up for Flu Watch**  
**(EISB (619) 692-8499 or EpiDiv.HHSA@sdcounty.ca.gov)**
- **Promote early immunization of staff to be consistent with health officer order “vaccinate or mask” Nov 1- **March 31 (likely to extend!)****
- **Promote flu immunizations to patients, especially those at risk for increased morbidity**

**Figure 3. Select Vaccine-Preventable Infections by Month  
March 2018 – February 2019**



# MUMPS



**Image Credit: CDPH**



**LIVE WELL**  
SAN DIEGO



To: CAHAN San Diego Participants  
Date: March 15, 2019  
From: Immunization Program, Public Health Services

### **Mumps and Acute Parotitis Cases Increase in San Diego**

This health advisory informs CAHAN participants that mumps may be circulating in San Diego County and contributing to an increase in acute parotitis cases seen at local emergency departments (EDs). Information is also provided on the clinical presentation, laboratory testing, and reporting of mumps.

#### **Key Messages**

- To date in 2019, five unrelated mumps cases have been reported in San Diego residents. Two patients had not travelled outside the county, indicating local mumps exposures are occurring.
- Local EDs have treated an increased number of acute parotitis cases in 2019. Some of these cases may be undiagnosed mumps.
- Patients with acute parotitis should have travel and sexual histories obtained, and viral causes should be considered, including mumps, influenza, and HIV.
- Mumps should be considered when individuals present with parotitis, other salivary gland swelling, orchitis, and aseptic meningitis, even when patients have been fully vaccinated.
- Polymerase chain reaction (PCR) testing of a [properly collected](#) buccal swab is preferred for mumps diagnosis in acute parotitis. The mumps PCR test is performed in some commercial labs and in the San Diego County Public Health Laboratory (SDCPHL).
- Providers are requested to promptly report any suspected mumps case to the County Immunization Program by calling 866-358-2966 (after hours call 858-565-5255).
- Mumps is endemic in many countries. Outbreaks are ongoing in Honduras and parts of Mexico. Anyone  $\geq 6$  months of age planning to go abroad should have [age appropriate immunization](#) with measles, mumps, and rubella (MMR) or evidence of immunity before travel.



- Mumps - an acute viral illness caused by an RNA virus in the Paramyxoviridae family - the only cause of epidemic parotitis.
  
- Parotitis – especially sporadic cases – may be due to viruses other than mumps.
  
- Parotitis can also be caused by
  - Epstein-Barr virus
  - Human herpesvirus B6 (the cause of roseola)
  - Cytomegalovirus
  - Parainfluenza virus types 1 and 3
  - Influenza A virus
  - Coxsackieviruses and other enteroviruses
  - Lymphocytic choriomeningitis virus
  - Human immunodeficiency virus
  - *Staphylococcus aureus*
  - Nontuberculous *Mycobacterium*

# MUMPS - SYMPTOMS



- **Prodromal symptoms** are nonspecific, may include myalgia, anorexia, malaise, headache and low-grade fever.
- Unilateral or bilateral swelling of one or more salivary glands, usually the parotid glands (parotitis), which occurs in 30%-40% of infected persons.
- **Parotitis** tends to occur within the first 2 days and may be first noted as earache and tenderness on palpation of the angle of the jaw.
- Symptoms tend to decrease after 1 week and usually resolve after 10 days.
- **40-50% may only have nonspecific or respiratory symptoms.**
- Up to **20% are asymptomatic.**



- **Orchitis** (testicular swelling) is a common complication and may occur in as many as 50% of postpubertal males.
- **Central nervous system (CNS)** involvement is common but fewer than 10% have symptoms of CNS infection.
- **Other** rare complications include arthritis, mastitis, glomerulonephritis, myocarditis, endocardial fibroelastosis, thrombocytopenia, cerebellar ataxis, transverse myelitis, ascending polyradiculitis, pancreatitis, oophoritis, and hearing impairment.
- Mumps during the first trimester is associated with an increased rate of spontaneous abortion, but although mumps virus can cross the placenta, there is no evidence that this results in congenital malformation.



## Mumps exposure

- Unprotected face-to-face (<3 feet) contact with an infectious person for at least 5 minutes.

## Incubation period

- Usually 16 to 18 days, but cases may occur 12 to 25 days after exposure.

## Period of communicability

- Communicability is probably highest from 2 days before to 5 days after onset of parotitis; mumps virus has been isolated in saliva from 7 days before through 9 days after onset of swelling.





- Live-attenuated mumps vaccine is given as part of measles, mumps and rubella (MMR) vaccine in the U.S.
- Post-licensure data estimate the effectiveness of 1 dose of mumps vaccine at approximately 80% (64%-95%) and two doses at 90% (88%-90%).
- In recent large outbreaks, mumps infections have occurred in many persons with a history of 2 doses of MMR



- Acute mumps infection can be laboratory confirmed by:
  - the presence of serum mumps IgM,
  - a significant rise in IgG antibody titer in acute- and convalescent-phase serum specimens,
  - positive mumps virus culture, or
  - detection of virus from a buccal specimen by reverse transcriptase polymerase chain reaction (RT-PCR).
- Serologically confirming mumps in an immunized person may be challenging :
  - IgM response may be absent or short lived
  - studies have shown that individuals with detectable mumps IgG titers have still developed mumps infection.



- **Unimmunized:** buccal specimen & acute blood specimen should be collected; a convalescent specimen may be requested.
- **Immunized:** buccal specimen should be collected; acute and convalescent blood specimens may also be submitted for IgM testing and/or detection of IgG rise. Collection of a buccal specimen within 1 to 3 days of parotitis onset is optimal, however virus may be detected for up to 9 days after parotitis onset.
- **Status unknown:** buccal & blood specimens should be submitted. Immunization status of the patient should be clearly indicated on the laboratory submittal form.
- **Outbreak:** buccal specimen is the preferred specimen for testing.

# MUMPS POSTEXPOSURE PROPHYLAXIS ?



 LIVE WELL  
SAN DIEGO

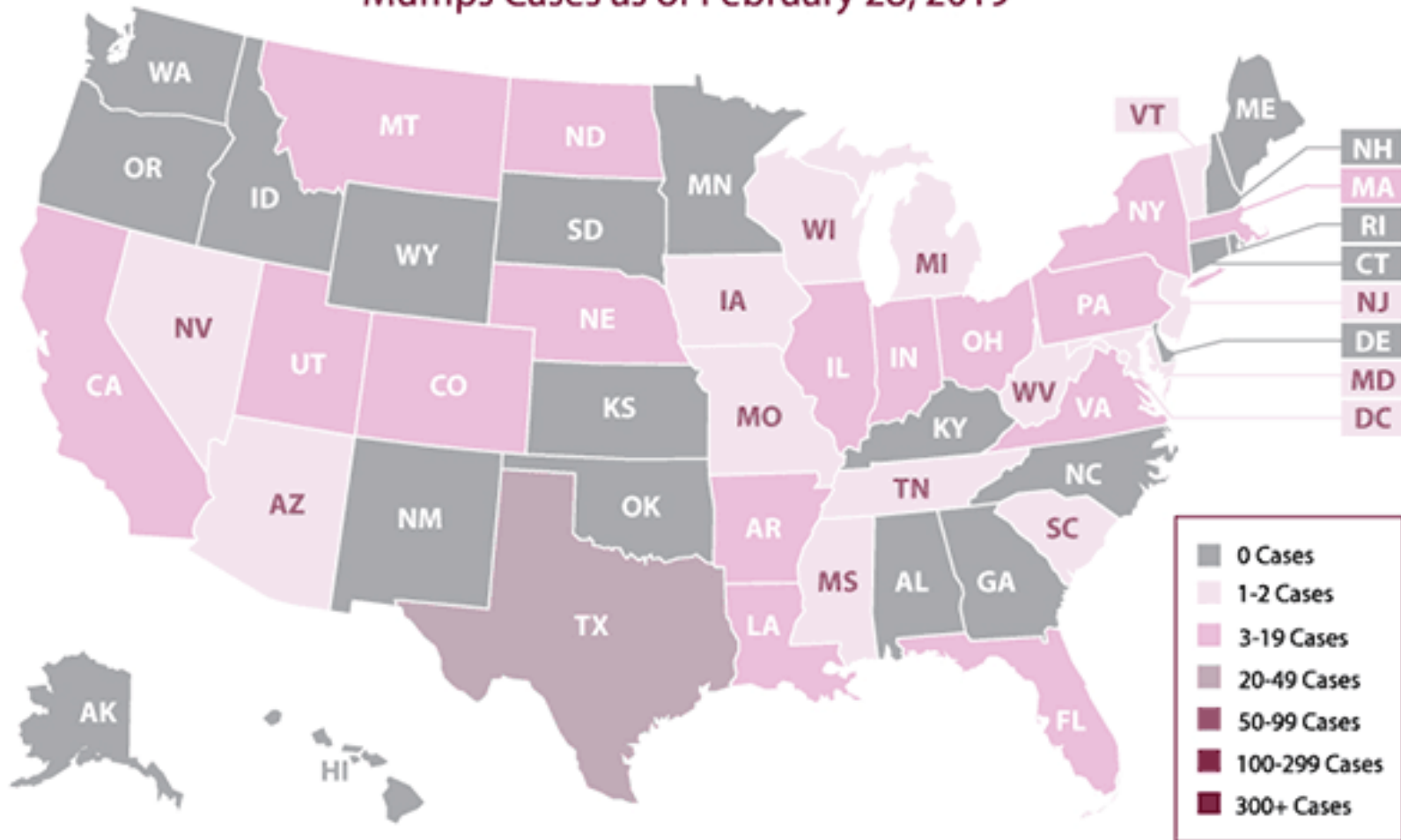
- Neither mumps vaccine nor immune globulin (IG) is effective for mumps postexposure prophylaxis.
- However, MMR vaccination of exposed persons who have had less than two doses of mumps containing vaccine is recommended unless otherwise contraindicated, because if the current exposure does not cause infection, vaccination should induce protection against subsequent exposure(s) to mumps, measles or rubella.
- Third MMR booster for those with basic series in college/university outbreaks – useful in outbreak situation

# MUMPS - US



N = 151

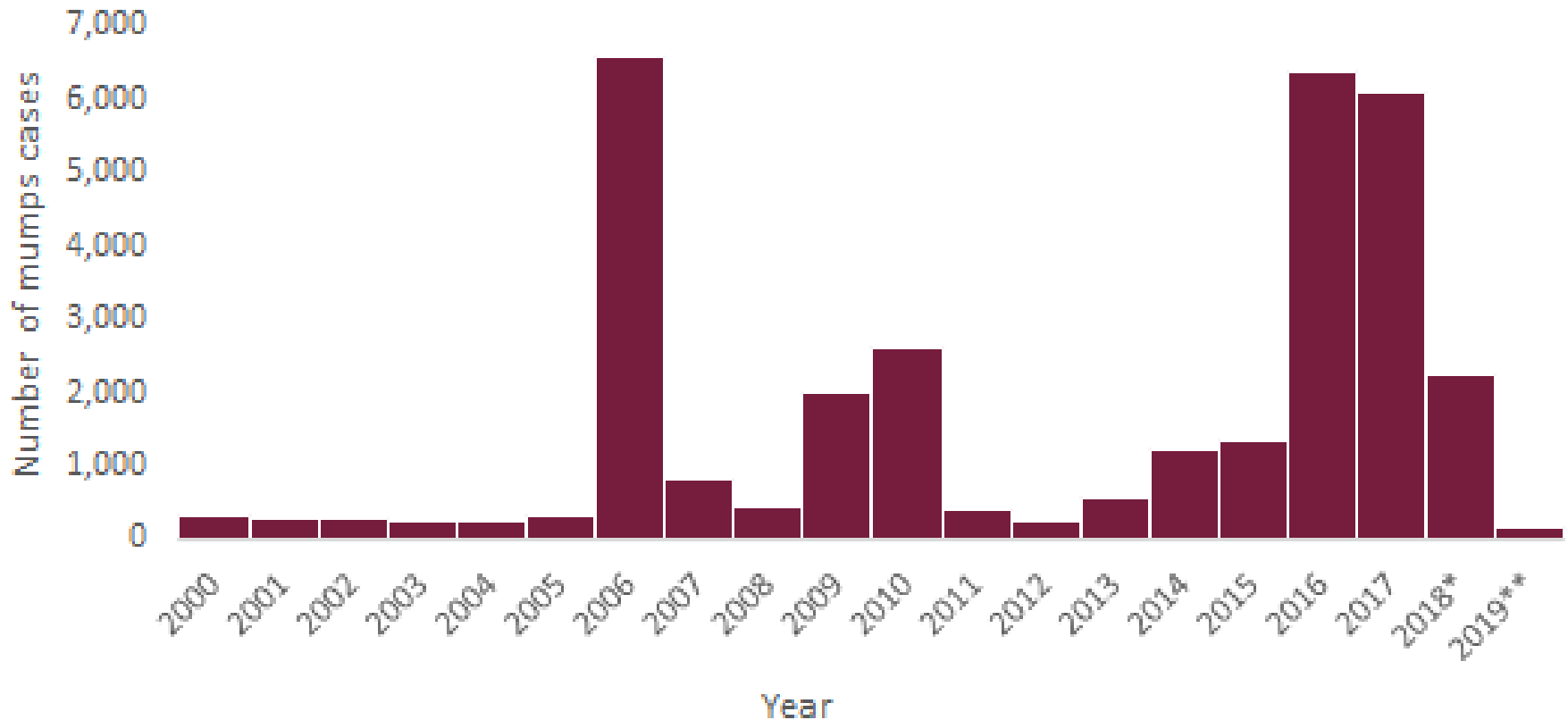
Mumps Cases as of February 28, 2019



Source: CDC. Downloaded 3/18/19 from:  
<https://www.cdc.gov/mumps/outbreaks.html>



## Reported mumps cases — United States, 2000–2019\*

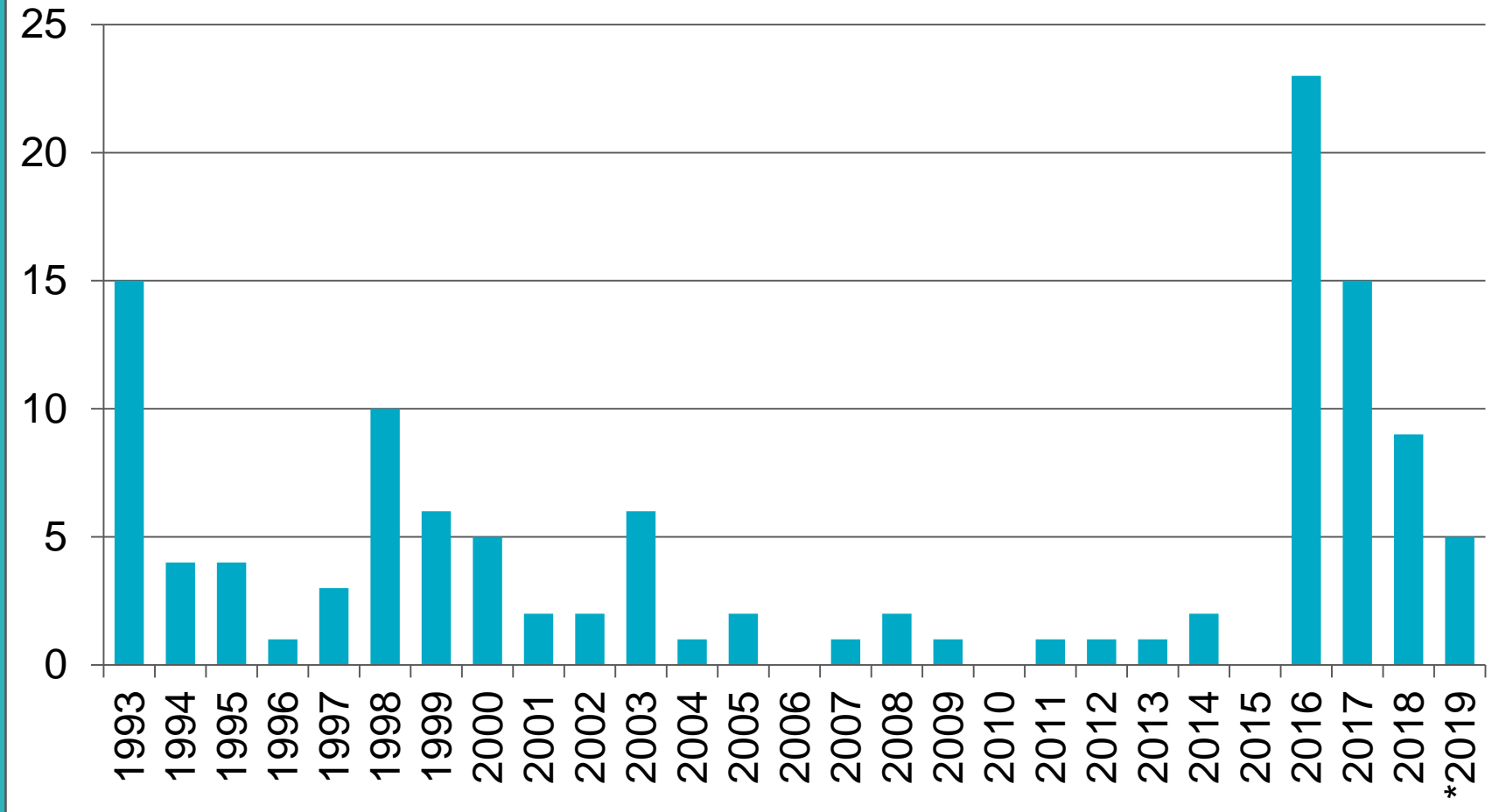


\* Case count is preliminary and subject to change.

\*\*Cases as of February 28, 2019. Case count is preliminary and subject to change.

**Source: CDC.** Downloaded 3/18/19 from:  
<https://www.cdc.gov/mumps/outbreaks.html>

# Mumps Cases, San Diego County 1993-2019\*



\* 2019 data are year to date.

