

Vaccine Preventable Diseases in Colorado

Surveillance Report: 2010



Colorado Department of Public Health and Environment

Communicable Disease Epidemiology Program
4300 Cherry Creek Drive South
Denver, CO 80246

January 2011

Table of Contents

<u>Introduction</u>	Page 3
Table 1. Reported Cases of Vaccine Preventable Diseases, Colorado, 2005-2010	Page 3
Table 2. Reported Cases and Rates of Selected Vaccine Preventable Diseases, Colorado and United States, 2010	Page 3
<u>Diphtheria</u>	Page 4
<u>Haemophilus influenzae</u>	Page 4
Figure 1. Reported Cases of Invasive <i>Haemophilus influenzae</i> Serotype b by Select Age Groups, Colorado, 2005-2010	Page 4
<u>Hepatitis</u>	Page 5
Figure 2. Rates of Acute Hepatitis A and B, Colorado, 2001-2010	Page 5
<u>Hepatitis A</u>	Page 6
Table 3. Reported Hepatitis A Cases and Rates by Age Group & Gender, Colorado, 2010	Page 6
<u>Acute Hepatitis B</u>	Page 7
Table 4. Reported Acute Hepatitis B Cases and Rates by Age Group & Gender, Colorado, 2010	Page 7
<u>Influenza</u>	Page 7
<u>Measles</u>	Page 7
<u>Meningococcal Disease</u>	Page 8-9
Figure 3. Rate of Meningococcal Disease by Year of Report, Colorado, 2002 - 2010	Page 8
Table 5. Reported Meningococcal Disease Cases, Rates and Case Fatality by Age Group, Colorado, 2010	Page 8
Table 6. Reported Meningococcal Disease Cases by Serogroup, Colorado, 2010	Page 9
Table 7. Reported Meningococcal Disease Cases 11-21 Years of Age by Immunization Status and Serogroup, Colorado 2010	Page 9
<u>Mumps</u>	Page 10
Figure 4. Rates of Reported Mumps Cases, Colorado, 2003-2010	Page 10
Table 8. Reported Mumps Cases by Age Group and Vaccination Status, Colorado, 2010	Page 10
<u>Pertussis</u>	Page 11-16
Figure 5. Rates of Reported Pertussis Cases, Colorado and United States, 2001-2010	Page 11
Table 9. Reported Pertussis Cases and Rates by Age Group, Colorado, 2010	Page 11
Table 10. Reported Pertussis Cases and Rates by County, Colorado, 2005-2010	Page 12-13
Figure 6. Immunization Status of Reported Pertussis Cases by Selected Age Groups, Colorado, 2010	Page 14
Table 11. Reported Pertussis-related Hospitalizations by Age Group, Colorado, 2010	Page 15
Table 12. Classification of Reported Pertussis Cases, Colorado, 2010	Page 16
<u>Pneumococcal Disease</u>	Page 17-18
Table 13. Reported Invasive Pneumococcal Disease Cases, Rates and Case Fatality by Age Group, Colorado, 2010	Page 17
Table 14. Reported Invasive Pneumococcal Disease Cases Less Than 5 Years of Age by Vaccine Serotype and Immunization Status, Denver Metro Area, Colorado, 2010	Page 17
Figure 7. Rates of Reported Invasive Pneumococcal Disease in Children < 5 Years of Age: Denver Metropolitan Area, Colorado, 2000-2010	Page 18
Figure 8. Rates of Reported invasive Pneumococcal Disease by Age Group, Denver Metro Area, 2002-2010	Page 18
<u>Polio, Rubella, and Tetanus</u>	Page 19
<u>Varicella</u>	Page 19-20
Figure 9. Rates of Reported Varicella Cases by Age Group and Report Year, Colorado, 2006-2010	Page 19
Table 15. Reported Varicella Cases and Rates by Age Group, Colorado, 2010	Page 20
Table 16. Reported Varicella Cases by Severity of Disease and Vaccine Status, Colorado, 2010	Page 20

INTRODUCTION

This report contains tables and graphs that summarize 2010 surveillance data for vaccine preventable diseases in Colorado. Colorado rates were calculated as cases per 100,000 population using 2010-based population final estimates from the Demography Section, Colorado Division of Local Government.

Table 1. Reported Cases of Vaccine Preventable Diseases*, Colorado, 2005 - 2010

Report Year	Invasive <i>H. influenzae</i> type b (Hib)	Hepatitis A	Acute Hepatitis B	Meningococcal Disease	Mumps	Pertussis	Invasive Pneumococcal Disease	Measles	Varicella [§]
2005	2	49	65	19	6	1383	420	0	1797
2006	0	44	35	22	51	710	419	1	1503
2007	2	27	41	22	17	306	458	0	1089
2008	0	37	33	16	8	158	542	0	873
2009	3	53	35	24	6	201	623	0	515
5-Year Median	2	44	35	22	8	306	458	0	1089
2010	4**	36	53	21	8	538	545	0	404

*During 2005-2010 one case of tetanus (2005) was reported. No congenital rubella, diphtheria, polio or rubella cases were reported.

**2 of the Hib cases reported during 2010 were <5 years of age and 2 were adults. Of the two children, 1 was incompletely vaccinated and the other had unknown vaccination status.

Table 2. Reported Cases and Rates of Selected Vaccine Preventable Diseases[¶], Colorado and United States, 2010

Disease	Colorado		United States	
	Cases	Rate [§]	Cases*	Rate [§]
<i>H. influenzae</i> type b, invasive disease (<5 years)	2	0.6	16	0.005
Hepatitis A	36	0.7	4,200	1.3
Acute Hepatitis B	53	1.1	4,737	1.5
Meningococcal Disease	21	0.4	749	0.2
Mumps	8	0.2	2,528	0.8
Pertussis	538	10.7	21,291	6.8

[¶] US rates of invasive pneumococcal disease and varicella were not available.

[§] Per 100,000 population.

