

Vaccine Preventable Diseases in Colorado

Surveillance Report: 2014



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of Public Health
and Environment**

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Introduction

This report contains tables and graphs that summarize 2014 surveillance data for vaccine preventable diseases in Colorado. Colorado rates were calculated as cases per 100,000 population using 2014-based population final estimates from the Demography Section, Colorado Division of Local Government.

Table 1. Reported Cases of Vaccine Preventable Diseases*, Colorado, 2009 - 2014

Report Year	Invasive <i>H. influenzae</i> type b (Hib)	Hepatitis A	Acute Hepatitis B	Measles	Meningococcal Disease	Mumps	Pertussis	Invasive Pneumococcal Disease	Varicella
2009	3	53	35	0	24	6	202	623	515
2010	4	36	53	0	21	8	538	545	403
2011	0	21	27	0	10	7	415	494	447
2012	2	30	25	0	6	7	1432	432	479
2013	0	50	25	2	9	4	1431	511	352
5-Year Average	1.8	38.0	33.0	0.4	14.0	8.4	803.6	521.0	439.2
2014	1	23	29	1	7	4	1259	459	386
*During 2009-2014 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, 2014

Disease	Colorado		United States	
	Cases	Rate [§]	Cases*	Rate [§]
<i>H. influenzae</i> type b, invasive disease (<5 years)	1	0.0	27	0.0
Hepatitis A	23	0.4	1,123	0.4
Acute Hepatitis B	29	0.5	2,636	0.8
Measles	1	0.0	628	0.2
Meningococcal Disease	7	0.1	397	0.1
Mumps	4	0.1	1,151	0.4
Pertussis	1,259	23.5	28,660	9.0
Invasive Pneumococcal Disease	459	8.6	13,083	4.1
Varicella	386	7.2	9,058	2.8

*Source, MMWR 2015;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*

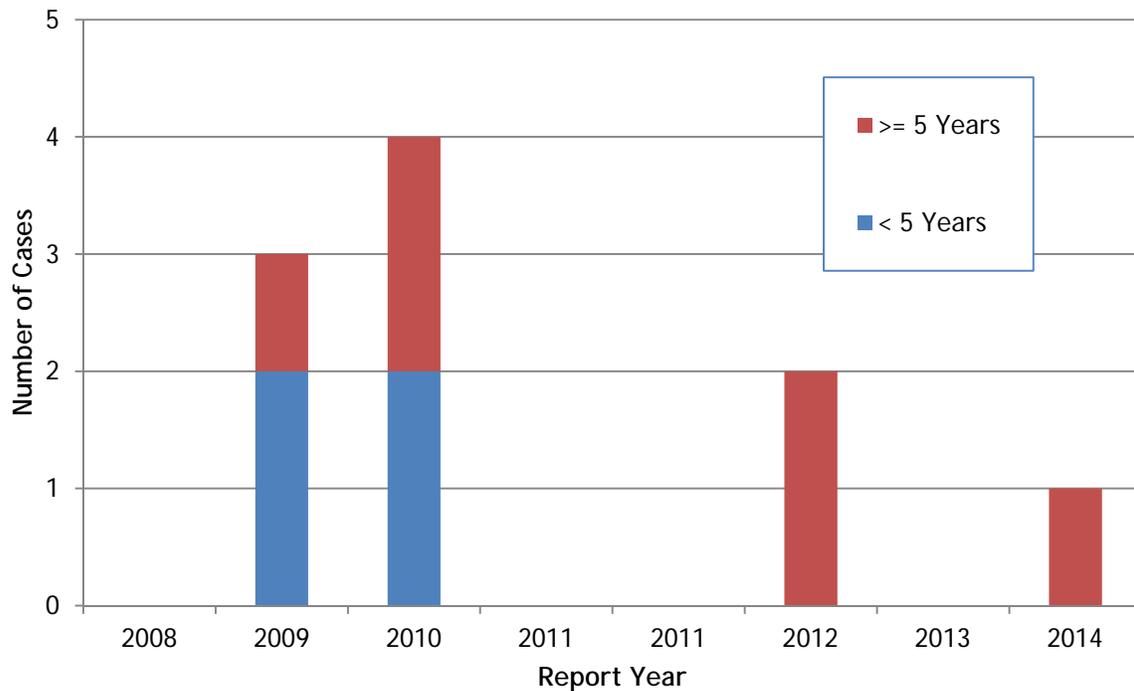
Table 3. Reported Cases, Rates, and Case Fatality of Invasive <i>Haemophilus influenzae</i> (all serotypes) by Age Group, Colorado, 2014				
Age Group (Years)	Cases	Rate*	Deaths	
			Number	Percent of Cases
<1	4	6	3	75.0
1-4	4	1.5	0	.
5-9	3	0.8	0	.
10-14	1	0.3	0	.
15-19	2	0.6	0	.
20-29	3	0.4	0	.
30-39	2	0.3	0	.
40-59	10	0.7	0	.
60+	37	3.7	6	16.2
Total	66	1.2	9	13.6

*Per 100,000 population.

Table 4. Reported Cases of Invasive <i>Haemophilus influenzae</i> by Serotype, Colorado, 2014		
Serotype	Cases	Percent of cases
a	1	1.6
b	1	1.6
c	0	0.0
d	0	0.0
e	3	4.8
f	9	14.5
Nontypeable	48	77.4
TOTAL*	62	100.00

*Four cases had an unknown serotype. Total number of cases = 66.

Figure 1. Reported Cases of Invasive *Haemophilus influenzae* type b (Hib) by Age Group, Colorado, 2008-2014



Note: Of the 4 cases < 5 years of age, 2 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, 2004 - 2014



Hepatitis A

Table 5. Reported Cases and Rates* of Hepatitis A by Age Group & Gender, Colorado 2014						
Age Group (years)	Male		Female		Total	
	Cases	Rate*	Cases	Rate*	Cases	Rate*
< 1	0	0.0	0	0.0	0	0.0
1-4	0	0.0	0	0.0	0	0.0
5-9	1	0.5	1	0.6	2	0.6
10-14	1	0.5	0	0.0	1	0.3
15-19	2	1.1	1	0.6	3	0.8
20-39	4	0.5	2	0.3	6	0.4
40+	7	0.6	4	0.3	11	0.4
Total	15	0.6	8	0.3	23	0.4

*Per 100,000 population.

