

Trends in Colorado Vaccine Preventable Diseases

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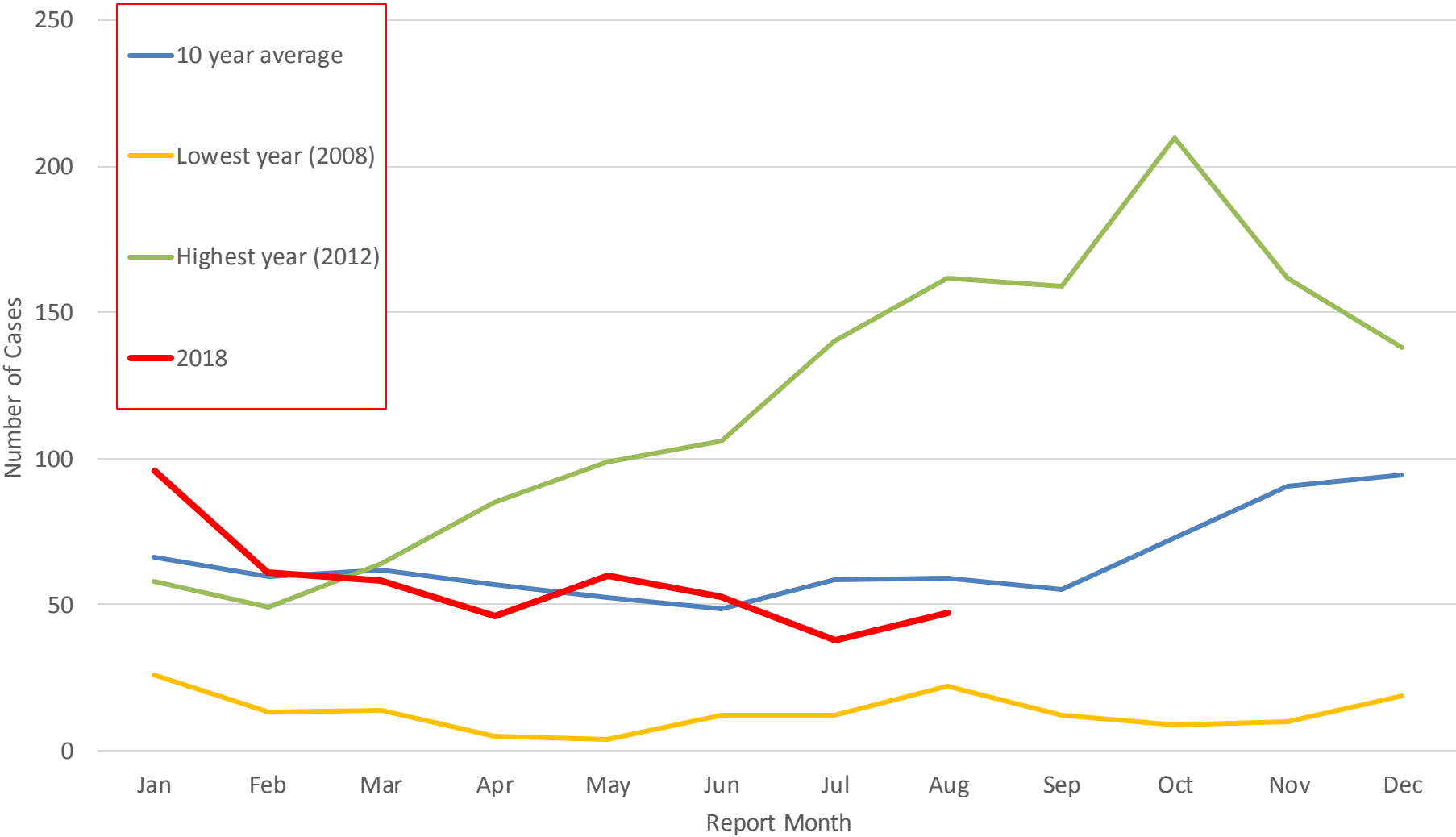
What we do

- Conduct disease surveillance, investigation, and control for measles, mumps, rubella, pertussis, varicella, meningococcal disease, *Haemophilus influenzae*, tetanus, diphtheria, polio, invasive pneumococcal disease, and acute flaccid myelitis
- Provide support and consultation to LPHAs, schools/childcare facilities, healthcare providers and facilities, employers, the general public regarding testing, diagnosis, treatment, and disease control for vaccine preventable diseases in Colorado.
- Develop Colorado-specific guidelines for monitoring and controlling VPDs in Colorado
- Analyze surveillance data to identify new disease trends
- Coordinate special projects

Colorado VPD Trends

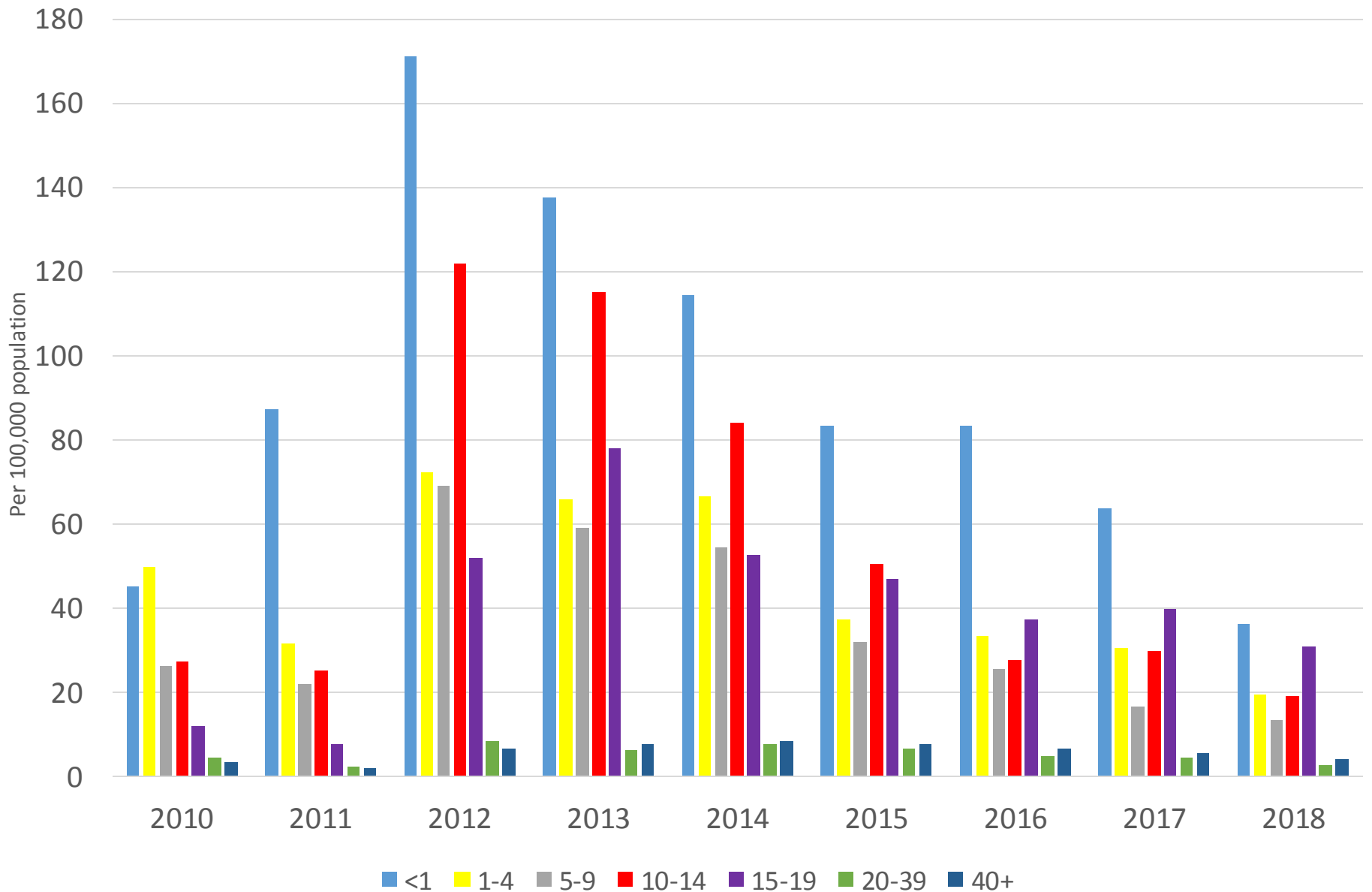
Pertussis (Whooping Cough)

