

# Vaccine Preventable Diseases in Colorado

## Surveillance Report: 2013



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## Introduction

This report contains tables and graphs that summarize 2013 surveillance data for vaccine preventable diseases in Colorado. Colorado rates were calculated as cases per 100,000 population using 2013-based population final estimates from the Demography Section, Colorado Division of Local Government.

**Table 1. Reported Cases of Vaccine Preventable Diseases\*, Colorado, 2008 - 2013**

Report Year	Invasive <i>H. influenzae</i> type b (Hib)	Hepatitis A	Acute Hepatitis B	Measles	Meningococcal Disease	Mumps	Pertussis	Invasive Pneumococcal Disease	Varicella
2008	0	37	33	0	16	8	158	541	873
2009	3	53	35	0	24	6	201	623	515
2010	4	36	53	0	21	8	538	545	403
2011	0	21	27	0	10	7	416	494	447
2012	2	30	25	0	6	7	1432	432	479
5-Year Average	1.8	35.4	34.6	0	15.4	7.2	549.0	527.0	543.4
2013	0	50	25	2	9	4	1429	511	352

\*During 2008-2013 no congenital rubella, diphtheria, polio, or rubella cases were reported. One tetanus case was reported during 2012.

**Table 2. Reported Cases and Rates of Selected Vaccine Preventable Diseases, Colorado and United States, 2013**

Disease	Colorado		United States	
	Cases	Rate <sup>§</sup>	Cases*	Rate <sup>§</sup>
<i>H. influenzae</i> type b, invasive disease (<5 years)	0	0.0	31	0.0
Hepatitis A	50	0.9	1,781	0.6
Acute Hepatitis B	25	0.5	3,050	1.0
Measles	2	0.0	187	0.1
Meningococcal Disease	9	0.2	556	0.2
Mumps	7	0.1	584	0.2
Pertussis	1,429	27.1	28,639	9.0
Invasive Pneumococcal Disease	511	9.7	16,666	5.3
Varicella	352	9.2	11,359	3.6

\*Source, MMWR 2014;63(53);ND-733-ND-746. US rates calculated using US Census Bureau Population Estimate.

§ Per 100,000 population.

## Diphtheria

No cases of diphtheria were reported in Colorado or the United States during 2013. The last case of diphtheria reported in Colorado was in 1985.

## Invasive *Haemophilus influenzae*

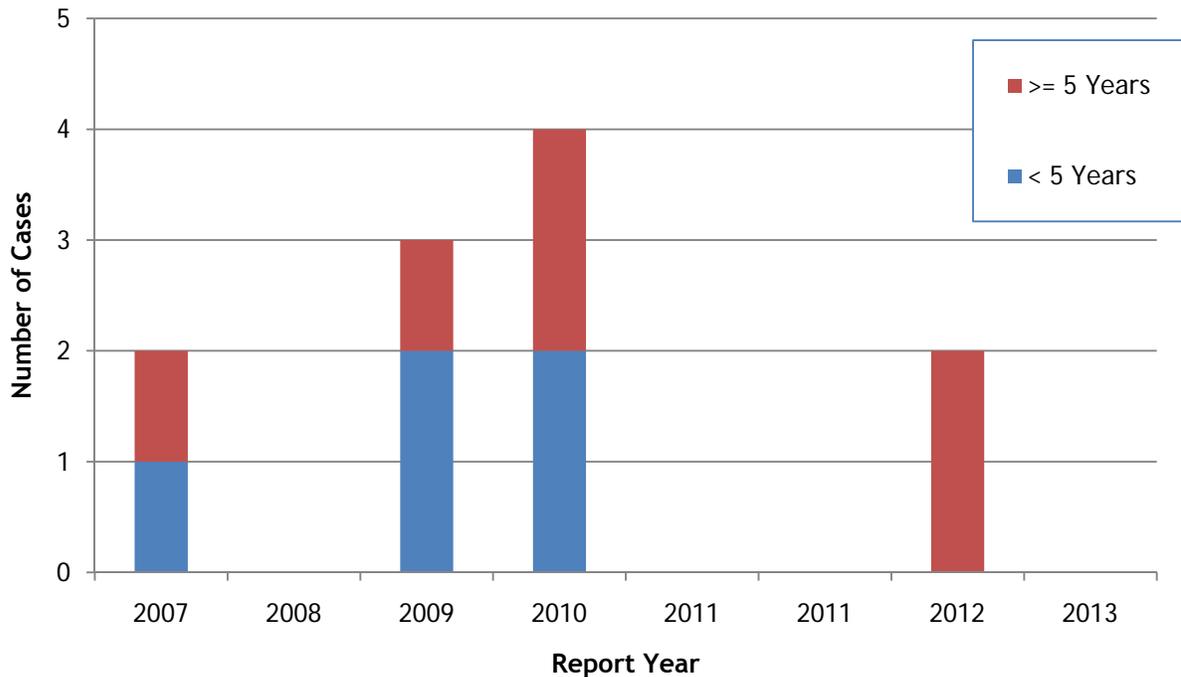
Table 3. Reported Cases, Rates, and Case Fatality of Invasive <i>Haemophilus influenzae</i> (all serotypes) by Age Group, Colorado, 2013				
Age Group (Years)	Cases	Rate*	Deaths	
			Number	Percent
<1	5	7.6	1	(20.0)
1-4	4	1.5	1	(25.0)
5-9	0	0	0	.
10-14	1	0.3	0	.
15-19	3	0.9	0	.
20-29	9	1.2	1	(11.1)
30-39	6	0.8	0	.
40-59	12	0.8	1	(8.3)
60+	41	4.3	7	(17.1)
<b>Total</b>	<b>81</b>	<b>1.5</b>	<b>11</b>	<b>(13.6)</b>

\*Per 100,000 population.

Table 4. Reported Cases of Invasive <i>Haemophilus influenzae</i> by Serotype, Colorado, 2013		
Serotype	Cases	Percent of cases
a	5	6.3
b	0	0.0
c	0	0.0
d	0	0.0
e	4	5.1
f	10	12.7
Nontypeable	60	75.9
TOTAL*	79	100.0

\*Two cases had an unknown serotype. Total number of cases = 81.