Acute Hepatitis B

Table 6. Reported Cases and Rates* of Acute Hepatitis B Cases by Age Group & Gender, Colorado, 2014						
Age Group (years)	Male		Female		Total	
	Cases	Rate*	Cases	Rate*	Cases	Rate*
< 15	0	0.0	0	0.0	0	0.0
15-19	0	0.0	1	0.6	1	0.3
20-29	2	0.5	0	0.0	2	0.3
30-39	2	0.5	0	0.0	2	0.3
40-49	8	2.2	1	0.3	9	1.3
50-59	5	1.4	0	0.0	5	0.7
60+	7	1.5	3	0.6	10	1.0
Total	24	0.9	5	0.2	29	0.5

* 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

Table 7. Reported Cases of Measles by Report Year, Colorado, 2005 - 2014	
Report year	Number of Cases
2005	0
2006	1
2007	0
2008	0
2009	0
2010	0
2011	0
2012	0
2013	2
2014	1

Note: Two of the four measles cases reported 2005 - 2014 were too young to receive measles vaccination. The 2 other cases were from abroad and their vaccination status is unknown.

Meningococcal disease

Figure 3. Rate of Meningococcal Disease by Year of Report, Colorado, 2003 - 2014

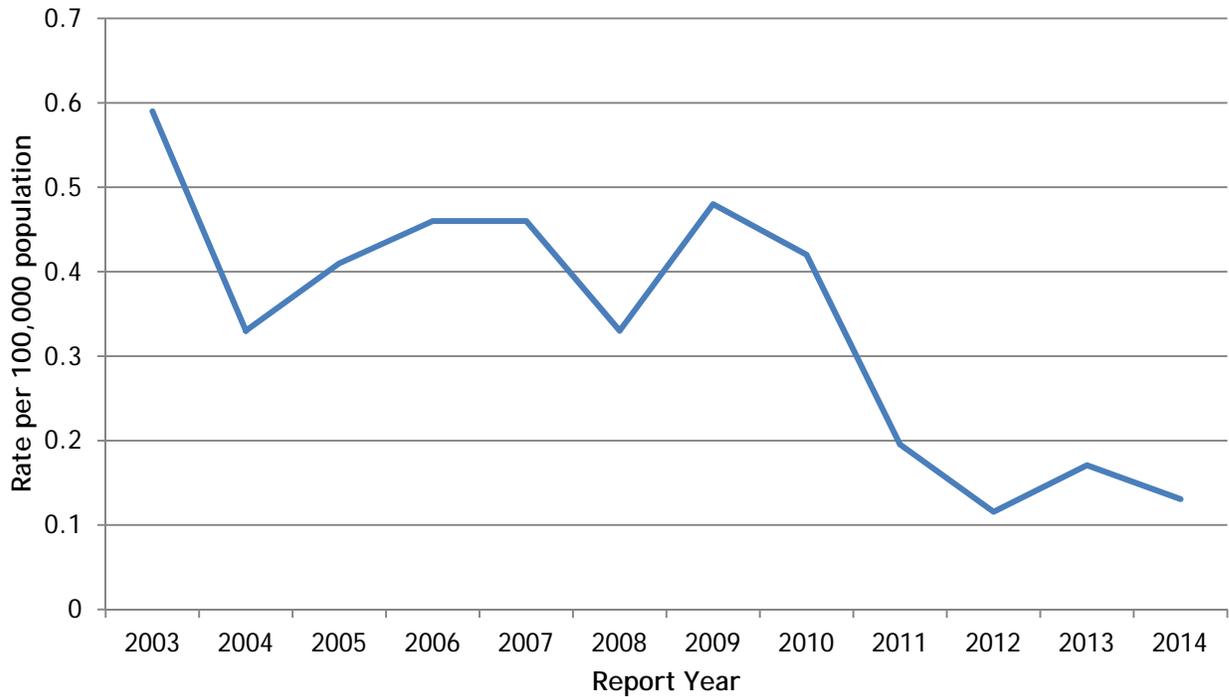


Figure 4. Rates of Meningococcal Disease by Age Group and Report Year, Colorado, 2010 - 2014