Pertussis Cases by Month of Report, Colorado, Provisional 2018 (year-to-date) vs. 10 Year Average (2008 - 2017) vs. Years with Highest and Lowest Case Counts (2008 and 2012)



August 31, 2018

Rates of Reported Pertussis Cases by Age Group and Report Year in Colorado, 2010 - 2018 (provisional)



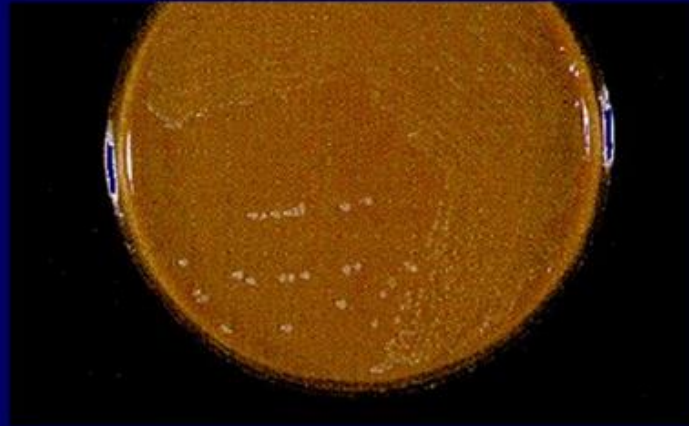
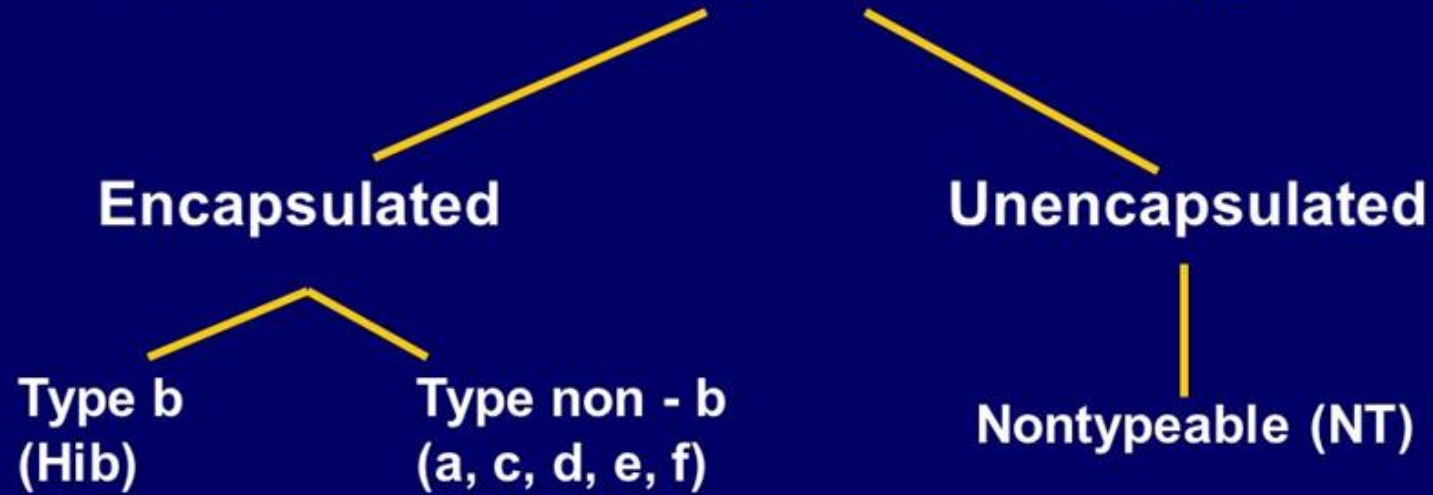
Why the increase?

A number of possible explanations have been put forward for the increase in disease over the past 10 years:

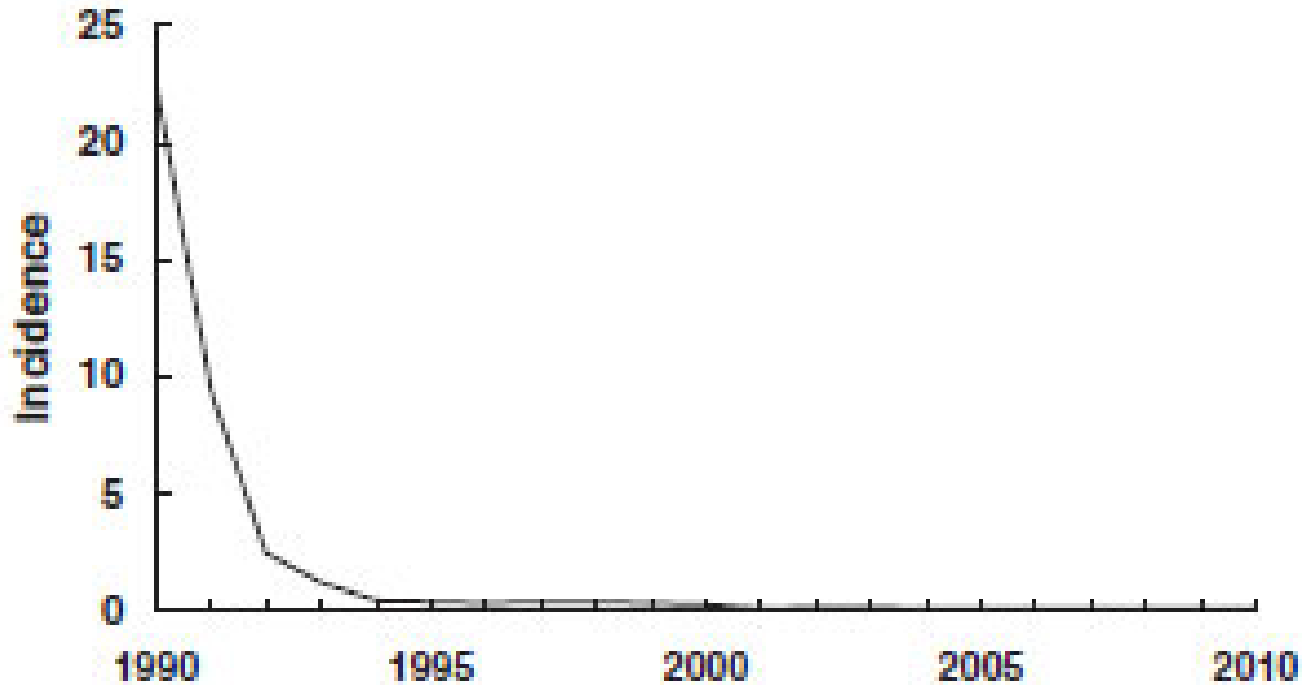
- 1) The evolution of the circulating bacteria
- 2) Decline in vaccine coverage levels
- 3) A change in vaccine efficacy (VE), and/or duration of protection due to the acellular vaccine
- 4) The decline of natural boosting, through reduced exposure to naturally circulating pertussis
- 5) An increase in disease reporting due to improved diagnostics and surveillance.