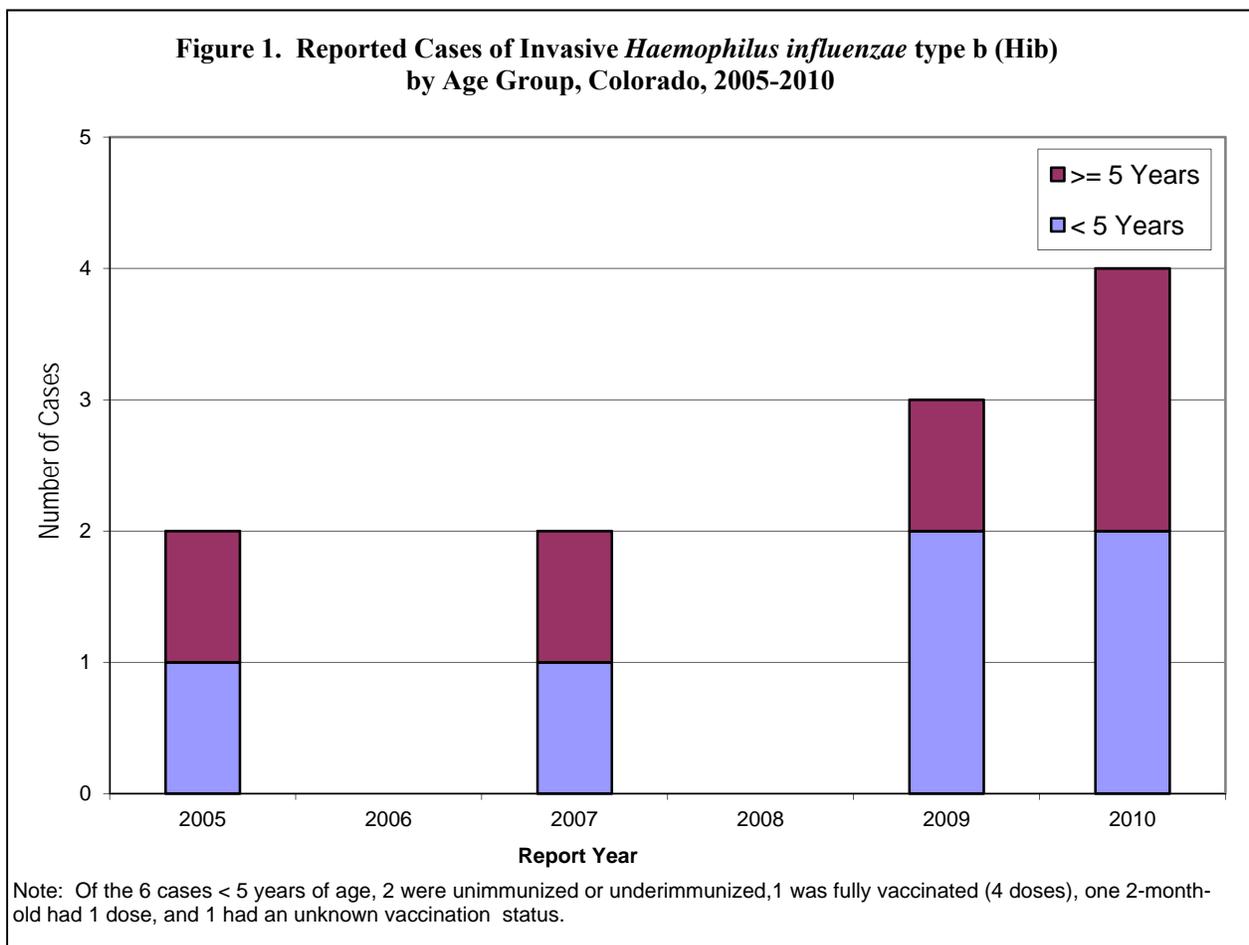
*Source, MMWR 2011;59(52): 1704-1717. US rates calculated using US Census Bureau Population Estimate.

DIPHTHERIA

No cases of diphtheria were reported in Colorado or the United States during 2010. The last case of diphtheria reported in Colorado was in 1985.

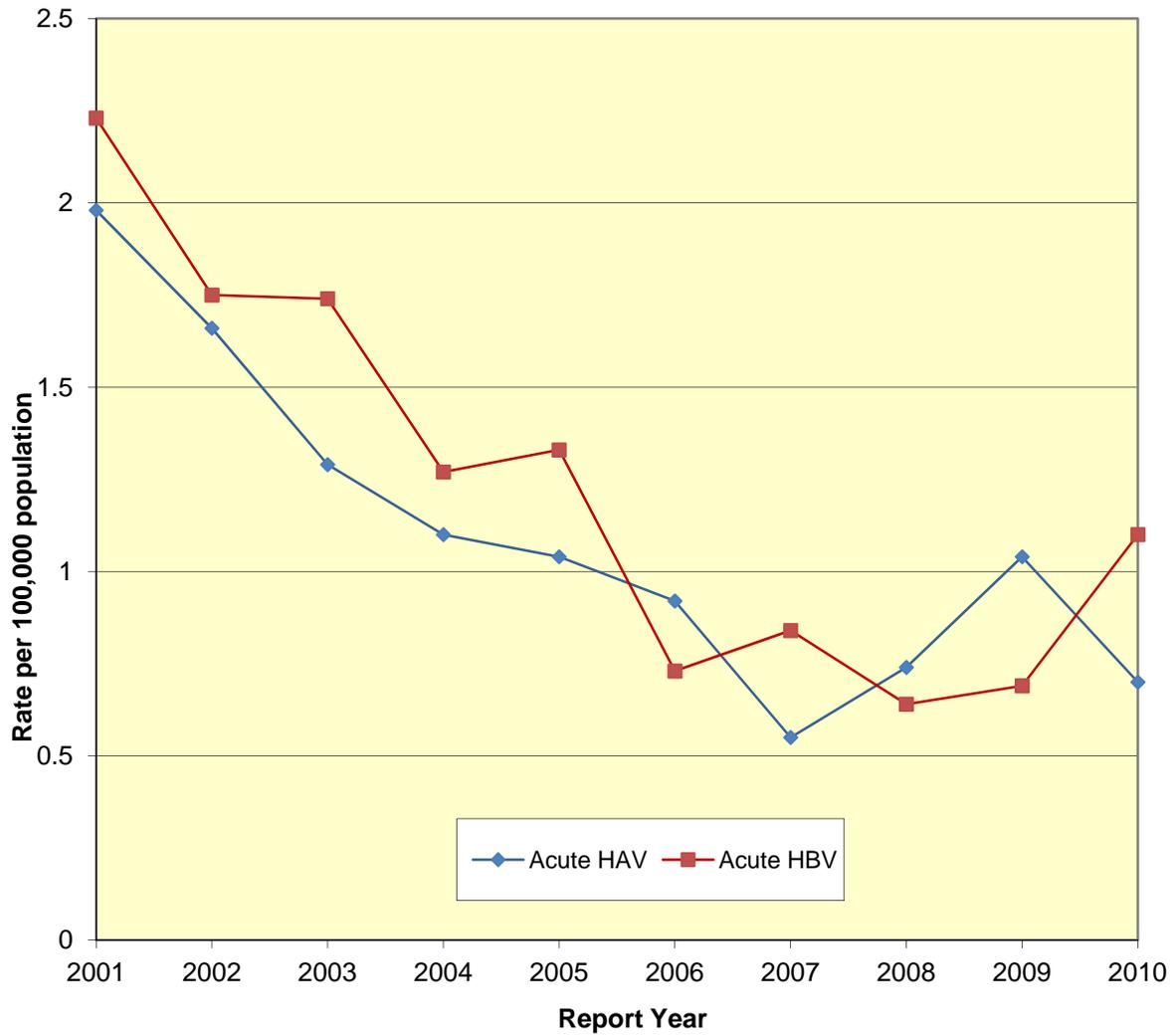
HAEMOPHILUS INFLUENZAE type b (Hib)