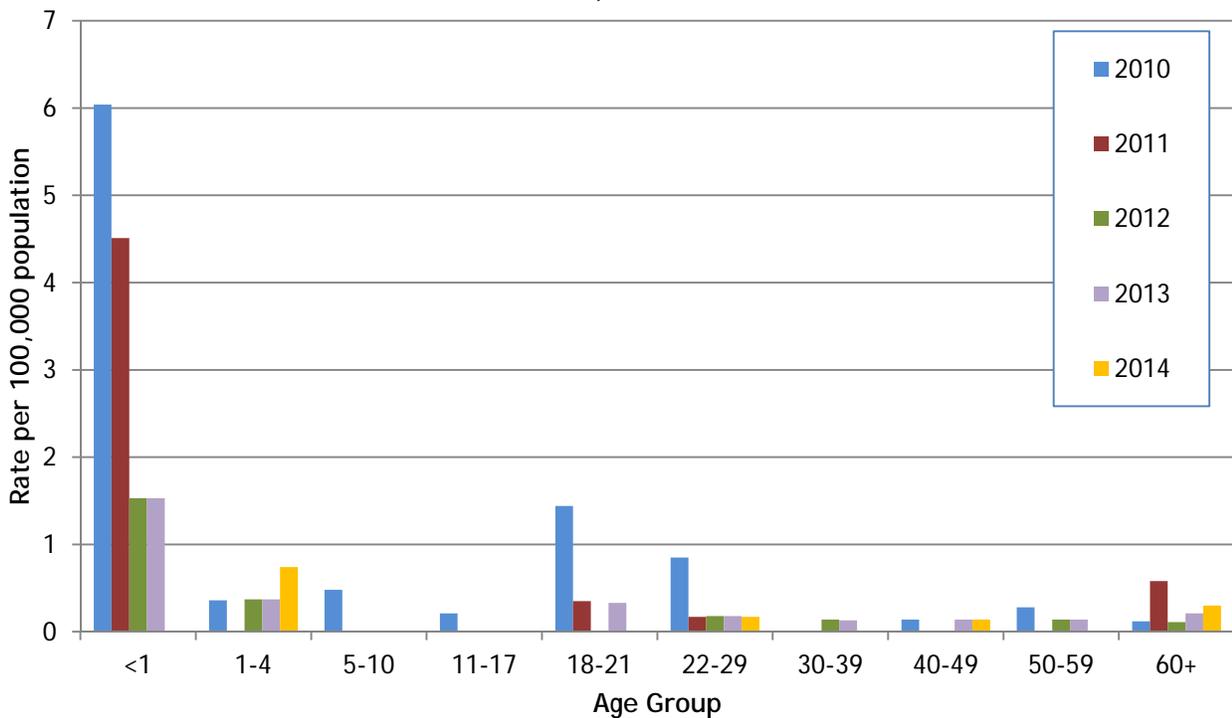


Table 8. Reported Cases, Rates*, and Case Fatality of Meningococcal Disease by Age Group, Colorado, 2014

Age Group (Years)	Cases		Deaths	
	Number	Rate*	Number	Percent of Cases
<1	0	.	0	.
1-4	2	0.7	0	.
5-10	0	.	0	.
11-17	0	.	0	.
18-21	0	.	0	.
22-29	1	0.1	1	100.0
30-39	0	.	0	.
40-49	1	0.1	0	.
50-59	0	.	0	.
60+	3	.	0	.
Total	7	0.1	1	14.3

*Per 100,000 population.

Table 9. Reported Cases of Meningococcal Disease
by Serogroup, Colorado, 2014

Serogroup	Cases	Percent of cases
A	0	0.0
B	1	14.3
C	1	14.3
Y	3	42.8
W-135	0	0.0
Not Groupable	2	28.6
TOTAL	8	100.0

Note: Meningococcal conjugate vaccines routinely available during 2014 contain antigens from serogroups A, C, Y and W-135. Of the four cases with disease caused by a vaccine-preventable serogroup, none were vaccinated against meningococcal disease.

Mumps

Figure 5. Rates of Reported Mumps Cases by Year of Report, Colorado and United States, 2004 - 2014

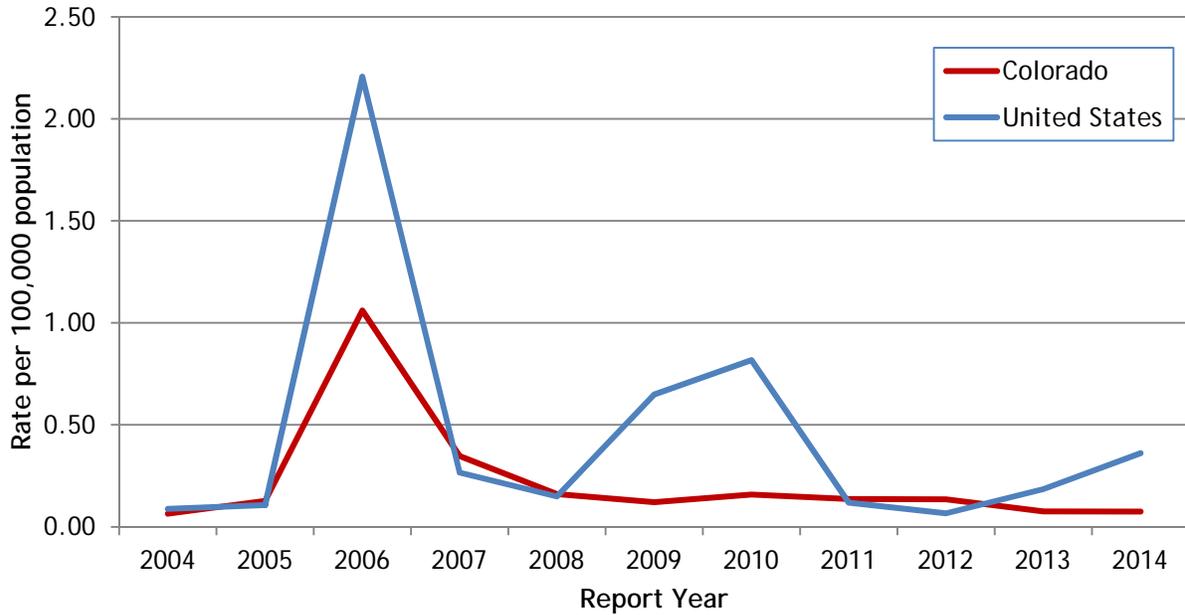


Table 10. Reported Cases of Mumps by Age Group and Number of MMR Vaccine Doses, Colorado, 2014

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

Pertussis

Figure 6. Reported Pertussis Cases by Month and Year with Projected Baseline and Epidemic Thresholds, Colorado, 2010-2014