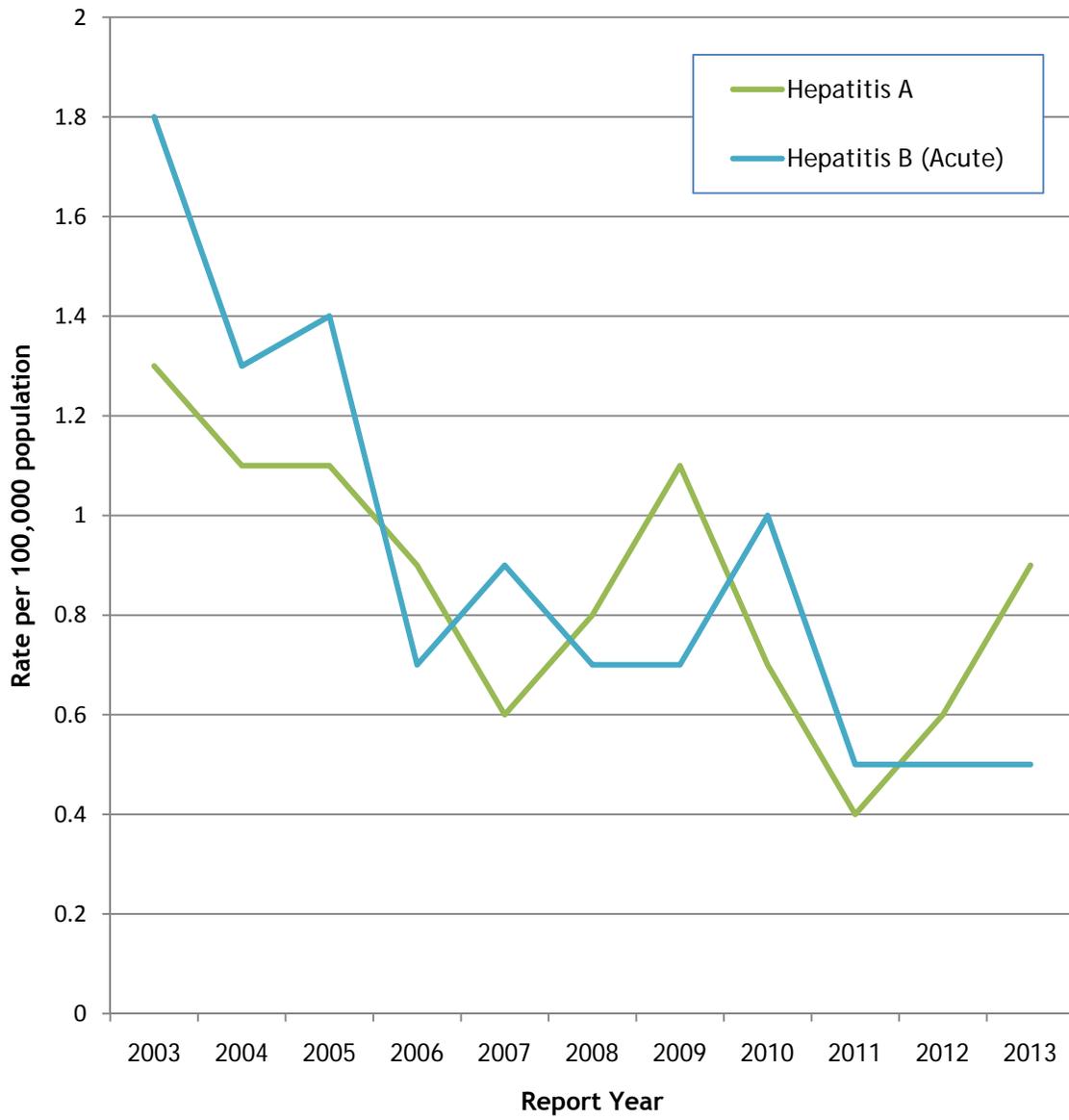
Figure 1. Reported Cases of Invasive *Haemophilus influenzae* type b (Hib) by Age Group, Colorado, 2007-2013



Note: Of the 5 cases < 5 years of age, 3 were unimmunized or underimmunized, one 2-month-old had 1 dose, and 1 had an unknown vaccination status.

# Hepatitis

Figure 2. Rates of Reported Hepatitis A and B, Colorado, 2003 - 2013



## Hepatitis A

Table 5. Reported Cases and Rates* of Hepatitis A by Age Group & Gender, Colorado 2013						
Age Group (years)	Male		Female		Total	
	Cases	Rate*	Cases	Rate*	Cases	Rate*
< 1	1	3	0	0	1	1.5
1-4	2	1.4	0	0	2	0.7
5-9	1	0.5	1	0.6	2	0.6
10-14	1	0.6	0	0	1	0.3
15-19	0	0	2	1.2	2	0.6
20-39	4	0.5	7	1	11	0.8
≥ 40	12	1	19	1.5	31	1.3
<b>TOTAL</b>	21	0.8	29	1.1	50	0.9

\* per 100,000 population.

## Acute Hepatitis B

Table 6. Reported Cases and Rates* of Acute Hepatitis B by Age Group & Gender, Colorado, 2013						
Age Group (years)	Male		Female		Total	
	Cases	Rate*	Cases	Rate*	Cases	Rate*
< 15	0	0	0	0	0	0
15-19	0	0	0	0	0	0
20-29	1	0.3	0	0	1	0.1
30-39	4	1.1	3	0.8	7	0.9
40-49	8	2.2	0	0	8	1.1
50-59	2	0.6	4	1.1	6	0.8
≥ 60	2	0.5	1	0.2	3	0.3
<b>TOTAL</b>	<b>17</b>	<b>0.6</b>	<b>8</b>	<b>0.3</b>	<b>25</b>	<b>0.5</b>

\* Per 100,000 population.

Detailed surveillance summaries of hepatitis A and hepatitis B in Colorado are posted at: <https://www.colorado.gov/cdphe/hepatitis>

### Influenza

See influenza summary report at: <https://www.colorado.gov/cdphe/influenza-data>

### Measles

There were two measles cases reported in Colorado during 2013, both adults. The index case was a visitor from Asia who spread the disease to one other person. These were the first measles cases reported in Colorado since 2006. The vaccination status of these cases is unknown.