Haemophilus influenzae (Hi)

H. influenzae (Hi) Serotypes



Incidence* of Invasive Hib Disease, 1990-2010



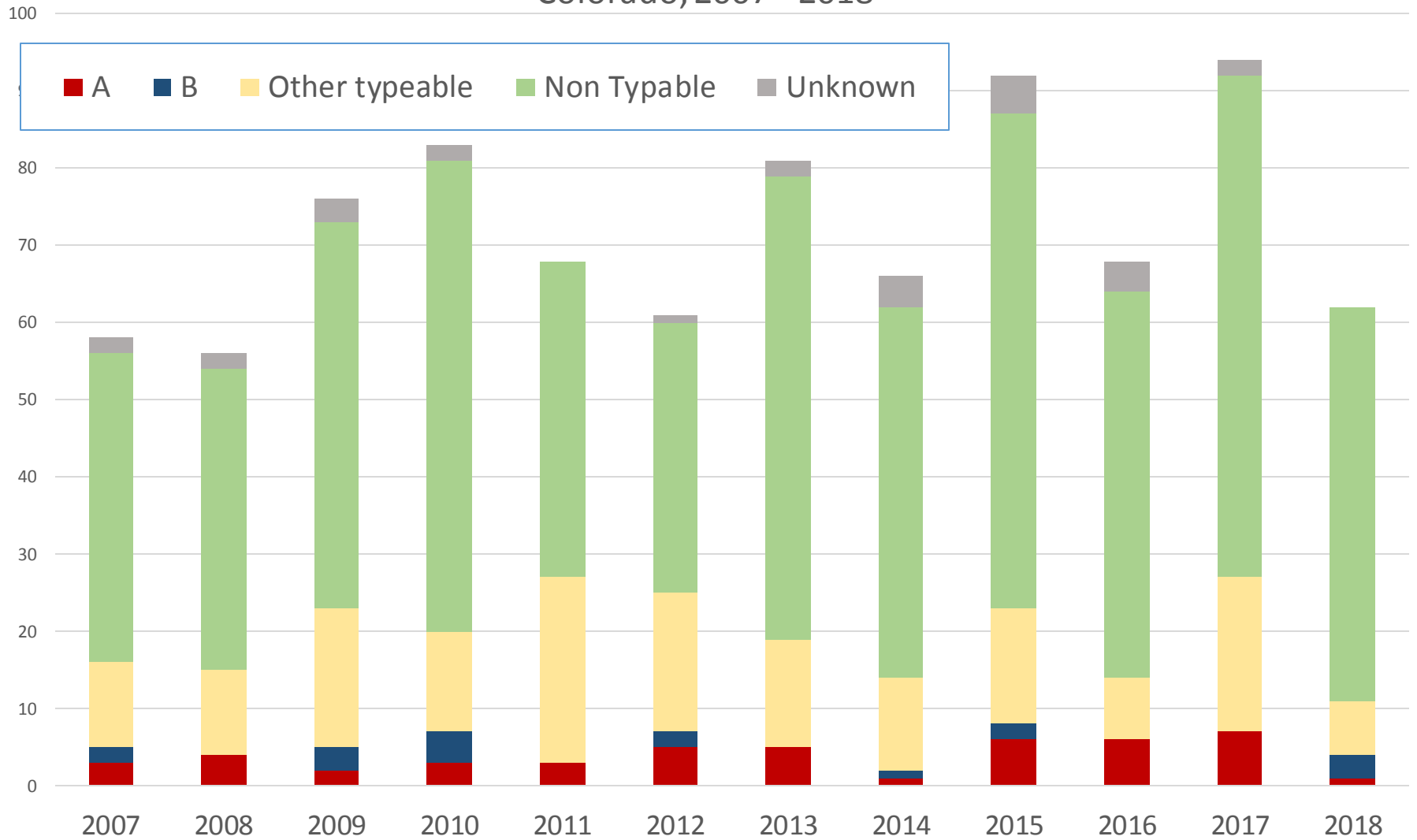
*rate per 100,000 children <5 years of age

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

Cases of Invasive *H. influenzae* Serotype b (Hib) by Age Group and Report Year, Colorado, 2007-2018

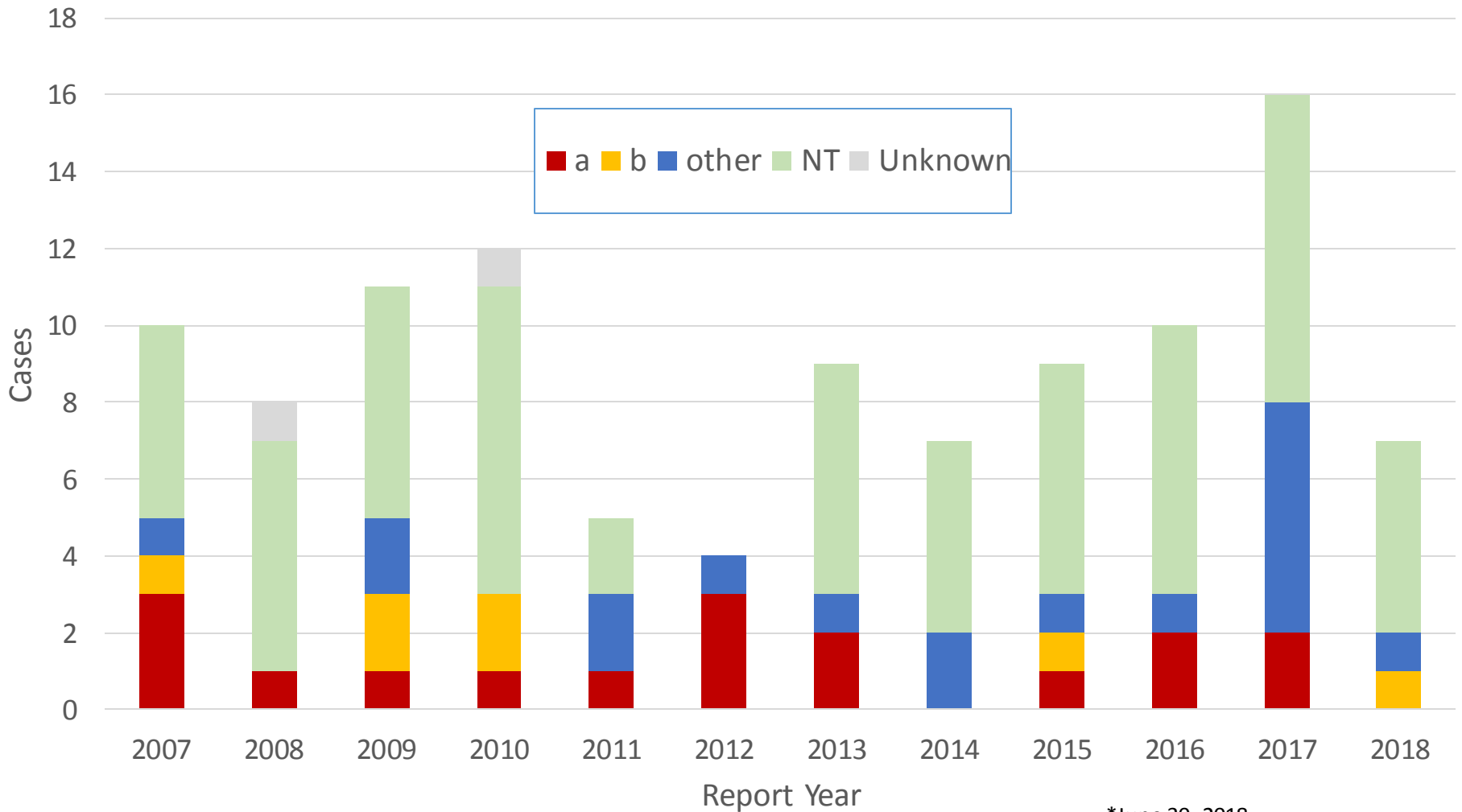


Reported Cases of Invasive *Haemophilus influenzae* by serotype, Colorado, 2007 - 2018*