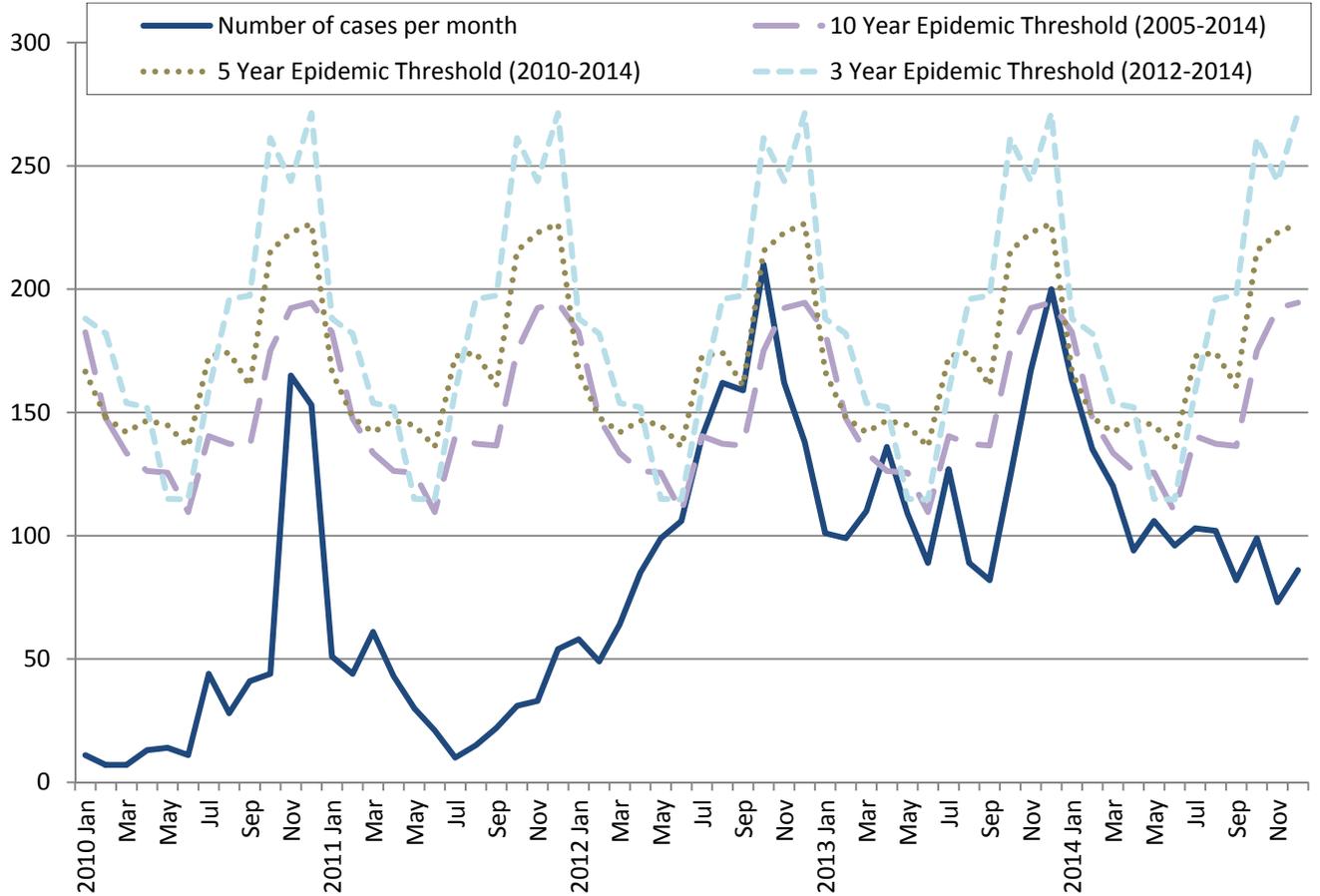


Table 11. Reported Cases, Rates*, and Hospitalization Status of Pertussis by Age Group, Colorado, 2014				
AGE GROUP (Years)	CASES	RATE*	Hospitalized Cases	
			Number	Percent of Cases
<6M	45	135.5	23	51.1
6 - 11M	30	90.3	5	16.7
1 - 4	177	65.9	4	2.3
5 - 9	192	53.2	2	1.0
10 - 14	301	83.1	2	0.7
15 - 19	186	52.2	0	.
20 - 29	45	6.2	2	4.4
30 - 39	74	9.8	0	.
40 - 59	138	9.5	8	5.8
60+	71	7.2	9	12.7
Total	1259	23.5	55	4.4

*Per 100,000 population.

- Average # days hospitalized in 2014 = 4.0 days, median 3.0 days
- There was one reported pertussis death in Colorado during 2014. The last previous pertussis death was in 2012. Both were adults.

Figure 7. Reported Pertussis Cases by Age Group and Number of Vaccine Doses, Colorado, 2014

