



**Trends in Pneumonia and Influenza
Morbidity and Mortality**

**American Lung Association
Epidemiology and Statistics Unit
Research and Health Education Division
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Introduction

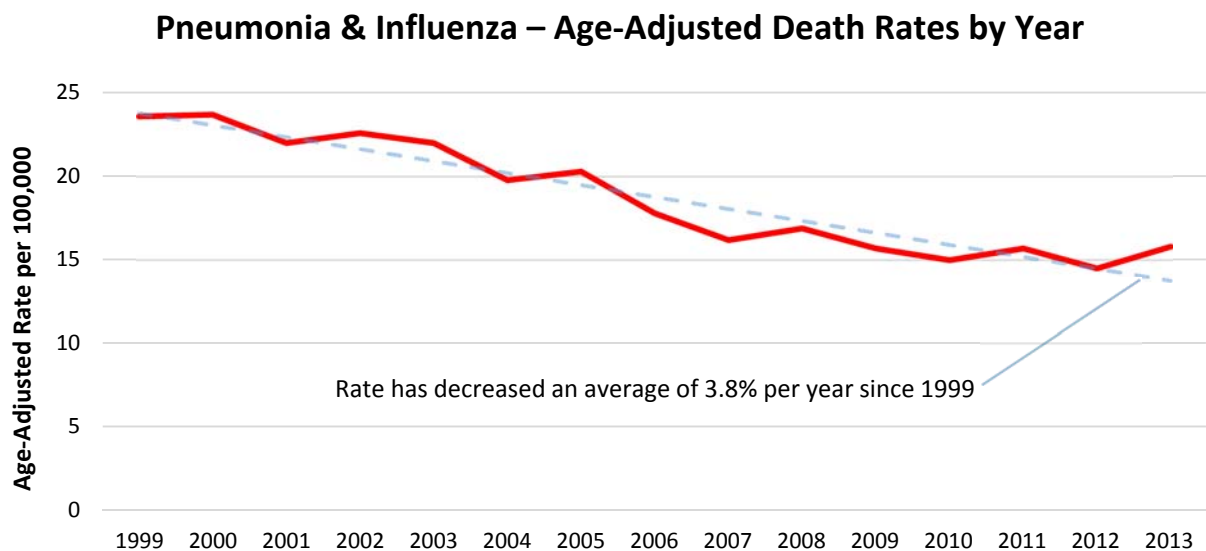
This report includes tables, figures, and descriptions for data relating to influenza and pneumonia mortality, hospitalization, vaccination, and economic costs, mostly specific to the United States. Trends and current year demographic breakdowns are presented and data limitations discussed when necessary. Comparisons of more, less, increasing, decreasing, or similar do not imply that such differences are statistically significant. While the content strives for a balance between detail and breadth, material is inevitably left out. Please contact the report authors for additional information about any area for which you would like to know more.

Mortality¹

Trends

There were 56,832 deaths due to pneumonia and influenza in 2013, which combined were the eighth leading cause of death in the U.S.

While the age-adjusted death rate for pneumonia and influenza increased 9 percent from 2012 to 2013, it has decreased an average of 3.8 percent per year since 1999.



Source: CDC. Wonder On-line Database, 1999-2013 data.

Pneumonia consistently accounts for the overwhelming majority of the combined pneumonia and influenza deaths. In 2013, 53,282 people died from pneumonia and 3,550 people died from influenza.

Sex

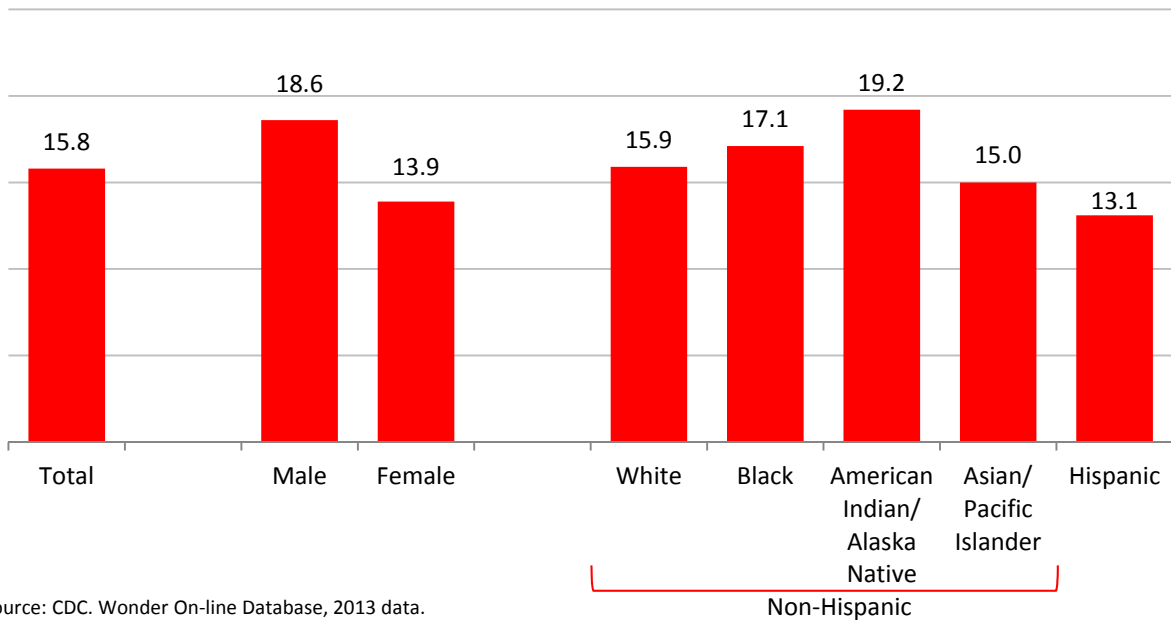
More women than men die from pneumonia and influenza. However, men are about 25 percent more likely than women to die from these diseases (age-adjusted death rates of 18.6 and 13.9 per 100,000, respectively) as the female population in the U.S. is larger than the male population.

Ethnicity

In 2013, age-adjusted death rates for pneumonia and influenza were highest among American Indians or Alaska Natives and lowest among Hispanics. Compared to whites, rates were:

- 8 percent higher among blacks
- 21 percent higher among American Indians or Alaska Natives
- 6 percent lower among Asians or Pacific Islanders
- 18 percent lower among Hispanics

Pneumonia & Influenza – Age-Adjusted Death Rates by Sex & Ethnicity, 2013



Source: CDC. Wonder On-line Database, 2013 data.