## Meningococcal disease

Figure 3. Rate of Meningococcal Disease by Year of Report, Colorado, 2003 - 2013

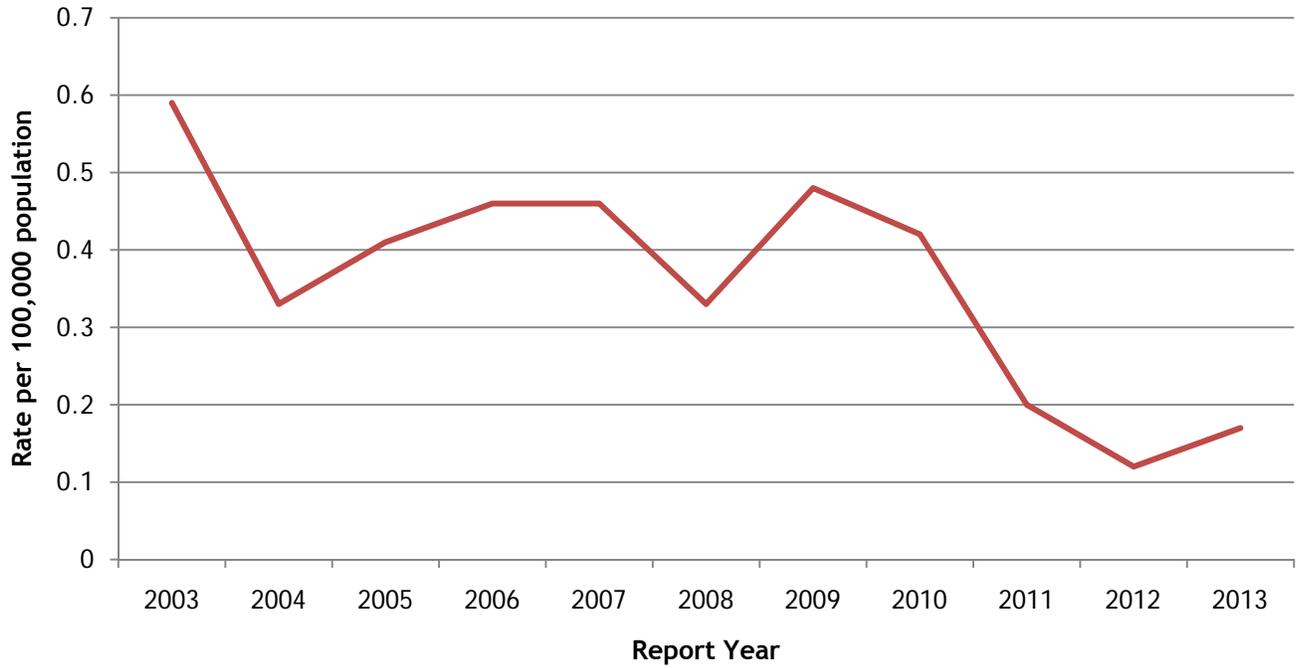
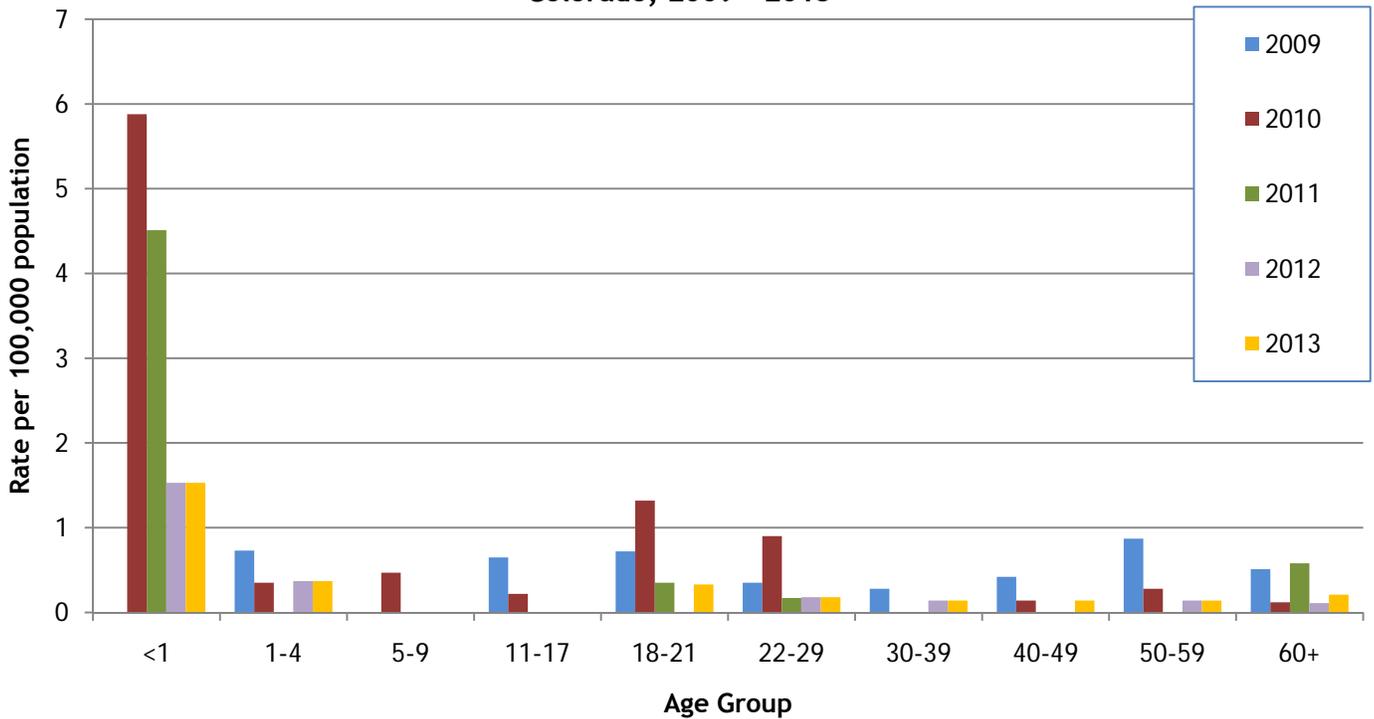


Figure 4. Rate of Meningococcal Disease by Age Group and Report Year, Colorado, 2009 - 2013



**Table 7. Reported Cases, Rates\*, and Case Fatality of Meningococcal Disease by Age Group, Colorado, 2013**

Age Group (Years)	Cases	Rate*
<1	1	1.5
1-4	1	0.4
5-9	0	.
10-14	0	.
15-19	0	.
20-29	2	0.3
30-39	1	0.1
40-59	2	0.1
60+	2	0.2
<b>Total</b>	<b>9</b>	<b>0.2</b>

\*Per 100,000 population. None of the cases reported during 2013 were fatal.