# MUMPS – MEXICO 2019



LIVE WELL  
SAN DIEGO



**Total reported  
in Mexico = 1,419  
through 3/2/19**

**Total reported  
in 6 Mexican border  
states = 568  
(40.0% of total)**

**Source: Secretaría de Salud.** Map prepared on 3/18/19 using data from:  
<https://www.gob.mx/cms/uploads/attachment/file/443225/sem08.pdf>  
and software on: <http://diymaps.net/>



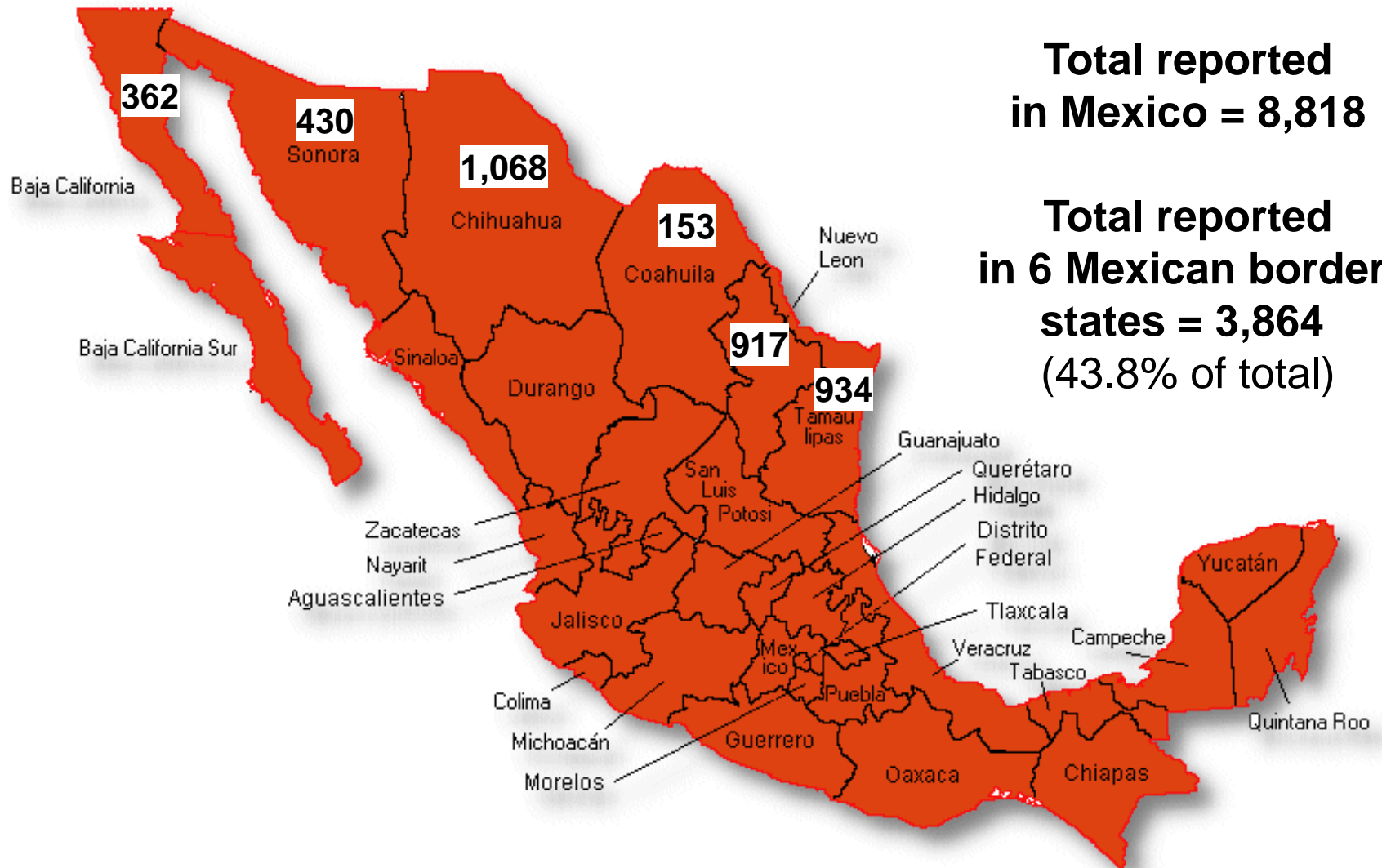
# MUMPS – MEXICO 2018



LIVE WELL  
SAN DIEGO

**Total reported  
in Mexico = 8,818**

**Total reported  
in 6 Mexican border  
states = 3,864  
(43.8% of total)**



**Source: Secretaría de Salud.** Map prepared on 3/18/19 using data from:

<https://www.gob.mx/salud/documentos/-boletinepidemiologico-sistema-nacional-de-vigilancia-epidemiologica-sistema-unico-de-informacion> and software on: <http://diymaps.net/>

# INFECTIOUS PAROTITIS (MUMPS) MEXICO, 2013-2019\*

	2013	2014	2015	2016	2017	2018	2019*
<b>Total in Mexico</b>	4,193	4,132	3,367	3,570	4,585	<b>8,818</b>	1,419
<b>Baja California</b>	258	315	220	200	285	<b>362</b>	38
<b>Sonora</b>	167	111	140	181	222	<b>430</b>	33
<b>Chihuahua</b>	256	398	232	248	355	<b>1,068</b>	79
<b>Coahuila</b>	61	79	48	42	202	153	31
<b>Nuevo Leon</b>	281	273	194	224	384	<b>917</b>	275
<b>Tamaulipas</b>	204	171	160	202	335	<b>934</b>	112
<b>Total Border States</b>	1,227	1,347	994	1,097	1,783	<b>3,864</b>	568
Percent of Mexico Cases	29.2%	32.5%	29.5%	30.7%	38.8%	43.8%	40.0%

\* 2019 data through Epidemiology Week 10, ending 3/2/19

**Source: Secretaría de Salud.** Data from reports accessed 3/18/19 at:

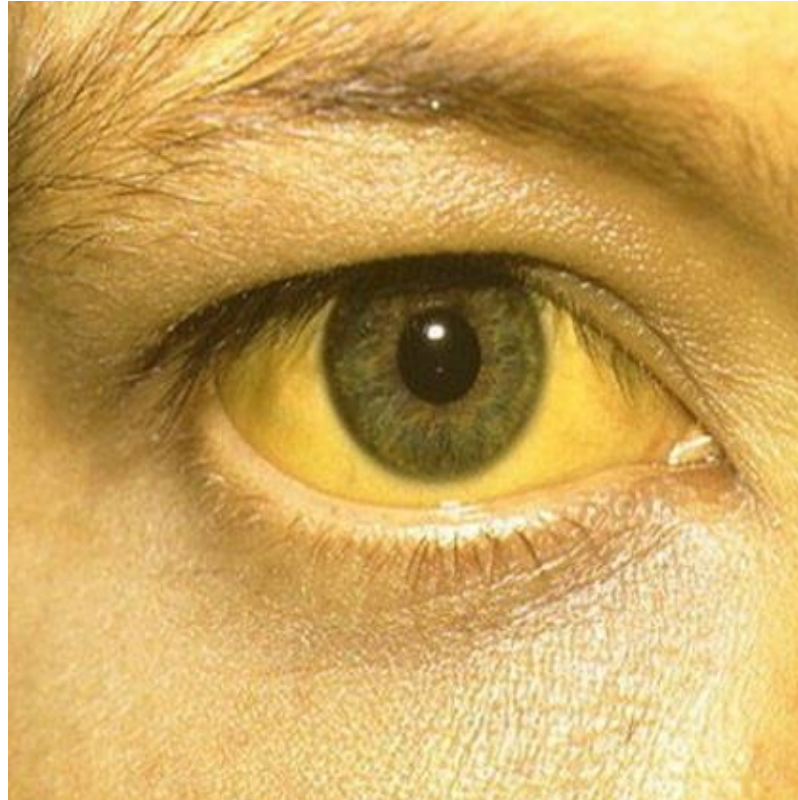
<https://www.gob.mx/salud/acciones-y-programas/direccion-general-de-epidemiologia-boletin-epidemiologico>



## WHAT CAN YOU DO?

- **Consider mumps in patients with parotitis, especially in college-age individuals and international travelers**
- **A correctly obtained buccal specimen for PCR testing is the best test for mumps – contact the Epidemiology Program for timely assistance**
- **Be aware of mumps outbreaks in other countries (Honduras, some Mexican states, Nepal, China, Japan, etc)**
- **All international travelers should have two doses of MMR**
- **Sign up for Monthly Communicable Disease Reports (EISB (619) 692-8499 or [EpiDiv.HHSA@sdcounty.ca.gov](mailto:EpiDiv.HHSA@sdcounty.ca.gov))**

# HEPATITIS A



**Image Credit: CDC**



**LIVE WELL**  
SAN DIEGO



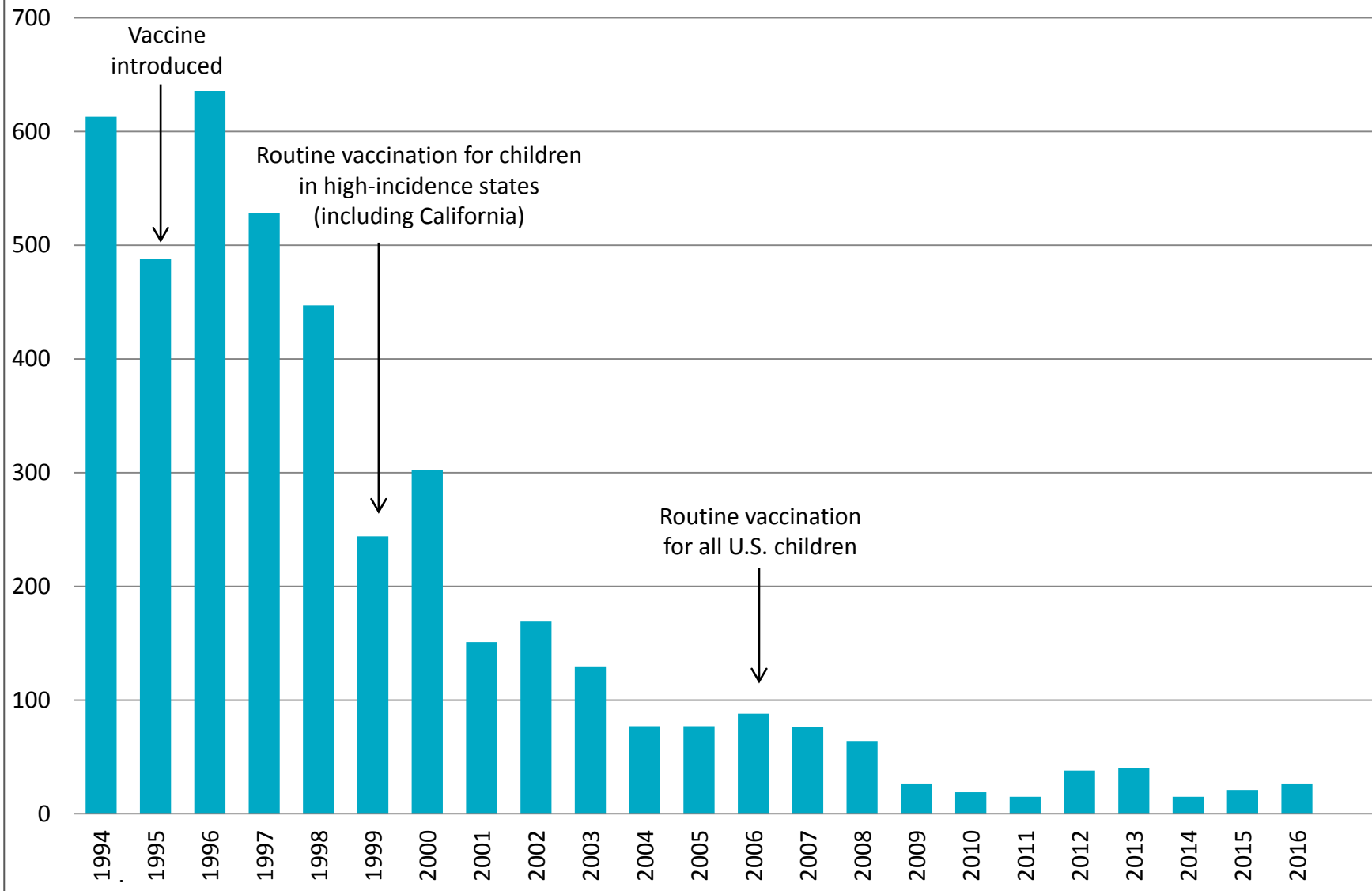
- **Primarily transmitted via the fecal-oral route**
- **Incubation period ranges from 15 to 50 days (mean 28 days)**
- **Period of communicability from two weeks before through one week after the onset of jaundice or elevation of liver enzymes**
- **Virus viable outside body for months, depending on environmental conditions**

# HEPATITIS A OVERVIEW



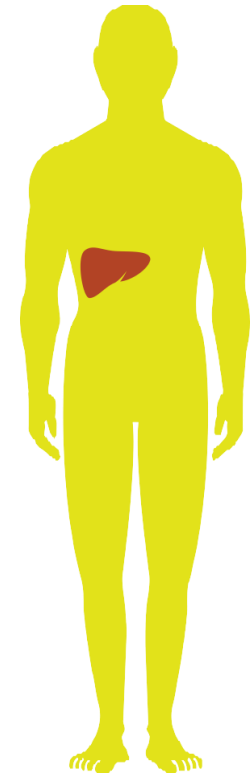
- **HAV virus inactivated by:**
  - Heating to  $>185^{\circ}$  F ( $>85^{\circ}$  C) for one minute
  - Routine water chlorination
  - 1:100 dilution of household bleach to water on surfaces
  - Quaternary ammonium formulations with HCl
  - 2% glutaraldehyde
- **Alcohol-based hand sanitizer not effective, need soap and running water**
- **Vaccination with the full, 2-dose series of Hepatitis A virus vaccine is the best way to prevent infection**

# Hepatitis A Cases, San Diego County 1994 - 2016





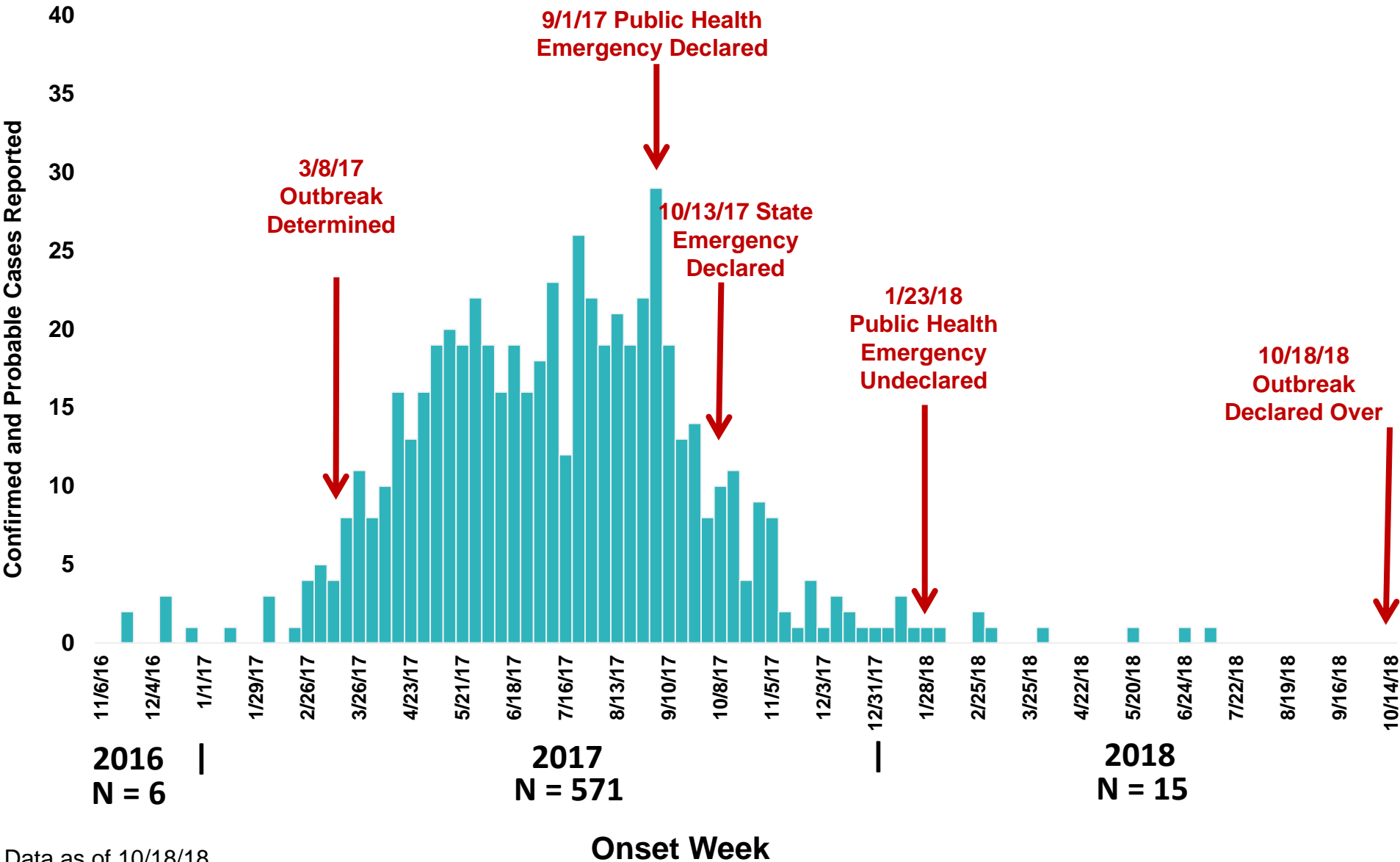
- **592 confirmed outbreak cases from 11/22/16 thru 10/18/18**
  - 407 (68%) hospitalizations, 20 (3.4%) deaths
  - 404 (68%) male (14 MSM), 188 (32%) female
  - Age range 5-87 (median 43.0)
- **Suspected Exposure Type**
  - 201 (34%) homeless and illicit drug use
  - 91(15%) homeless only
  - 79 (13%) illicit drug use only
  - 167 (28%) neither
  - 54 (9%) unknown





# Outbreak-associated Hepatitis A Cases by Onset Week

## San Diego County Residents, 11/1/2016 – 10/18/2018\*, N = 592

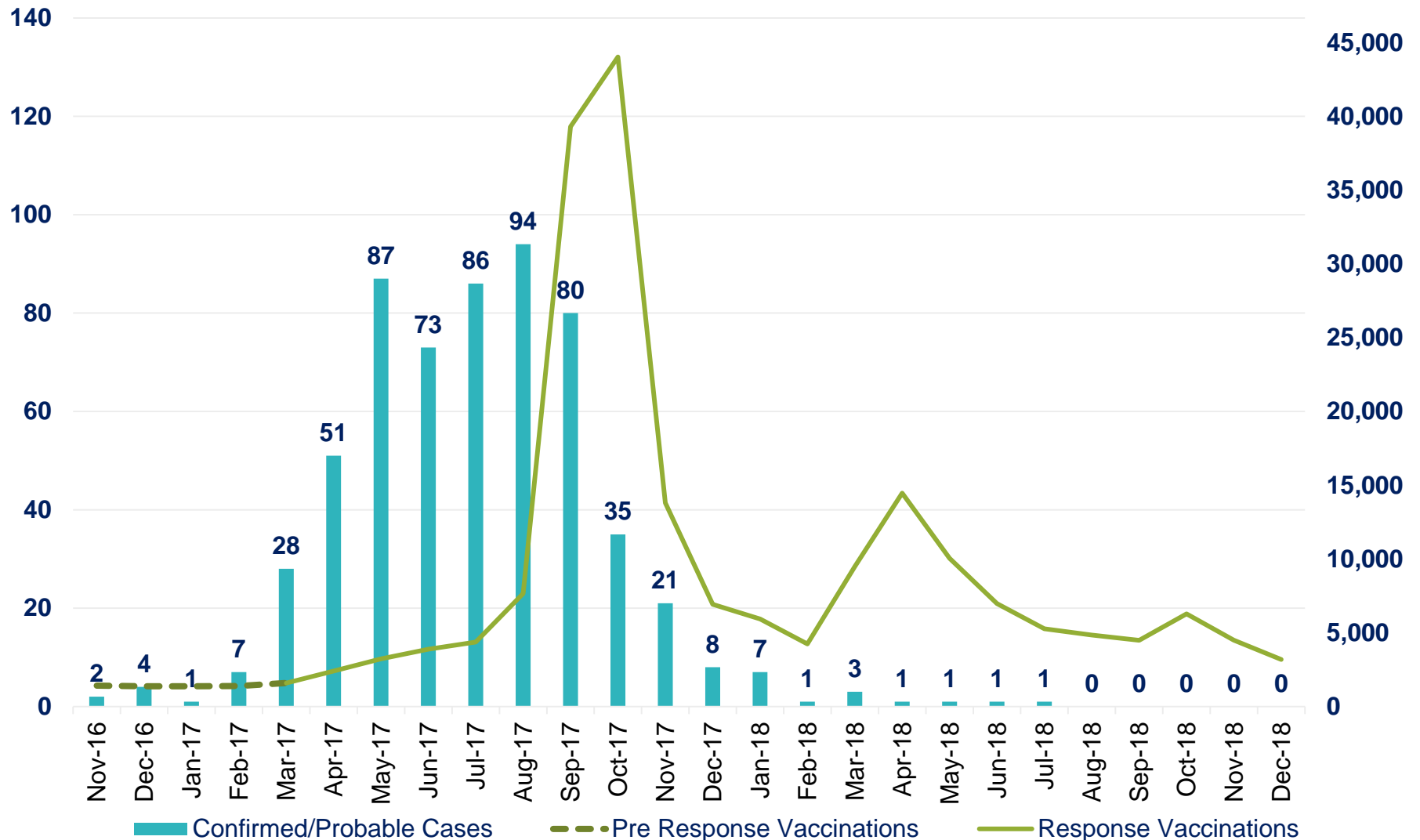


Data as of 10/18/18

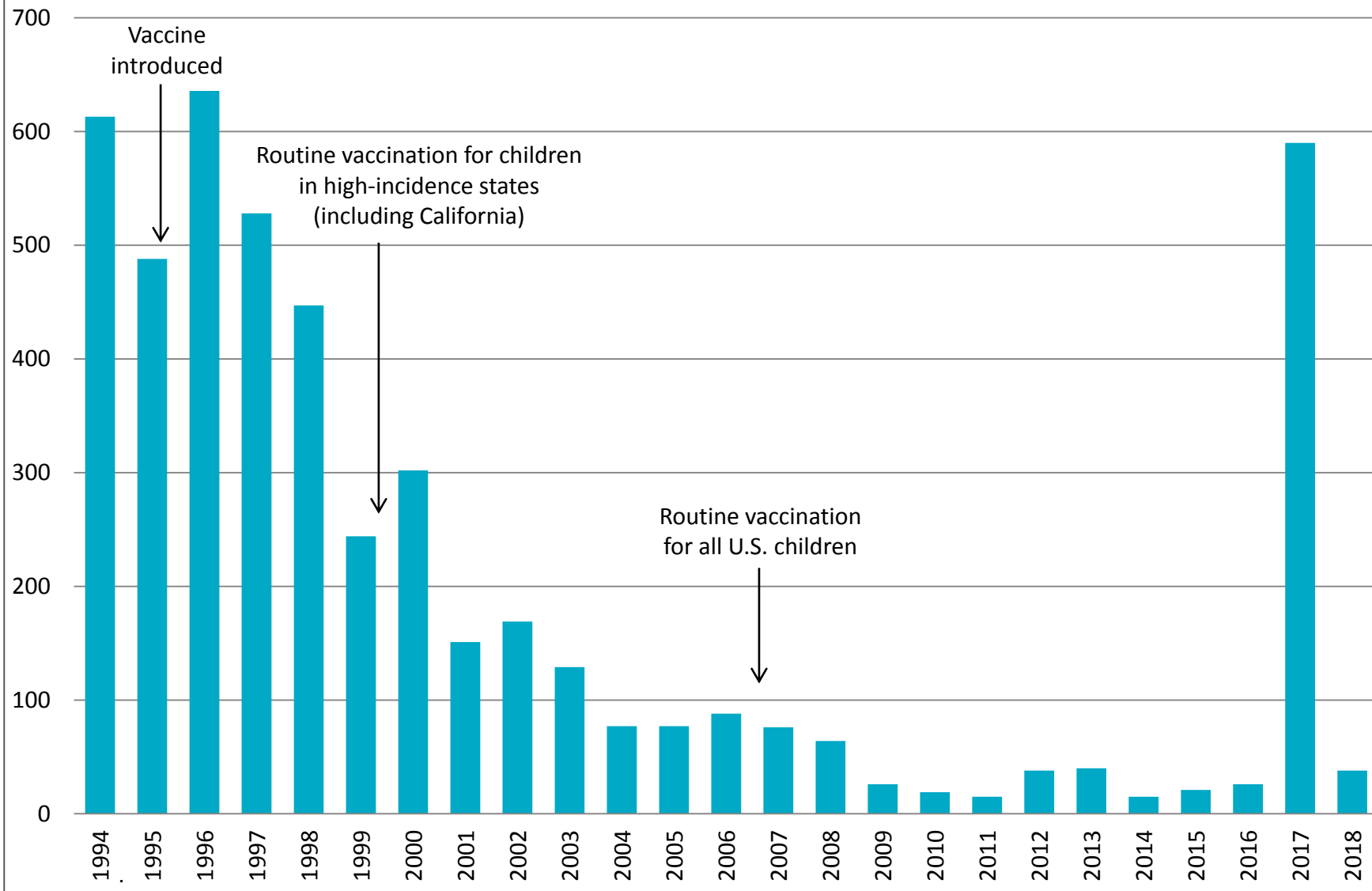
# Outbreak-Associated Hepatitis A Cases & Vaccinations by Month, November 2016 through December 2018