Pneumonia & Influenza - Number of Deaths & Age-Adjusted Death Rates by Sex & Ethnic Origin, 1999-2013^{I,II}

Cause of Death	Non-Hispanic															
	Total		Male		Female		White		Black		American Indian/ Alaska Native		Asian/ Pacific Islander		Hispanic	
	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate
Pneumonia & Influenza																
1999	63,730	23.6	27,718	28.0	36,012	20.8	54,280	23.7	5,794	26.1	308	30.6	836	16.3	2,246	15.6
2000	65,313	23.7	28,658	28.1	36,655	20.9	55,135	23.7	5,920	26.4	279	24.7	1,106	19.8	2,625	17.0
2001	62,034	22.0	27,342	26.6	34,692	19.2	51,952	21.7	5,686	24.3	305	26.9	1,160	19.4	2,722	20.5
2002	65,681	22.6	28,918	27.0	36,763	19.9	55,419	22.6	5,803	24.3	286	25.9	1,149	18.2	2,824	19.2
2003	65,163	22.0	28,778	26.1	36,385	19.4	54,617	22.0	5,798	23.6	382	31.6	1,245	18.4	2,948	18.4
2004	59,664	19.8	26,861	23.7	32,803	17.3	49,456	17.1	5,620	19.9	277	23.1	1,228	17.1	2,912	19.6
2005	63,001	20.3	28,052	23.9	34,949	17.9	52,431	20.4	5,716	22.1	341	27.7	1,316	16.9	3,085	16.8
2006	56,326	17.8	25,650	21.2	30,676	15.5	46,419	17.8	5,242	19.9	261	19.9	1,327	16.1	2,966	15.0
2007	52,717	16.2	24,071	19.3	28,546	14.2	43,219	16.2	5,091	18.8	270	19.5	1,316	15.0	2,735	13.1
2008	56,283	16.9	25,571	19.9	30,712	15.0	45,779	16.9	5,396	19.3	363	24.4	1,485	15.7	3,176	14.0
2009	52,135	15.7	24,353	18.9	27,782	13.7	41,859	15.6	5,039	18.0	345	21.5	1,496	14.8	3,292	13.3
2010	49,871	15.0	23,498	18.1	26,373	13.0	40,122	14.9	4,821	17.0	316	20.5	1,511	14.5	2,966	13.5
2011	53,609	15.7	25,291	18.7	28,318	13.6	43,206	15.7	5,082	17.1	337	20.2	1,629	14.3	3,205	13.5
2012	50,623	14.5	24,008	17.3	26,615	12.5	40,452	14.4	4,922	16.1	294	16.9	1,717	14.1	3,046	12.0
2013	56,832	15.8	26,718	18.6	30,114	13.9	45,262	15.9	5,473	17.1	350	19.2	1,983	15.0	3,565	13.1
Pneumonia																
1999	62,065	22.9	27,116	27.4	34,949	20.2	52,758	23.0	5,729	25.8	303	30.2	816	15.9	2,201	15.3
2000	63,548	23.0	27,994	27.5	35,554	20.2	53,522	23.0	5,839	26.0	275	24.3	1,088	19.5	2,578	16.7
2001	61,777	21.9	27,241	26.5	34,536	19.1	51,736	21.6	5,666	24.3	302	26.8	1,155	19.4	2,709	20.4
2002	64,954	22.4	28,629	26.7	36,325	19.6	54,756	22.4	5,773	24.2	281	25.5	1,143	18.1	2,805	19.2
2003	63,371	21.4	28,079	25.5	35,292	18.8	53,039	21.4	5,703	23.2	366	30.4	1,220	18.1	2,873	18.1
2004	58,564	19.4	26,440	23.3	32,124	16.9	48,452	17.0	5,570	19.5	274	22.8	1,214	17.0	2,886	19.2
2005	61,189	19.7	27,395	23.3	33,794	17.3	50,777	19.7	5,649	21.8	330	26.7	1,296	16.7	3,030	16.6
2006	55,477	17.5	25,288	20.9	30,189	15.3	45,670	17.5	5,202	19.7	258	19.7	1,311	16.0	2,927	14.9
2007	52,306	16.1	23,884	19.2	28,422	14.1	42,877	16.1	5,065	18.7	266	19.2	1,310	15.0	2,703	13.0
2008	54,562	16.4	24,881	19.3	29,681	14.4	44,257	16.3	5,315	19.0	348	23.4	1,459	15.5	3,103	13.7
2009	50,774	15.3	23,646	18.4	27,128	13.3	40,905	15.2	4,908	17.7	311	20.0	1,444	14.4	3,106	12.9
2010	49,597	14.9	23,365	18.0	26,232	12.9	39,925	14.8	4,788	16.9	313	20.4	1,503	14.4	2,933	13.4
2011	52,294	15.3	24,722	18.3	27,572	13.3	42,143	15.2	4,976	16.8	318	19.2	1,592	14.0	3,118	13.2
2012	49,530	14.1	23,535	17.0	25,995	12.2	39,528	14.0	4,853	15.9	284	16.4	1,701	13.9	2,974	11.8
2013	53,282	14.8	25,107	17.5	28,175	13.0	42,304	14.8	5,221	16.3	325	18.0	1,894	14.3	3,345	12.4
Influenza																
1999	1,665	0.6	602	0.6	1,063	0.6	1,522	0.6	65	0.3	5	*	20	0.3	45	0.3
2000	1,765	0.6	664	0.6	1,101	0.6	1,613	0.7	81	0.4	4	*	18	*	47	0.3
2001	257	0.1	101	0.1	156	0.1	216	0.1	20	0.1	3	*	5	*	13	*
2002	727	0.2	289	0.3	438	0.2	663	0.3	30	0.1	5	*	6	*	19	*
2003	1,792	0.6	699	0.6	1,093	0.6	1,578	0.7	95	0.3	16	*	25	0.3	75	0.3
2004	1,100	0.4	421	0.4	679	0.4	1,004	0.1	50	0.5	3	*	14	*	26	0.4
2005	1,812	0.6	657	0.6	1,155	0.6	1,654	0.6	67	0.2	11	*	20	0.2	55	0.2
2006	849	0.3	362	0.3	487	0.2	749	0.3	40	0.1	3	*	16	*	39	0.1
2007	411	0.1	187	0.1	224	0.1	342	0.1	26	0.1	4	*	6	*	32	0.1
2008	1,721	0.5	690	0.5	1,031	0.5	1,522	0.6	81	0.3	15	*	26	0.2	73	0.2
2009	1,361	0.4	707	0.5	654	0.4	954	0.4	131	0.4	34	1.5	52	0.4	186	0.5
2010	274	0.1	133	0.1	141	0.1	197	0.1	33	0.1	3	*	8	*	33	0.1
2011	1,315	0.4	569	0.4	746	0.4	1,063	0.4	106	0.3	19	*	37	0.3	87	0.3
2012	1,093	0.3	473	0.3	620	0.3	924	0.3	69	0.2	10	*	16	*	72	0.2
2013	3,550	1.0	1,611	1.1	1,939	0.9	2,958	1.1	252	0.7	25	1.2	89	0.6	220	0.7

Source: Centers for Disease Control and Prevention, National Center for Health Statistics. CDC Wonder On-line Database, compiled from Compressed Mortality File 1999-2013 Series 20 No. 2S, 2014.