**Table 8. Reported Cases of Meningococcal Disease by Serogroup, Colorado, 2013**

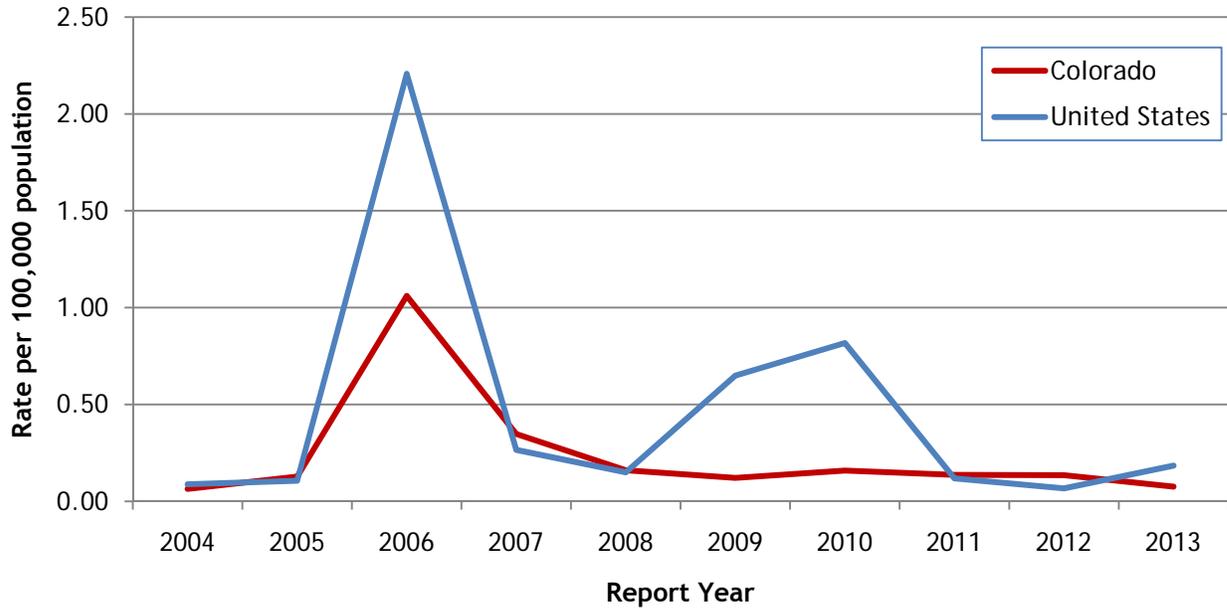
Serogroup	Cases*	Percent of cases
<b>B</b>	2	66.7
<b>C</b>	3	0.0
<b>Y</b>	3	33.3
<b>W-135</b>	0	0.0
<b>Not Groupable</b>	0	0.0
<b>TOTAL</b>	<b>8</b>	<b>100.0</b>

\*Serogroup was unknown for one case. Total number of cases =9.

Note: Meningococcal conjugate vaccines available during 2013 contain antigens from serogroups A, C, Y and W-135. Of the six cases with disease caused by a vaccine-preventable serogroup, one was vaccinated against meningococcal disease. None of the five unvaccinated cases were in age groups routinely recommended to receive vaccination.

## Mumps

**Figure 5. Rates of Reported Mumps Cases by Year of Report, Colorado and United States, 2004 - 2013**



**Table 9. Reported Cases of Mumps by Age Group and Number of MMR Vaccine Doses, Colorado, 2013**

Age Group (Years)	0 Doses	1 Dose	2 Doses	Unknown	Total Number of Cases
<1	0	0	0	0	0
1 - 4	1	1	0	0	2
5 - 9	0	0	1	0	1
10 - 14	0	0	0	0	0
15 - 19	0	0	1	0	1
20 - 39	0	0	0	0	0
40+	0	0	0	0	1
<b>TOTAL</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>0</b>	<b>4</b>

# Pertussis

**Figure 6. Reported Pertussis Cases by Month and Year with Projected Baseline and Epidemic Thresholds, Colorado, 2004-2013**

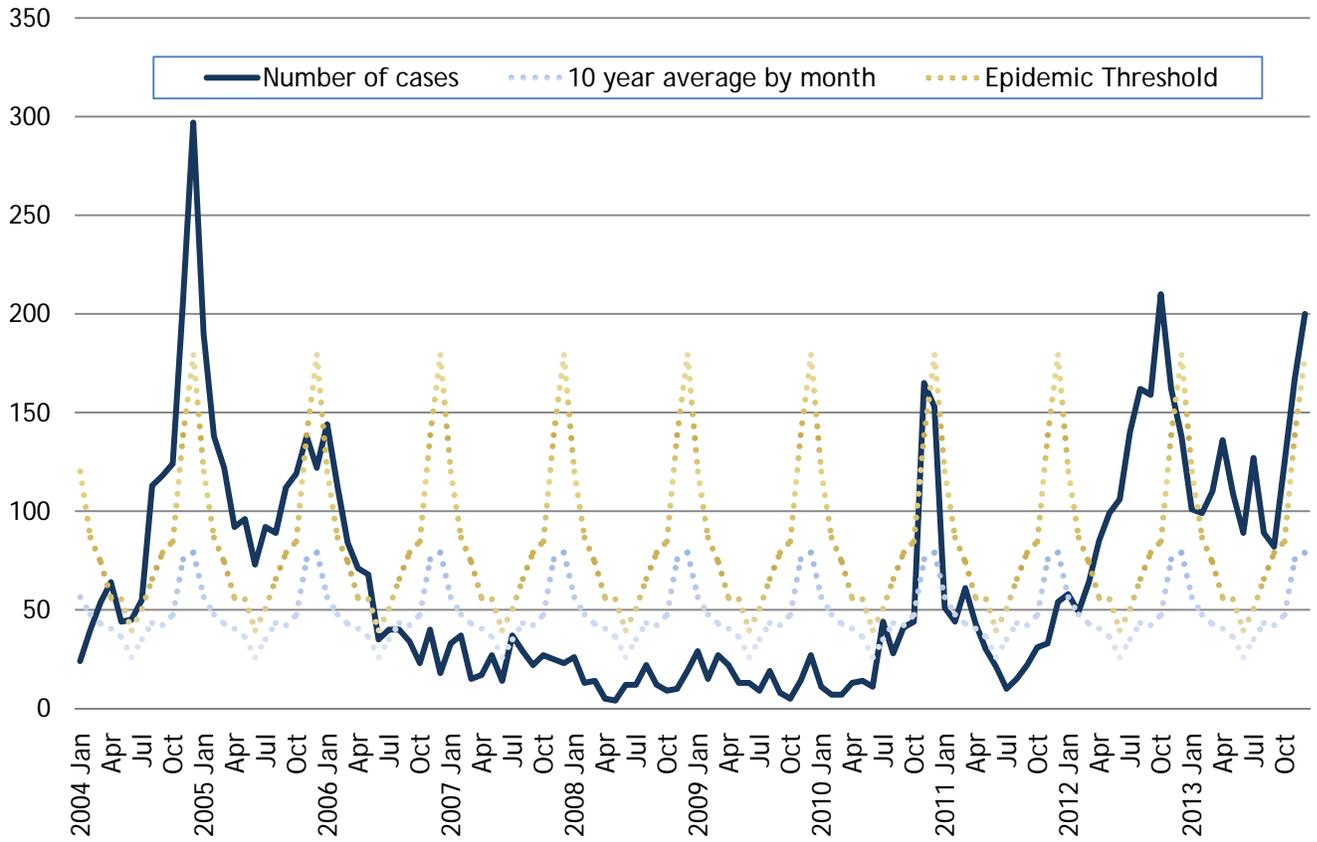
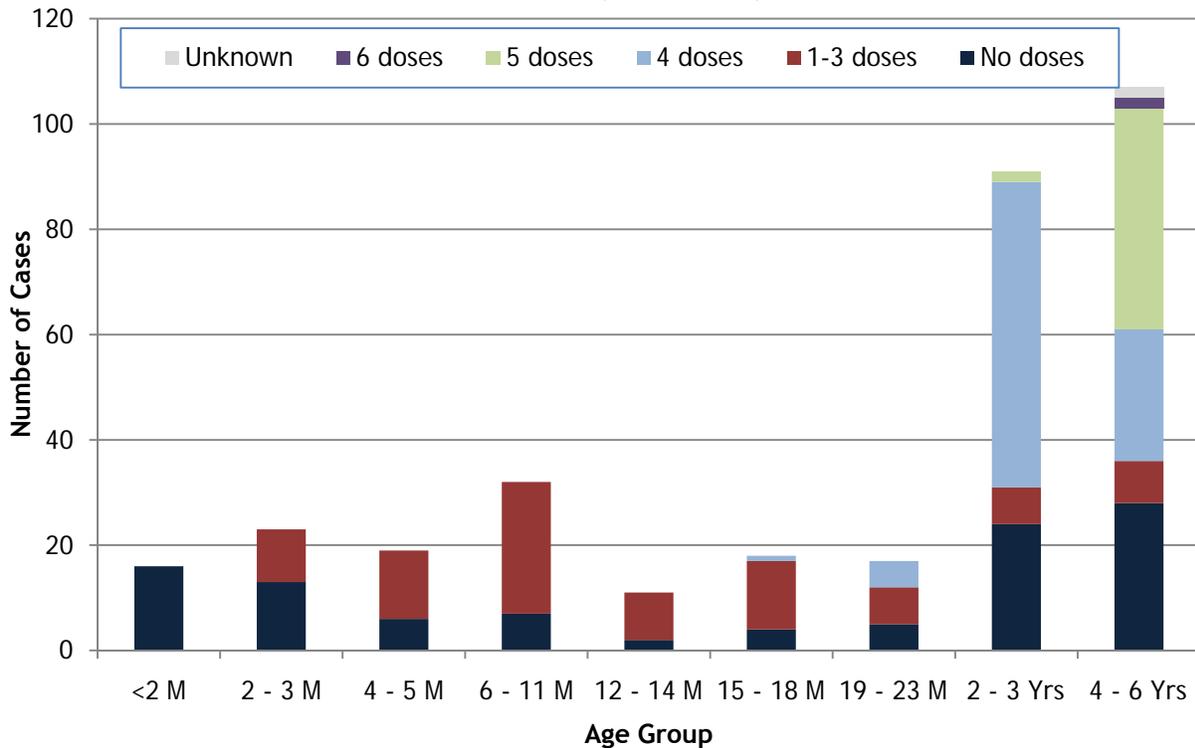