Cases

Vaccinations



# Hepatitis A Cases, San Diego County 1994 - 2018

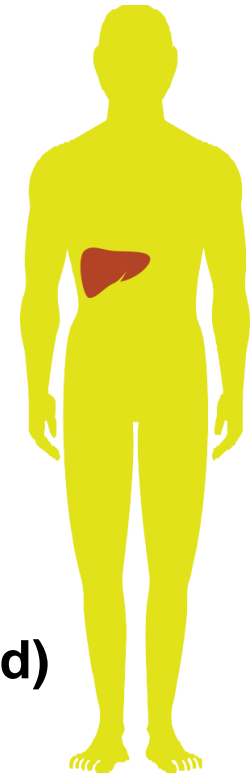


# HEPATITIS A, SAN DIEGO



**LIVE WELL  
SAN DIEGO**

- **Co-infections**
  - 81/474 (17.1%) with hepatitis C
  - 25/474 (5.1%) with hepatitis B
- **20 (3.4%) cases diagnosed in jails**
  - 15 primary, 5 secondary
- **Sensitive occupations**
  - 24 food handlers (1 secondary case ID'ed)
  - 7 healthcare workers (1 secondary case ID'ed)
- **70 non-outbreak CSTE HAV cases**  
(not included in outbreak count)





**Based on the San Diego outbreak experience, persons experiencing homelessness had:**

↑ risk for HAV: **aOR = 3.1** (95%CI 1.4-7.4)

↑ risk for HAV hospitalization: **aOR = 3.8** (95% CI 2.2–6.6)

↑ risk of death from HAV: **aOR = 3.9** (95% CI 1.1–17)

**CDC recommends that persons experiencing homelessness get vaccinated against HAV  
(See [MMWR article](#))**



- **Vaccinate**



- **Sanitize/hygiene**



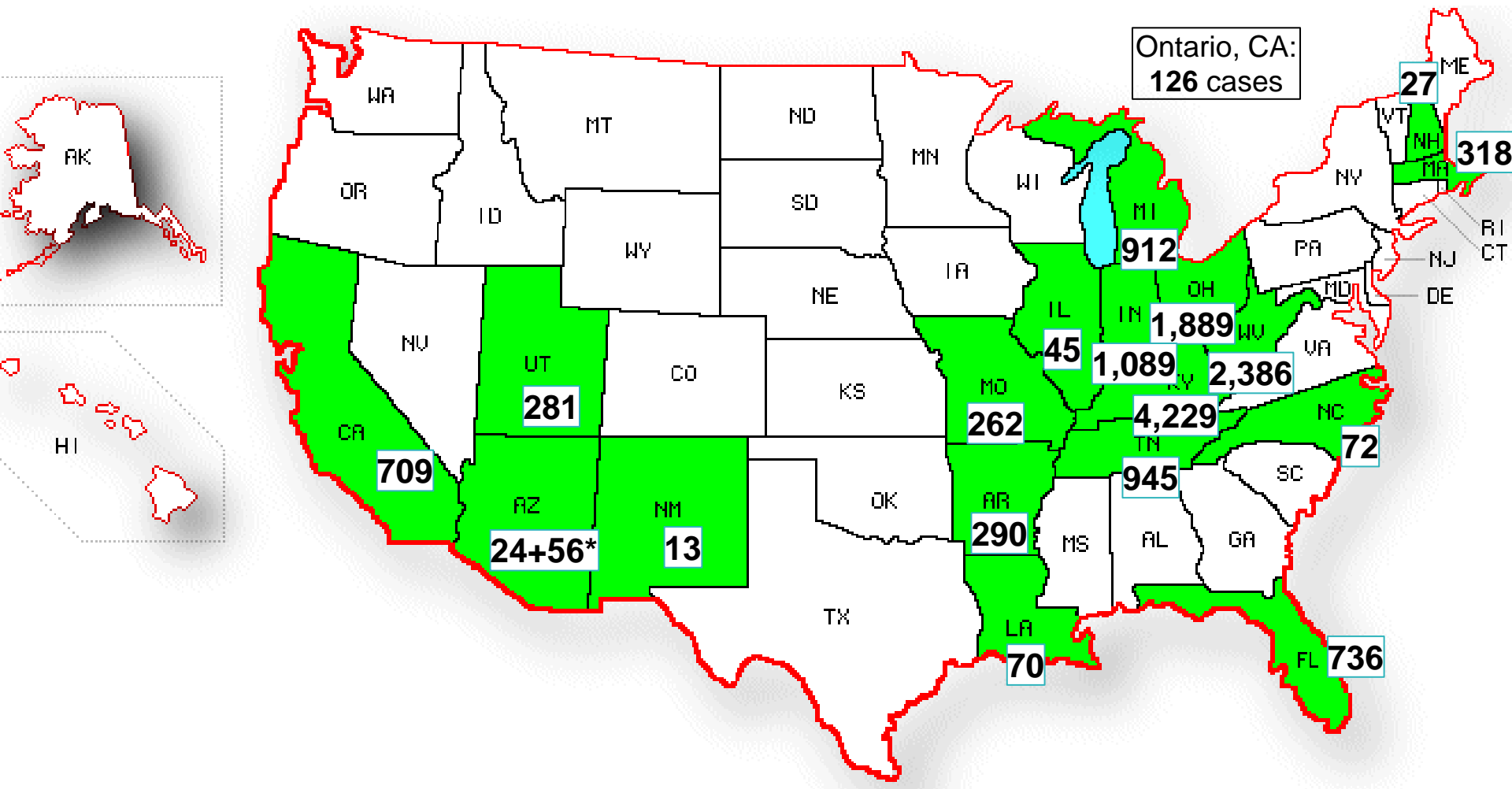
- **Educate**



# HEPATITIS A – UNITED STATES



LIVE WELL  
SAN DIEGO



Map prepared on 3/4/19 using data from state department of health websites and software on: <http://diymaps.net/>



## WHAT CAN YOU DO?

- **Vaccinate children and ADULTS according to ACIP guidelines**
- **Report suspect cases while patients are still at the medical facility**
- **Do not discharge a suspect or confirmed HAV case unless they have shelter and a restroom that is not shared**
- **Be aware of continued outbreaks in persons experiencing homelessness and using illicit drugs**



# PERTUSSIS



Image Credit: CDC



LIVE WELL  
SAN DIEGO



- **Highly contagious respiratory infection caused by *Bordetella pertussis***
- **Primarily a toxin-mediated disease**
- **Bacteria attach to cilia or respiratory epithelial cells**
- **Cyclic (peaks every 2-5 years)**
- **Most poorly controlled VPD**

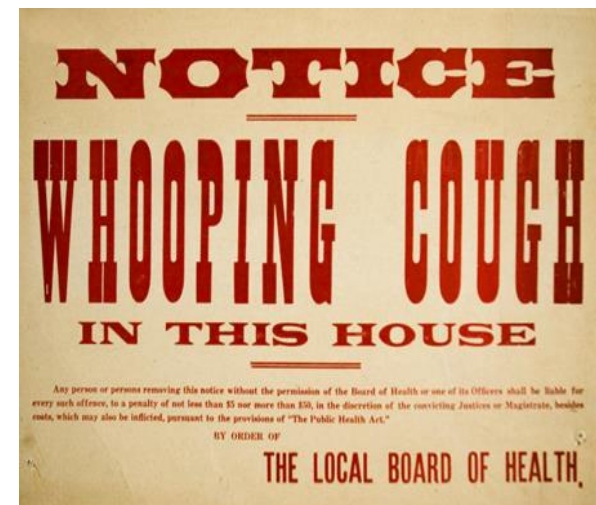
# PERTUSSIS - BASICS



- **Transmission occurs by close contact via droplets**
- **Very contagious: approximately 90% of susceptible household contacts become infected**
- **Immunity wanes after vaccination or disease**
- **92-95% of population must be immune to eliminate transmission**
- **Infants  $\leq$  1 year of age are most vulnerable**
- **Adolescents & adults transmit disease to infants**



- **Incubation Period 7 – 10 days (range 5 – 21 days)**
- **Infectious Period**
  - **Persons  $\geq$  1 year of age = from onset of cold-like symptoms until after 5 days of treatment or until 21 days after cough onset if no (or partial) treatment is given**
  - **Infants  $<$  1 year are considered infectious for 6 weeks without treatment**



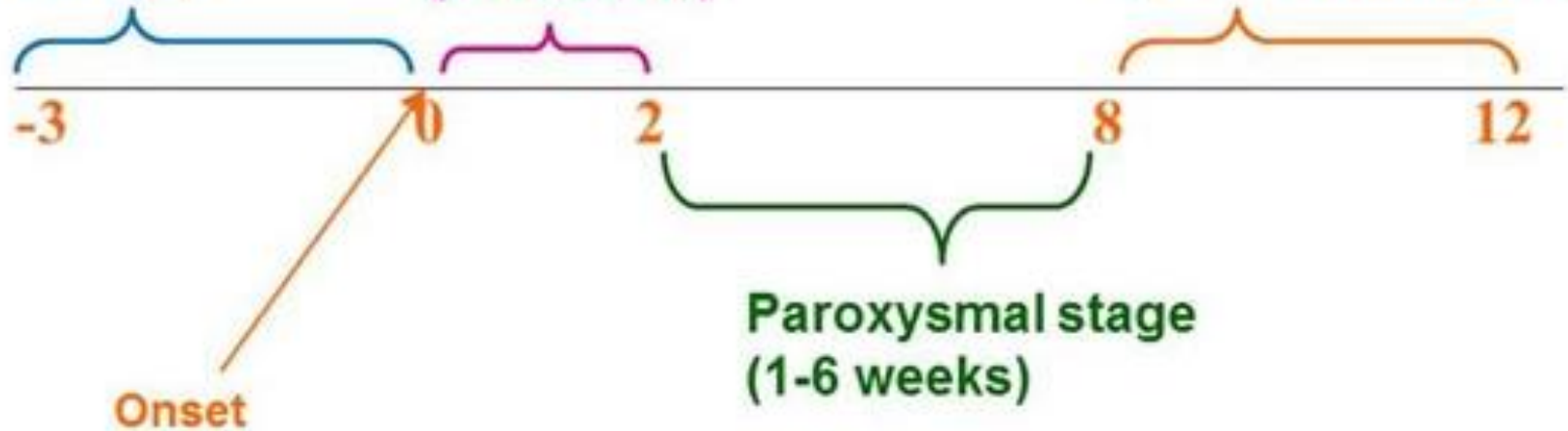
# PERTUSSIS - STAGES

Communicable period  
(onset to 3 weeks after  
start of paroxysmal cough)

Incubation period  
(typically 5-10 days;  
max 21 days)

Catarrhal stage  
(1-2 weeks)

Convalescent stage  
(weeks to months)



# PERTUSSIS - SYMPTOMS



LIVE WELL  
SAN DIEGO

- **Cold-like symptoms**
  - **Coryza**
  - **Sneezing**
  - **Occasional cough**
- **Fever usually absent or minimal**
- **Stage lasts for about 1-2 weeks with cough gradually becoming more severe**

**Catarrhal  
Stage**





- Spasms of severe coughing followed by a sudden deep inspiration
- Characteristic “whooping” sound  
<https://www.soundsofpertussis.com/>
- Post-tussive vomiting common in all ages
- Illness may be milder in previously vaccinated people

**Paroxysmal  
Stage**





- **Coughing, whooping and vomiting decreasing in frequency and severity**
- **Paroxysms may recur with subsequent respiratory infections**
- **Classic pertussis is 6-10 weeks, but may last longer in some people (100 day cough)**

**Convalescent  
Stage**







- **Initially mild cough, runny nose, no fever**
- **Develops into serious symptoms:**
  - **May gag, gasp or stop breathing (apnea)**
  - **Face may turn blue, purple or red (cyanosis)**
  - **Post-tussive vomiting**
  - **May not have noticeable cough or “whoop”**
  - **Seizures**
  - **Respiratory distress**
  - **Pneumonia**





## Adolescents and adults

- Disease is often milder than infants and children
- Infection may be asymptomatic or present as classic pertussis
- Adults may describe intermittent
- Older persons often source of infection for children



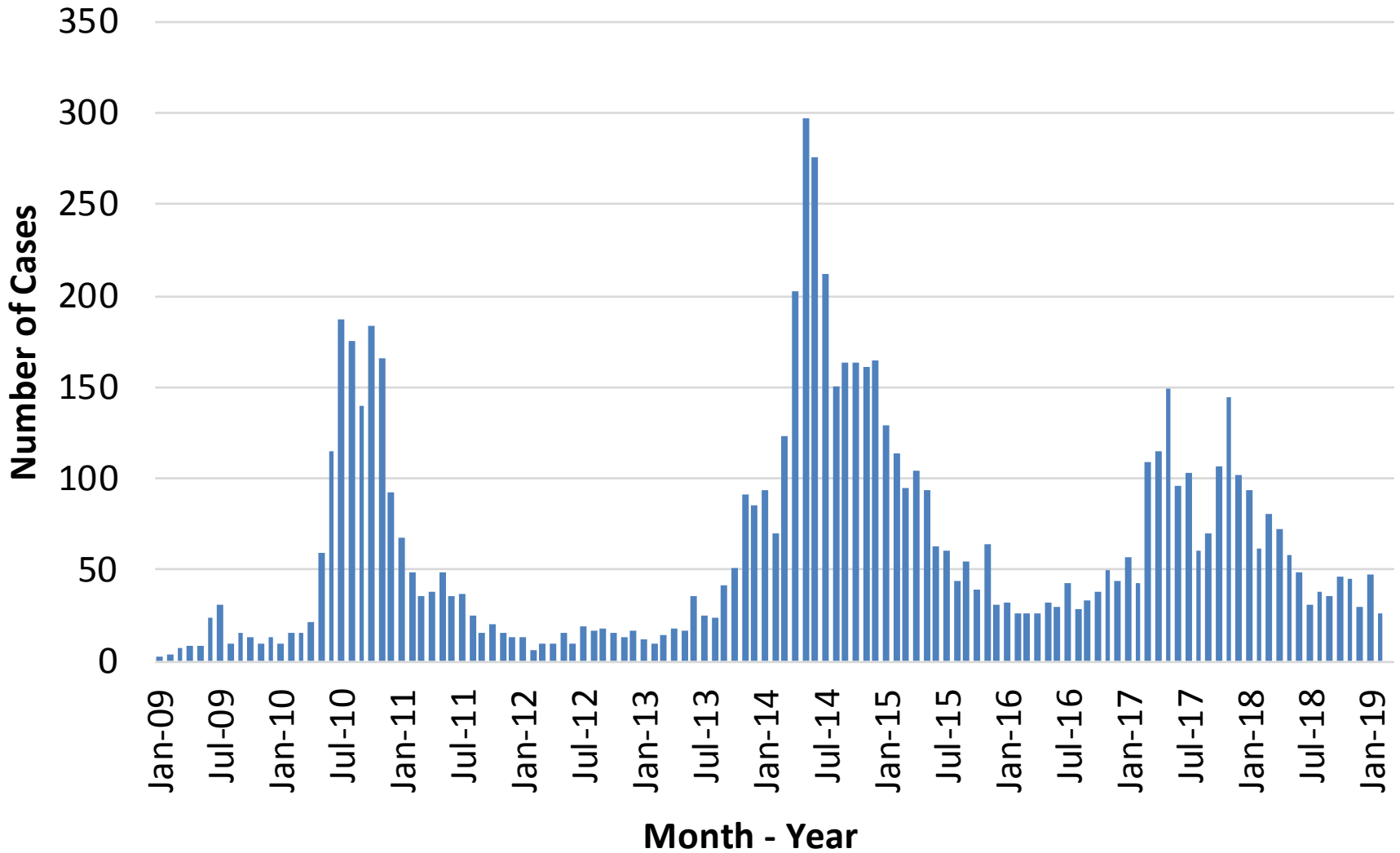
- **Azithromycin** – 5 days (most effective/common)
- **Erythromycin** – 14 days (7-14 days infants  $\geq 6$  months & children)
- **Clarithromycin** – 7 days (not recommended for  $< 1$  month of age)
- **Bactrim/Septra** – 10-14 days