Notes:

I. Rates are age-adjusted to the 2000 U.S. standard population and per 100,000 population.

II. Deaths are coded by the 10th revision of International Classification of Diseases, codes J10-J11 for influenza and J12-J18 for pneumonia.

* Rate does not meet standard of reliability or precision.

Age

The pneumonia and influenza mortality rate is much higher for those aged 65 years and older compared to younger age groups.

About 85 percent of all pneumonia and influenza deaths occur in this age group, and it represents the seventh leading cause of death in this age group. (1)

Only about 3 percent of pneumonia and influenza deaths occurred in those under age 45.

Pneumonia & Influenza – Death Rates by Age Group, 2013

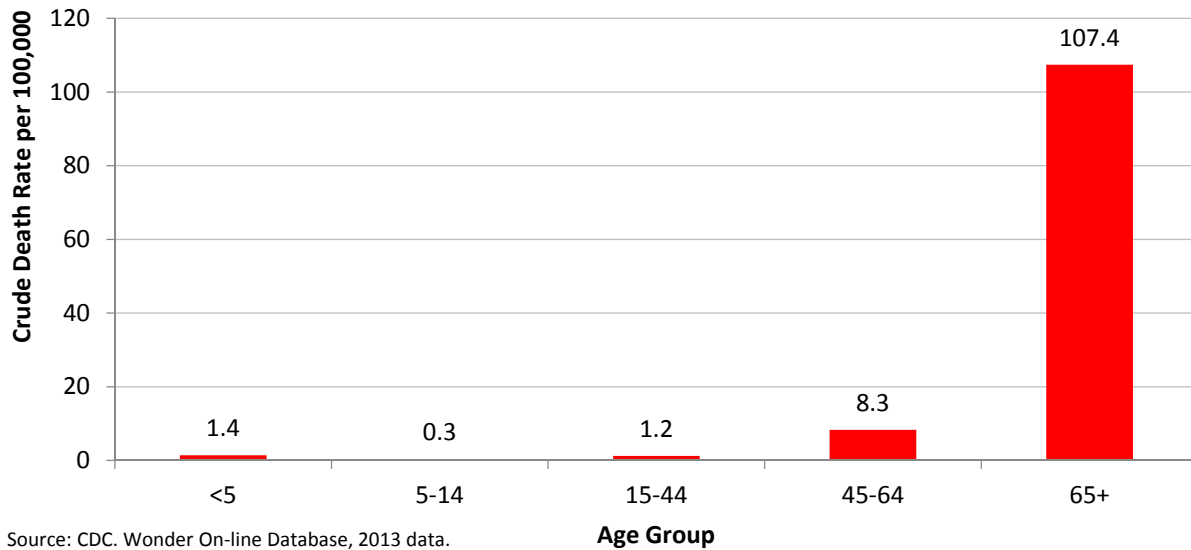


Table 2: Pneumonia & Influenza - Number of Deaths & Age-Specific Death Rates per 100,000 population by Age Group, 1999-2013 ¹

Cause of Death	<5		5-14		15-44		45-64		65+	
	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate
Pneumonia & Influenza										
1999	450	2.4	93	0.2	1,581	1.3	4,322	7.2	57,282	164.6
2000	392	2.0	87	0.2	1,621	1.3	4,653	7.5	58,557	167.3
2001	411	2.1	92	0.2	1,503	1.2	4,505	7.0	55,518	157.3
2002	373	1.9	91	0.2	1,483	1.2	4,905	7.4	58,826	165.2
2003	485	2.5	147	0.4	1,589	1.3	5,270	7.7	57,670	160.6
2004	392	2.0	82	0.2	1,379	1.1	5,051	7.1	52,760	145.4
2005	375	1.8	106	0.3	1,460	1.2	5,605	7.7	55,453	150.7
2006	388	1.9	68	0.2	1,360	1.1	5,161	6.9	49,346	132.4
2007	331	1.6	103	0.3	1,278	1.0	5,061	6.6	45,941	121.3
2008	367	1.7	89	0.2	1,457	1.2	5,987	7.7	48,382	124.5
2009	354	1.7	144	0.4	1,981	1.6	6,351	8.0	43,303	109.4
2010	282	1.4	70	0.2	1,257	1.0	5,444	6.7	42,816	106.3
2011	313	1.6	114	0.3	1,519	1.2	6,300	7.6	45,363	109.6
2012	252	1.3	85	0.2	1,186	0.9	5,747	6.9	43,351	100.5
2013	279	1.4	125	0.3	1,484	1.2	6,928	8.3	48,015	107.4
Pneumonia										
1999	425	2.2	82	0.2	1,545	1.2	4,225	7.0	55,786	160.3
2000	373	1.9	76	0.2	1,573	1.3	4,512	7.3	57,011	162.9
2001	398	2.1	80	0.2	1,480	1.2	4,469	6.9	55,345	156.8
2002	361	1.8	79	0.2	1,464	1.2	4,858	7.3	58,189	163.4
2003	395	2.0	101	0.2	1,522	1.2	5,124	7.5	56,227	156.5
2004	356	1.8	69	0.2	1,352	1.1	4,971	7.0	51,816	142.8
2005	337	1.7	86	0.2	1,418	1.1	5,494	7.5	53,852	146.4
2006	351	1.7	43	0.1	1,331	1.1	5,092	6.8	48,657	130.6
2007	299	1.4	68	0.2	1,246	1.0	5,005	6.5	45,685	120.6
2008	328	1.6	57	0.1	1,364	1.1	5,788	7.4	47,024	121.0
2009	299	1.4	66	0.2	1,664	1.3	5,912	7.4	42,831	108.2
2010	257	1.3	59	0.1	1,211	1.0	5,366	6.6	42,702	106.0
2011	273	1.4	84	0.2	1,353	1.1	6,039	7.3	44,545	107.6
2012	220	1.1	55	0.1	1,121	0.9	5,599	6.8	42,533	98.6
2013	228	1.1	67	0.2	1,253	1.0	6,388	7.7	45,345	101.4
Influenza										
1999	25	0.1	11	*	36	0.0	97	0.2	1,496	4.3
2000	19	*	11	*	48	0.0	141	0.2	1,546	4.4
2001	13	*	12	*	23	0.0	36	0.1	173	0.5
2002	12	*	12	*	19	*	47	0.1	637	1.8
2003	90	0.5	46	0.1	67	0.1	146	0.2	1,443	4.0
2004	36	0.2	13	*	27	0.0	80	0.1	944	2.6
2005	38	0.2	20	0.0	42	0.0	111	0.2	1,601	4.4
2006	37	0.2	25	0.1	29	0.0	69	0.1	689	1.8
2007	32	0.2	35	0.1	32	0.0	56	0.1	256	0.7
2008	39	0.2	32	0.1	93	0.1	199	0.3	1,358	3.5
2009	55	0.3	78	0.2	317	0.3	439	0.6	472	1.2
2010	25	0.1	11	*	46	0.0	78	0.1	114	0.3
2011	40	0.2	30	0.1	166	0.1	261	0.3	818	2.0
2012	32	0.2	30	0.1	65	0.1	148	0.2	818	1.9
2013	51	0.3	58	0.1	231	0.2	540	0.6	2,670	6.0