Table 10. Reported Cases, Rates*, and Hospitalization Status of Pertussis by Age Group, Colorado, 2013				
AGE GROUP (Years)	CASES	RATE*	Hospitalized Cases	
			Number	Percent of Cases
<6M	58	177.4	27	46.6
6 - 11M	32	97.9	1	3.1
1 - 4	175	64.9	1	0.6
5 - 9	209	58.3	0	.
10 - 14	406	114.7	1	0.2
15 - 19	272	77.4	2	0.7
20 - 29	47	6.5	0	.
30 - 39	49	6.6	2	4.1
40 - 59	126	8.7	2	1.6
60+	55	5.8	2	3.6
<b>Total</b>	<b>1429</b>	<b>26.8</b>	<b>38</b>	<b>2.7</b>

\*Per 100,000 population.

- Average # days hospitalized in 2013 = 5.1 days, median 2.5 days
- There were no reported pertussis deaths in Colorado during 2013. The last pertussis death was in 2012.

Figure 7. Reported Pertussis Cases by Age Group and Number of Vaccine Doses, Colorado, 2013



**Table 11. Reported Cases and Rates\* of Pertussis by County,  
Colorado, 2008 - 2013**

County**	Number of Cases by Year of Report							
	2008	2009	2010	2011	2012	5 Year Average	2013	2013 Rate*
ADAMS	7	13	56	54	206	67.2	139	29.7
ALAMOSA	0	0	1	0	0	0.2	0	
ARAPAHOE	22	26	64	83	170	73	184	30.3
ARCHULETA	1	2	1	6	0	2	3	24.7
BACA	0	0	2	0	1	0.6	0	
BENT	0	0	0	1	0	0.2	3	52.9
BOULDER	5	23	19	16	155	43.6	217	70.0
BROOMFIELD	2	0	6	4	35	9.4	28	47.1
CHAFFEE	0	0	2	0	5	1.4	3	16.4
CLEAR CREEK	3	0	3	2	1	1.8	0	
CONEJOS	0	14	2	0	0	3.2	1	*
COSTILLA	0	0	0	0	0	0	3	85.6
DELTA	1	0	7	1	8	3.4	0	*
DENVER	40	23	58	37	209	73.4	145	22.3
DOUGLAS	8	4	23	29	85	29.8	63	20.6
EL PASO	9	20	21	37	89	35.2	77	11.7
ELBERT	0	1	1	0	2	0.8	6	25.3
FREMONT	0	1	14	1	6	4.4	3	6.5
GARFIELD	0	3	4	0	0	1.4	19	33.2
GILPIN	0	0	0	3	1	0.8	0	
GRAND	0	0	1	0	2	0.6	2	*
GUNNISON	0	0	4	0	0	0.8	0	
JEFFERSON	35	19	165	103	267	117.8	238	43.1
KIT CARSON	0	0	1	0	2	0.6	0	