**Post-exposure prophylaxis (PEP)**

**is**

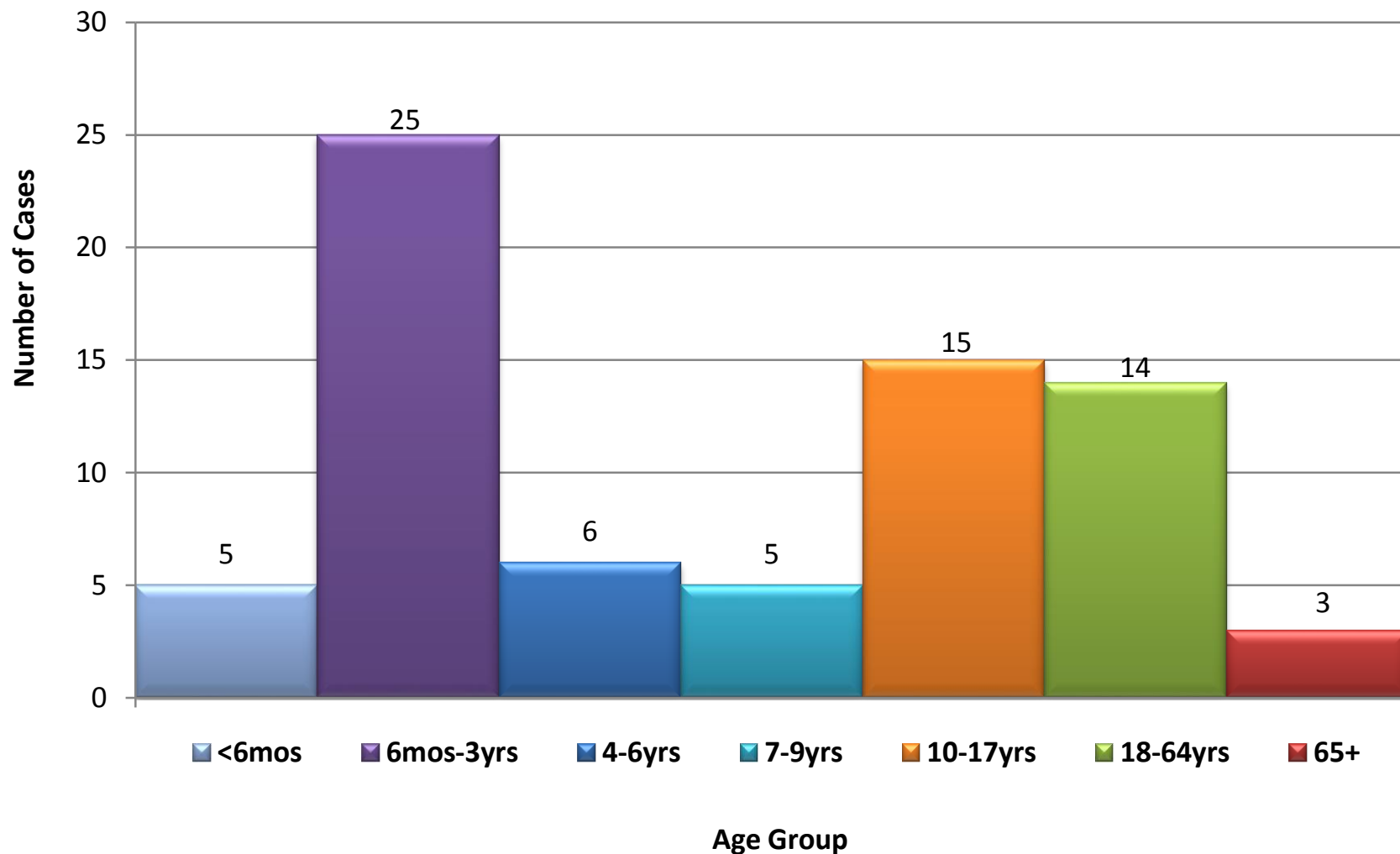
**SAME AS TREATMENT.**

# Pertussis Cases by Episode Month, 2009-2019 YTD



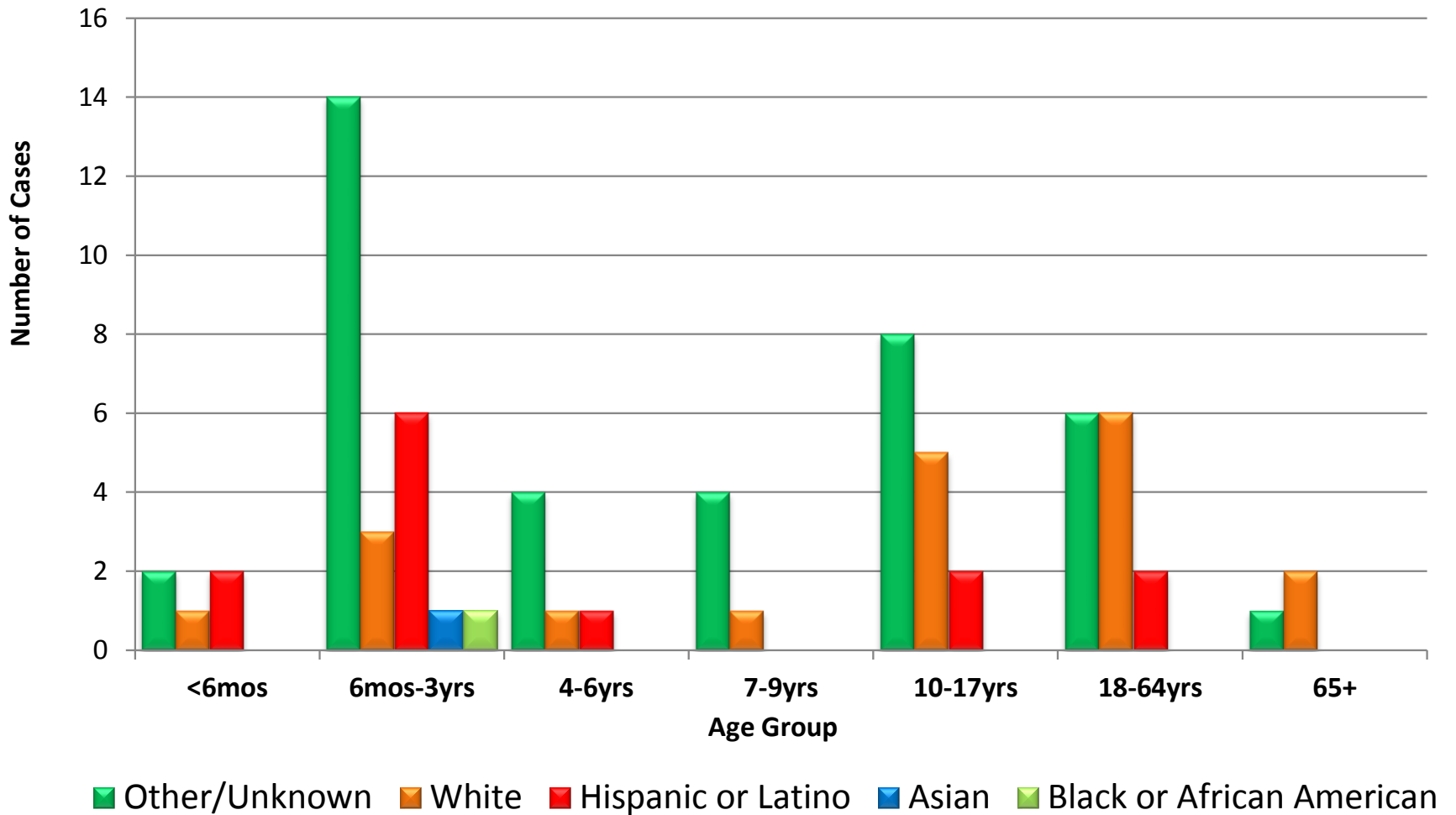
\* CDC week year used, which may differ from calendar year totals

## San Diego County Number of Pertussis Cases Reported by Age Group, 2019 (N=73).



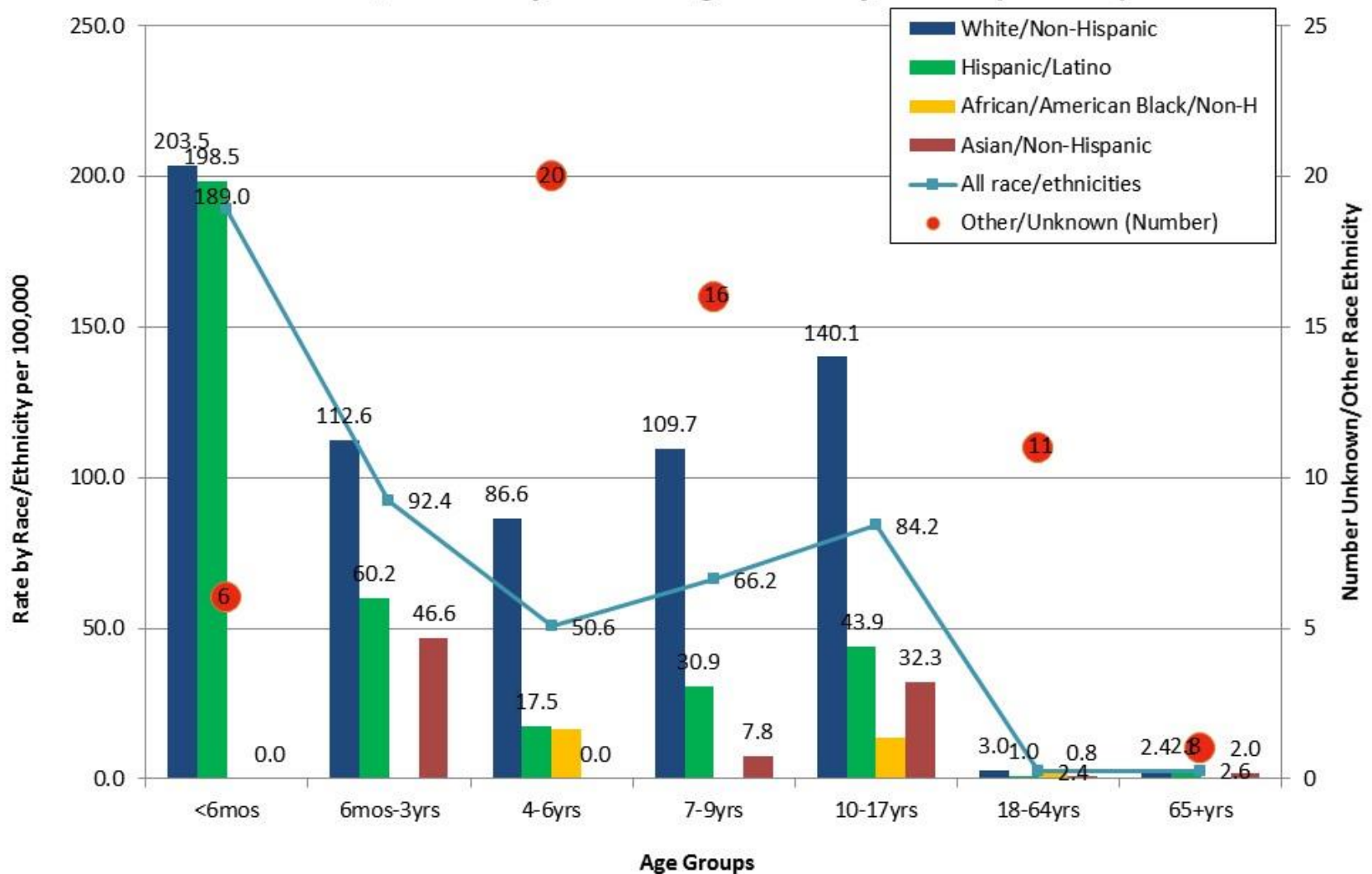
\* CDC week year used, which may differ from calendar year totals

## San Diego County Number of Pertussis Cases Reported by Race/Ethnicity and Age Group, 2019 (N=73).



\* CDC week year used, which may differ from calendar year totals

## Pertussis Rates (per 100,000 population) by Age Group and Race/Ethnicity, San Diego County, 2018 (N=642).



\*Rate per 100,000 population using SANDAG population estimates for 2016



## WHAT CAN YOU DO?

- **Consider pertussis in any patient with classic presentations, persistent cough, or cough complaints out of proportion to exam**
- **Recognize the challenge of diagnosis in young infants**
- **Encourage all patients to be up-to-date with pertussis vaccination, especially pregnant women!**
- **Presumptive treatment is cost effective, but test when infants and/or pregnant women are in the household and when outbreaks are suspected to facilitate public health actions.**





**PRIORITY CONTROL STRATEGY**  
**EVERY PREGNANT WOMEN RECEIVES**  
**TDAP BOOSTER FOR**  
**EVERY PREGNANCY AT 27-36 WEEKS EGA!**

# VARICELLA



**Image Credit: AAP**



**LIVE WELL**  
SAN DIEGO

# VARICELLA: CLINICAL FEATURES IN UNVACCINATED CASES



 LIVE WELL  
SAN DIEGO

- **Prodrome of fever, malaise, headache, and abdominal pain 1-2 days before rash**
- **Rash involves 3 or more successive crops over several days**
  - **Each crop usually progresses within less than 24 h from macules to papules, vesicles, pustules and crusts so that on any part of the body there are lesions in different stages of development**
- **Rash usually starts on face and trunk, then spreads to extremities**
- **Rash usually involves 250-500 lesions that are pruritic**
- **Lesions are typically crusted 4-7 days after rash onset**

# VARICELLA: CLINICAL FEATURES IN VACCINATED PERSONS



- **Breakthrough varicella: infection with wild-type varicella disease occurring > 42 days after vaccination**
- **15-20% of one-dose vaccinated persons may develop varicella if exposed to VZV**
- **Usually milder presentation than varicella in unvaccinated cases**
  - **Usually low or no fever**
  - **Develop < 50 lesions**
  - **Experience shorter duration of illness**
  - **Rash predominantly maculopapular rather than vesicular**
- **25-30% of breakthrough varicella cases are not mild and have clinical features more similar to varicella in unvaccinated persons**

# Breakthrough Varicella



Image Credit: CDPH



- **Bacterial superinfection of skin lesions**
- **Pneumonia (viral or bacterial)**
- **Central nervous system manifestations (meningoencephalitis, cerebellar ataxia)**
- **Hepatitis, hemorrhagic complications, thrombocytopenia, nephritis occur less frequently**
- **Increased risk for complications**
  - **Adults**
  - **Immunocompromised persons**
  - **Pregnant Women**
  - **Newborns**



# Hemorrhagic Varicella



Image Credit: CDC



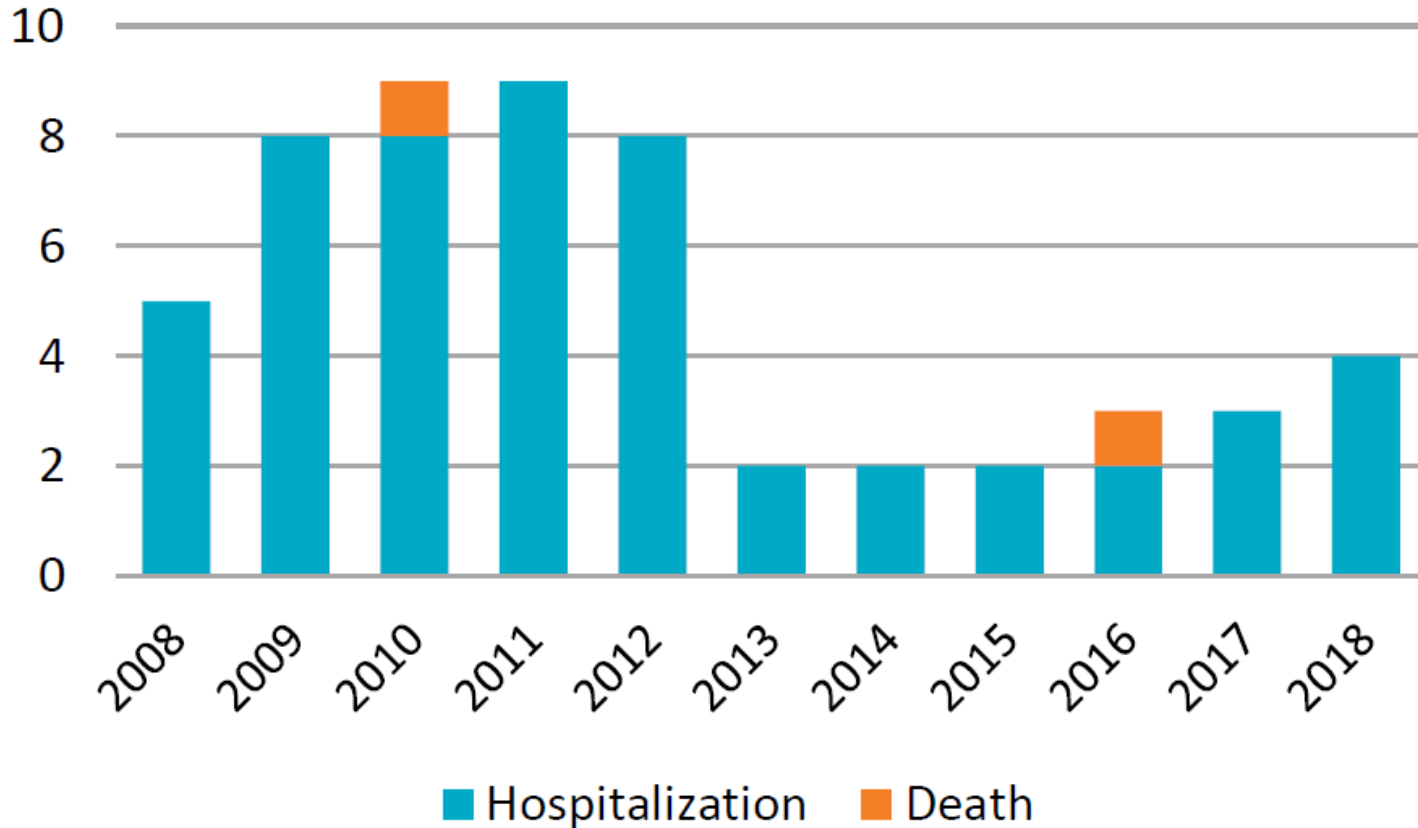
- **Transmitted person-to-person by direct contact, inhalation of aerosols from vesicular fluid of skin lesions of acute varicella or zoster, or aerosolized respiratory tract secretions**
- **Incubation period: 14-16 days (range: 10-21 days)**
- **Period of contagiousness: 1-2 days before rash onset until all lesions crusted or disappear if maculopapular rash (typically 4-7 days)**
- **Varicella in unvaccinated persons is highly contagious (61-100% secondary household attack rate)**
- **Varicella in one-dose vaccinated persons half as contagious as unvaccinated cases**





- **Varicella vaccine is recommended for use in susceptible person after exposure to varicella**
  - **70%-100% effective if given within 72 hours of exposure**
  - **Not effective if >5 days but will produce immunity if not infected**
- **VariZIG<sup>®</sup> is recommended for non-immune persons at risk for complications**
  - **Give as soon as possible within 10 days of exposure**
  - **Very expensive**
  - **125 units/10 kg body weight up to 625 units (4 vials)**

**Figure 1. Varicella Cases, Hospitalization or Death,  
San Diego County, 2008-2018**

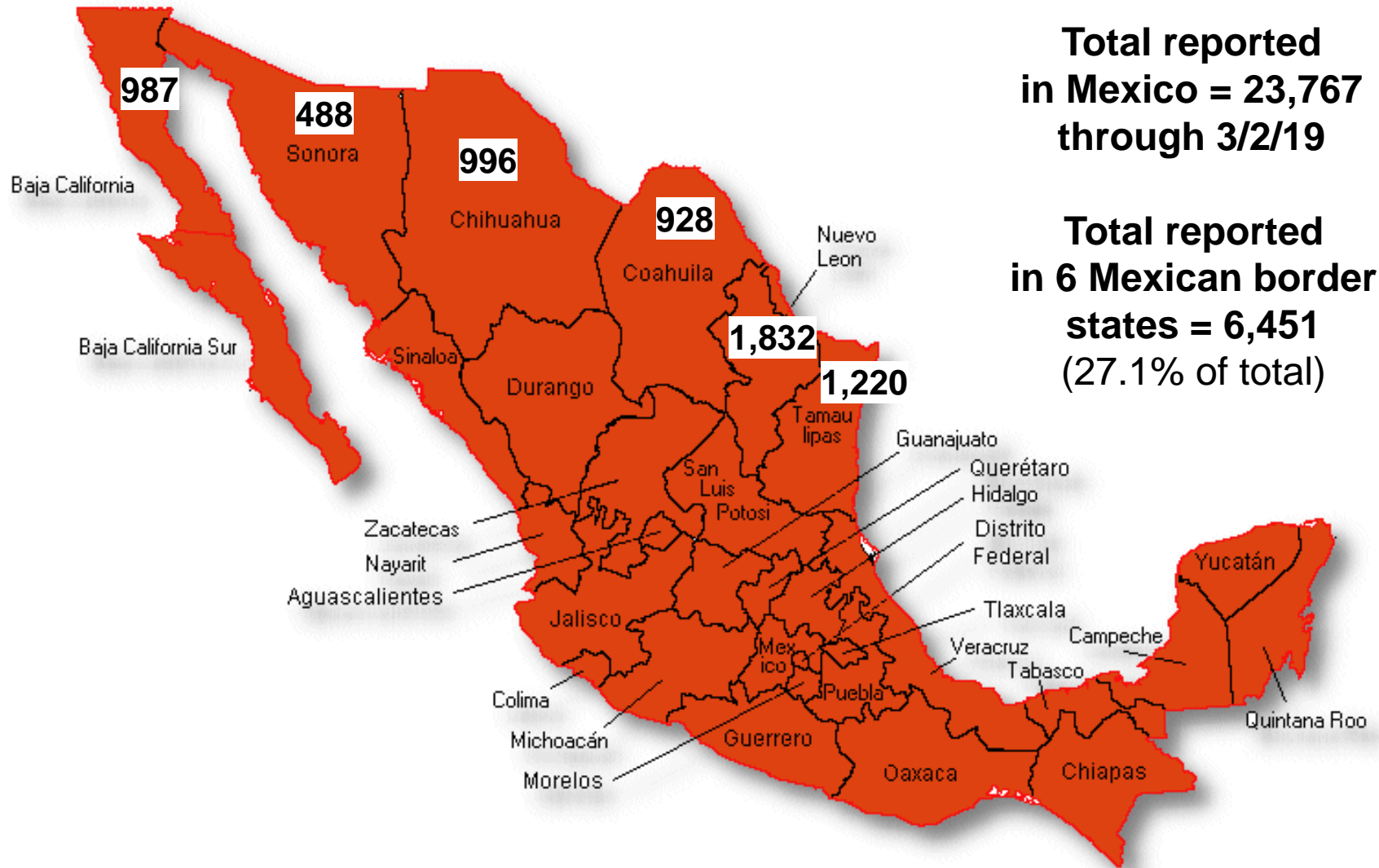


Data are provisional and subject to change as additional information becomes available. Grouped by CDC disease years. Varicella cases are only reportable in California when there is a hospitalization or death.