Source: Centers for Disease Control and Prevention. National Center for Health Statistics. CDC Wonder On-line Database, compiled from Compressed Mortality File 1999-2013 Series 20 No. 2S, 2014.

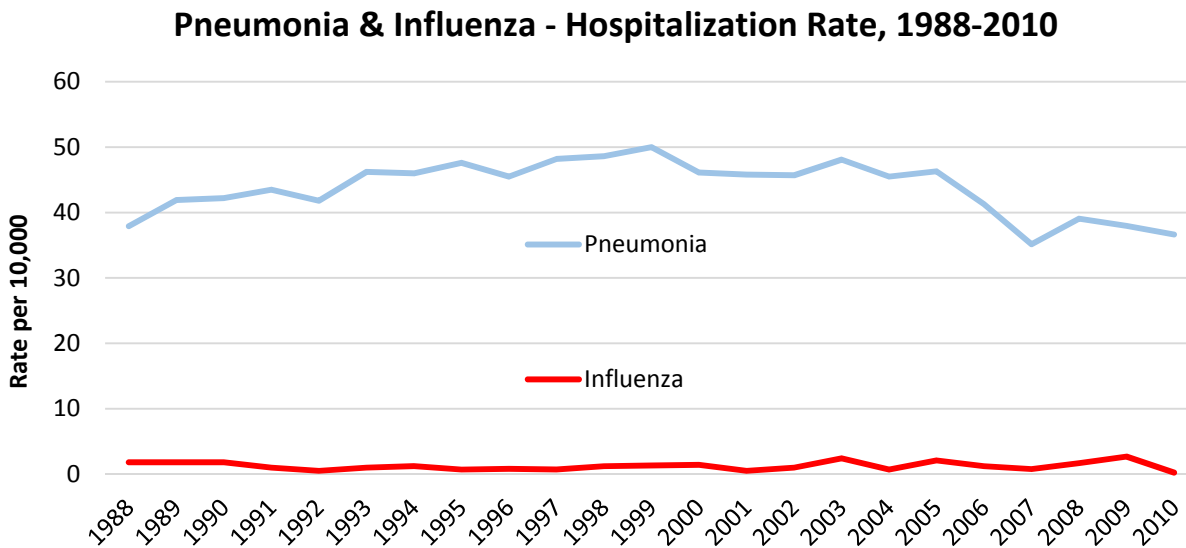
Notes:

1. Deaths are coded by the 10th revision of International Classification of Diseases, codes J10-J11 for influenza and J12-J18 for pneumonia.

* Rate does not meet standard of reliability or precision.

Hospitalizations²

There were more than one million hospitalizations due to pneumonia and another 7,000 due to influenza in 2010. Hospitalization rates are much higher for pneumonia than influenza, with influenza rates generally too low to allow for meaningful comparison. In 2014, the hospitalization rate for pneumonia was 36.6 per 10,000, the second lowest it has been since 1988. This is a 27 percent decrease from the peak rate of 50.0 per 10,000 in 1999.



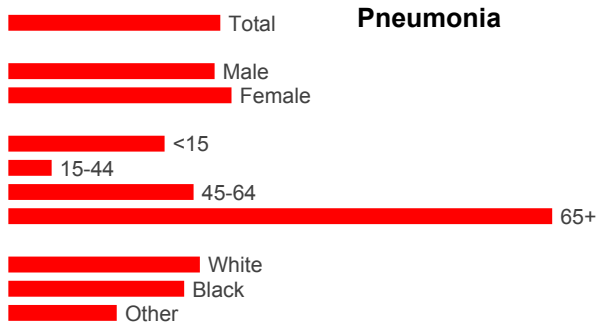
Source: CDC. NHDS, 1988-2010 data.

In 2014, hospitalization rates were:

- Slightly higher among women compared to men.
- Highest among those ages 65 and older and lowest among those ages 15 to 44.
- Slightly higher among whites than blacks. However, these results should be interpreted with caution as a significant portion of hospitalization records are missing information on race.

Pneumonia & Influenza - Number & Rate of Hospitalizations ^{I,II}

By Year					By Demographic, 2010				
Year	Pneumonia		Influenza		Demographic	Pneumonia		Influenza	
	Number	Rate	Number	Rate		Number	Rate	Number	Rate
1988	924,000	37.9	45,000	1.8	Sex				
1989	1,033,000	41.9	45,000	1.8	Male	533,000	35.7	2,000	0.1
1990	1,052,000	42.2	44,000	1.8	Female	594,000	38.6	5,000	0.3
1991	1,089,000	43.5	26,000	1.0	Age				
1992	1,059,000	41.8	13,000	0.5	<15	156,000	27.0	4,000	0.6
1993	1,184,000	46.2	25,000	1.0	15-44	94,000	7.5	1,000	0.1
1994	1,191,000	46.0	31,000	1.2	45-64	257,000	32.0	2,000	0.2
1995	1,246,000	47.6	19,000	0.7	65+	621,000	94.0	NA	NA
1996	1,202,000	45.5	21,000	0.8	Race				
1997	1,304,000	48.2	19,000	0.7	White	799,000	33.1	3,000	0.1
1998	1,328,000	48.6	34,000	1.2	Black	119,000	30.4	2,000	0.4
1999	1,379,000	50.0	37,000	1.3	Other	43,000	18.7	NA	NA
2000	1,282,000	46.1	39,000	1.4					
2001	1,300,000	45.8	15,000	0.5					
2002	1,312,000	45.7	28,000	1.0					
2003	1,393,000	48.1	70,000	2.4					
2004	1,329,000	45.5	20,000	0.7					
2005	1,368,000	46.3	62,000	2.1					
2006	1,232,000	41.3	37,000	1.2					
2007	1,056,000	35.2	23,000	0.8					
2008	1,183,000	39.1	51,000	1.7					
2009	1,145,000	38.0	81,000	2.7					
2010	1,128,000	36.6	7,000	0.2					



Source: Centers for Disease Control and Prevention. National Center For Health Statistics. National Hospital Discharge Survey, 1988-2010.