There were four cases of invasive *Haemophilus influenzae* type b (Hib) disease reported during 2010 in Colorado. Of these cases, two were adults, one was an under-immunized (2 doses) 2-year-old, and one was a 1-year-old who had recently been adopted from Haiti with an unknown vaccination history.



HEPATITIS

Figure 2. Reported Rates of Acute Hepatitis A and B, Colorado, 2001 - 2010



Detailed surveillance summaries of Hepatitis A and Hepatitis B in Colorado are posted at:
www.cdphe.state.co.us/dc/hepatitis/data.html

HEPATITIS A

Table 3. Reported Cases and Rates* of Hepatitis A by Age Group & Gender, Colorado 2010						
Age Group (years)	Male		Female		Total	
	Cases	Rate	Cases	Rate	Cases	Rate
< 1	0	0.0	0	0.0	0	0.0
1-4	2	1.4	0	0.0	2	0.7
5-9	0	0.0	0	0.0	0	0.0
10-14	5	2.9	0	0.0	5	1.5
15-19	2	1.1	0	0.0	2	0.6
20-39	3	0.4	6	0.9	9	0.6
≥ 40	9	0.8	9	0.8	18	0.8
Total	21	0.8	15	0.6	36	0.7

* Per 100,000 population.

ACUTE HEPATITIS B

Table 4. Reported Cases and Rates* of Acute Hepatitis B Cases by Age Group & Gender, Colorado, 2010						
Age Group (years)	Male		Female		Total	
	Cases	Rate	Cases	Rate	Cases	Rate
< 15	1	0.2	1	0.2	2	0.2
15-19	1	0.6	0	0.0	1	0.1
20-29	2	0.5	2	0.6	4	0.6
30-39	6	1.6	5	1.5	11	1.6
40-49	10	2.8	6	1.7	16	2.2
50-59	8	2.3	5	1.4	13	1.9
≥ 60	4	1.1	2	0.5	6	0.7
Total	32	1.3	21	0.8	53	1.1

* Per 100,000 population.

INFLUENZA

See Influenza Surveillance web page at:
www.cdphe.state.co.us/dc/Influenza/index.html

MEASLES

There were no measles cases reported in Colorado during 2010. During the previous five years (2005 – 2009), one measles case was reported (in 2006). The case had a history of travel to Asia during the exposure period. During 2010, there were 61 measles cases reported in the United States.

MENINGOCOCCAL DISEASE

Figure 3. Reported Rates of Meningococcal Disease, Colorado, 2002 - 2010

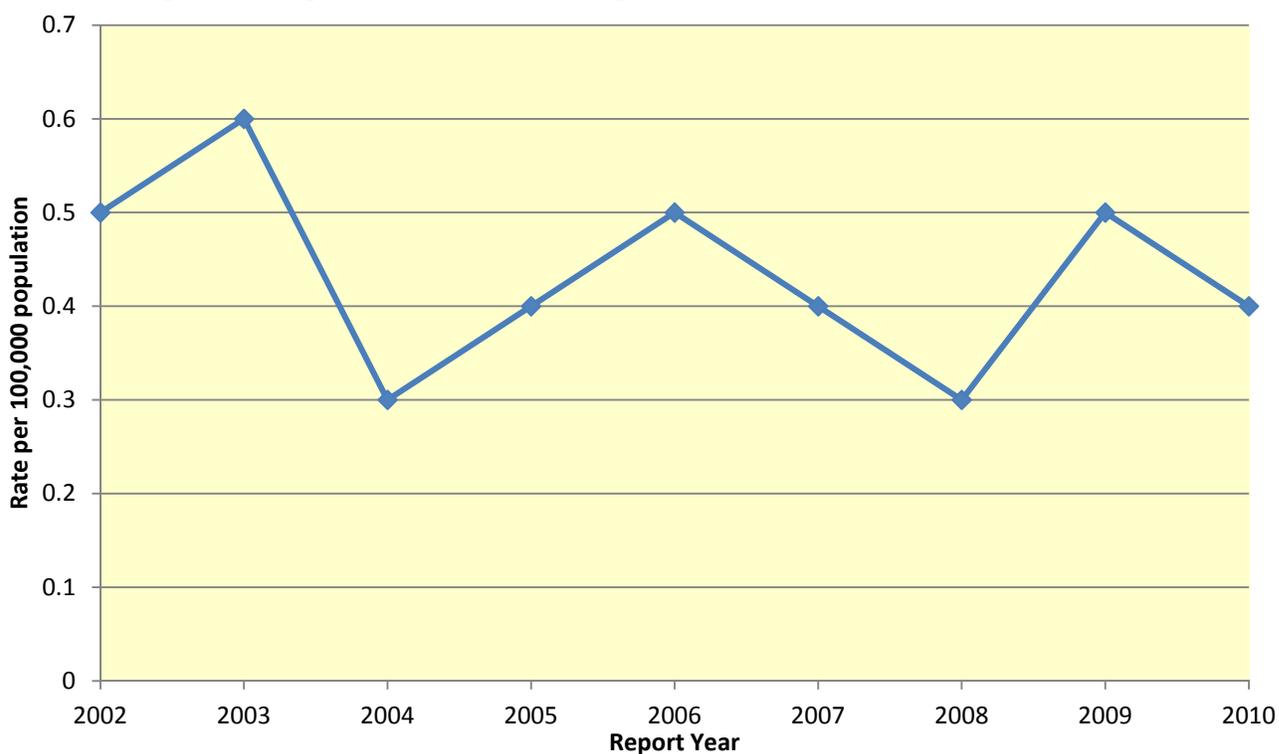


Table 5. Reported Cases, Rates*, and Case Fatality of Meningococcal Disease by Age Group, Colorado, 2010