# VARICELLA – MEXICO 2019 YTD

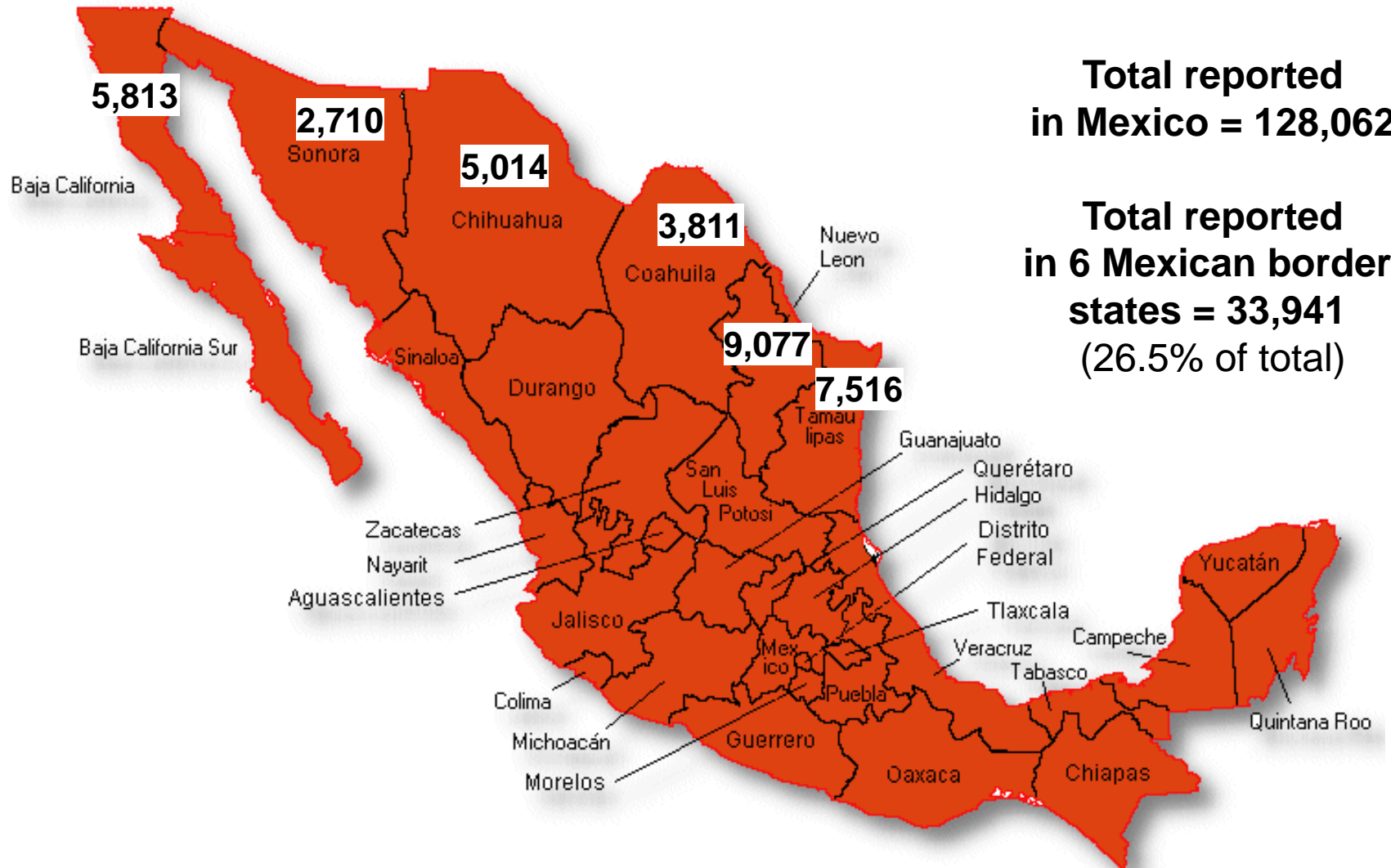


LIVE WELL  
SAN DIEGO



Source: Secretaría de Salud. Map prepared on 3/18/19 using data from:  
<https://www.gob.mx/cms/uploads/attachment/file/437985/sem06.pdf>  
and software on: <http://diymaps.net/>

# VARICELLA – MEXICO 2018



Source: Secretaría de Salud. Map prepared on 2/21/19 using data from:

<https://www.gob.mx/salud/documentos/-boletinepidemiologico-sistema-nacional-de-vigilancia-epidemiologica-sistema-unico-de-informacion> and software on: <http://diymaps.net/>

# VARICELLA – MEXICO 2018



Source: Secretaría de Salud. Map prepared on 2/21/19 using data from:

<https://www.gob.mx/salud/documentos/-boletinepidemiologico-sistema-nacional-de-vigilancia-epidemiologica-sistema-unico-de-informacion>, 2015 census data, and software on: <http://diymaps.net/>



## WHAT CAN YOU DO?

- **Encourage routine childhood vaccination for varicella and adult vaccination for shingles**
- **Remember shingles is contagious to those who are non-immune**
- **Report varicella outbreaks, hospitalizations and deaths to Epidemiology Program**
- **Be aware of need for post-exposure prophylaxis in persons at risk for severe outcome (non-immune pregnant women, newborns, immune compromised)**

# MEASLES



**Image Credit: CDC**



**LIVE WELL**  
SAN DIEGO





To: CAHAN San Diego Participants  
Date: January 31, 2019  
From: Immunization Program, Public Health Services

### **Measles Outbreaks in Washington, New York, and Overseas**

This health advisory informs healthcare professionals about recent measles outbreaks in the United States and other countries. It also contains recommendations for providers and resource links.

#### **Key Points:**

- Measles outbreaks are currently ongoing in Washington and New York.
- Reports of measles after international travel increased significantly in the United States in 2018, notably after travel to Israel, Italy, France, the United Kingdom, and Ukraine. Countries experiencing current large measles outbreaks include Ukraine, India, Brazil, Philippines, Democratic Republic of Congo, and Somalia.
- Measles should be considered when individuals present with an acute febrile illness and maculopapular rash. Recent travel to communities or countries with ongoing outbreaks and exposures at locations with international tourists increase relative risk of disease.
- All patients with fever and rash should be screened at the point of entry to a healthcare facility. Providers should immediately institute airborne precautions on patients suspected of measles to prevent healthcare associated exposures.
- **Providers should immediately report any suspect measles case to the County Immunization Program. Do not wait for laboratory confirmation.**
- Specimens on patients with suspected measles can be expeditiously tested at the San Diego County Public Health Laboratory (SDPHL) after consultation with the County Immunization Program.





- Since 1/1/19, [Clark County](#), WA has identified 73 confirmed cases and NO suspect cases. Date of last case 3/13/19.
  
- Ages
  - 1 to 10 years: 53 cases
  - 11 to 18 years: 15 cases
  - 19 to 29 years: 1 case
  - 30 to 39 years: 4 case
  
- Hospitalization: 1 case
  
- Confirmed cases include
  - 2 cases who traveled to Hawaii
  - 1 case who traveled to Bend, Oregon
  - 2 cases who moved from Clark County to Georgia.
  
- The case totals do not include confirmed cases from King County and Multnomah County, OR

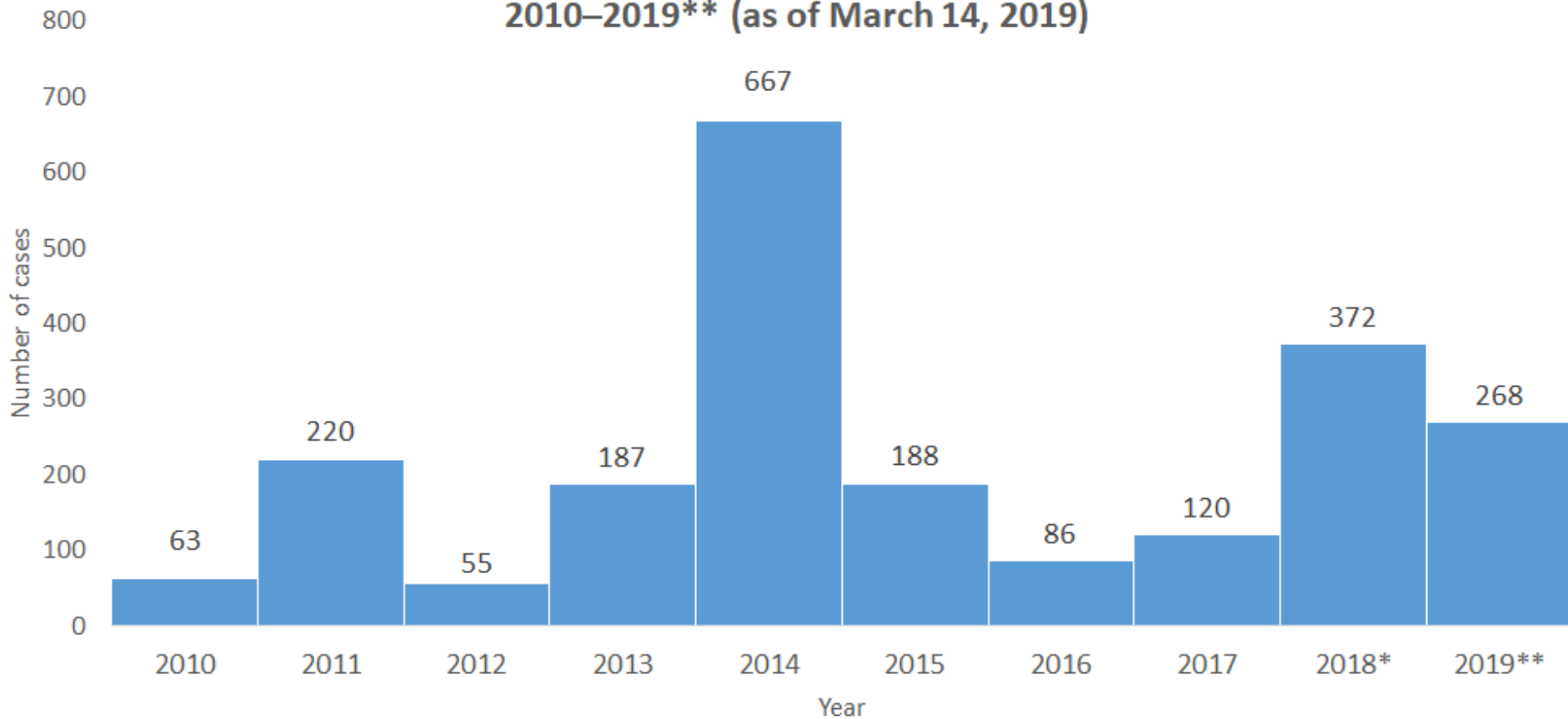


Six outbreaks (defined as 3 or more cases) have been reported in 2019 in the following jurisdictions:

- [New York State, Rockland County](#) – 147 cases
- [New York State, Monroe County](#) – 7 cases
- [New York City](#) – 158 cases
- [Washington](#) - 73 cases
- [Texas](#) – 11 cases
- [Illinois](#) – 6 cases
- [California](#) – 3 cases

Six cases in CA in 2019, all related to international travel (Philippines, Ukraine)

## NUMBER OF MEASLES CASES REPORTED BY YEAR 2010–2019\*\* (as of March 14, 2019)

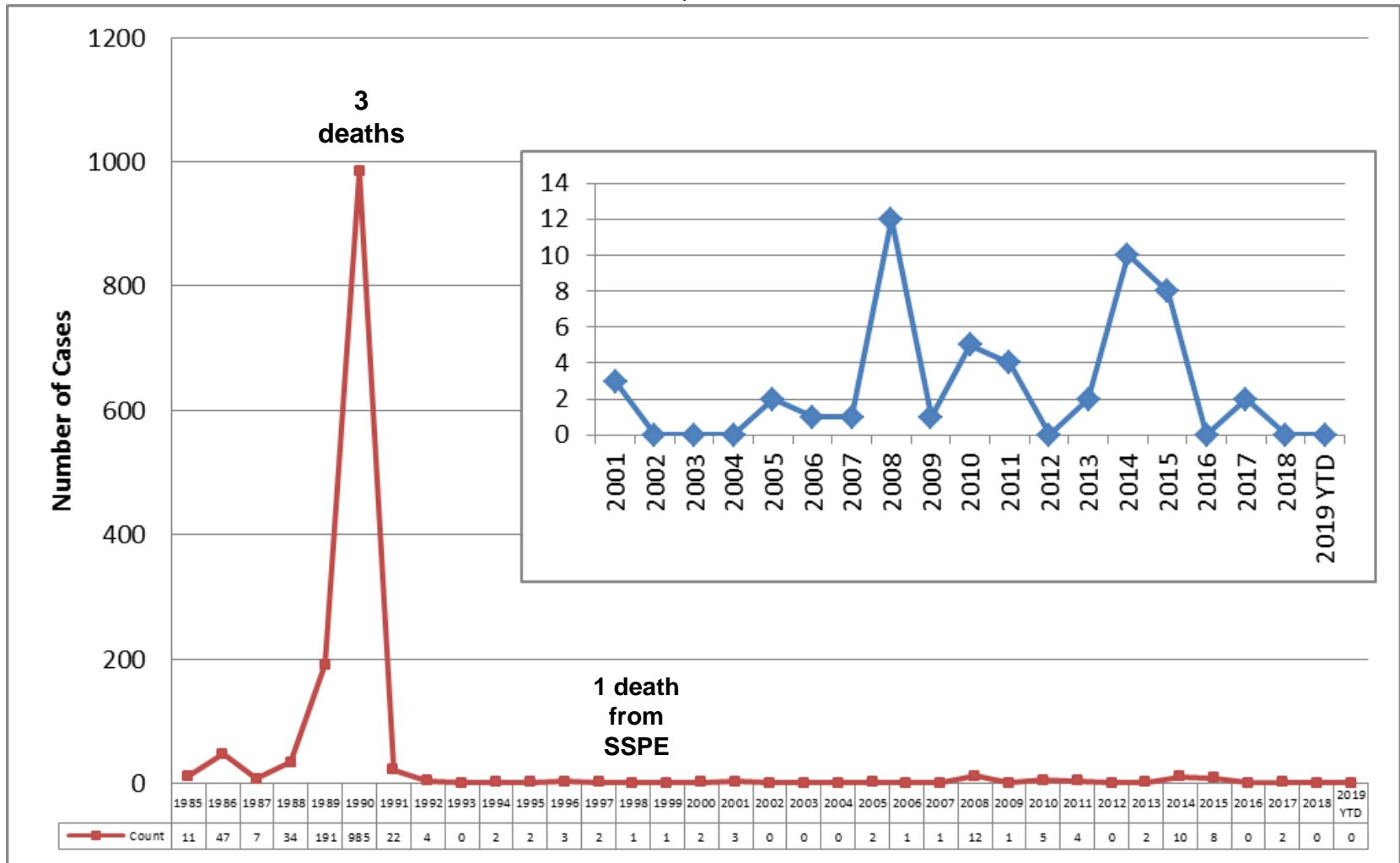


\*Cases as of December 29, 2018. Case count is preliminary and subject to change.

\*\*Cases as of March 14, 2019. Case count is preliminary and subject to change

**Source: CDC.** Downloaded 3/18/19 from:  
<https://www.cdc.gov/measles/cases-outbreaks.html>

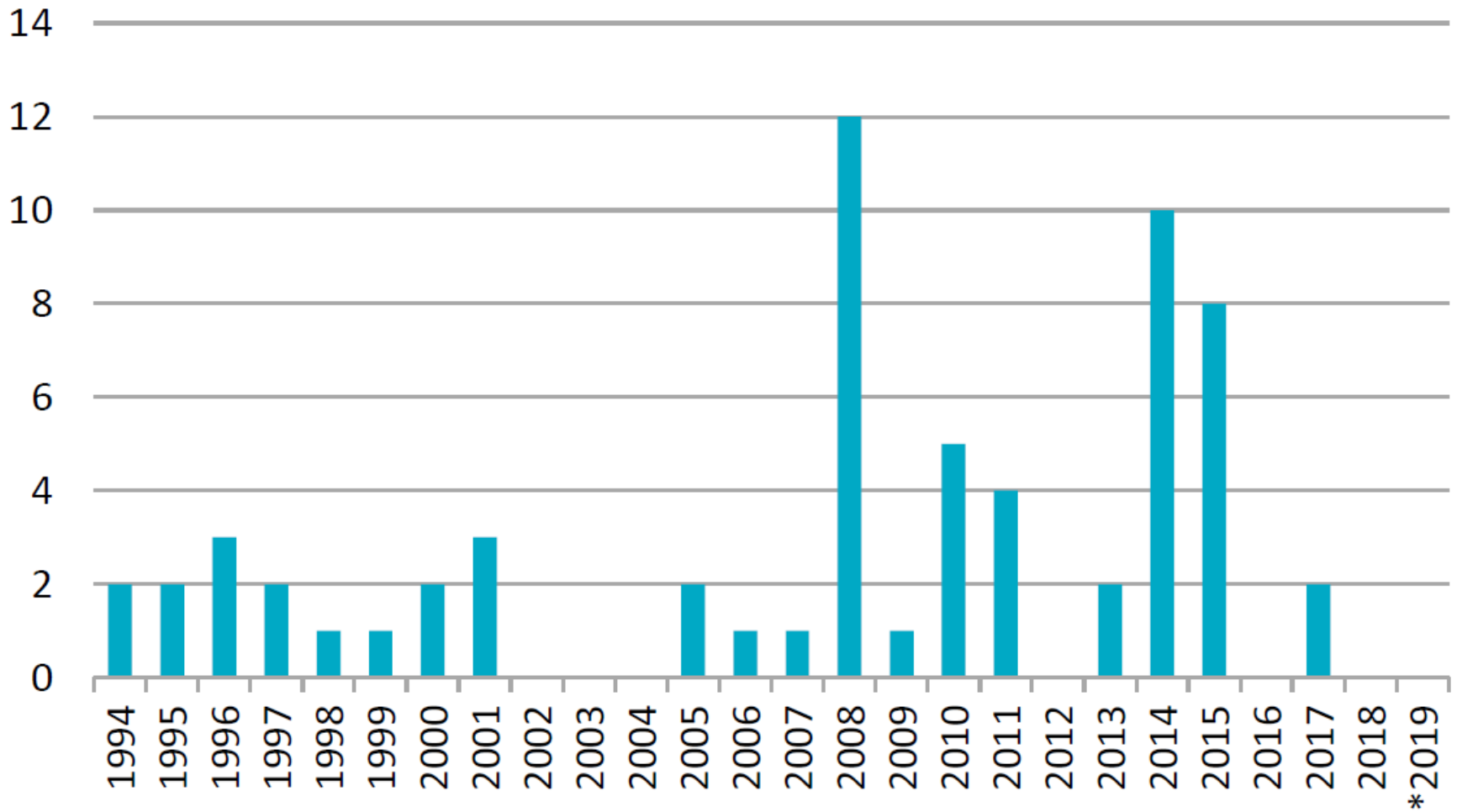
# REPORTED CASES OF MEASLES SAN DIEGO COUNTY, 1985 – JANUARY 2019



1990

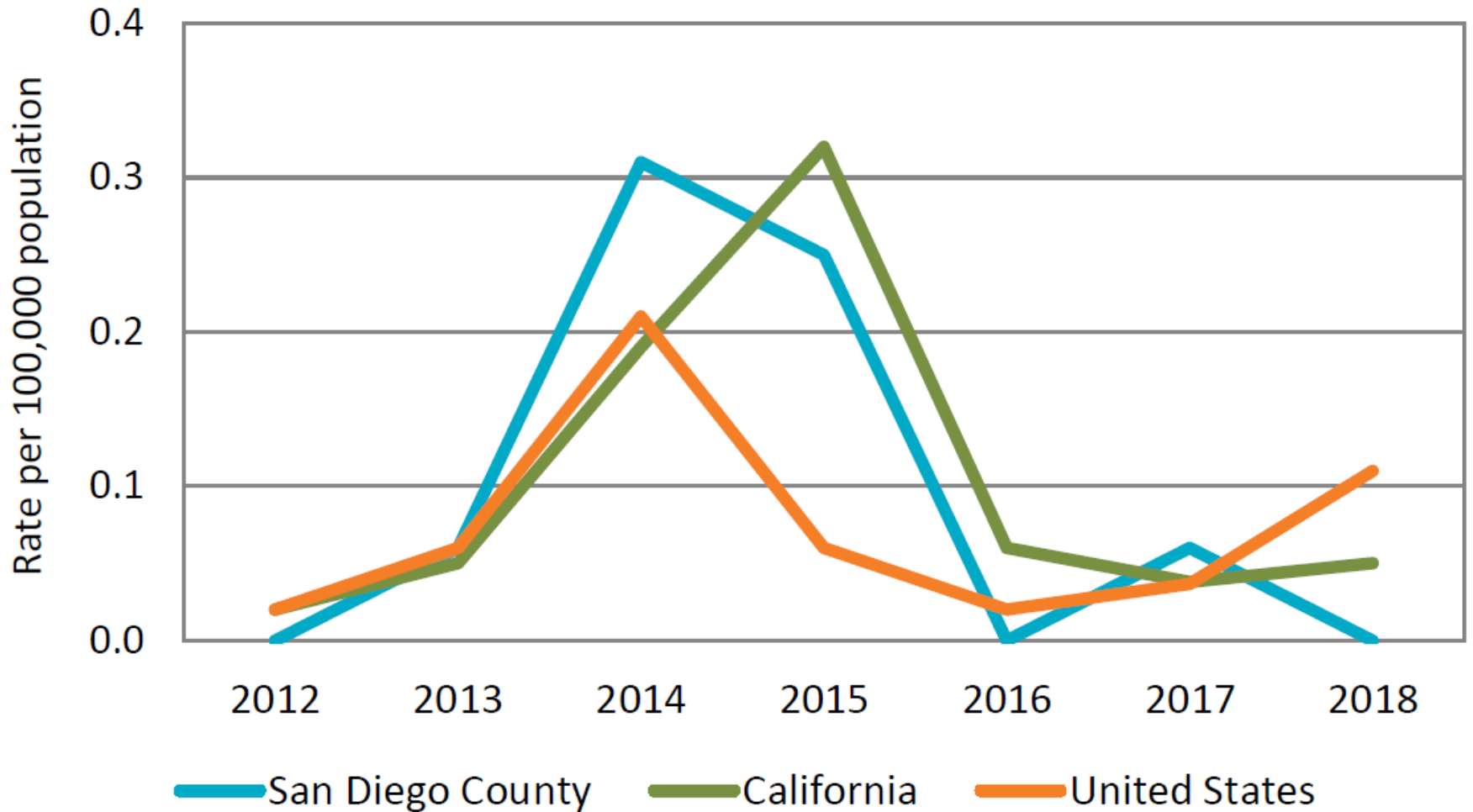
Data Source: HHS Immunizations Program  
Data through January 31, 2019