Notes:

I. Hospitalizations are based on first-listed diagnosis at discharge coded by the 9th revision of International Classification of Diseases, codes 480-486 for pneumonia and code 487 for influenza.

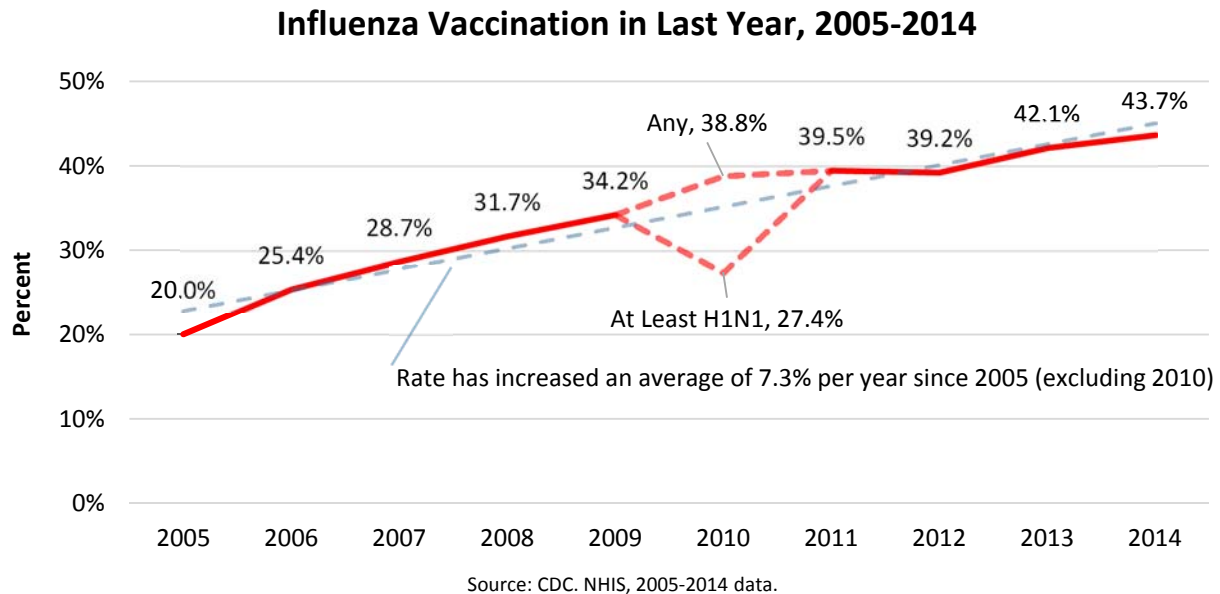
II. Rate is per 10,000 population.

Vaccination Rates

Influenza

Trends³

The Centers for Disease Control and Prevention recommends annual influenza vaccination for everyone 6 months of age and older. In 2014, 43.7 percent of individuals reported receiving an influenza vaccination in the last year, over double the percent in 2005. Influenza vaccination coverage has increased an average of 7.3 percent annually over this period (excluding 2010).



2009 novel H1N1

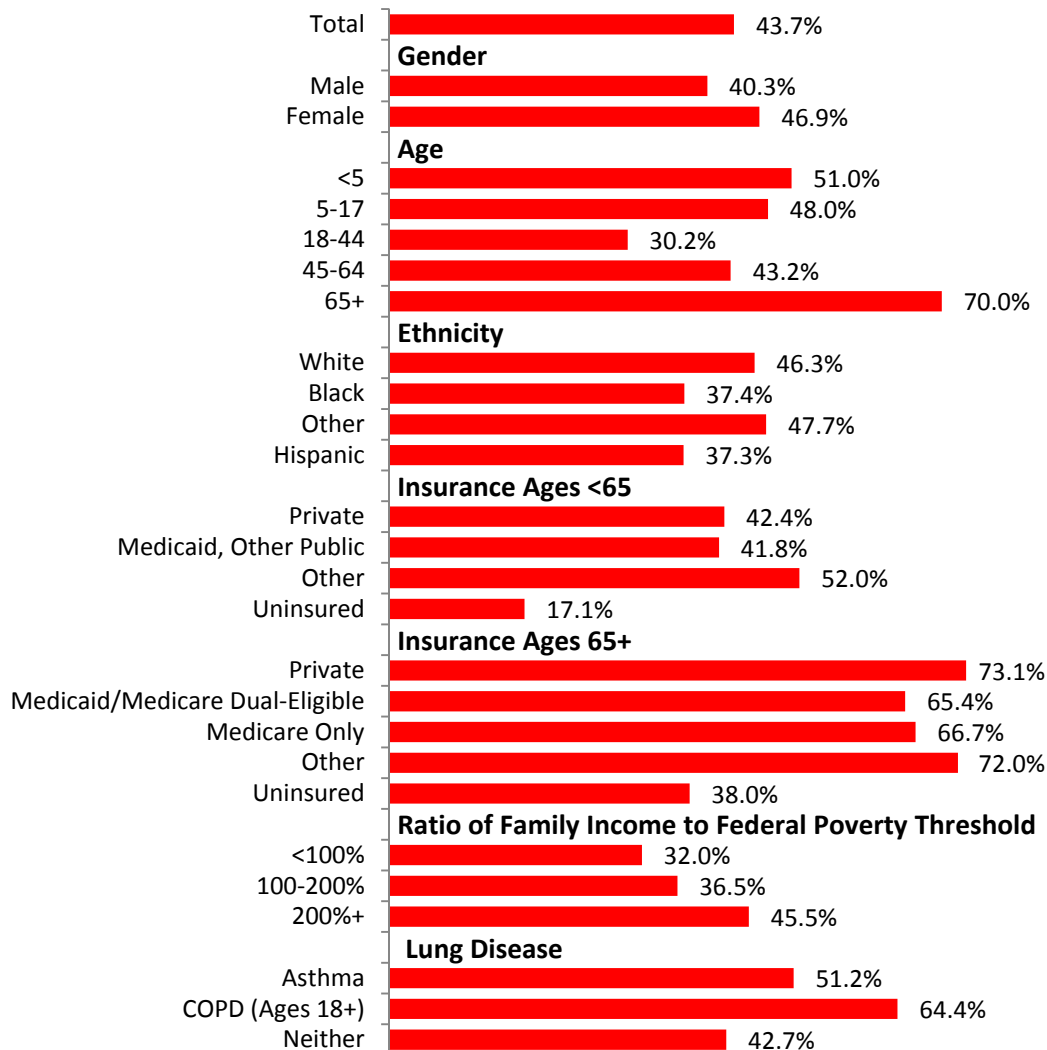
The emergence and predominance of the 2009 novel H1N1 influenza strain led to changes in the survey questions relating to influenza vaccination. Initially, the historical question asking about vaccination against seasonal influenza in the last year was retained in addition to a new question asking about vaccination against 2009 H1N1 specifically. In practice, one could receive the seasonal influenza vaccine, the 2009 H1N1 vaccine, neither, or both. These options may have impacted self-report survey results as participants could have been confused by the options or suffered from recall bias. Additionally, receipt of only one of either vaccine might not represent actual protection from the predominant circulating strain depending on time and geography. As such, approximate maximum and minimum levels of vaccination coverage are presented for 2010, defined as those reporting having received either the seasonal or 2009 H1N1 vaccination in the last year (38.8%) or at least the 2009 H1N1 vaccine in the last year (27.4%), respectively. The estimates for those receiving only the seasonal vaccine or both vaccines fell between these two numbers, and the actual level of vaccination coverage in 2010 can be assumed to also exist within this range. In late 2010 and subsequent years, the influenza vaccine survey question was further revised to reflect the current vaccine availability by asking a modified version of the historical question about receipt of the seasonal influenza vaccine in the last year with the addition of the phrase, "which includes the 2009 novel H1N1 influenza strain."