AGE GROUP (Years)	CASES	RATE*	DEATHS [§]	
			Number	Percent of Cases
< 1	4	5.7	0	0.0
1 – 4	1	0.3	0	0.0
5 – 9	1	0.3	0	0.0
10 – 14	1	0.3	0	0.0
15 – 19	1	0.3	1	100.0
20 – 29	9	1.3	4	44.4
30 – 39	0	0.0	0	0.0
40 – 59	3	0.2	1	33.3
60 – 79	0	0.0	0	0.0
≥ 80	1	0.8	0	0.0
TOTAL	21	0.4	6	28.6

* Per 100,000 population.

§ 5 of the 6 fatal cases during 2010 were part of an outbreak of serogroup C meningococcal disease in Fort Collins. The fatal case not associated with the outbreak was a 17 year old with serogroup Y.

Table 6. Reported Cases of Meningococcal Disease by Serogroup, Colorado, 2010		
Serogroup	Cases	Percent of cases
B	2	9.5
C	9	42.8
Y	8	38.1
W-135	1	4.8
Not Groupable	1	4.8
Total	21	100.0

Table 7. Reported Cases of Meningococcal Disease Ages 11 – 21 by Immunization Status* and Serogroup, Colorado, 2010		
Age Group (Years)	Immunization Status	
	Immunized (Serogroup)	Unimmunized (Serogroup)
11 – 18	1 (Y)	0
19 – 21	1 (C)	3 (2 C, 1 Y)

*Meningococcal vaccine contains antigens from serogroups A, C, Y and W-135. Immunization status and serogroup information was available for all 5 cases in this age group.

MUMPS

Figure 4. Reported Rates of Mumps, Colorado and United States, 2003 - 2010

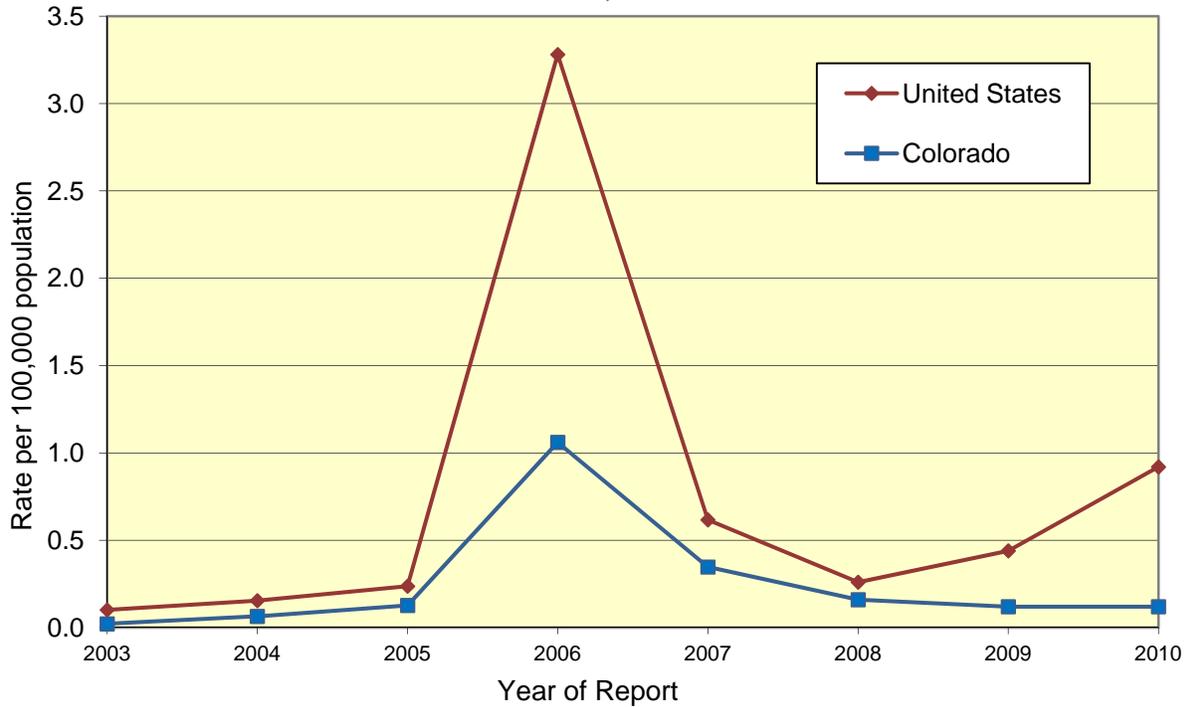


Table 8. Reported Cases of Mumps by Age Group and Vaccination Status, Colorado, 2010

Age Group	Number of Doses of Mumps Vaccine				Total
	0	1	2	Unknown	
< 1	0	0	0	0	0
1 – 4	0	1	0	0	1
5 – 9	1	0	1	0	2
10 – 14	0	0	0	0	0
15 – 19	0	0	0	0	0
20 – 39	0	2	1	1	4
≥ 40	0	0	0	1	1
TOTAL	1	3	2	2	8