**Figure 1. Measles Cases,  
San Diego County, 1994-2019\***



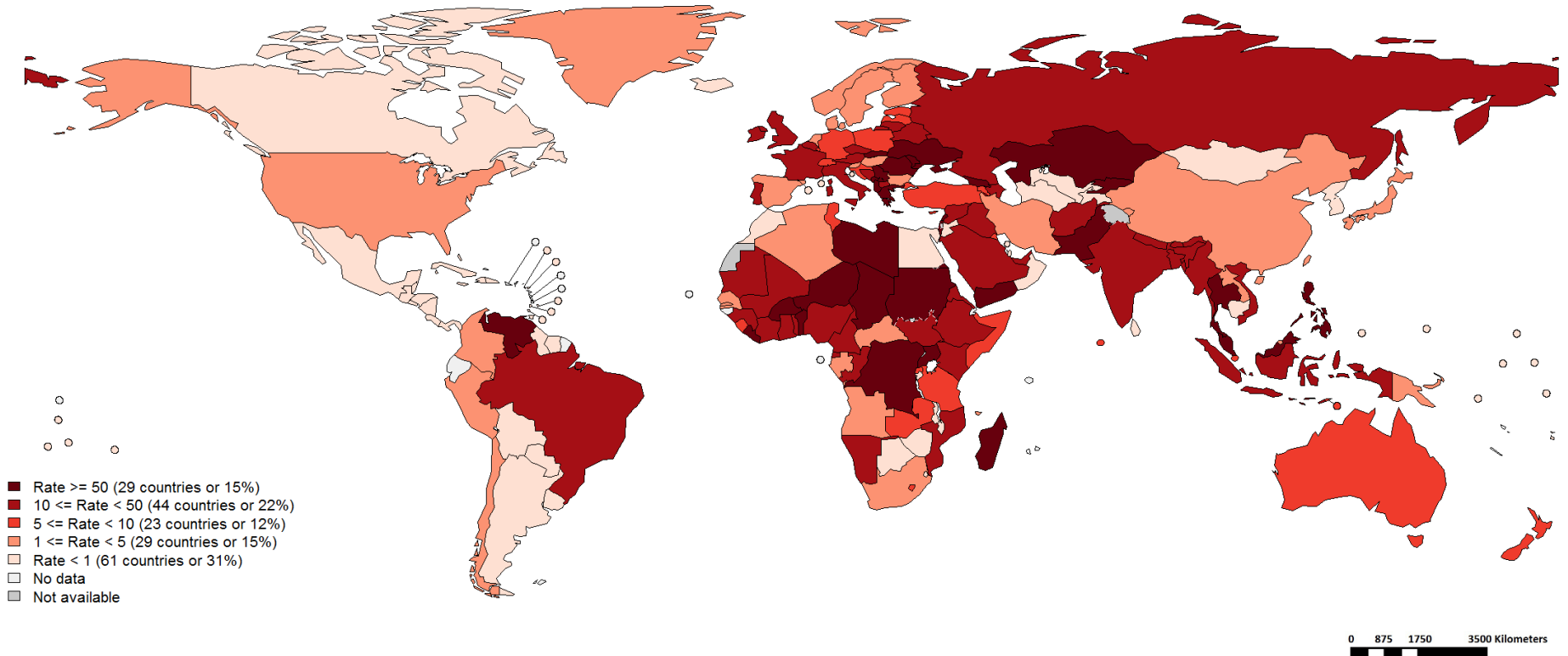
\*2019 data are year-to-date; current as of 2/15/2019. Data are provisional and subject to change as additional information becomes available. Grouped by CDC disease years.

**Figure 2. Measles Incidence, San Diego County, California, and United States, 2012-2018**



Data are provisional and subject to change as additional information becomes available. United States and California data for 2018 are preliminary. Grouped by CDC disease years.

# Number of measles cases reported to WHO from member states 2/1/18 to 1/31/19



**Map production:** World Health Organization, WHO, 2019. All rights reserved  
**Data source:** IVB Database

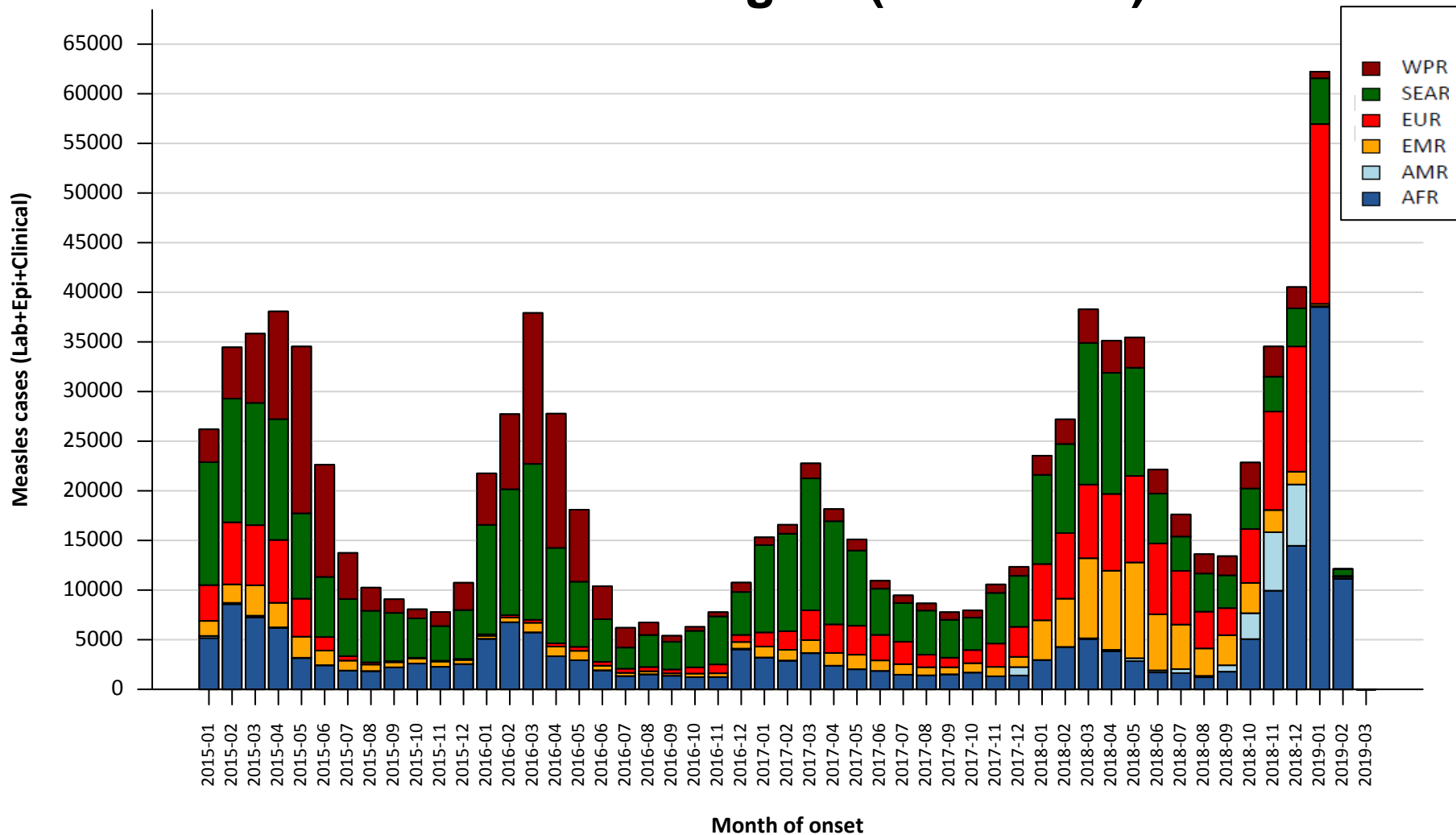
**Disclaimer:**

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. Dotted and dashed lines on maps represent approximate border lines for which there may not yet be full agreement.

**Source: WHO.** Downloaded 3/18/19 from:

[http://www.who.int/immunization/monitoring\\_surveillance/burden/vpd/surveillance\\_type/active/measles\\_monthlydata/en/](http://www.who.int/immunization/monitoring_surveillance/burden/vpd/surveillance_type/active/measles_monthlydata/en/)

# Measles case distribution by month and WHO Region (2015-2019)



Source: WHO. Downloaded 3/18/19 from:

[http://www.who.int/immunization/monitoring\\_surveillance/burden/vpd/surveillance\\_type/active/measles\\_monthlydata/en/](http://www.who.int/immunization/monitoring_surveillance/burden/vpd/surveillance_type/active/measles_monthlydata/en/)



Top 10**		
Country	Cases	Rate
Ukraine	63948	1439.02
India	63364	47.85
Madagascar	59407	2386.35
Pakistan	30747	159.14
Philippines	19401	187.78
Yemen	11746	425.82
Brazil	10262	49.42
Nigeria	5847	31.44
Venezuela (Bolivarian Republic of)	5668	179.55
Thailand	5579	81.02

Other countries with high incidence rates***		
Country	Cases	Rate
Georgia	3176	809.09
Liberia	3194	692.27
Albania	1476	504.38
Serbia	4176	473.46
Israel	3377	412.24
Montenegro	201	319.75
Kyrgyzstan	1509	253.37

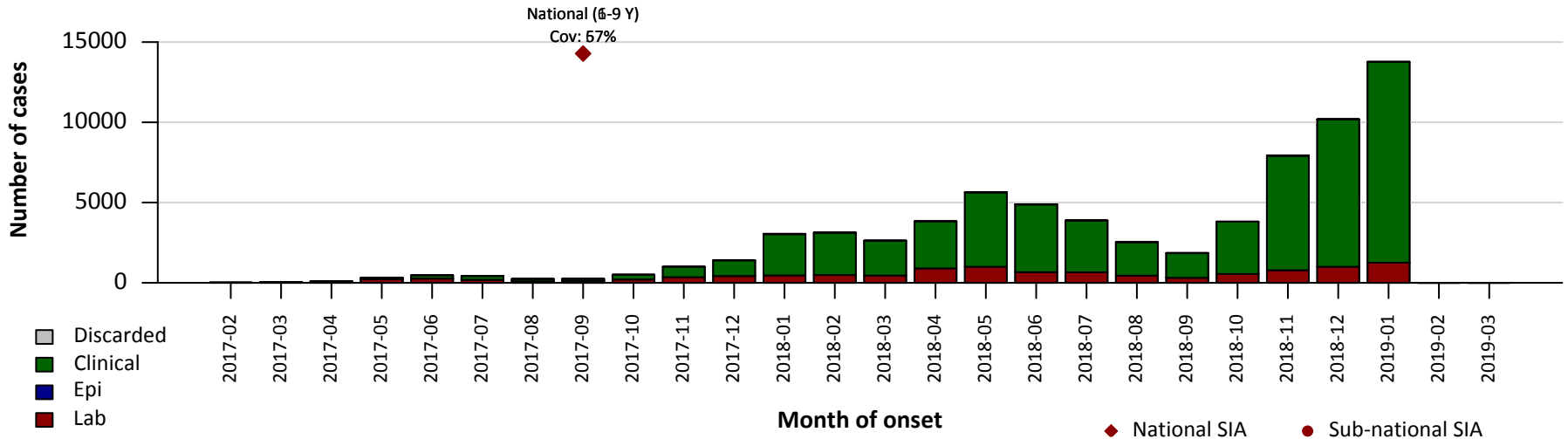
Measles cases from countries with known discrepancies between case-based and aggregate surveillance, as reported by country			
Country	Year	Cases	Data Source
DR Congo	2018	67072	SITUATION EPIDEMIOLOGIQUE DE LA ROUGEOLE EN RDC, Week of 05/03/2019
	2019	17646	
Somalia	2018	9135	Somali EPI/POL Weekly Update Week 09
	2019	720	

**Source: WHO.** Downloaded 3/18/19 from:

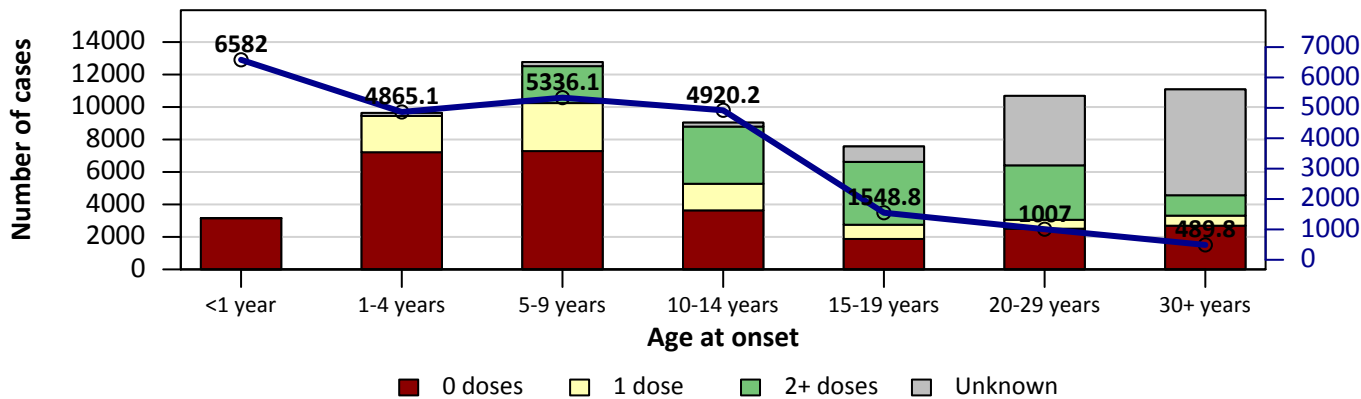
[http://www.who.int/immunization/monitoring\\_surveillance/burden/vpd/surveillance\\_type/active/measles\\_monthlydata/en/](http://www.who.int/immunization/monitoring_surveillance/burden/vpd/surveillance_type/active/measles_monthlydata/en/)

# Measles in Ukraine

**53,218 in 2018**  
**13,760 in 2019**



Ukraine age distribution, vaccination status, and incidence, 2018-02 to 2019-01



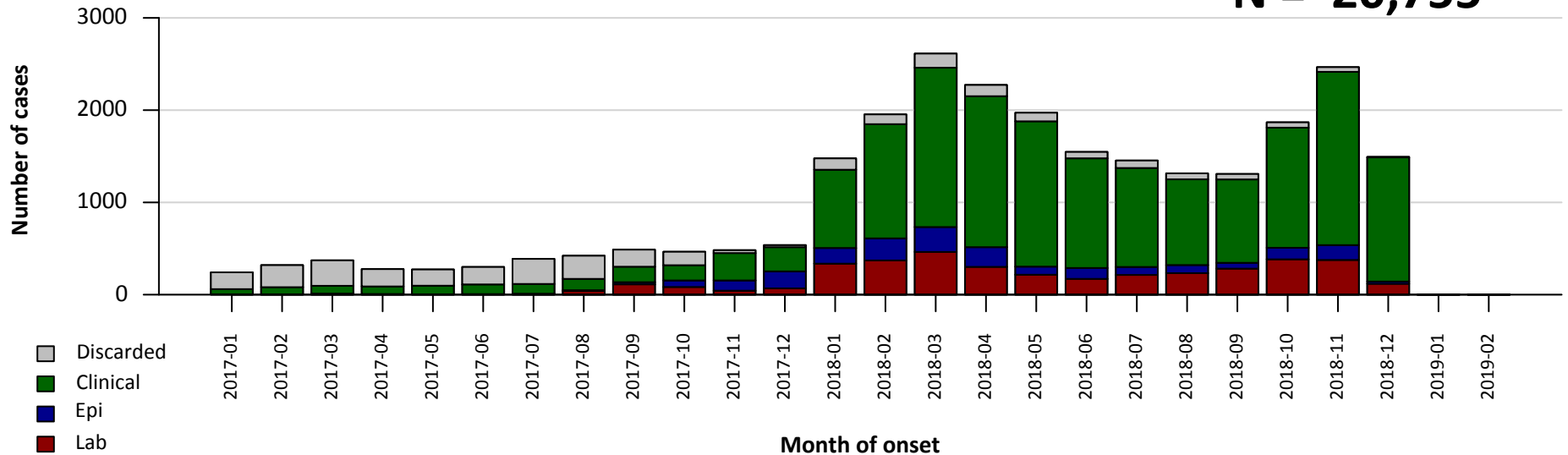
Year	Confirmed Cases
2006	945
2007	232
2008	41
2009	24
2010	42
2011	1313
2012	12744
2013	3308
2014	2326
2015	141
2016	90
2017	4782
2018	53218
2019	13760

**Source: WHO. Downloaded 3/18/19 from:**

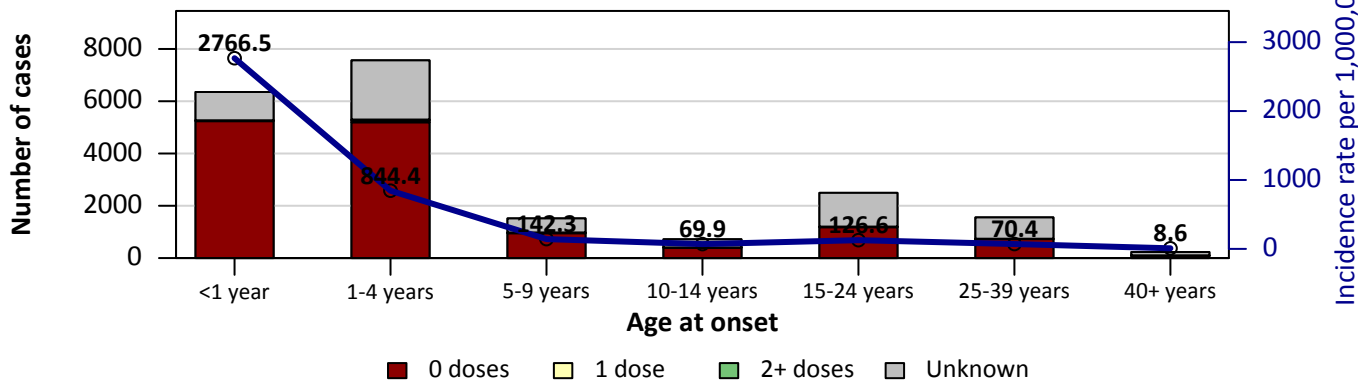
[http://www.who.int/immunization/monitoring\\_surveillance/burden/vpd/surveillance\\_type/active/measles\\_monthlydata/en](http://www.who.int/immunization/monitoring_surveillance/burden/vpd/surveillance_type/active/measles_monthlydata/en)