*June 30, 2018

Reported Case of Invasive *H.flu* **Less than 5 Years of Age** by Serotype, Colorado, 2007-2018*

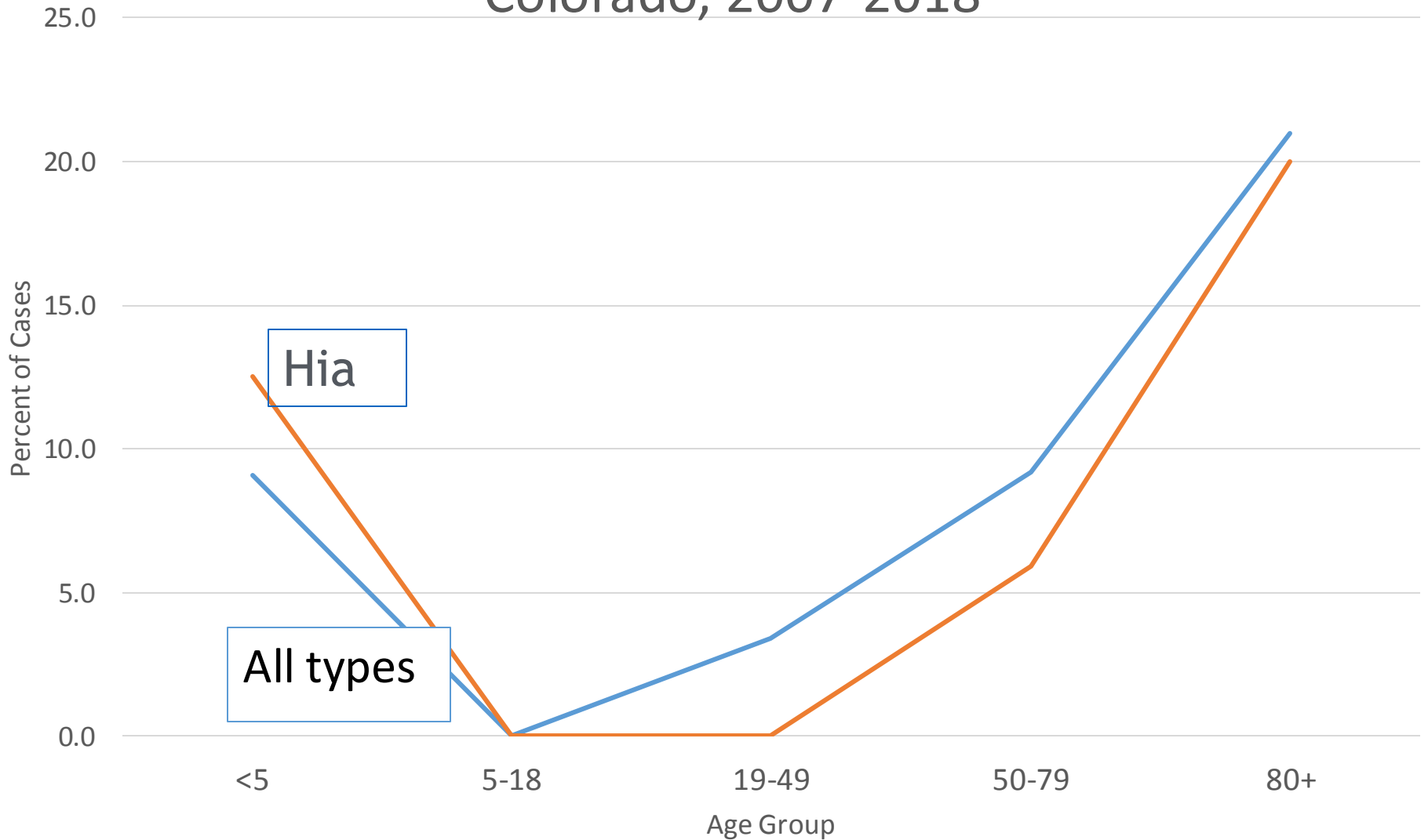


*June 30, 2018

Change in annual estimated incidence of *H. influenzae*, United States, 2009–2015

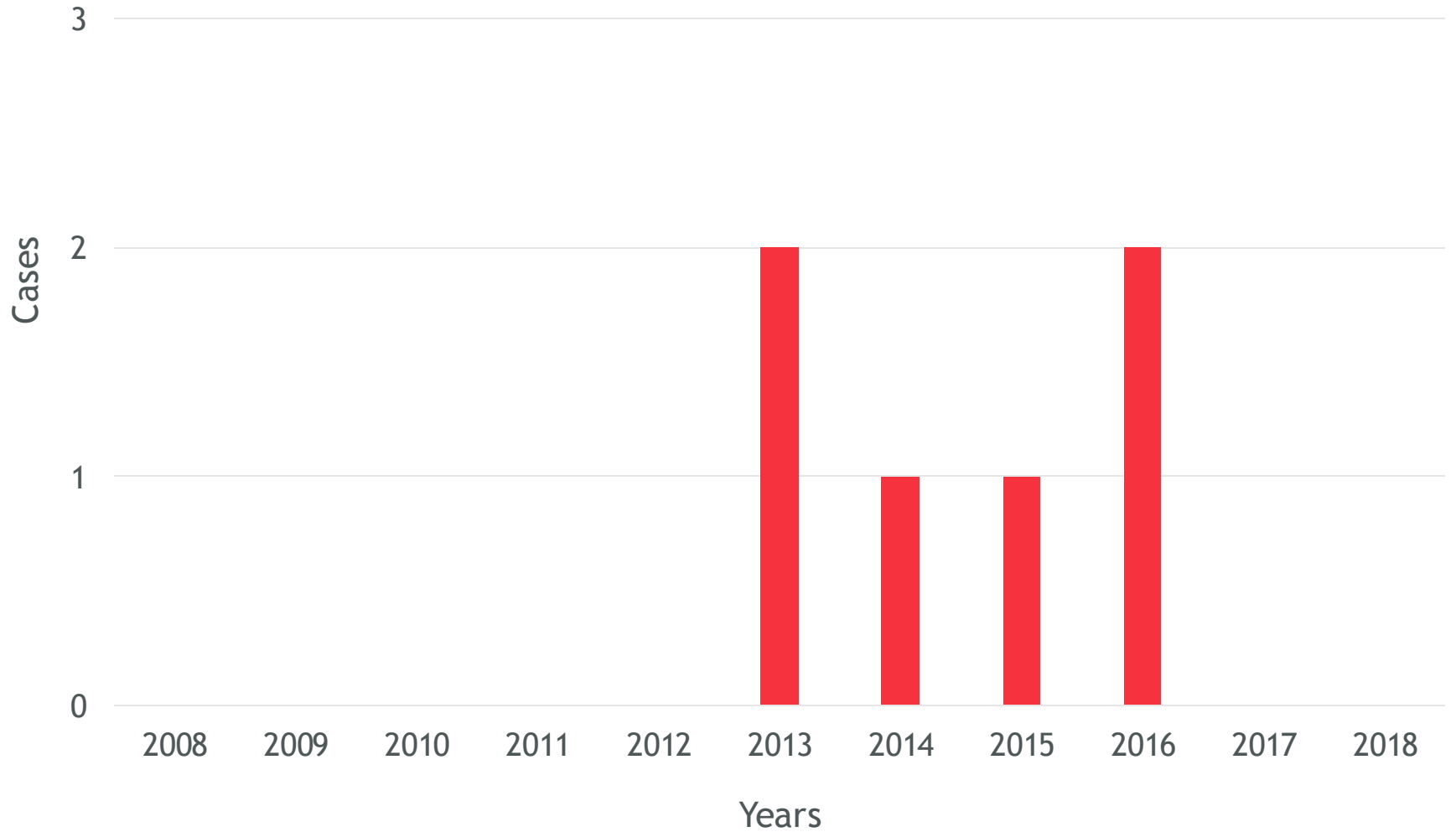
Serotype	2002–2008 average annual incidence	2009–2015 average annual incidence	% change in incidence	2002–2015 annual % change in incidence
Hib	0.04	0.03	–25%	–4%
Non-b	0.41	0.45	10%	1%
a	0.04	0.10	148%	13%
c	0.004	0	–100%	–27%
d	0.004	0.002	–45%	–5%
e	0.09	0.08	–15%	–1%
f	0.27	0.27	0%	0%
Nontypeable	1.01	1.22	21%	3%
Total	1.47	1.70	16%	2%