Demographics³

In 2014, influenza vaccination rates were:

- Higher among females than males.
- Highest among those ages 65 and older, followed by children 5 or younger, children 5 to 17, adults 45 to 64, and lowest among adults 18 to 44.
- Highest among non-Hispanic whites, and lowest among non-Hispanic blacks and Hispanics.
- Highest among those with other insurance and lowest among the uninsured (among those ages 64 or younger).
- Highest among those with private or other insurance and lowest among the uninsured (among those ages 65 and older).
- Highest among those with a family income 200 percent or greater than the Federal poverty threshold and lowest among those with a family income below the Federal poverty threshold.

Influenza Vaccination in Last Year, 2014



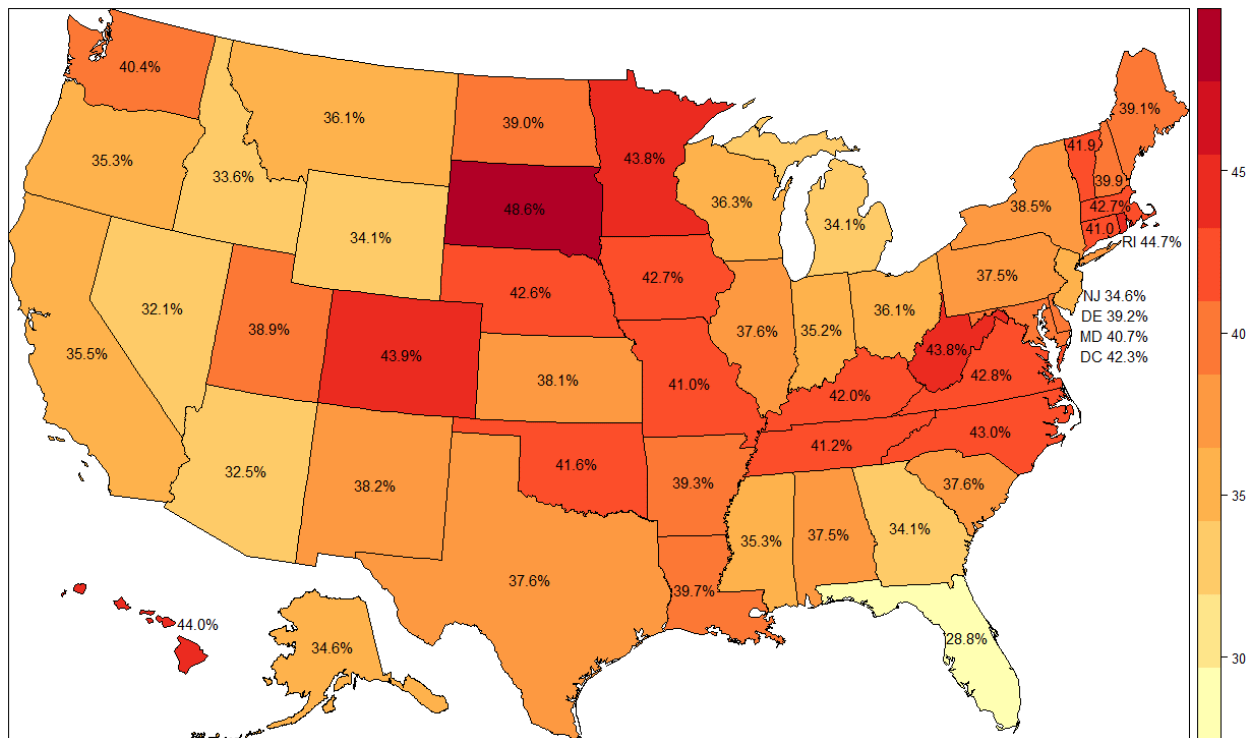
Source: CDC. NHIS, 2014 data.

Those with chronic lung diseases such as asthma and COPD (chronic obstructive pulmonary disease, which includes chronic bronchitis and emphysema) are at higher risk from complications related to influenza infection and are a priority group for vaccination. In 2014, adults with COPD (64.4%) and children and adults with asthma (51.2%) had higher levels of vaccination against influenza compared to those without either lung disease (42.7%).

By State⁴

Influenza vaccination coverage varies considerably by state. Among adults ages 18 and older, age-adjusted influenza vaccination rates were lowest in Florida (28.8%) and highest in South Dakota (48.6%) in 2014.

Flu Vaccination in Adults by State, 2014^{I,II}



Source: CDC. BRFSS, 2014 data.