PERTUSSIS

Figure 5. Rates of Reported Pertussis, Colorado and United States, 2001 - 2010

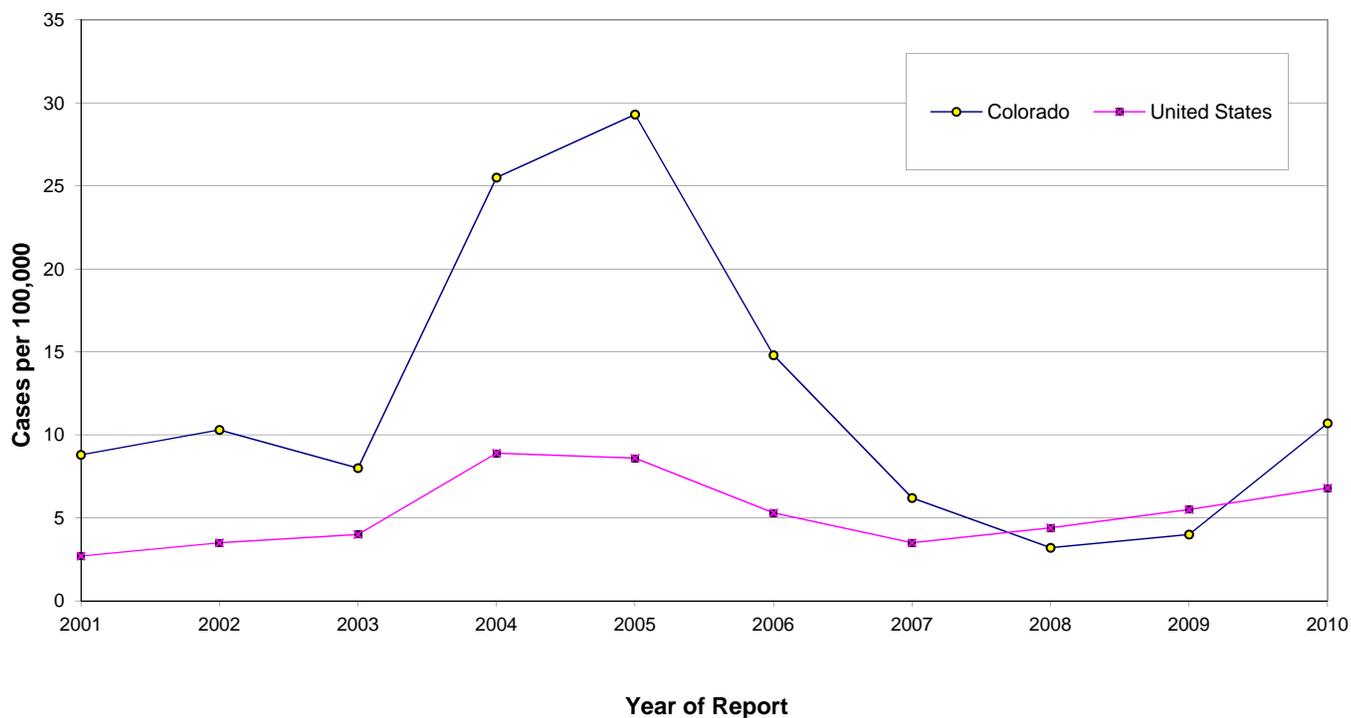


Table 9. Reported Cases and Rates of Pertussis by Age Group, Colorado, 2010			
Age Group (Years)	Cases	Percent	Rate*
<1	29	5.4	43.5
1 – 4	138	25.7	49.8
5 – 9	92	17.1	26.4
10 – 14	92	17.1	27.7
15 – 19	41	7.6	12.1
20 – 29	24	4.5	3.3
30 – 39	43	8.0	6.1
40 – 59	63	11.7	4.4
≥ 60	16	3.0	2.0
TOTAL	538	100.0	10.7

* Per 100,000 population.

**Table 10. Reported Cases and Rates* of Pertussis by County,
Colorado, 2005 – 2010**

County	Number of Cases by Year of Report						2010 Rate*
	2005	2006	2007	2008	2009	2010	
Adams	119	69	13	7	13	56	12.7
Alamosa	1	1	0	0	0	1	*
Arapahoe	169	68	34	22	26	64	11.2
Archuleta	4	0	2	1	2	1	*
Baca	0	0	1	0	0	2	*
Boulder	115	74	23	5	23	19	6.5
Broomfield	16	11	10	2	0	6	10.7
Chaffee	9	2	0	0	0	2	*
Cheyenne	7	0	1	0	0	0	*
Clear Creek	5	2	1	3	0	3	33.0
Conejos	0	0	0	0	14	2	*
Costilla	0	0	0	0	0	0	*
Delta	5	17	3	1	0	7	22.6
Denver	175	40	35	40	23	58	9.7
Dolores	2	0	0	0	0	0	*
Douglas	55	29	12	8	4	23	8.1
Eagle	2	5	1	0	0	0	*
El Paso	62	18	53	9	20	21	3.4
Elbert	12	1	0	0	1	1	*
Fremont	5	0	0	0	1	14	29.9
Garfield	15	12	2	0	3	4	7.1
Gilpin	4	4	0	0	0	0	*
Grand	7	0	18	0	0	1	6.7
Gunnison	0	0	0	0	0	4	26.1
Huerfano	0	0	1	0	0	0	*
Jefferson	287	168	30	35	19	165**	30.9
Kit Carson	0	1	2	0	0	1	*