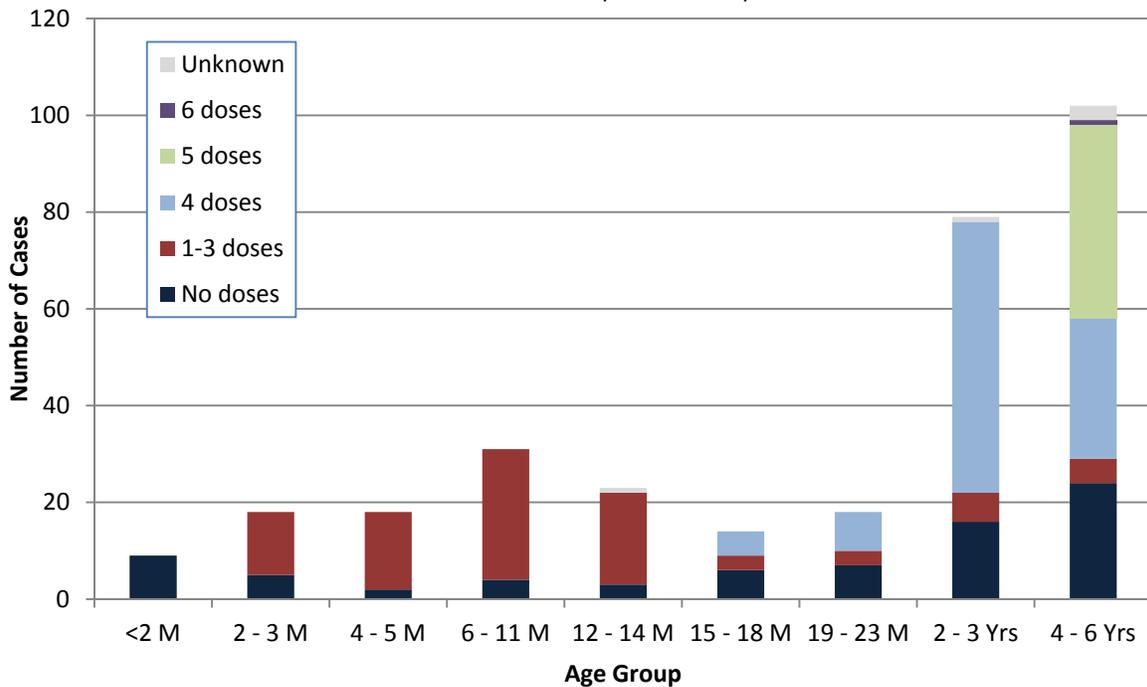
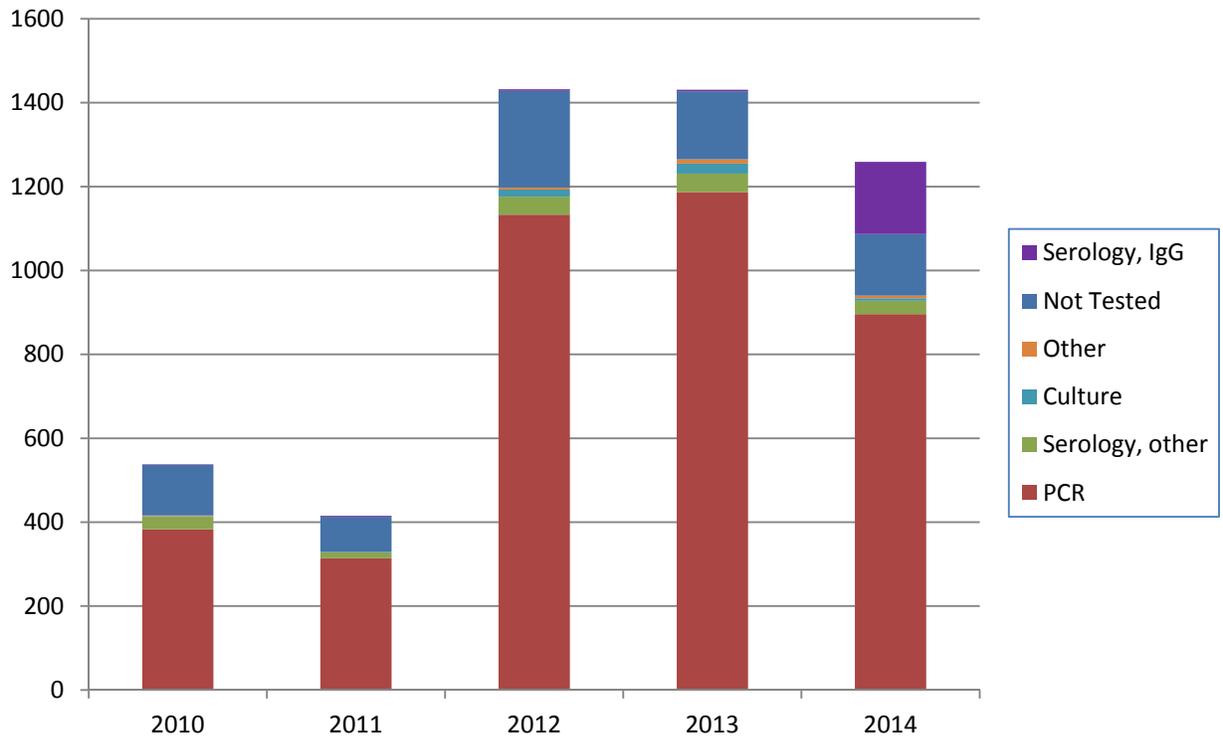


Figure 8. Pertussis Cases by Lab Test*, Colorado, 2010 - 2014



*Reports of IgG+ cases were not investigated prior to 2014. Not tested = Epi-link, MD diagnosis, Outbreak situation; Other = DFA+, Total antibody+; Serology Other = IgM+, IgA+

Table 12. Reported Cases and Rates* of Pertussis by County, Colorado, 2009 - 2014

County ^s	Number of Cases by Year of Report							
	2009	2010	2011	2012	2013	5 Year Average	2014	2014 Rate*
ADAMS	13	56	54	206	139	93.6	165	34.4
ALAMOSA	0	1	0	0	1	0.4	0	.
ARAPAHOE	26	64	83	170	184	105.4	134	21.7
ARCHULETA	2	1	6	0	3	2.4	0	.
BACA	0	2	0	1	0	0.6	4	110.4
BENT	0	0	1	0	3	0.8	2	*
BOULDER	23	19	16	153	217	85.6	92	29.3
BROOMFIELD	0	6	4	35	28	14.6	12	19.4
CHAFFEE	0	2	0	5	3	2.0	0	.
CHEYENNE	0	0	0	0	0	0	8	427.8
CLEAR CREEK	0	3	2	1	0	1.2	0	.
CONEJOS	14	2	0	0	1	3.4	0	.
COSTILLA	0	0	0	0	3	0.6	0	.
CROWLEY	0	0	0	0	0	0	3	54.0
CUSTER	0	0	0	0	0	0	2	*
DELTA	0	7	1	8	0	3.2	0	.
DENVER	23	58	37	209	145	94.4	145	21.8
DOUGLAS	4	23	29	85	63	40.8	63	20.0
EAGLE	0	0	0	0	0	0	5	9.5
ELBERT	1	1	0	2	6	2.0	2	*
EL PASO	20	21	37	89	77	48.8	54	8.1
FREMONT	1	14	1	6	3	5.0	1	*
GARFIELD	3	4	0	0	19	5.2	7	12.2
GILPIN	0	0	3	1	0	0.8	0	.
GRAND	0	1	0	2	2	1.0	7	48.3
GUNNISON	0	4	0	0	0	0.8	0	.
HUERFANO	0	0	0	0	0	0	1	*
JEFFERSON	19	165	103	267	238	158.4	184	32.9
KIT CARSON	0	1	0	2	0	0.6	1	*