# Measles in Philippines

**N = 20,755**



Philippines age distribution, vaccination status, and incidence, 2018-01 to 2018-12



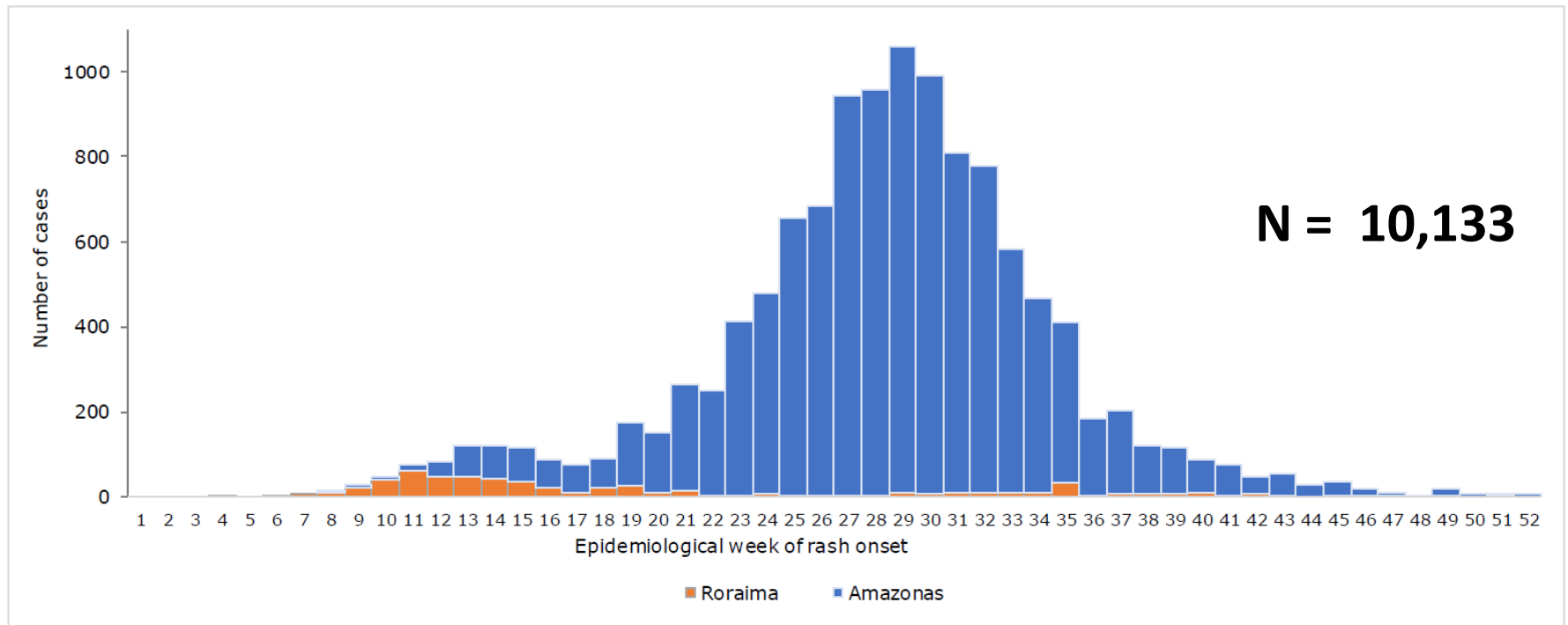
Year	Confirmed Cases
2006	216
2007	612
2008	838
2009	1351
2010	6363
2011	6519
2012	1441
2013	4855
2014	53906
2015	2021
2016	647
2017	2409
2018	20755

**Source: WHO.** Downloaded 3/18/19 from:

[http://www.who.int/immunization/monitoring\\_surveillance/burden/vpd/surveillance\\_type/active/measles\\_monthlydata/en](http://www.who.int/immunization/monitoring_surveillance/burden/vpd/surveillance_type/active/measles_monthlydata/en)

# Measles in Brazil

**Figure 1.** Reported confirmed measles cases by EW of rash onset. Amazonas and Roraima states, Brazil, EW 1 to EW 52 of 2018.



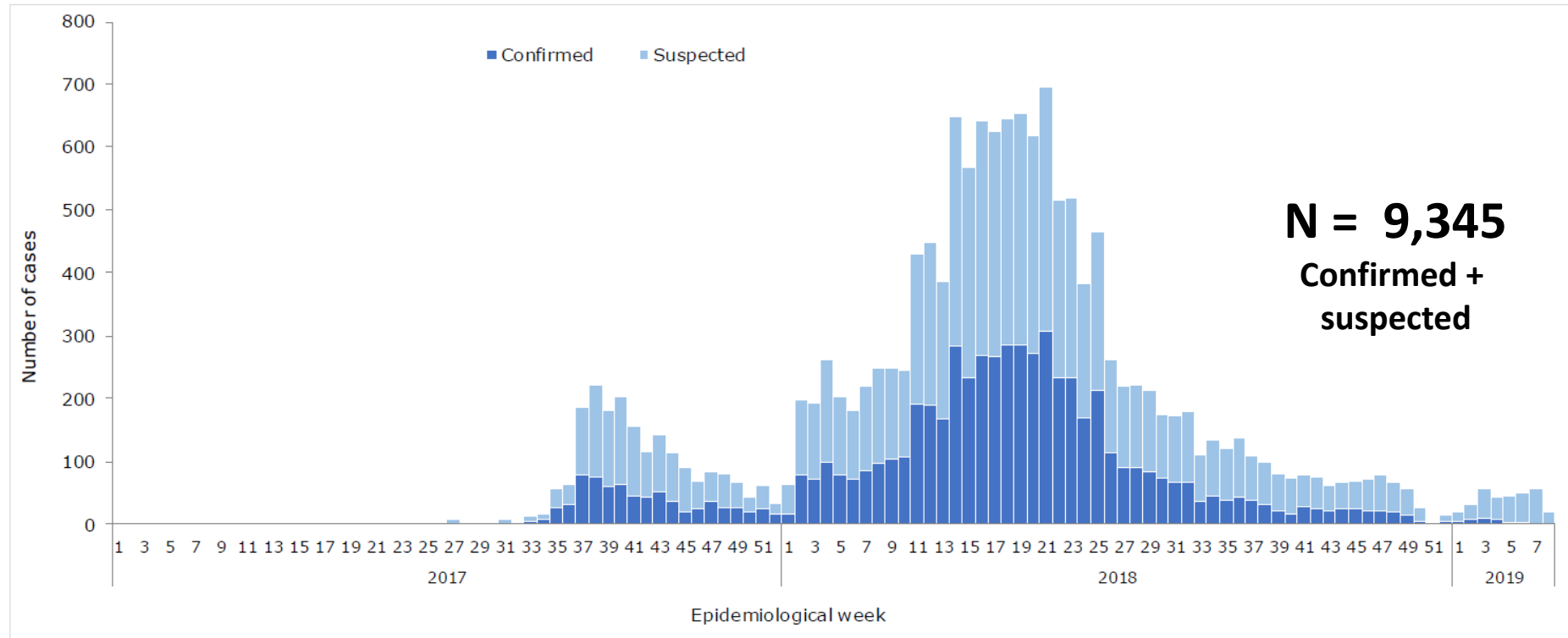
**Source:** Data published by the Brazil Ministry of Health and reproduced by PAHO/WHO.

**Source: PAHO.** Downloaded 2/4/19 from:

[https://www.paho.org/hq/index.php?option=com\\_docman&view=download&category\\_slug=measles-2204&alias=47518-18-january-2019-measles-epidemiological-update&Itemid=270&lang=en](https://www.paho.org/hq/index.php?option=com_docman&view=download&category_slug=measles-2204&alias=47518-18-january-2019-measles-epidemiological-update&Itemid=270&lang=en)

# Measles in Venezuela

**Figure 6.** Reported measles cases by EW of rash onset. Venezuela, 2017-2019 (until EW 8).



**Source:** Venezuela Ministry of Popular Power for Health data and reproduced by PAHO/WHO.

**727 confirmed cases in 2017**

**5,668 confirmed cases in 2018**

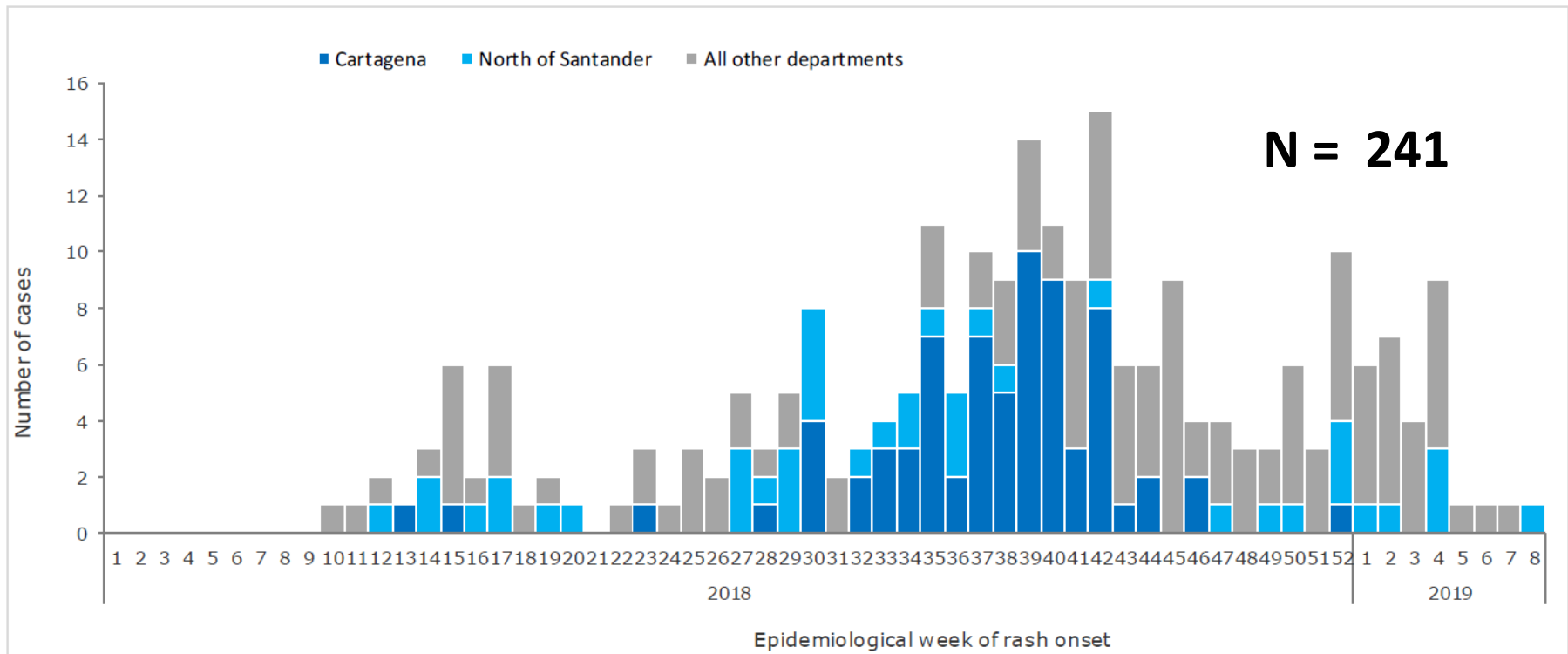
**40 confirmed cases in 2019**

**Source: PAHO.** Downloaded 3/18/19 from:

[https://www.paho.org/hq/index.php?option=com\\_docman&view=download&category\\_slug=measles-2204&alias=47907-4-march-2019-measles-epidemiological-update&Itemid=270&lang=en](https://www.paho.org/hq/index.php?option=com_docman&view=download&category_slug=measles-2204&alias=47907-4-march-2019-measles-epidemiological-update&Itemid=270&lang=en)

# Measles in Colombia

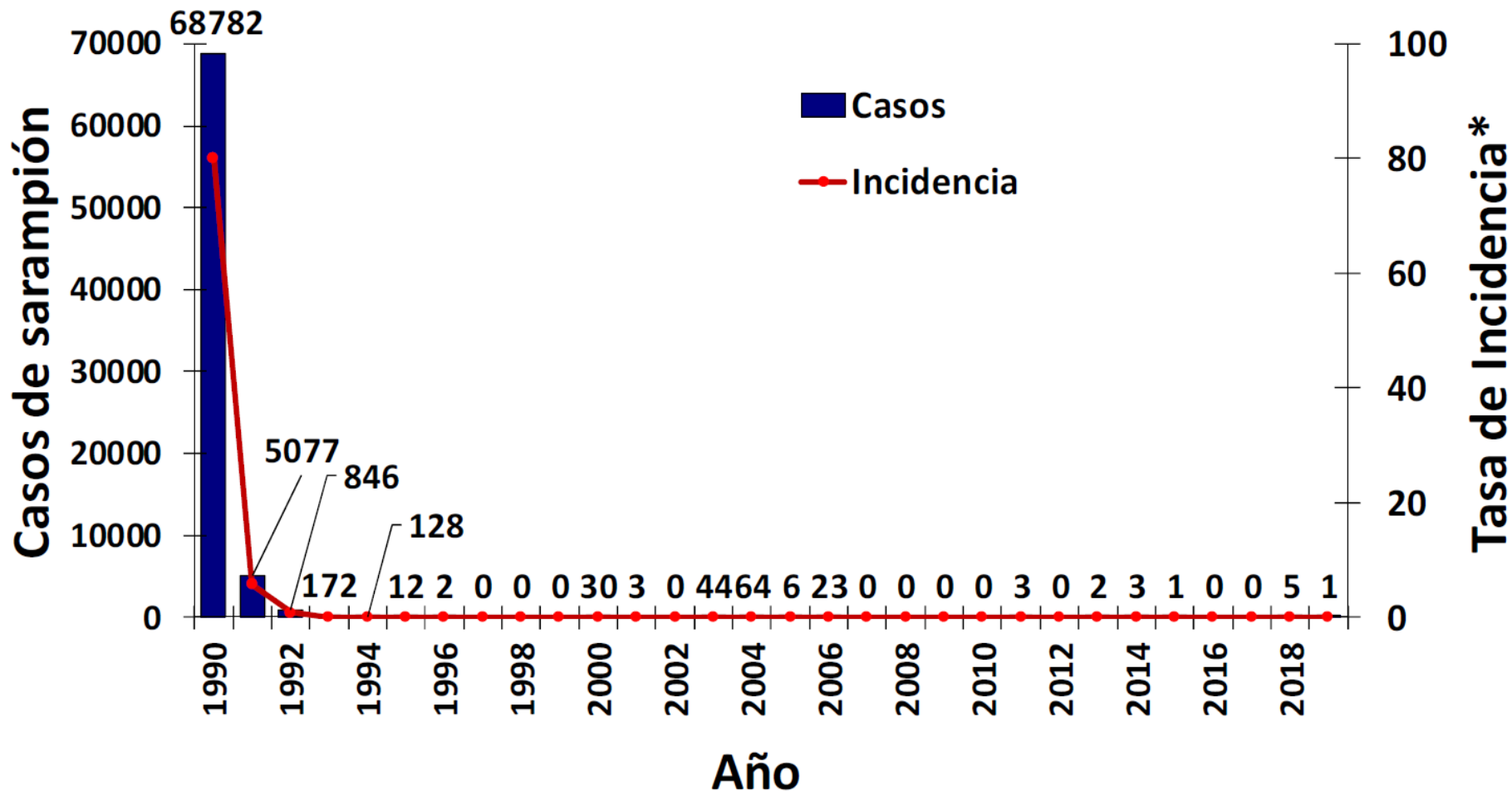
**Figure 5.** Confirmed measles cases by EW of rash onset. Colombia, EW 10 of 2018 to EW 8 of 2019.



**Source: PAHO.** Downloaded 3/18/19 from:

[https://www.paho.org/hq/index.php?option=com\\_docman&view=download&category\\_slug=measles-2204&alias=47907-4-march-2019-measles-epidemiological-update&Itemid=270&lang=en](https://www.paho.org/hq/index.php?option=com_docman&view=download&category_slug=measles-2204&alias=47907-4-march-2019-measles-epidemiological-update&Itemid=270&lang=en)

## Casos e Incidencia\* de Sarampión. México, 1990 – 2019\*\*



Fuente: SUIVE/DGE/SS. Sistema de Vigilancia Epidemiológica de Enfermedad Febril Exantemática. \* Por 100,000 habitantes. \*\*A la semana 05

Source: Secretaría de Salud. Downloaded 3/4/19 from:

<https://www.gob.mx/cms/uploads/attachment/file/443225/sem08.pdf>

# MEASLES - BASICS



- **Rash illness, historically childhood infection with 2-4 year epidemic cycle; most cases in winter and spring**
- **Complications may include otitis media, pneumonia, encephalitis, miscarriage, and death**
- **Airborne spread - probably the most infectious communicable disease;  $R_0=15-18$**



# MEASLES - BASICS

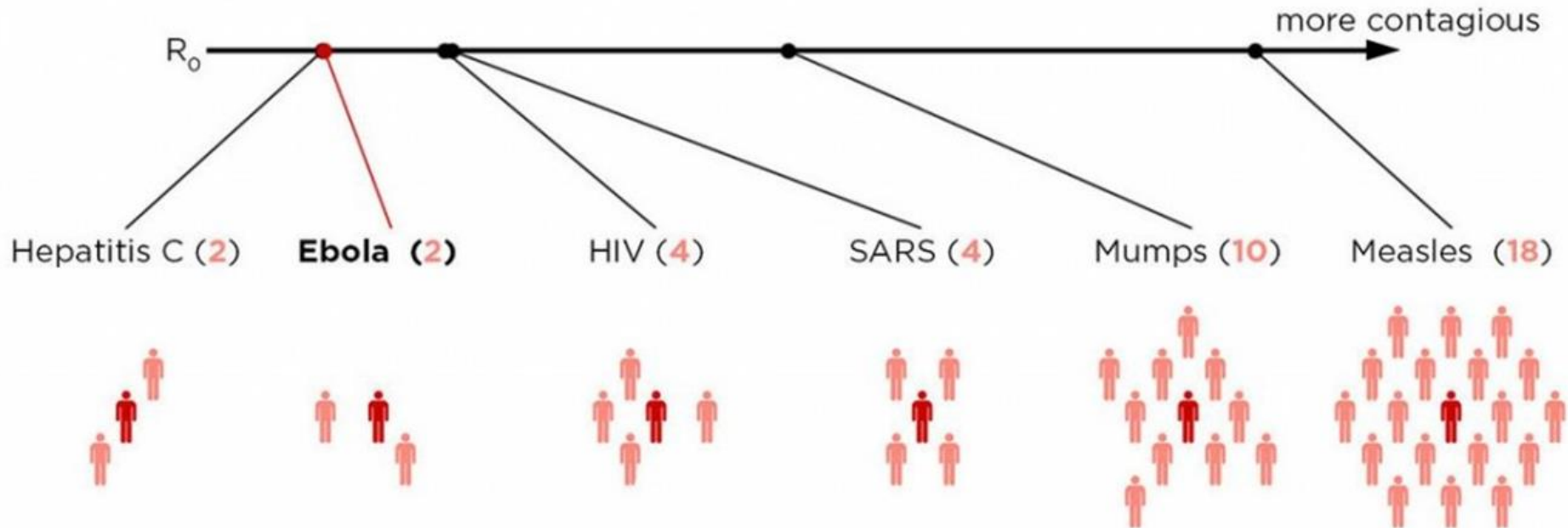


- **Two doses of MMR vaccine offer >99% protection from disease; however, requires very high population immunity to interrupt transmission (92-95%)**
- **No endemic transmission in the U.S. at this time – declared eliminated in 2000**

# COMMUNICABILITY



The number of **people** that **one sick person** will infect (on average) is called  $R_0$ . Here are the maximum  $R_0$  values for a few viruses.