Notes:

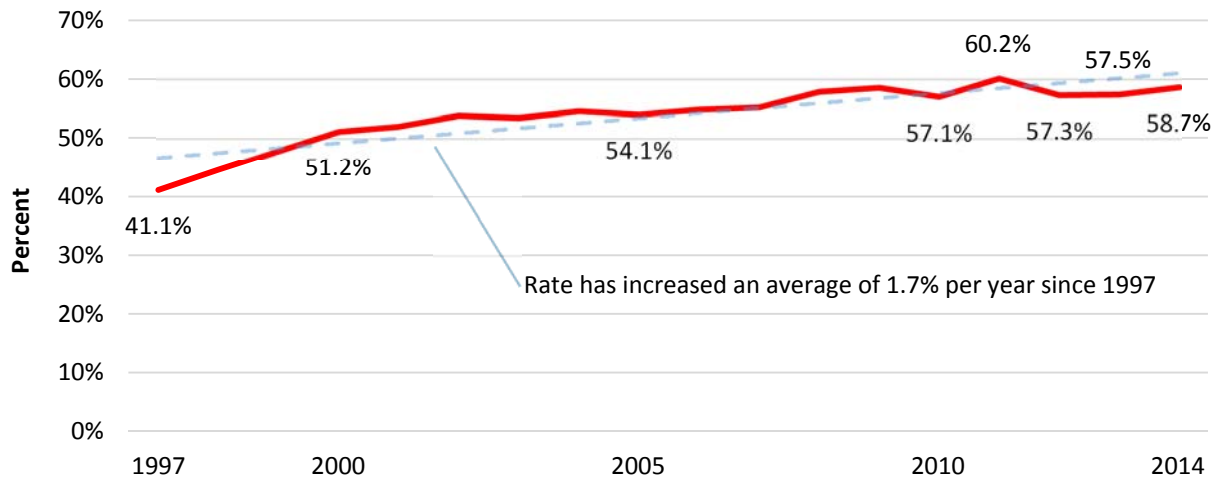
- I. Flu vaccination coverage was defined as answering "yes" to "During the past 12 months, have you had either a flu shot or a flu vaccine that was sprayed in your nose?"
- II. Percentages are age-adjusted to allow for more accurate comparisons between states with different age profiles.

Pneumonia

Trends³

The Centers for Disease Control and Prevention recommends pneumococcal vaccination to help prevent pneumonia for all adults ages 65 and older, as well as other groups at high risk. There are two types of pneumococcal vaccine that differ both which and how many bacteria strains they protect against and for whom they are recommended. However, the two premiere national health behavior surveys only ask if one has ever received a "pneumonia shot" and not what type. In 2014, 58.7 percent of adults ages 65 and older reported ever receiving a pneumonia vaccination. Since 1997, this rate has increased an average of 1.7 percent annually.

Pneumonia Vaccination Ever, Ages 65+, 1997-2014



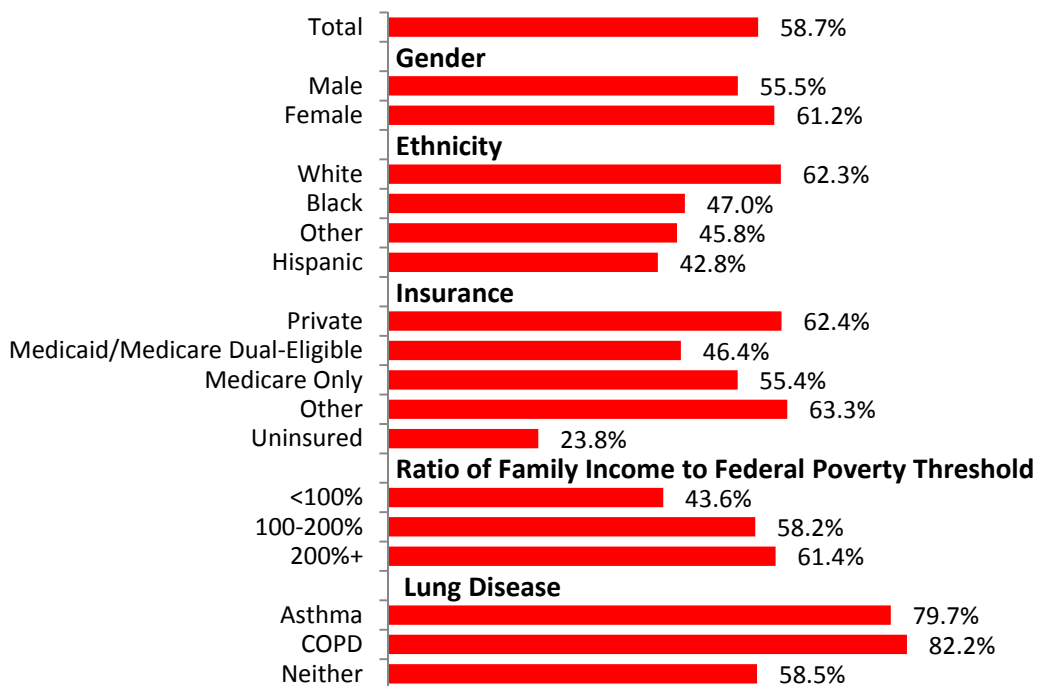
Source: CDC. NHIS, 1997-2014 data.

Demographics³

In 2014, pneumonia vaccination rates were:

- Higher among women compared to men.
- Highest among non-Hispanic whites and lowest among Hispanics.
- Highest among those with other and private insurance and lowest among the uninsured.
- Highest among those with a family income 200 percent or greater than the Federal poverty threshold and lowest among those with a family income below the Federal poverty threshold.