Table12. continues on next page

Table 12. Reported Cases and Rates* of Pertussis by County, Colorado, 2009 - 2014

County [§]	Number of Cases by Year of Report							
	2009	2010	2011	2012	2013	5 Year Average	2014	2014 Rate*
LAKE	0	0	0	0	0	0	1	*
LA PLATA	35	0	6	3	21	13	22	40.7
LARIMER	2	8	7	75	79	34.2	74	22.8
LAS ANIMAS	0	1	0	0	0	0.2	0	.
LINCOLN	0	0	0	1	0	0.2	0	.
LOGAN	0	0	0	1	0	0.2	1	*
MESA	2	7	4	14	10	7.4	19	12.8
MOFFAT	0	1	2	1	1	1.0	0	.
MONTEZUMA	3	4	0	0	8	3.0	0	.
MONTROSE	0	1	2	5	6	2.8	0	.
MORGAN	0	0	0	1	3	0.8	7	24.8
OTERO	1	1	1	1	4	1.6	17	92.5
PARK	0	1	2	0	1	0.8	3	18.3
PHILLIPS	1	1	0	0	12	2.8	1	*
PITKIN	2	1	0	0	1	0.8	3	17.0
PROWERS	0	1	0	3	26	6.0	0	.
PUEBLO	1	18	8	8	19	10.8	33	20.4
RIO BLANCO	0	0	0	0	4	0.8	0	.
RIO GRANDE	1	2	0	1	2	1.2	0	.
ROUTT	0	1	0	1	1	0.6	1	*
SAGUACHE	0	0	0	1	0	0.2	1	*
SAN MIGUEL	0	0	0	0	0	0	1	*
SUMMIT	0	1	0	1	3	1.0	0	.
TELLER	0	21	0	6	0	5.4	1	*
WASHINGTON	0	2	1	0	0	0.6	0	.
WELD	4	10	5	67	94	36.0	181	65.6
YUMA	1	1	0	0	1	0.6	1	*
Total	202	538	415	1432	1431	803.6	1259	23.5

*Per 100,000 population. Rates were not calculated for counties with < 3 pertussis cases during 2014. Caution should be used when interpreting rates based on small numbers of cases.

[§]There were no reported cases of pertussis in 2009-2014 in the following counties: Dolores, Hinsdale, Jackson, Kiowa, Mineral, Ouray, San Juan, and Sedgwick.

**Table 13. Classification of Reported Pertussis Cases,
Colorado, 2014**

Case Classification	Number	Percent
<u>Confirmed</u> *: Culture or PCR positive	882	70.1
<u>Confirmed</u> *: Epidemiologically-linked to a PCR positive case	130	10.3
<u>Probable</u> §: Clinically-compatible case	239	19.0
<u>Probable</u> §: Infant case with cough duration <14 days	5	0.4
<u>Probable</u> §: Infant case epidemiologically-linked to PCR positive case, with cough duration <14 days	3	0.2
TOTAL	1259	100.0

* **Confirmed** = Laboratory confirmed case (PCR or culture positive) and meets clinical case definition, **OR** epidemiologically linked to a laboratory confirmed case and meets the clinical case definition.

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

Clinical Case Definition = cough illness lasting 14 days or more, with at least one of the following: paroxysms of coughing, inspiratory “whoop”, post-tussive vomiting.