Table 10. continues on next page

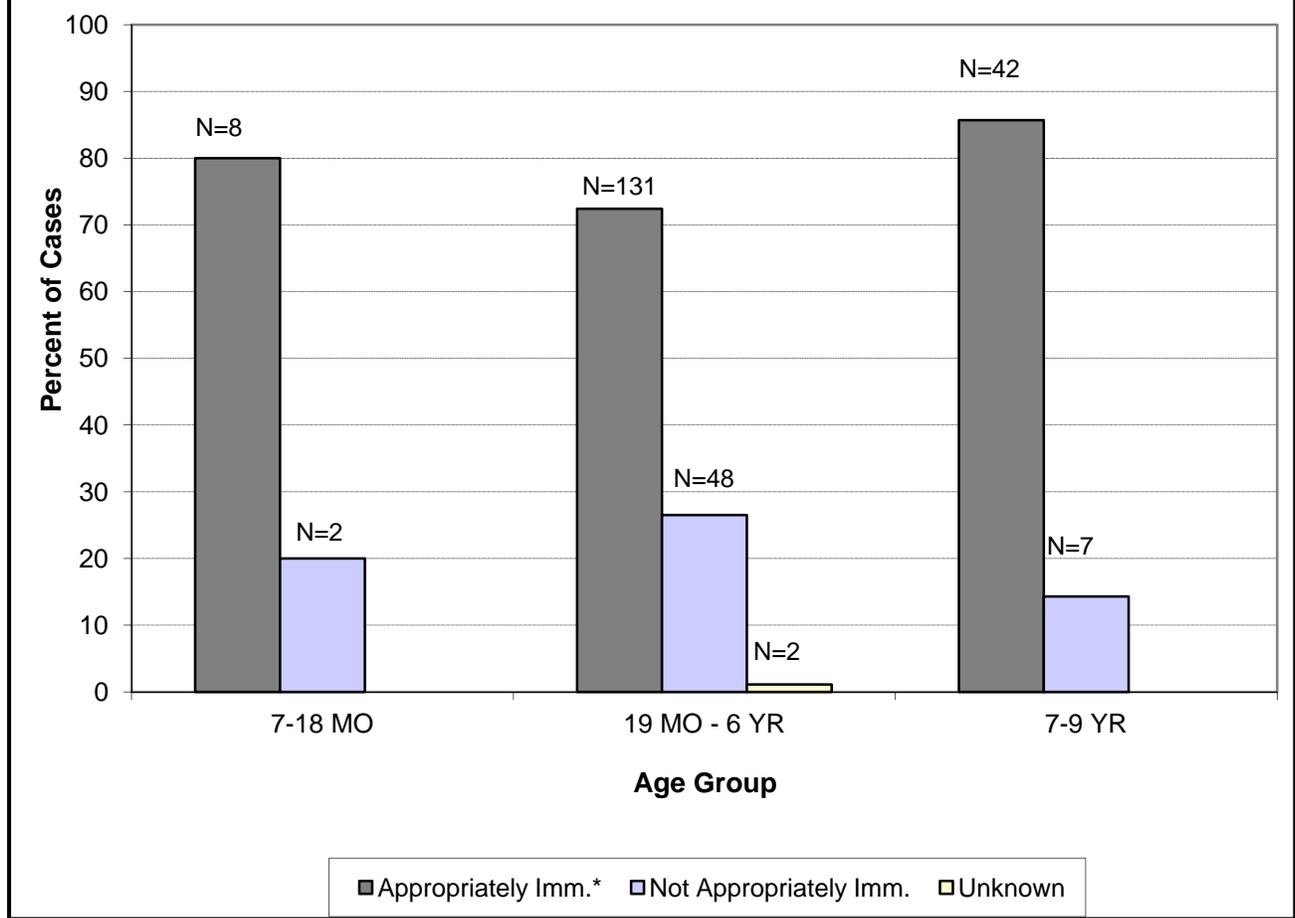
**Table 10. (Continued) Pertussis Cases and Rates* by County, Colorado,
2005-2010**

County	Number of Cases by Year of Report						2010 Rate*
	2005	2006	2007	2008	2009	2010	
La Plata	32	51	3	9	34	0	*
Lake	1	0	1	0	0	0	*
Larimer	80	29	24	8	2	8	2.7
Las Animas	0	0	0	0	0	1	*
Lincoln	0	0	2	0	0	0	*
Logan	21	1	1	0	0	0	*
Mesa	81	9	5	0	2	7	4.8
Moffat	0	0	0	0	0	1	*
Montezuma	12	10	1	0	3	4	15.7
Montrose	3	15	3	0	0	1	*
Morgan	1	1	1	0	0	0	*
Otero	1	0	3	0	1	1	*
Ouray	0	10	1	0	0	0	*
Park	2	0	3	0	0	1	*
Phillips	0	0	0	0	1	1	*
Pitkin	1	2	0	1	2	1	*
Prowers	11	0	0	0	0	1	*
Pueblo	17	5	2	3	1	18	11.3
Rio Blanco	4	0	0	0	0	0	*
Rio Grande	4	0	1	0	1	2	*
Routt	1	1	1	0	0	1	*
Saguache	0	0	1	0	0	0	*
San Miguel	0	2	2	0	0	0	*
Summit	0	1	0	0	0	1	*
Teller	10	1	7	2	0	21	89.9
Washington	2	0	0	0	0	2	*
Weld	23	50	2	2	4	10	4.0
Yuma	0	0	0	0	1	1	*
TOTAL	1383	710	306	158	201	540	10.7

* Rates were not calculated for counties with < 3 pertussis cases during 2010. Caution should be used when interpreting rates based on small numbers of cases.

**Colorado had an increase in reported pertussis cases during 2010 that disproportionately affected Jefferson County. The apparent outbreak was thought largely due to over-testing and poorly targeted testing along with inappropriate PCR reporting criteria (along with a few other issues) used by a large commercial lab.

Figure 6. Percent of Reported Pertussis Cases Appropriately Immunized by Selected Age Groups, Colorado, 2010



*Appropriately immunized was defined using ACIP recommendations; 3 doses by age 7 months, 4 doses by age 19 months, and 5 doses by age 7 years or 4 doses by age 7 years if 4th dose was given at age 4 or older.

During 2010, there were 123 pertussis cases reported in the 10-17 year old age group in Colorado. Among these cases, 69 (56.1%) had received Tdap vaccine.

Table 11. Reported Pertussis-related Hospitalizations by Age Group, Colorado, 2010			
Age Group	Cases	Hospitalized	
		Number	Percent
< 6 Months	16	9	56.3
6 – 11 Months	13	1	7.7
1 – 4 Years	138	1	0.7
5 – 9 Years	92	1	1.1
10 – 14 Years	92	1	1.1
15 – 19 Years	41	0	0.0
20 – 29 Years	24	0	0.0
30 – 39 Years	43	3	7.0
40 – 59 Years	63	1	1.6
60+ Years	16	2	12.5
TOTAL	538	19	3.5

- Average # days hospitalized in 2010 = 3.5 days, median 3.0 days
- There were 2 reported cases with pertussis-associated seizures (1 and 37 years of age) during 2010.
- There were no reported cases of encephalopathy or death in Colorado during 2010.
- The last reported pertussis-associated deaths occurred during 2005, when 2 infants < 2 months of age died due to pertussis infection.