Case Fatality Rate of H.flu by Age Group, Colorado, 2007-2018



Measles

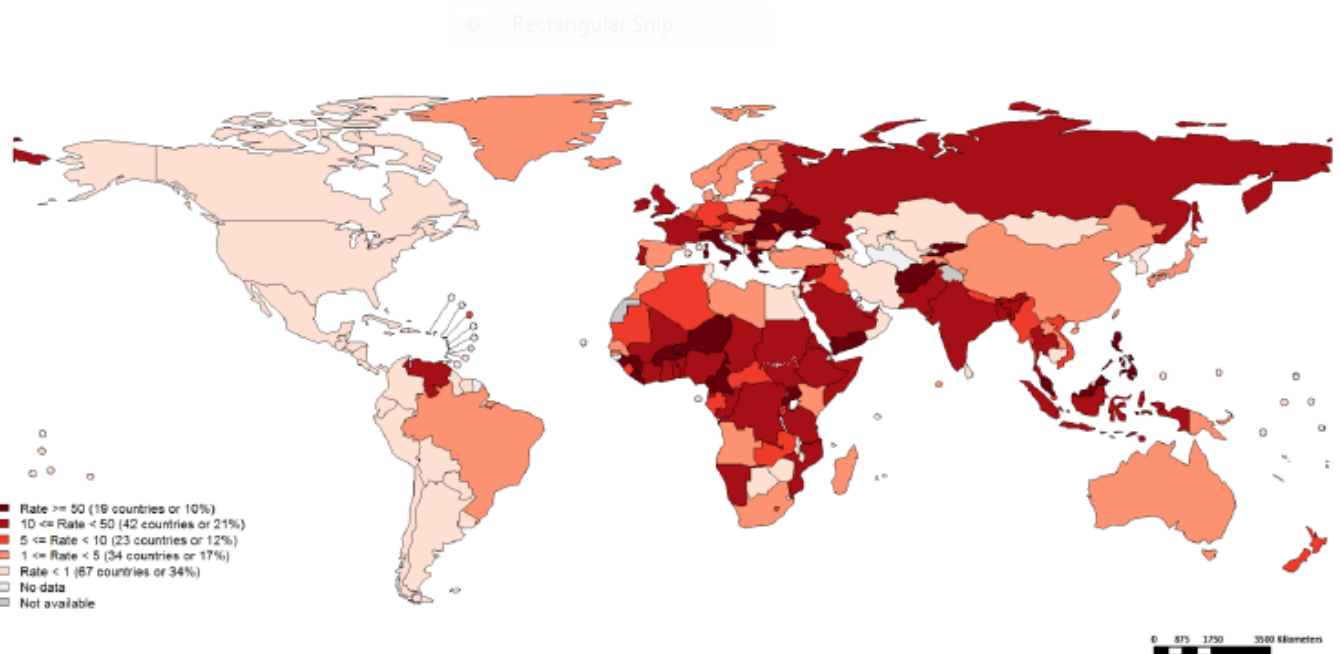
Number of Reported Measles Cases in Colorado, 2008-2018



Measles Incidence Rate per Million (12M period)



Top 10**		
Country	Cases	Rate
India	56151	42.40
Ukraine	26894	605.19
Philippines	8992	87.03
Nigeria	8622	46.36
Yemen	6322	229.19
Serbia	5645	640.02
Indonesia	4897	18.75
China	4498	3.20
DR Congo	3587	45.56
Pakistan	3442	17.82



World Health Organization

Map production: World Health Organization, WHO, 2018. All rights reserved
Data source: IVB Database

Disclaimer:

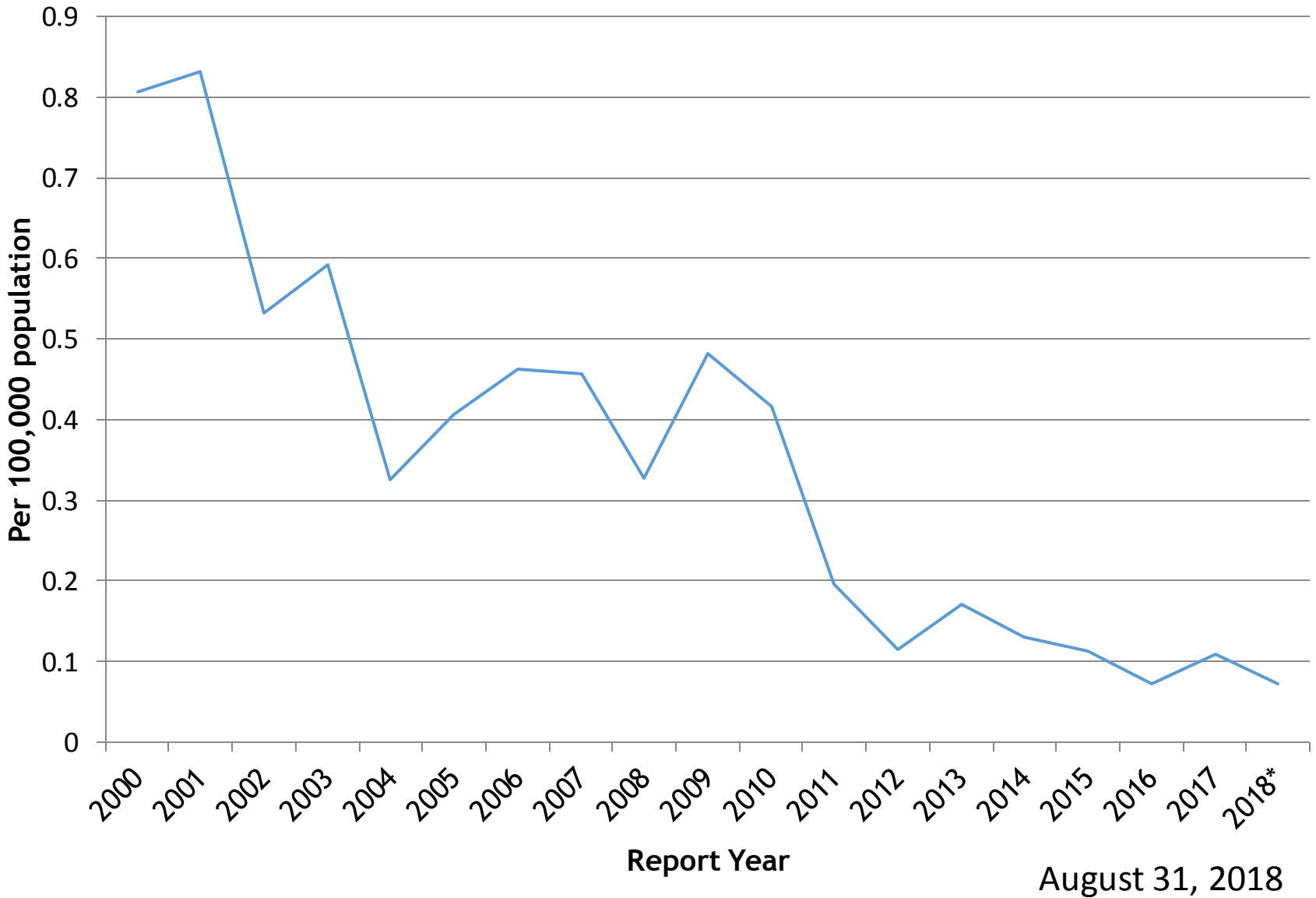
The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers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