Pneumonia Vaccination Ever, Ages 65+, 2014



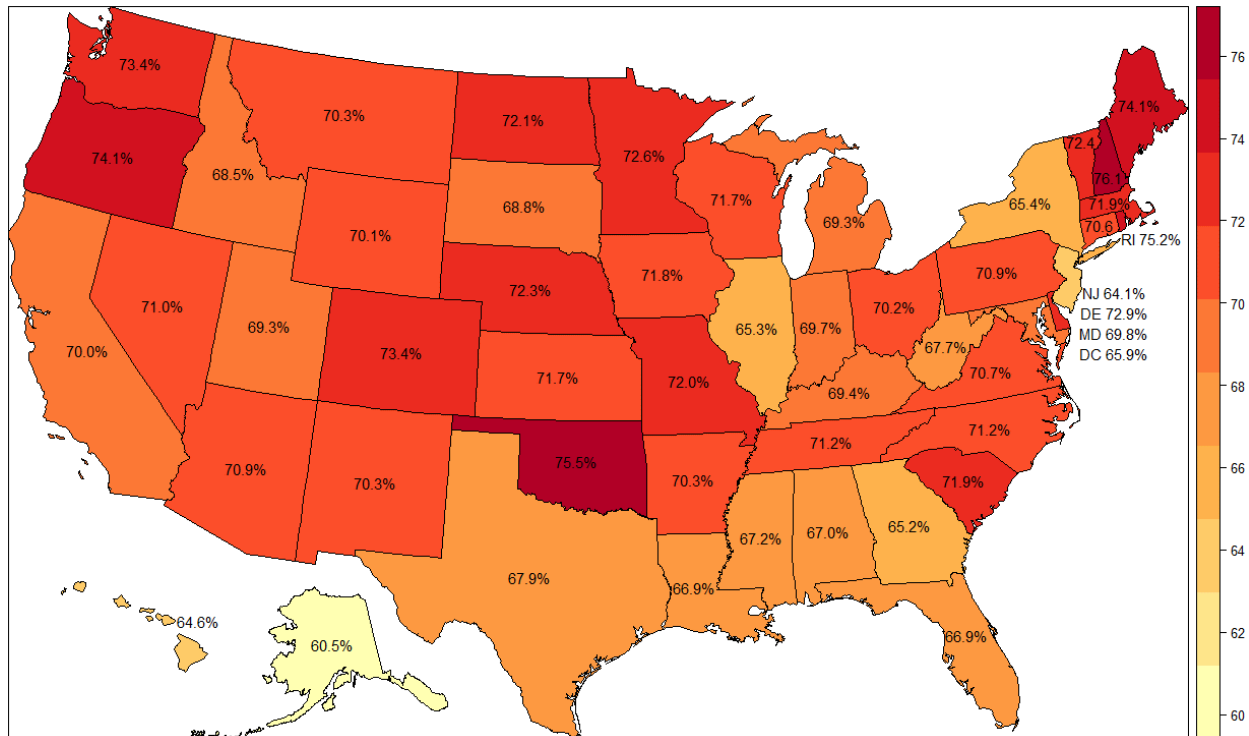
Source: CDC. NHIS, 2014 data.

Those with chronic lung diseases such as asthma and COPD (chronic obstructive pulmonary disease, which includes chronic bronchitis and emphysema) are at higher risk from complications related to pneumococcal infection and are a priority group for increased vaccination. In 2014, adults ages 65 years and older with COPD (82.2%) or asthma (79.7%) had higher levels of vaccination against pneumonia compared to those without either lung disease (58.5%).

*By State*⁴

Pneumonia vaccination coverage varies considerably by state. Among adults ages 65 and older, pneumonia vaccination rates were lowest in Alaska (60.5%) and highest in New Hampshire (76.1%) in 2014.

Pneumonia Vaccination in Ages 65+ by State, 2014^I



Source: CDC. BRFSS, 2014 data.

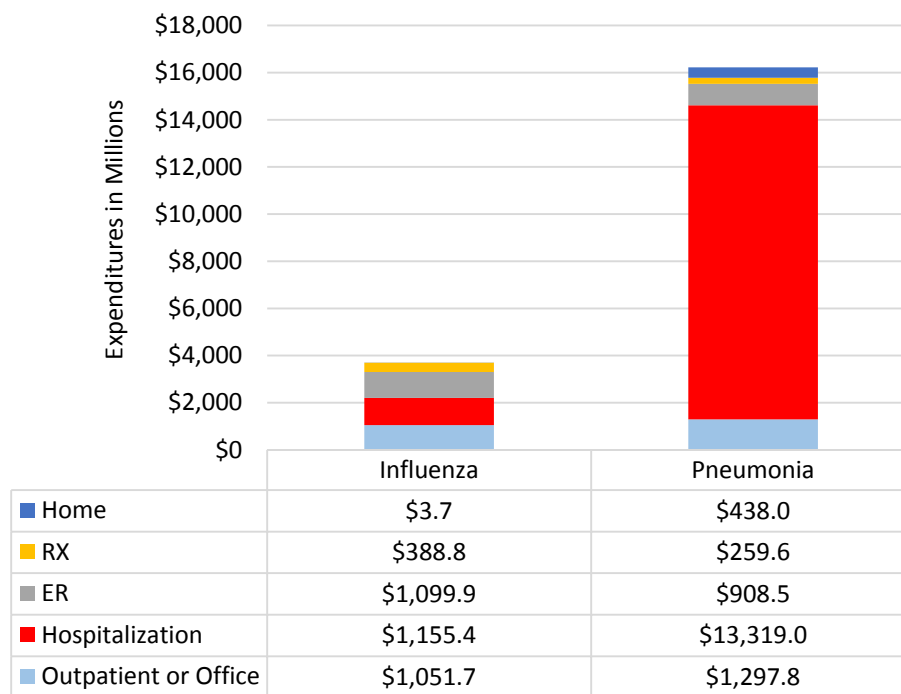
Notes:

- I. Pneumonia vaccination coverage was defined as answering "yes" to "Have you ever had a pneumonia shot?"

Economic Costs⁵

In 2013, more than \$19.9 billion was spent on pneumonia and influenza health care. Pneumonia expenses accounted for 81 percent of this total (\$16.2 billion) and influenza the remaining \$3.7 billion. Emergency room visit and prescription medication expenditures were somewhat higher for influenza compared to pneumonia. Outpatient or office visit expenditures were somewhat higher, home health expenditures much higher, and hospitalization expenditures over eleven times higher for pneumonia compared to influenza. Pneumonia hospitalizations were the largest expenditure category, accounting for two-thirds of total pneumonia and influenza expenditures. Data on the indirect costs of pneumonia and influenza, such as lost wages, are not currently available.

Pneumonia & Influenza - Healthcare Expenditures by Disease and Type of Service, 2013



Source: AHRQ. MEPS, 2013 data.

Glossary

Prevalence:	The number of existing cases of a particular condition, disease, or other occurrence (e.g., persons smoking) at a given time.
Incidence:	The number of new cases occurring in a population during a particular period of time (e.g. 100 cases of tuberculosis from 1998 to 2002).
Crude Rate:	Cases in a particular population quantity- e.g., per hundred.
Age-Adjusted Rate:	A figure that is statistically corrected to remove the distorting effect of age when comparing populations of different age structures.

Sources

1. Centers for Disease Control and Prevention. National Center for Health Statistics. CDC WONDER On-Line Database, Compiled from Compressed Mortality File 1999-2013 Series 20 No. 2S, 2015.
2. Centers for Disease Control and Prevention. National Hospital Discharge Survey, 2010. Analysis Performed by the American Lung Association Research and Health Education Division Using SPSS Software.
3. Centers for Disease Control and Prevention. National Health Interview Survey, 2014. Analysis by the American Lung Association Epidemiology and Statistics Unit Using SPSS Software.
4. Centers for Disease Control and Prevention. Behavioral Risk Factor Surveillance Survey, 2014. Analysis by the American Lung Association Research and Health Education Division Using SPSS and R Software.
5. Agency for Healthcare Research and Quality. Medical Expenditure Panel Survey, 2013 Household Component Summary Tables.