**Table 12. Classification of Reported Pertussis Cases,
Colorado, 2010**

CASE CLASSIFICATION	Number	Percent
<u>Confirmed</u>[§]: Culture or PCR Positive	371	69.0
<u>Confirmed</u>[§]: Epidemiologically-linked to a PCR Positive Case	110	20.4
<u>Probable</u>[¶]: Physician Diagnosed Case	20	3.7
<u>Probable</u>[¶]: Serology Positive Only	30	5.6
<u>Probable</u>: Outbreak Situation*	7	1.3
TOTAL	538	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. One culture positive and no DFA positive cases were reported during 2010. 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.

* In outbreak settings a case may be defined as a cough illness lasting ≥ 2 weeks.

PNEUMOCOCCAL DISEASE

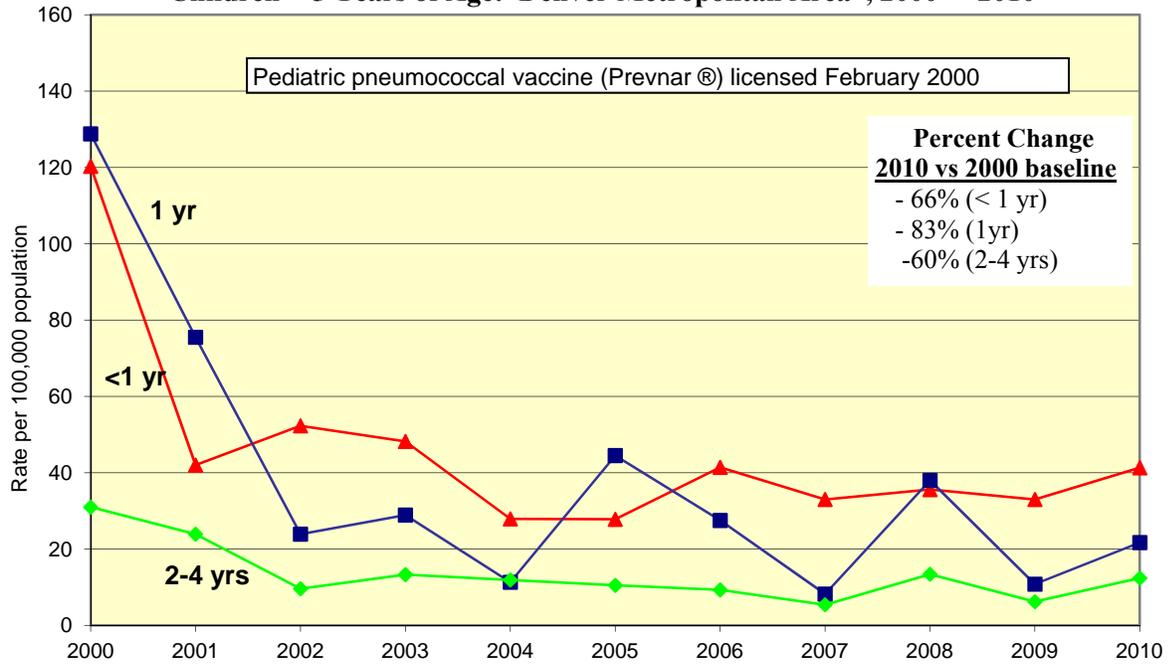
Table 13. Reported Cases, Rates, and Case Fatality of Invasive Pneumococcal Disease by Age Group, Colorado, 2010				
AGE GROUP (Years)	CASES	RATE*	DEATHS	
			Number	Percent of Cases
< 1	22	33.0	0	0.0
1 – 4	41	14.8	2	4.9
5 – 9	10	2.9	0	0.0
10 – 14	9	2.7	0	0.0
15 – 19	4	1.2	0	0.0
20 – 29	22	3.1	2	9.0
30 – 39	44	6.2	3	6.8
40 – 59	168	11.9	6	3.6
60 – 79	172	25.4	9	5.2
80 +	53	37.1	9	17.0
TOTAL	545	10.8	31	5.7

*Per 100,000 population.

Table 14. Reported Cases and Percents of Invasive Pneumococcal Disease Less Than 5 Years of Age by Vaccine Serotype, Denver Metro Area[¶], Colorado, 2010		
Serotype	Number of Cases	Percent of Cases
PCV7 Vaccine Serotype*	0	0.0
PCV13 additional Serotype**	23	60.5
Serotype not in either Vaccine	7	18.4
Not typed	8	21.1
TOTAL	38	100.0

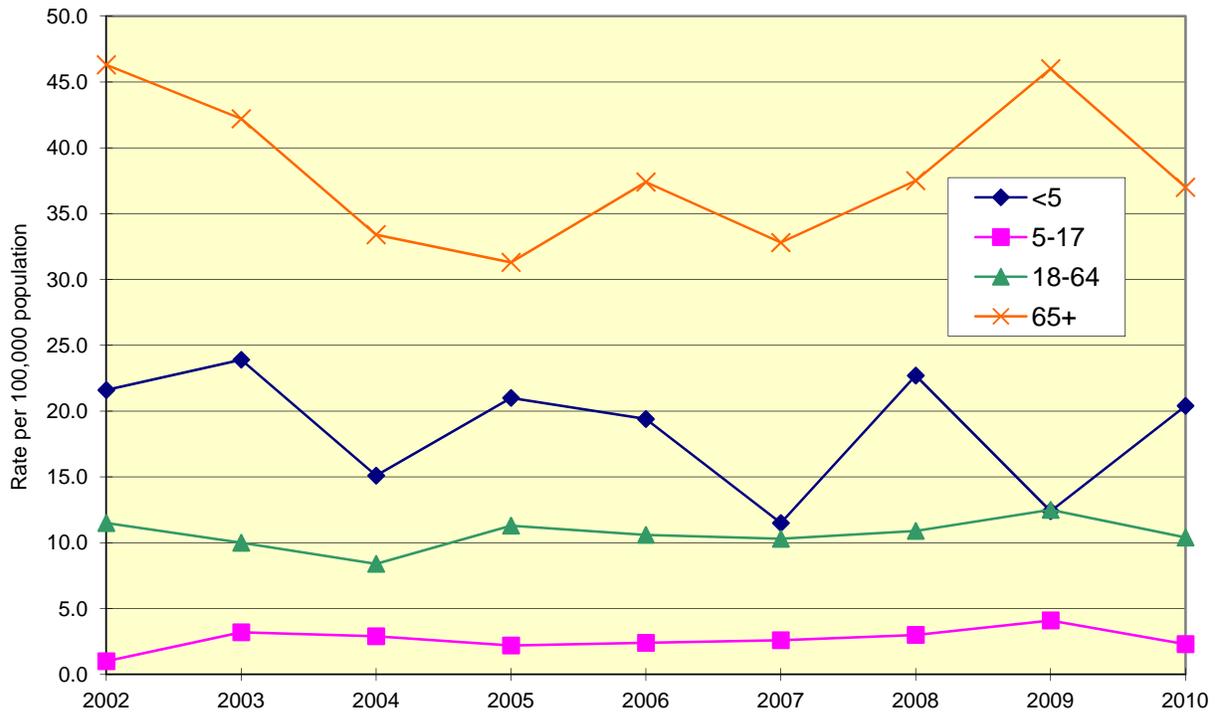
¶ Adams, Arapahoe, Denver, Douglas, and Jefferson counties.
 * Serotypes included in PCV7 (4, 6B, 9V, 14, 18C, 19F, 23F).
 ** Additional serotypes included in PCV13 and not PCV7 (1, 3, 5, 6A, 7F, 19A).