Other countries with high incidence rates***		
Country	Cases	Rate
Georgia	1221	311.05
Greece	3192	285.41
Liberia	892	193.33
Lebanon	648	107.88
Malaysia	2362	75.74
Romania	1357	68.61

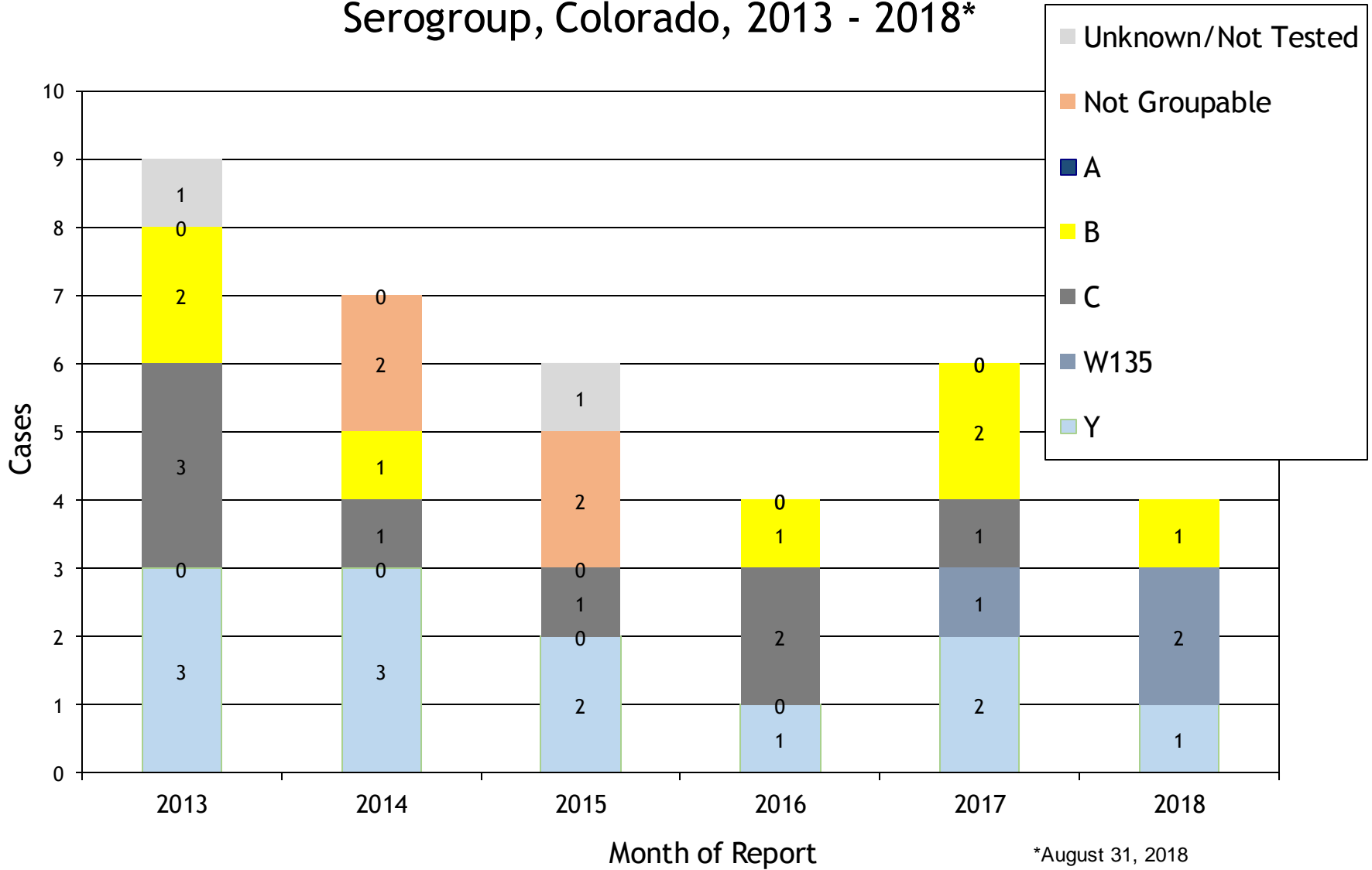
Measles cases from countries with known discrepancies between case-based and aggregate surveillance, as reported by country				
Country	Year	Cases	Data Source	
DR Congo	2017	45,165	SITUATION EPIDEMIOLOGIQUE DE LA ROUGEOLE EN RDC, Week of 31/07/2018	
	2018	18,347		
Somalia	2017	23,353	Somali EPI/POL Weekly Update Week 31, 2018	
	2018	6979		