Table 11. continues on next page

**Table 11. Reported Cases and Rates\* of Pertussis by County,  
Colorado, 2008 - 2013**

County <sup>§</sup>	Number of Cases by Year of Report							
	2008	2009	2010	2011	2012	5 Year Average	2013	2013 Rate*
LA PLATA	9	34	0	6	3	10.4	21	39.3
LARIMER	8	2	8	7	75	20	79	25.0
LAS ANIMAS	0	0	1	0	0	0.2	0	
LINCOLN	0	0	0	0	1	0.2	0	
LOGAN	0	0	0	0	1	0.2	0	
MESA	0	2	7	4	14	5.4	10	6.8
MOFFAT	0	0	1	2	1	0.8	1	*
MONTEZUMA	0	3	4	0	0	1.4	7	27.3
MONTROSE	0	0	1	2	5	1.6	6	14.7
MORGAN	0	0	0	0	1	0.2	3	10.6
OTERO	0	1	1	1	1	0.8	4	21.6
PARK	0	0	1	2	0	0.6	1	*
PHILLIPS	0	1	1	0	0	0.4	12	276.1
PITKIN	1	2	1	0	0	0.8	1	*
PROWERS	0	0	1	0	3	0.8	26	212.5
PUEBLO	3	1	18	8	8	7.6	19	11.8
RIO BLANCO	0	0	0	0	0	0	4	59.0
RIO GRANDE	0	1	2	0	1	0.8	2	*
ROUTT	0	0	1	0	1	0.4	1	*
SAGUACHE	0	0	0	0	1	0.2	0	
SUMMIT	0	0	1	0	1	0.4	3	10.5
TELLER	2	0	21	0	6	5.8	0	
WASHINGTON	0	0	2	1	0	0.6	0	
WELD	2	4	10	5	68	17.8	94	34.9
YUMA	0	1	1	0	0	0.4	1	*
<b>Total</b>	<b>158</b>	<b>201</b>	<b>538</b>	<b>415</b>	<b>1432</b>	<b>548.8</b>	<b>1429</b>	<b>27.5</b>

\*Per 100,000 population. Rates were not calculated for counties with < 3 pertussis cases during 2013. Caution should be used when interpreting rates based on small numbers of cases.

<sup>§</sup>There were no reported cases of pertussis 2008-2013 in the following counties: Cheyenne, Crowley, Custer, Dolores, Eagle, Hinsdale, Huerfano, Jackson, Kiowa, Lake, Mineral, Ouray, San Juan, San Miguel, and Sedgwick.

**Table 12. Classification of Reported Pertussis Cases,  
Colorado, 2013**

CASE CLASSIFICATION	Number	Percent
<b><u>Confirmed</u></b> *: Culture or PCR positive	1174	82.2
<b><u>Confirmed</u></b> *: Epidemiologically-linked to a PCR positive case	152	10.6
<b><u>Probable</u></b> <sup>§</sup> : Clinical case only	101	7.1
<b><u>Probable</u></b> <sup>§</sup> : Infant case with cough duration <14 days	2	0.1
<b>TOTAL</b>	1429	100.0

\* Confirmed = Laboratory confirmed cases (culture positive or PCR positive and meet clinical case definition) or epidemiologically linked to a laboratory confirmed case and meet the clinical case definition. Clinical Case Definition is a cough illness lasting at least 14 days with one of the following: paroxysms of coughing, inspiratory "whoop", or post-tussive vomiting, without other apparent cause (as reported by a health care professional).

§ Probable = Meets the clinical case definition, is not laboratory-confirmed, and is not epidemiologically linked to a laboratory confirmed case, or an infant who is laboratory confirmed with a cough duration <14 days.

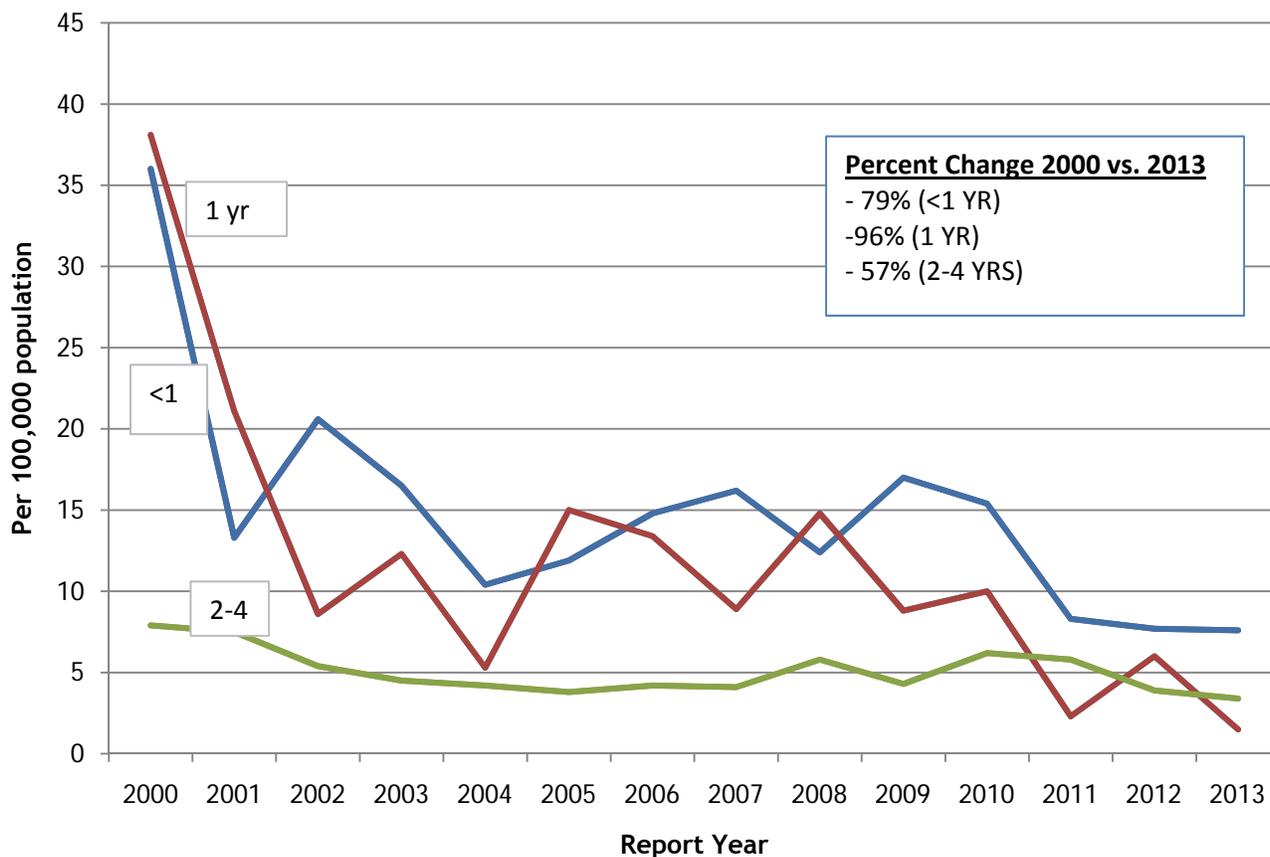
Pneumococcal disease

Table 13. Reported Cases, Rates*, and Case Fatality of Invasive Pneumococcal Disease by Age Group, Colorado, 2013				
Age Group (Years)	Cases	Rate*	Deaths	
			Number	Percent of Cases
<1	10	15.3	0	.
1-4	16	5.9	0	.
5-9	6	1.7	0	.
10-14	5	1.4	0	.
15-19	3	0.9	0	.
20-29	20	2.8	0	.
30-39	34	4.6	1	(2.9)
40-59	188	13.0	14	(7.4)
60+	229	24.0	14	(6.1)
<b>Total</b>	511	9.7	29	(5.7)

\*Per 100,000 population.