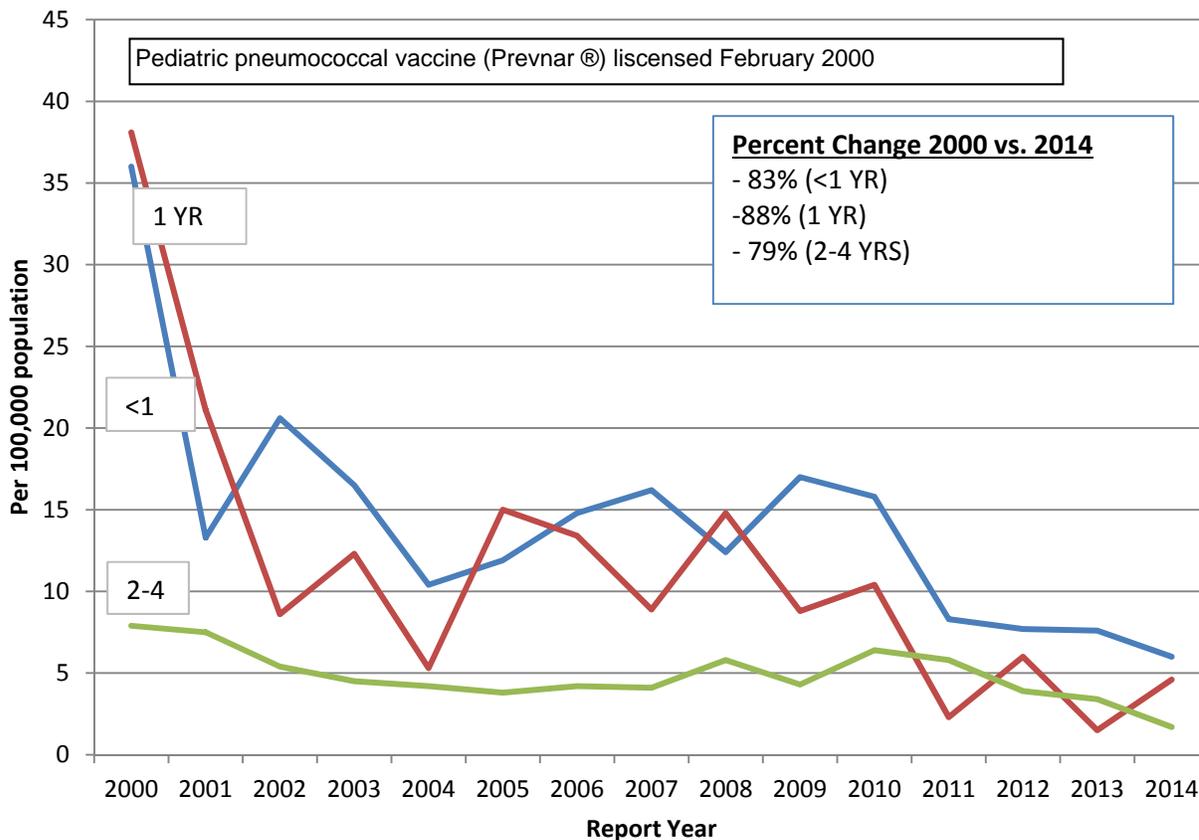
Pneumococcal disease

Table 14. Reported Cases, Rates*, and Case Fatality of Invasive Pneumococcal Disease by Age Group, Colorado, 2014				
Age Group (Years)	Cases	Rate*	Deaths	
			Number	Percent of Cases
<1	8	12.0	0	.
1-4	13	4.8	0	.
5-9	6	1.7	0	.
10-14	5	1.4	0	.
15-19	4	1.1	1	25.0
20-29	15	2.1	1	6.7
30-39	39	5.1	2	5.1
40-59	169	11.6	8	4.7
60+	200	20.1	11	5.5
Total	459	8.6	23	5.0

*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 9. Reported Rates of Invasive Pneumococcal Disease in Children < 5 Years of Age, Colorado, 2000-2014



Rates also decreased in other age groups following the use of 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 10).

Figure 10. Reported Rates of Invasive Pneumococcal Disease by Age Group, Colorado, 2002 - 2014

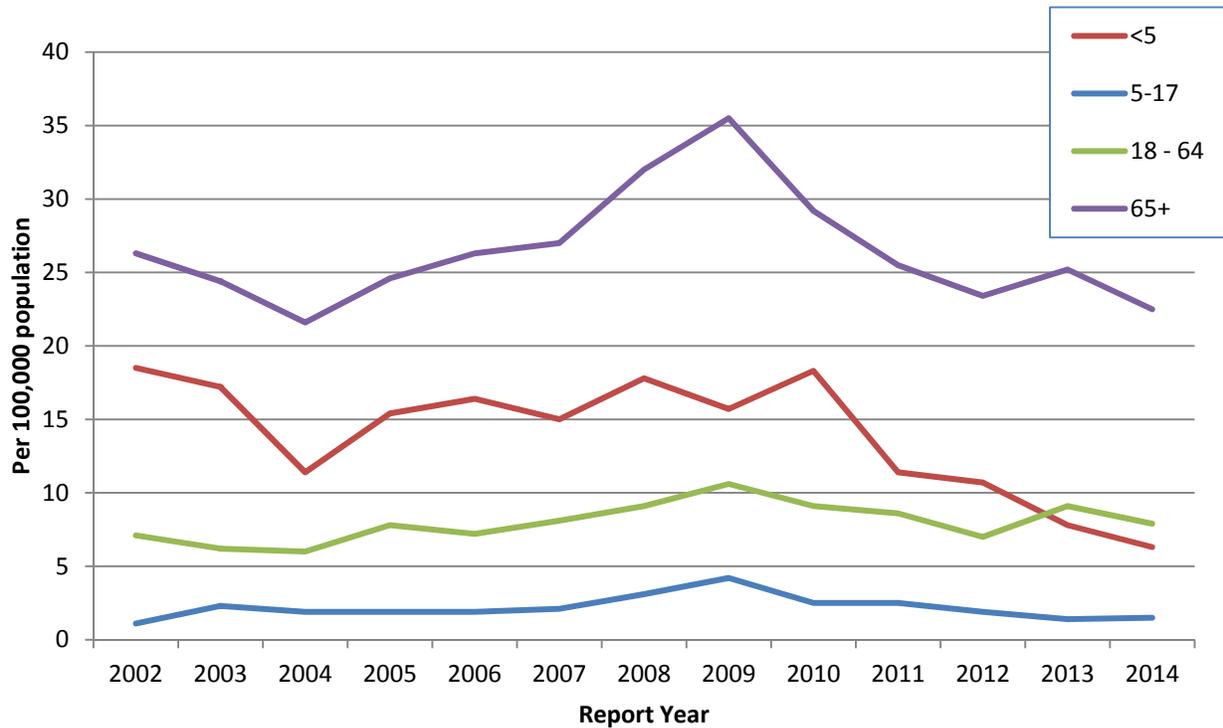
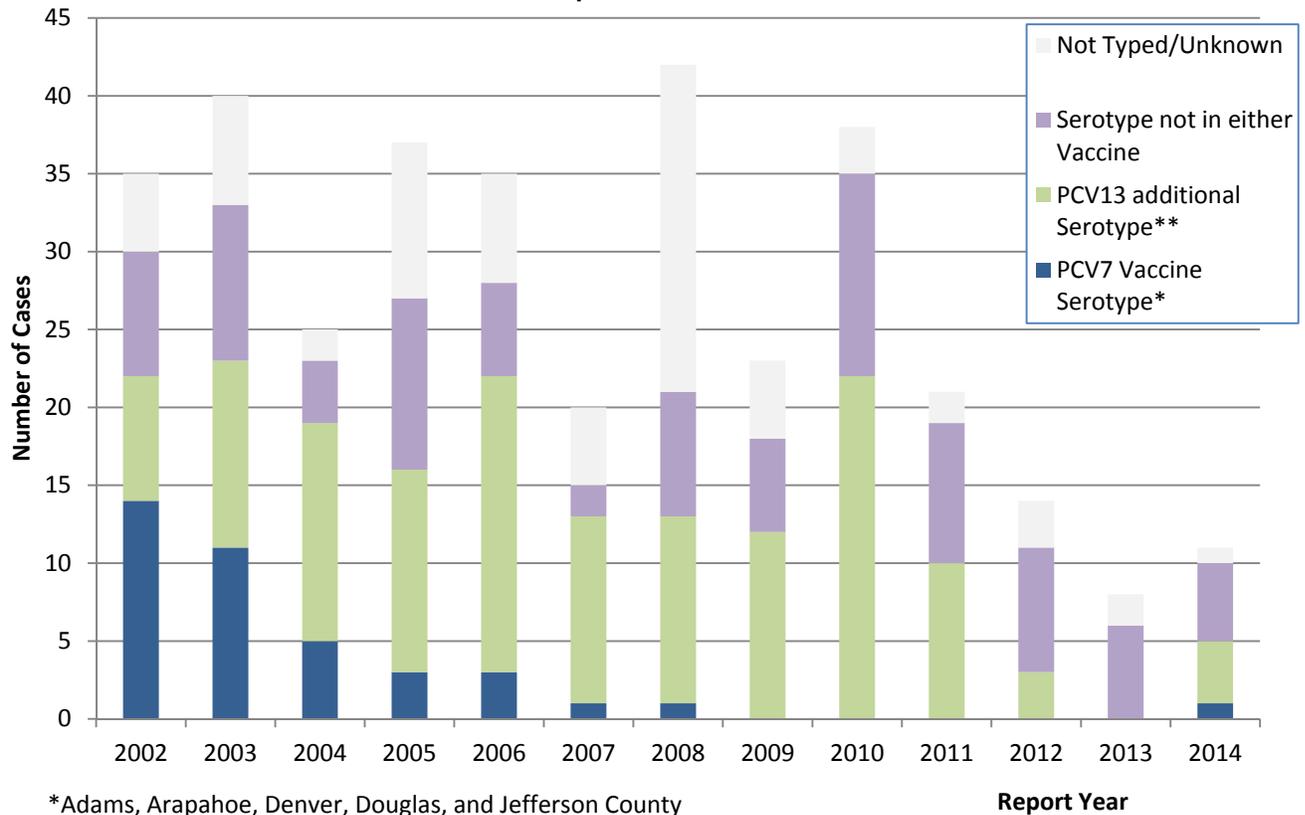