Meningococcal Disease

Rates of Meningococcal Disease, Colorado, 2000 - 2018

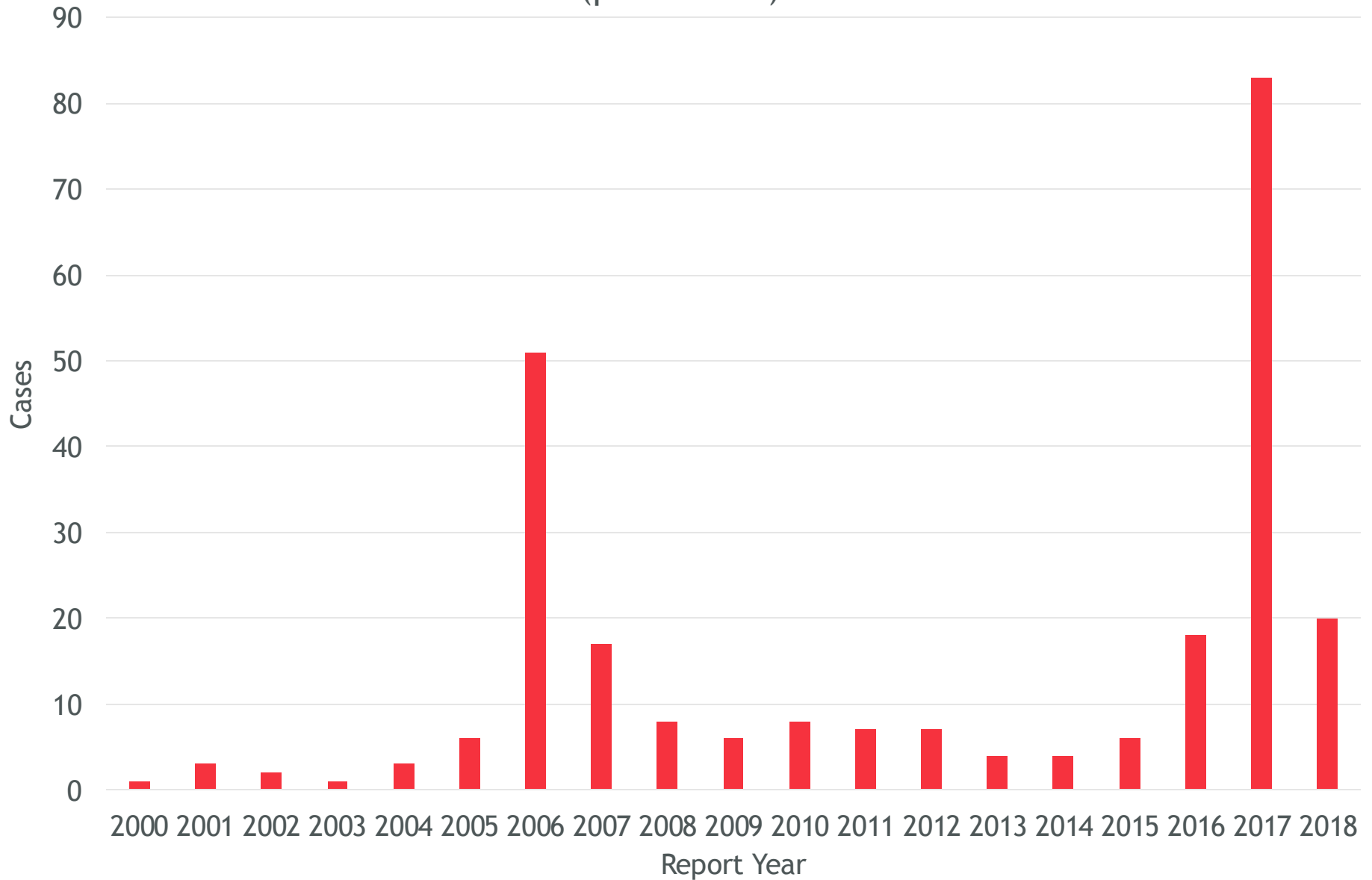


Invasive Meningococcal Disease by Year of Report and Serogroup, Colorado, 2013 - 2018*

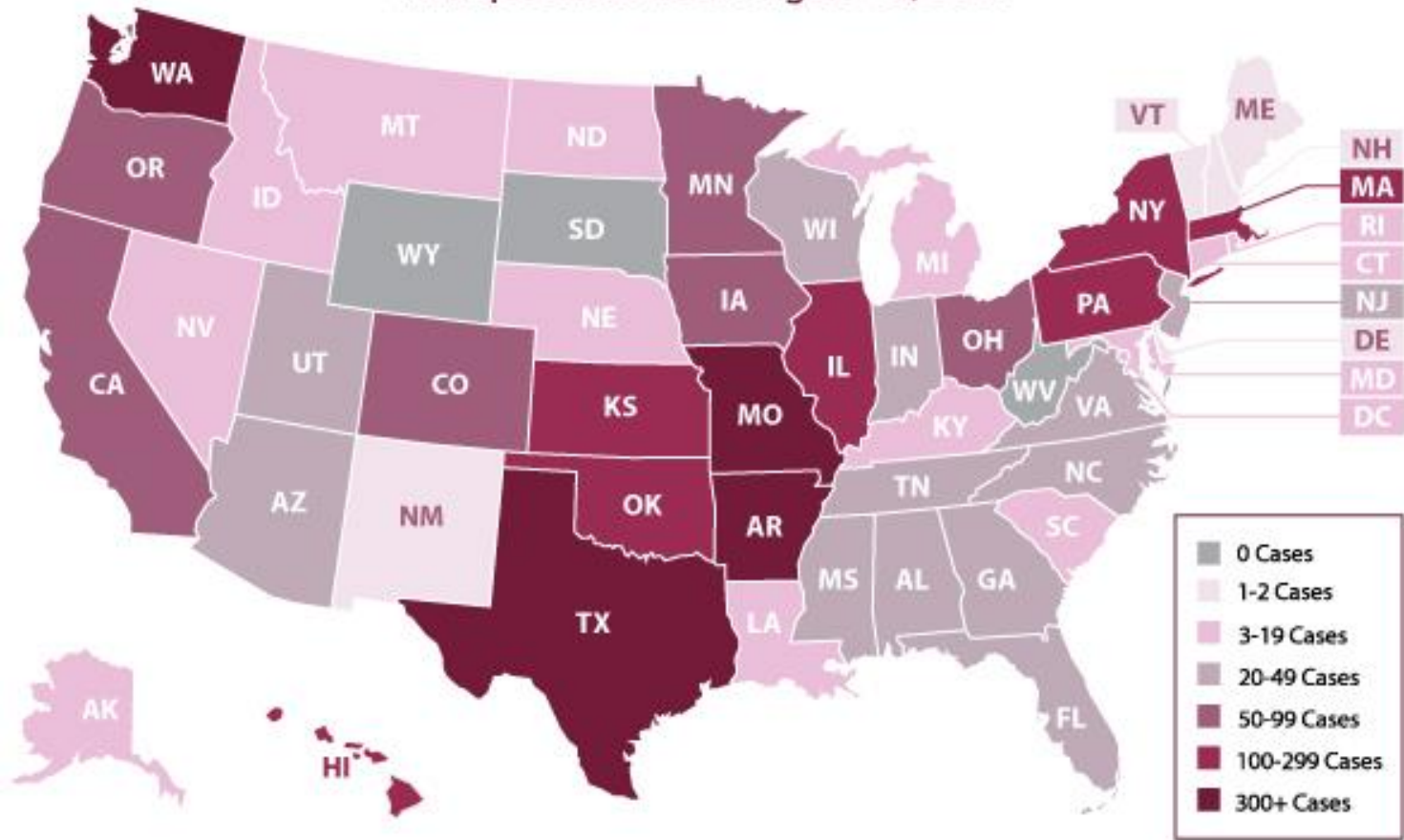


Mumps

Number of Reported Mumps Cases by Year in Colorado, 2000-2018
(provisional)



Mumps Cases as of August 12, 2017



CDC, 2017

Colorado Mumps Outbreak Cases (n = 47)