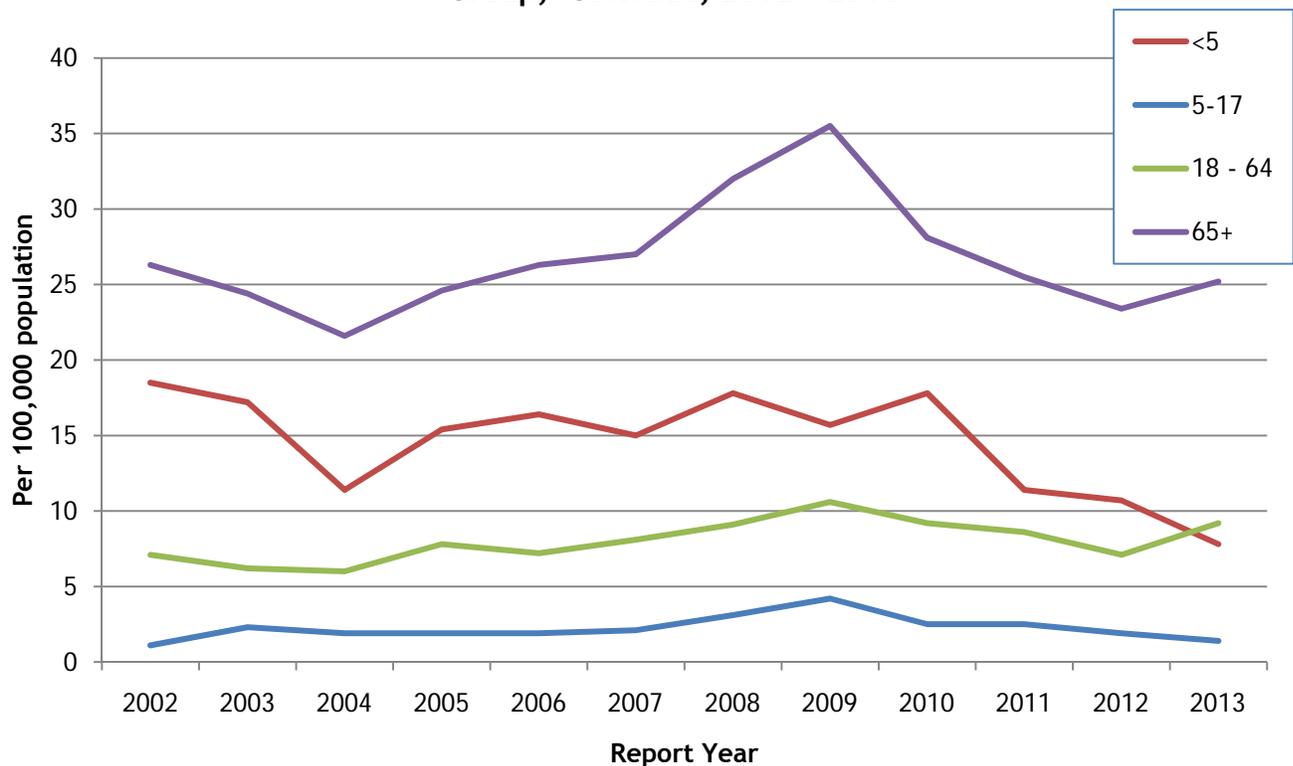
Following the introduction of pneumococcal conjugate vaccines in 2000, dramatic declines in invasive pneumococcal disease (IPD) were reported among children less than 5 years of age, in particular, children 1 year of age and younger.