Figure 7. Reported Rates of Invasive Pneumococcal Disease in Children < 5 Years of Age: Denver Metropolitan Area*, 2000-2010**



*Adams, Arapahoe, Denver, Douglas, and Jefferson Counties. Year Report
 **Annualized July-December

Figure 8. Reported Rates of Invasive Pneumococcal Disease by Age Group, Denver Metropolitan Area*, 2002 - 2010



*Adams, Arapahoe, Denver, Douglas, and Jefferson Counties. Year of Report

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 2010. The last reported case of rubella in Colorado was in 2003.

TETANUS

There were no tetanus cases reported in Colorado during 2010. The last reported case of tetanus in Colorado was in 2005.

VARICELLA

Figure 9. Reported Rates of Varicella Cases by Age Group and Report Year, Colorado, 2006 - 2010

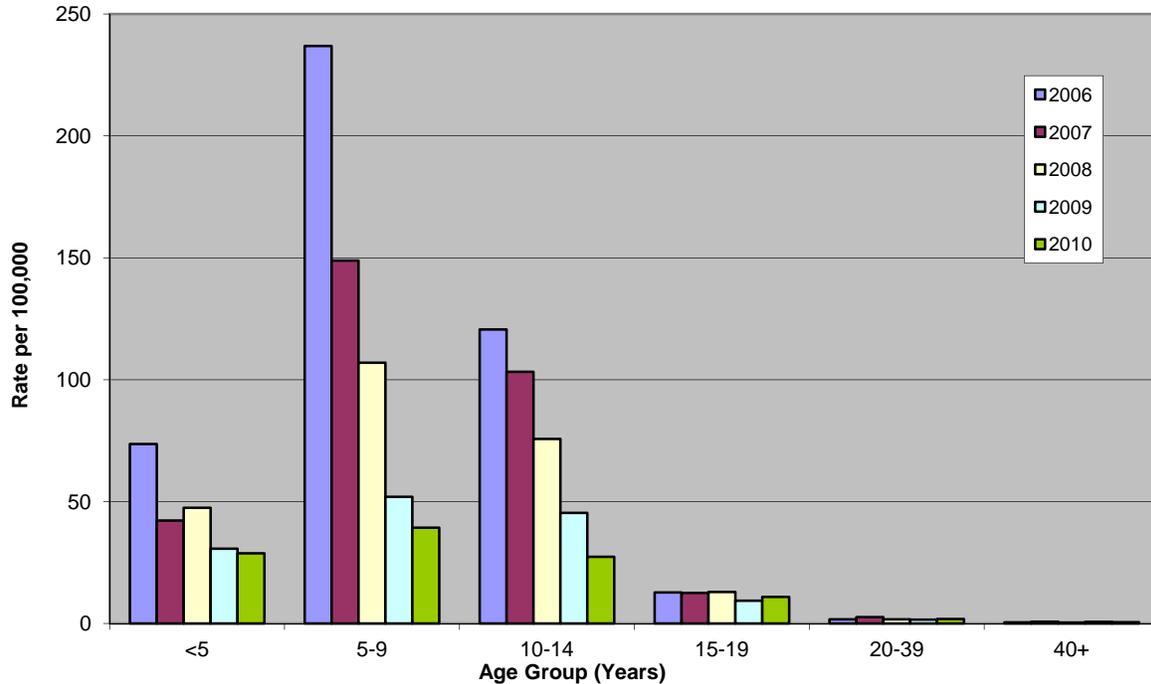


Table 15. Reported Cases[§] and Rates of Varicella by Age Group, Colorado, 2010

Age Group (Years)	Cases	Percent	Rate*
< 1	24	5.9	36.0
1 – 4	75	18.6	27.0
5 – 9	137	33.9	39.3
10 – 14	91	22.5	27.4
15 – 19	37	9.2	10.9
20 – 29	16	4.0	2.2
30 – 39	10	2.5	1.4
40 – 59	10	2.5	0.7
≥ 60	2	0.5	0.2
TOTAL**	404	100.0	8.0

[§] Of the 380 cases with known report sources, 219 cases (57.6 %) were reported from schools/pre-school/childcare and 130 cases (34.2 %) were reported by health care providers.
 * Rate per 100,000.
 **Age is unknown for 2 cases.

Table 16. Reported Cases of Varicella by Severity of Disease* and Vaccine Status, Colorado, 2010

Severity of Disease	≥ 1 Dose of Vaccine		Unimmunized		Unknown Immunization Status		Total Cases	
	#	%	#	%	#	%	#	%
< 50 Lesions	108	49.8	41	32.3	17	28.3	166	41.1
50 – 500 Lesions	65	30.0	57	44.9	13	21.7	135	33.4
> 500 Lesions	4	1.8	5	3.9	2	3.3	11	2.7
Unknown	40	18.4	24	18.9	28	46.7	92	22.8
TOTAL	217	100	127	100.0	60	100.0	404	100.0

*Of the 404 varicella cases reported during 2010, a total of 10 (2.5 %) cases were hospitalized, 4 of the hospitalized cases (40%) were ≤18 years of age and 3 cases (30 %) were < 5 years of age. Hospitalization status was unknown for 61 (15%) cases. There were no varicella-associated deaths reported in 2010.