Median age, years (range)	20 (4 months - 44)
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Male sex (n, %)	24 (51%)
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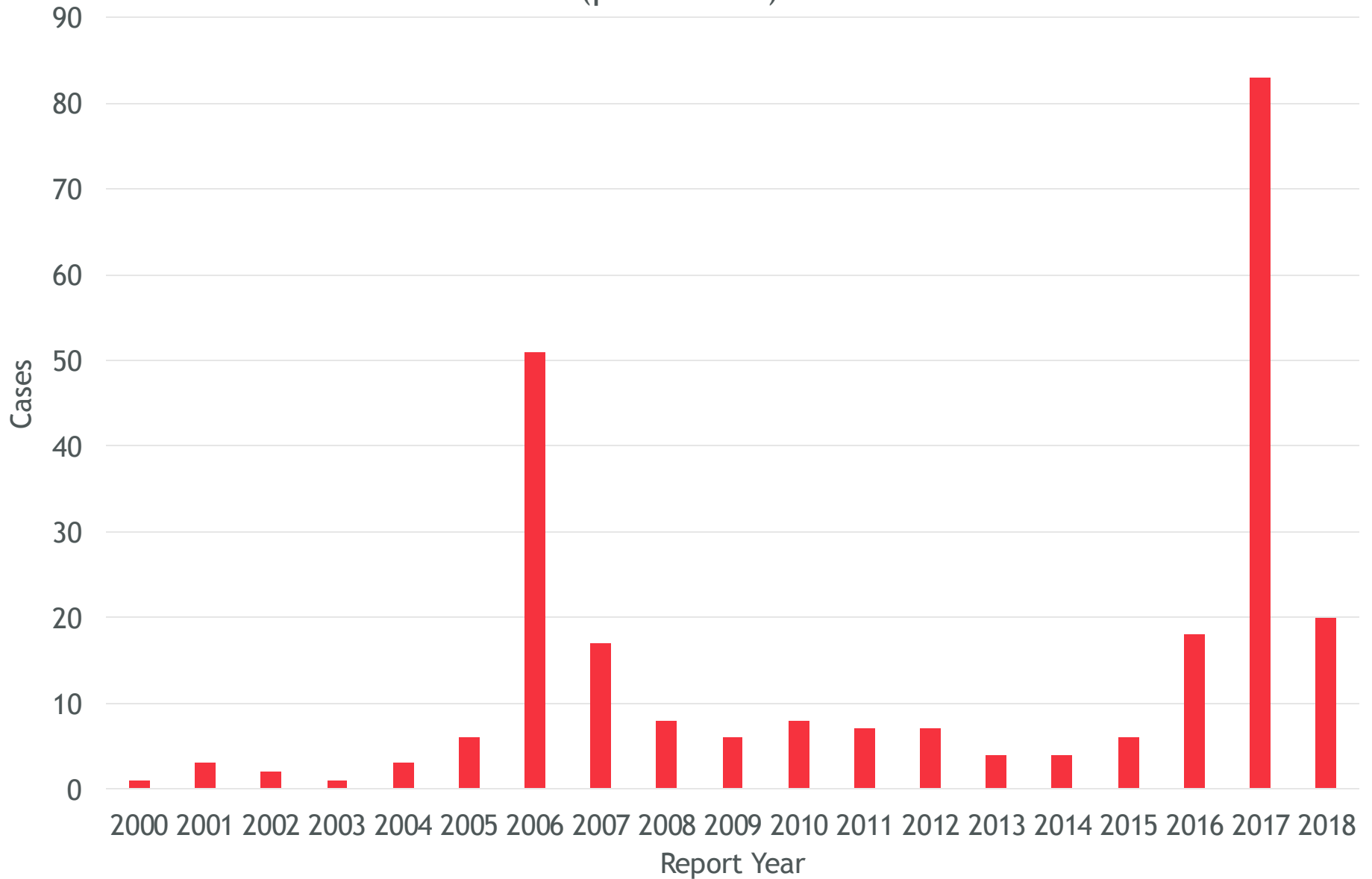
MMR Vaccination Status

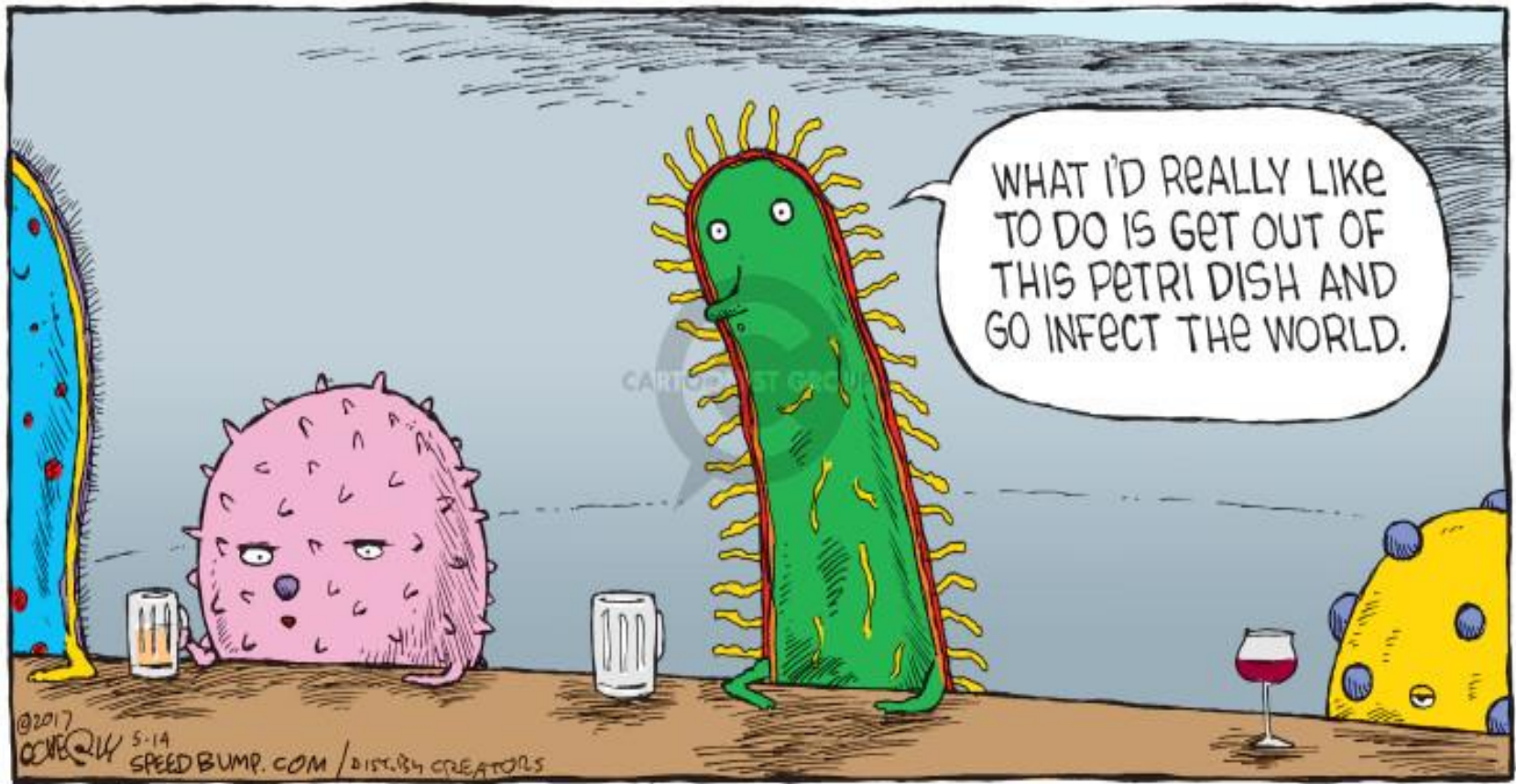
None / Unknown	34 (72%)
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1 MMR	3 (6%)
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2+ MMR	10 (21%)
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Number of Reported Mumps Cases by Year in Colorado, 2000-2018
(provisional)





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