**Figure 8. Reported Rates of Invasive Pneumococcal Disease in Children < 5 Years of Age, Colorado, 2000-2013**

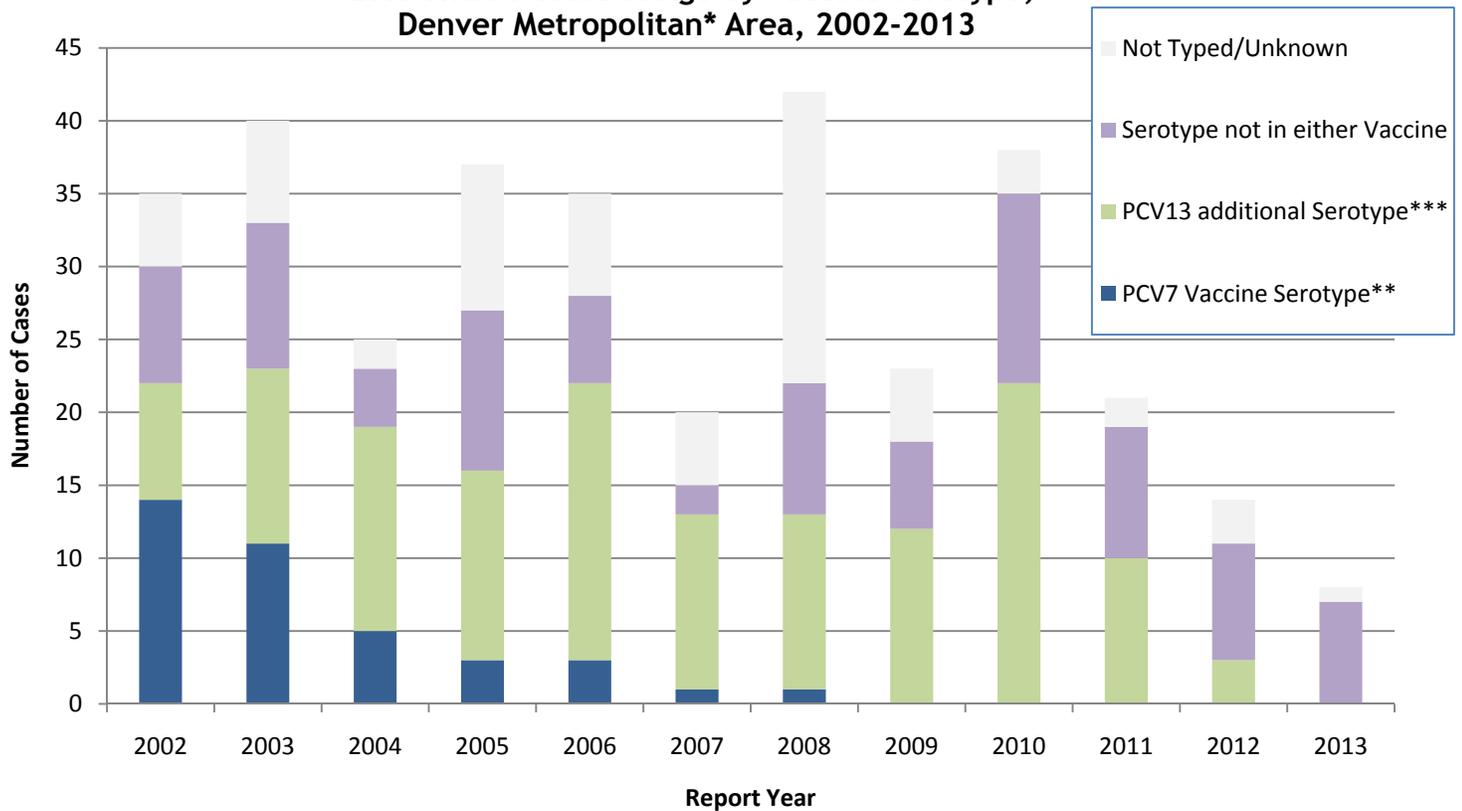


Rates also decreased in other age groups following the use of 7-valent pneumococcal conjugate vaccine (PCV7). During 2002 - 2004, rates decreased 18% in those 65 years of age and older and 15% in those 18-64 years of age. However, a steady increase in disease, likely due to non-PCV7 serotypes, was observed in all age groups during 2004 - 2009. The introduction of the 13-valent pneumococcal conjugate vaccine (PCV13) in February of 2010 reversed this trend and the number of cases of invasive disease due to the 6 additional serotypes covered by the vaccine have decreased (Figure 9).

**Figure 9. Reported Rates of Invasive Pneumococcal Disease by Age Group, Colorado, 2002 - 2013**



**Figure 10. Reported Cases of Invasive Pneumococcal Disease Less Than 5 Years of Age by Vaccine Serotype, Denver Metropolitan\* Area, 2002-2013**



\*Adams, Arapahoe, Denver, Douglas, and Jefferson County

\*\*Serotypes included in PCV7 (4, 6B, 9V, 14, 18C, 19F, 23F).

\*\*\*Additional serotypes included in PCV13 and not PCV7 (1, 3, 5, 6A, 7F, 19A).

## Polio

In the United States, the last polio case caused by wild poliovirus was identified in 1979. In 1994, the World Health Organization certified the Western Hemisphere as free of wild poliovirus.

## Rubella

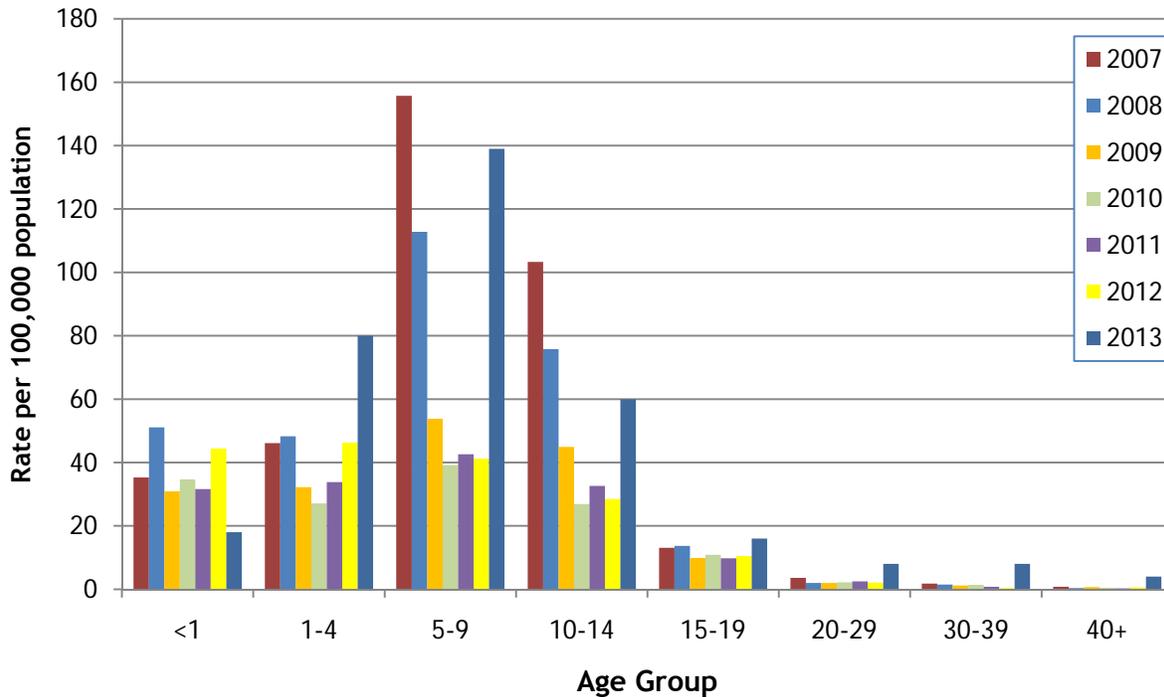
There were no rubella cases reported in Colorado during 2013. The last reported case of rubella in Colorado was in 2003.

## Tetanus

During the previous ten years (2004-2013) there were 5 cases of tetanus reported in Colorado (3 in 2004, 1 in 2005, and 1 in 2012). The 2012 case was an adult male who at received 5 doses of DTaP as a child and a Tdap in 2008. He recovered from his illness.

## Varicella

**Figure 11. Reported Rates of Varicella by Age Group and Report Year, Colorado, 2007 - 2013**



**Table 14. Reported Cases, Rates\*, and Hospitalization of Varicella by Age Group, Colorado, 2013**

Age Group (Years)	Cases	Rate*	Hospitalized Cases	
			Number	Percent of Cases
<1	18	27.6	1	5.6
1 - 4	80	29.4	1	1.3
5 - 9	139	39	0	.
10 - 14	60	17.3	0	.
15-19	16	4.6	0	.
20-29	8	1.1	1	12.5
30-39	8	1.1	0	.
40-59	3	0.2	1	33.3
60+	1	0.1	1	100
<b>Total</b>	<b>352</b>	<b>6.8</b>	<b>5</b>	<b>1.4</b>

\*Per 100,000 population.