Figure 11. Reported Cases of Invasive Pneumococcal Disease Less Than 5 Years of Age by Vaccine Serotype, Denver Metropolitan* Area, 2002-2014



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

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

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

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 2014. The last reported case of rubella in Colorado was in 2003.

Tetanus

During the previous ten years (2005-2014) there were 2 cases of tetanus reported in Colorado (2005 and 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 12. Reported Rates of Varicella Cases by Age Group and Report Year, Colorado, 2009 - 2014

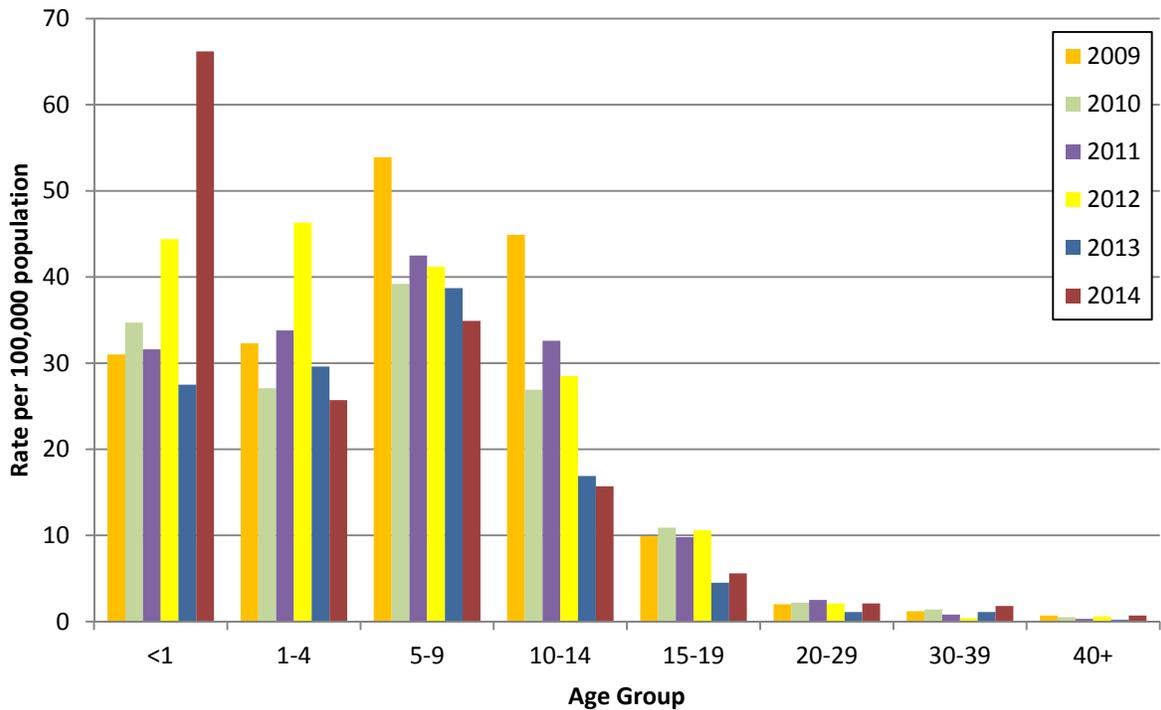


Table 15. Reported Cases, Rates*, and Hospitalization of Varicella by Age Group, Colorado, 2014

Age Group (Years)	Cases	Rate*	Hospitalized Cases	
			Number	Percent of Cases
<1	44	66.2	1	2.3
1-4	69	25.7	1	1.4
5-9	126	34.9	1	0.8
10-14	57	15.7	1	1.8
15-19	20	5.6	1	5.0
20-29	15	2.1	0	.
30-39	14	1.8	2	14.3
40-59	10	0.7	1	10
60+	7	0.7	0	.
Total	386	7.2	8	2.1

*Per 100,000 population.