**Prodrome – onset 8 to 12 days after exposure  
(range=7-21 days)**

- **Stepwise increase in fever to 101<sup>o</sup> F or higher**
- **Dry cough, coryza, conjunctivitis**
- **Koplik spots (rash on mucous membranes)**

# MEASLES CLINICAL FEATURES



LIVE WELL  
SAN DIEGO

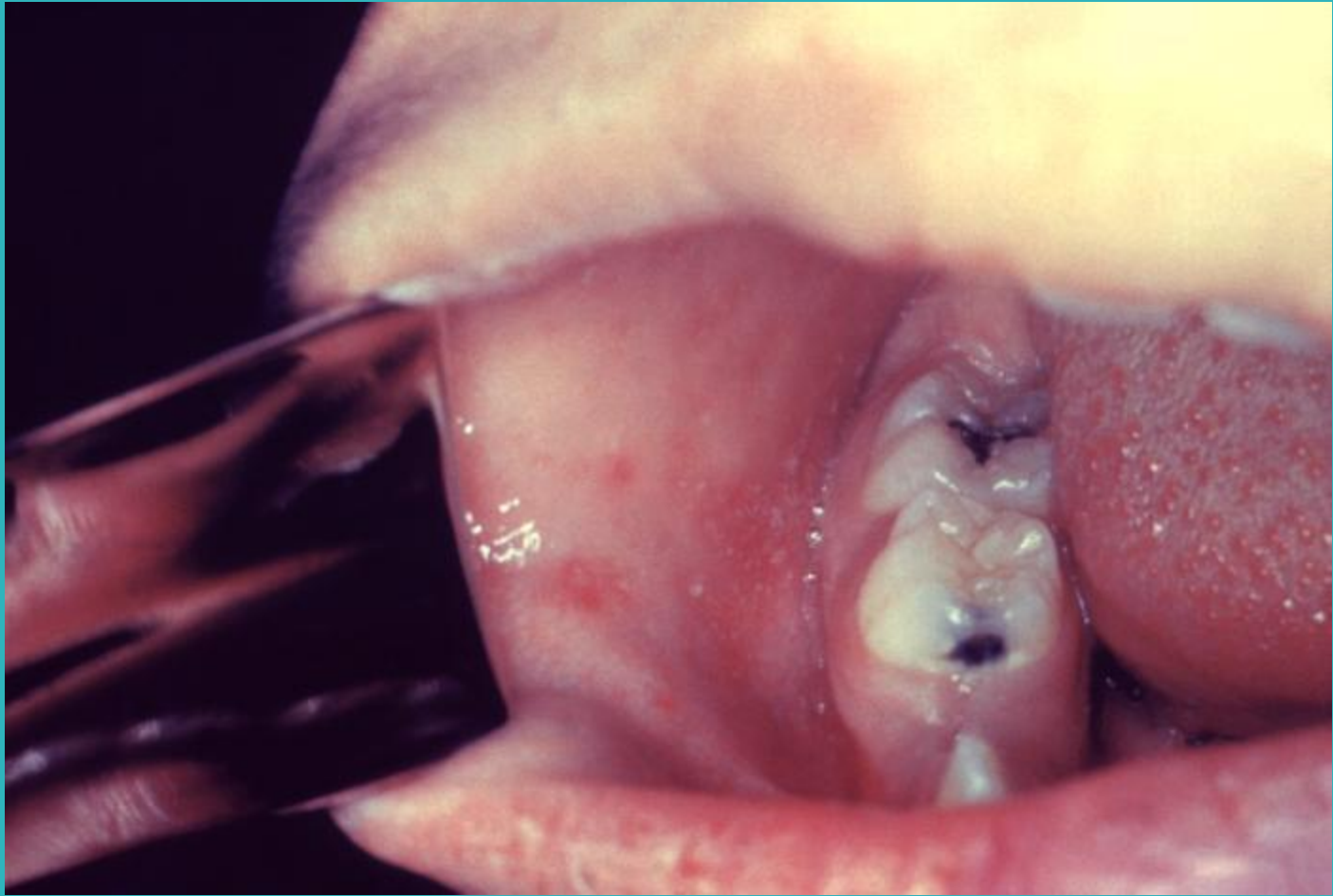
## Rash

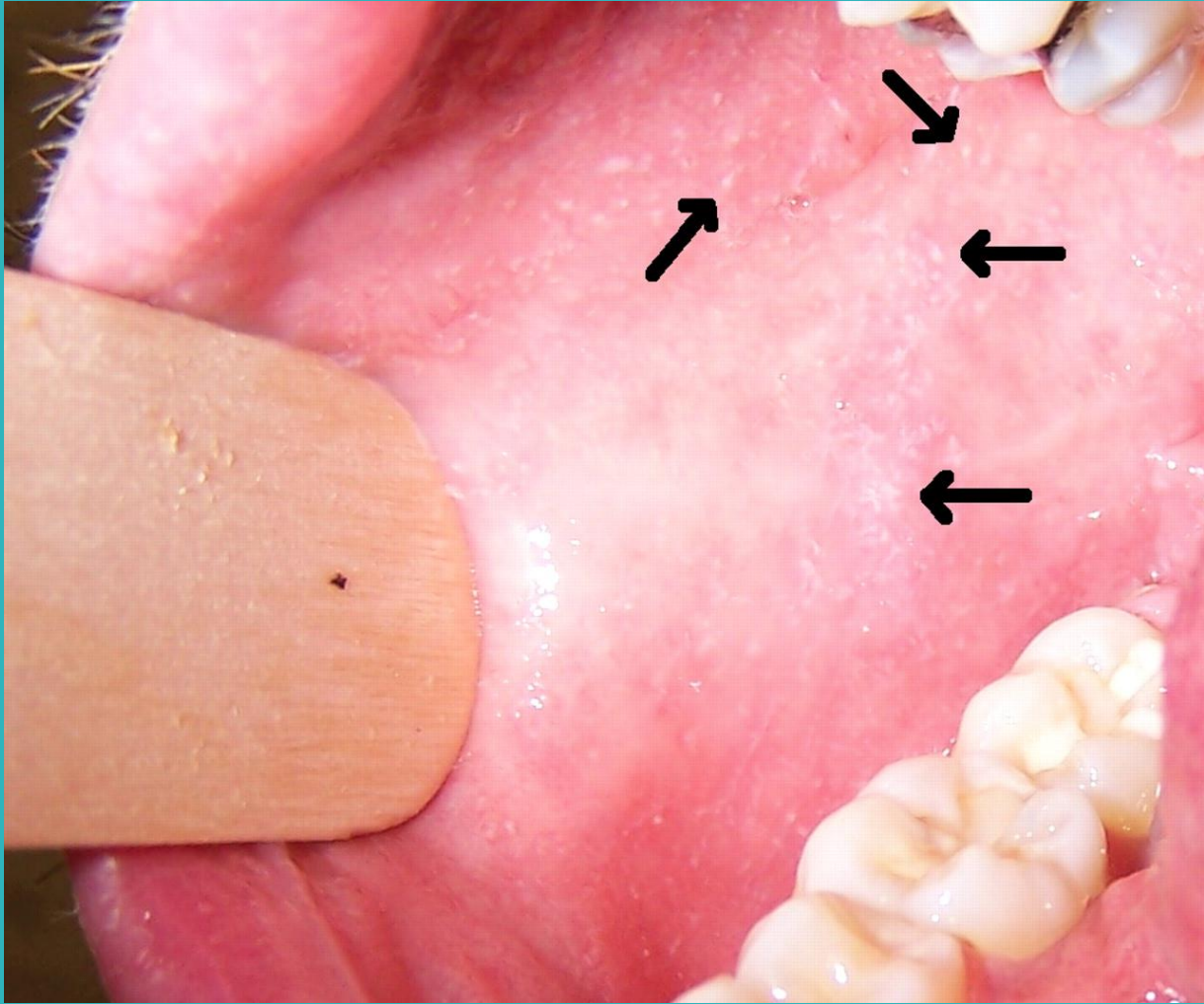
- **2-4 days after prodrome, 14 days after exposure**
- **Maculopapular, becomes confluent (not itchy, except late in rash)**
- **Begins on face and head (not on face, not measles!)**
- **Occurs with fever**
- **Persists 5-6 days**
- **Fades in order of appearance**

# KOPLIK SPOTS



**Koplik spots in mouth due to pre-eruptive measles on day 3 of illness. Classically described as appearing like "grains of salt on a wet background."**













## Maculopapular Rashes of Childhood

	<b>Disease</b>	<b>Cause</b>
<b>First</b>	<b>measles</b>	<b>rubeola</b>
<b>Second</b>	<b>scarlet fever</b>	<b>group A streptococcus</b>
<b>Third</b>	<b>German measles</b>	<b>rubella</b>
<b>Fourth</b>	<b>scarletina, Duke's</b>	<b>Same as #2</b>
<b>Fifth</b>	<b>erythema infectiosa</b>	<b>human parvovirus B19</b>
<b>Sixth</b>	<b>roseola infanticum</b>	<b>human herpesvirus 7</b>



























# MEASLES COMPLICATIONS



<u>Condition</u>	<u>Percent reported*</u>
<b>Diarrhea</b>	<b>8</b>
<b>Otitis media</b>	<b>7</b>
<b>Pneumonia</b>	<b>6</b>
<b>Encephalitis</b>	<b>0.1</b>
<b>Hospitalization</b>	<b>18</b>
<b>Death</b>	<b>0.2</b>

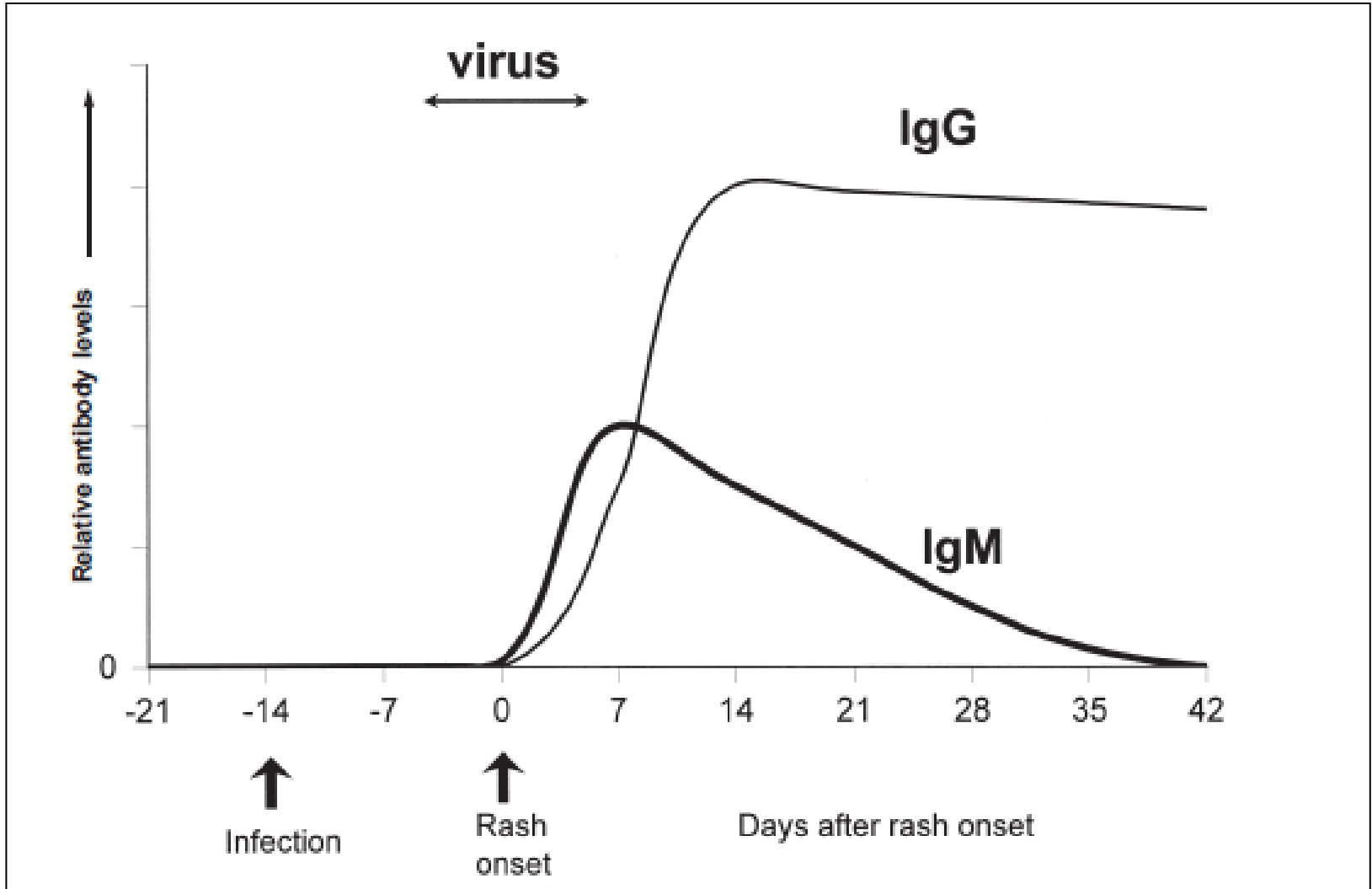
\*Based on 1985-1992 surveillance data

# MEASLES LABORATORY DIAGNOSIS

- Serum measles IgM antibody positive test result (may be negative in the first 72 hours)
- Significant rise in serum measles IgG antibody between acute and convalescent titers
- Isolation of measles virus from clinical samples (blood, urine or NP secretions)
- Detection of viral RNA by reverse transcription polymerase chain reaction (RT-PCR).

**ALL CASES OF SUSPECTED MEASLES SHOULD BE REPORTED IMMEDIATELY TO THE HEALTH DEPARTMENT WITHOUT WAITING FOR RESULTS OF DIAGNOSTIC TESTS.**

# IGM AND IGG ANTIBODY RESPONSES TO ACUTE MEASLES INFECTION





## TREATMENT

- No specific antiviral treatment available
- Vitamin A once daily for 2 days – World Health Organization (WHO) recommends for all children with acute measles, regardless of their country of residence.
- Supportive

## POST-EXPOSURE PROPHYLAXIS

- MMR vaccine may be given <72 hours of exposure to persons  $\geq 6$  months of age with 1 or no documented doses of MMR, if not contraindicated.
- Immune globulin (IG) may be given to exposed susceptible people\* of any age  $\leq 6$  days of exposure to prevent infection (\* = infants <12 months, pregnant women without evidence of measles immunity, severely immunocompromised persons.)

**CALL COUNTY!**





# MEASLES – OUTREACH



**LIVE WELL  
SAN DIEGO**

BIBISITA SA IBANG BANSAPANGALAGAAN ANGIYONG PAMILYA.  
**ALALAHANIN ANG TIGDAS.**  
 Ang tigdas ay laganap sa mga lugar gaya ng Europa, Africa, Asya, Indya at Pilipinas.



**BAGO BAYO MAGLAKBAY**

Sabihin sa inyong doktor kung saan kayo maglalakbay. Mga sanggol at kabataan ay maaring mangailangan ng proteksyon laban sa tigdas sa edad na masbata sa karaniwan.

**MATAPOS NIYONG MAGLAKBAY**

Tawagan ang inyong doktor kung magkaroon ng lagnat at pamamantalang sino man sa loob ng 3 linggo pagkabalik mula sa inyong biyahe. Isalarawan kung saan kayo naglakbay.

**Wala pang-ussap sa inyong doktor kung kayo ay nagpapalaso ng isang biyahe sa labas ng bansa.**  
 Para sa karagdagang kaalaman pumunta sa [www.cdc.gov/travel](http://www.cdc.gov/travel).

Adapted with permission from the Minnesota Department of Health, Immunization Program and the California Department of Public Health, Immunization Branch (866-1048-1100) 1/3/10



VISITING ANOTHER COUNTRY? PROTECT YOUR FAMILY.  
**THINK MEASLES.**  
 Measles is widespread in places like Europe, Africa, Asia, India, and the Philippines.



**BEFORE YOU TRAVEL**

Call your doctor where you are traveling so you and your children can get the best measles protection possible before you travel.

**AFTER YOU TRAVEL**

Call your doctor if anyone gets a fever and rash within 3 weeks of returning from your trip. Describe where you traveled.

**Call your doctor if you are planning an international trip.**  
 For more information go to [www.cdc.gov/travel](http://www.cdc.gov/travel).



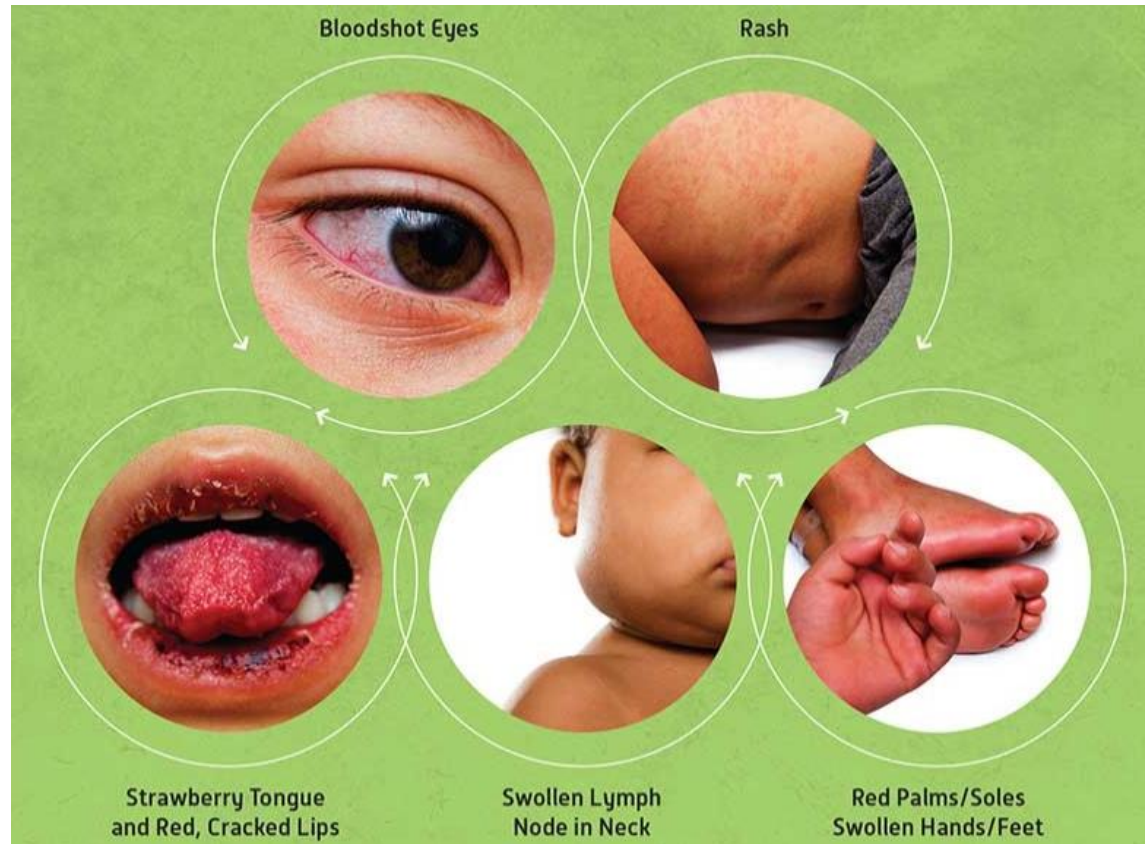
Adapted from a flyer (866-1048) from the California Department of Public Health



## IDENTIFY ISOLATE INFORM

- **Maintain a high index of suspicion in appropriate cases**
  - **Fever + rash**
  - **3 C's and Koplik spots**
  - **Travel history**
  - **Exposure to travelers**
- **Know the immune status of all your staff – NOW!!!**
- **Contact the LHD when suspected, not confirmed**
- **Urine PCR is an ideal test when available (can get thru San Diego PHL 😊)**

# KAWASAKI DISEASE



**Image Credit: Kawasaki Foundation**





To: CAHAN San Diego Participants  
Date: February 14, 2019  
From: Epidemiology Program, Public Health Services

### **Kawasaki Disease Increased in San Diego**

This health advisory informs healthcare professionals about a recent increase in diagnosed cases of Kawasaki disease (KD) in the San Diego County region. It also contains recommendations and resources to help providers promptly diagnose and initiate hospital care for children with KD.

#### **Key Points:**

- Since January 1, 2019, 16 San Diego County residents have been diagnosed with KD at Rady Children's Hospital-San Diego (RCHSD), twice the expected number based on prior winters.
- KD is a seasonal disease that occurs in clusters, with March as the typical peak month for symptom onset in Southern California. A second, smaller peak occurs in mid-summer.
- KD should be considered in any pediatric patient presenting with sustained fever and any combination of rash, non-exudative conjunctival injection, red lips and pharynx, cervical adenitis, and extremity edema or erythema of the palms or soles.
- Although 85% of patients with KD are younger than 5 years, KD can present at older ages. Children of Asian/Pacific Island descent have the highest incidence.
- KD can initially be misdiagnosed as scarlet fever, measles, mumps, bacterial lymphadenitis, and adenovirus. Consider the possibility of measles especially if recent international travel or contact with an international traveler. Laboratory studies detailed in this advisory are helpful in confirming the KD diagnosis and excluding alternative diagnoses.
- Treatment of KD with high-dose IVIG and moderate dose aspirin should be initiated as soon as the clinical diagnosis can be confidently made. An echocardiogram by a pediatric sonographer should be performed within 24 hours of initiation of treatment.
- RCHSD has a dedicated KD specialist on call 24/7 to assist healthcare providers in diagnosing and managing KD (page via the RCHSD operator at 858-576-1700, ext. 0).





**For more information contact:**

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