Centers for Disease Control and Prevention
CDC 24/7: Saving Lives, Protecting People™

Influenza (Flu)

Estimated Influenza Illnesses, Medical visits, Hospitalizations, and Deaths in the United States — 2018–2019 influenza season

Past Seasons

2018–2019

2017-2018

2016-2017

2015-2016

2014-2015

2013-2014

2012-2013

2011-2012

2010-2011

Introduction

This web page provides estimates on the burden of influenza in the United States for the 2018–2019 influenza season. For the past several years, CDC has estimated the numbers of influenza illnesses, medical visits, hospitalizations, and deaths[1-4]. The methods used to calculate the estimates have been described previously[3]. CDC uses the estimates of the burden of influenza in the population to inform policy and communications related to influenza.

2018-2019 Estimates

Influenza activity in the United States during the 2018–2019 season began to increase in November and remained at high

Benefits of Flu Vaccination for the 2018-2019 Season

CDC estimates the influenza illnesses, hospitalizations, and deaths prevented by seasonal influenza vaccination.

levels for several weeks during January–February[5]. Influenza A viruses were the predominant circulating viruses last year. While influenza A(H1N1pdm09) viruses predominated from October 2018 – mid February 2019, influenza A(H3N2) viruses were more commonly reported starting in late February 2019. Influenza B viruses were not commonly reported among circulating viruses during the 2018–2019 season. The season had moderate severity based on levels of outpatient influenza-like illness, hospitalizations rates, and proportions of pneumonia and influenza-associated deaths.

CDC estimates that the burden of illness during the 2018–2019 season included an estimated 35.5 million people getting sick with influenza, 16.5 million people going to a health care provider for their illness, 490,600 hospitalizations, and 34,200 deaths from influenza (Table 1). The number of influenza-associated illnesses that occurred last season was similar to the estimated number of influenza-associated illnesses during the 2012–2013 influenza season when an estimated 34 million people had symptomatic influenza illness[6].

Peak activity during the 2018–2019 influenza season was classified as having moderate severity across ages in the population. Compared with the 2017–2018 season , which was classified as high severity, the overall rates and burden of influenza were much lower during the 2018–2019 season (Table 2). Among children, however, rates of influenza during the 2018–2019 season were similar to the 2017–2018 season. In addition, the 2018–2019 season had two waves of activity, including a wave predominated by influenza A(H1N1)pdm09 viruses and another wave of similar magnitude attributable to influenza A(H3N2) viruses[5]. The dual waves resulted in a protracted season during 2018–2019 that was less severe when compared with peak activity in 2017–2018, but resulted in a similar burden of illness in children by the end of the season.

During the 2018–2019 season, 136 deaths in children with laboratory–confirmed influenza virus infection were reported in the United States[8]. However, influenza-associated pediatric deaths are likely under-reported as not all children whose death was related to an influenza virus infection may have been tested for influenza[9,10]. By combining data on hospitalization rates, influenza testing practices, and the frequency of death in and out of the hospital from death certificates, we estimate that there were approximately 480 deaths associated with influenza in children during 2018–2019.

Our estimates of hospitalizations and mortality associated with the 2018–2019 influenza season continue to demonstrate how serious influenza virus infection can be. We estimate, overall, there were 490,600 hospitalizations and 34,200 deaths during the 2018–2019 season. More than 46,000 hospitalizations occurred in children (aged <18 years); however, 57% of hospitalizations occurred in older adults aged ≥65 years. Older adults also accounted for 75% of influenza-associated deaths, highlighting that older adults are particularly vulnerable to severe outcomes resulting from an influenza virus infection. An estimated 8,100 deaths occurred among working age adults (aged 18–64 years), an age group that often has low influenza vaccination uptake[11].

Conclusion

CDC estimates that influenza was associated with more than 35.5 million illnesses, more than 16.5 million medical visits, 490,600 hospitalizations, and 34,200 deaths during the 2018–2019 influenza season. This burden was similar to estimated burden during the 2012–2013 influenza season[1].

Limitations

These estimates are subject to several limitations.

First, rates of influenza-associated hospitalizations are based on data reported to the Influenza Hospitalization Surveillance Network (FluSurv–NET) through October 1, 2019. Final case counts may differ slightly as further data cleaning from the 2018–2019 season are conducted by FluSurv–NET sites. The most updated crude rates of hospitalization for FluSurv-NET sites from the 2018–2019 season are available on FluView Interactive[7].

Second, national rates of influenza-associated hospitalizations and in-hospital death were adjusted for the frequency of influenza testing and the sensitivity of influenza diagnostic assays, using a multiplier approach[3]. However, data on testing practices during the 2018–2019 season were not available at the time of estimation. We adjusted rates using the most conservative multiplier from any season between 2010–2011 and 2016–2017. Burden estimates from the 2018–2019 season will be updated at a later date when data on contemporary testing practices become available.

Third, estimates of influenza-associated illness and medical visits are based on a ratio of illnesses to hospitalizations determined in a prior study. This ratio is based on data from prior seasons, which may not be accurate if patterns of care-seeking have changed.

Fourth, our estimate of influenza-associated deaths relies on information about location of death from death certificates. However, death certificate data during the 2018–2019 season were not available at the time of estimation. We have used death certification data from all influenza seasons between 2010-2011 and 2016–2017 where these data were available from the National Center for Health Statistics. Furthermore, our model uses the frequency of influenza-related deaths that have cause of death related to pneumonia or influenza (P&I), other respiratory or cardiovascular (other R&C), or

other non-respiratory, non-cardiovascular (non-R&C) to account for deaths occurring outside of a hospital by cause of death. These frequencies were not available from the 2018–2019 season at the time of estimation, so we used the average frequencies of each cause from previous seasons, 2010–2011 to 2016–2017.

Fifth, estimates of burden were derived from rates of influenza-associated hospitalization, which is a different approach than the statistical models used in older published reports. This makes it difficult to directly compare our estimates since 2009 to those older reports, though the estimates from our current method are largely consistent for similar years[12–15]. Furthermore, some of the previous published models have estimated influenza-associated hospitalizations and deaths back as far as the 1970s, and that level of historic data is not available for this current method. However, it is useful to keep in mind that direct comparisons to influenza disease burden decades ago are complicated by large differences in the age of the US population and the increasing number of adults aged ≥65 years.

Table 1: Estimated influenza disease burden, by age group — United States, 2018-2019 influenza season

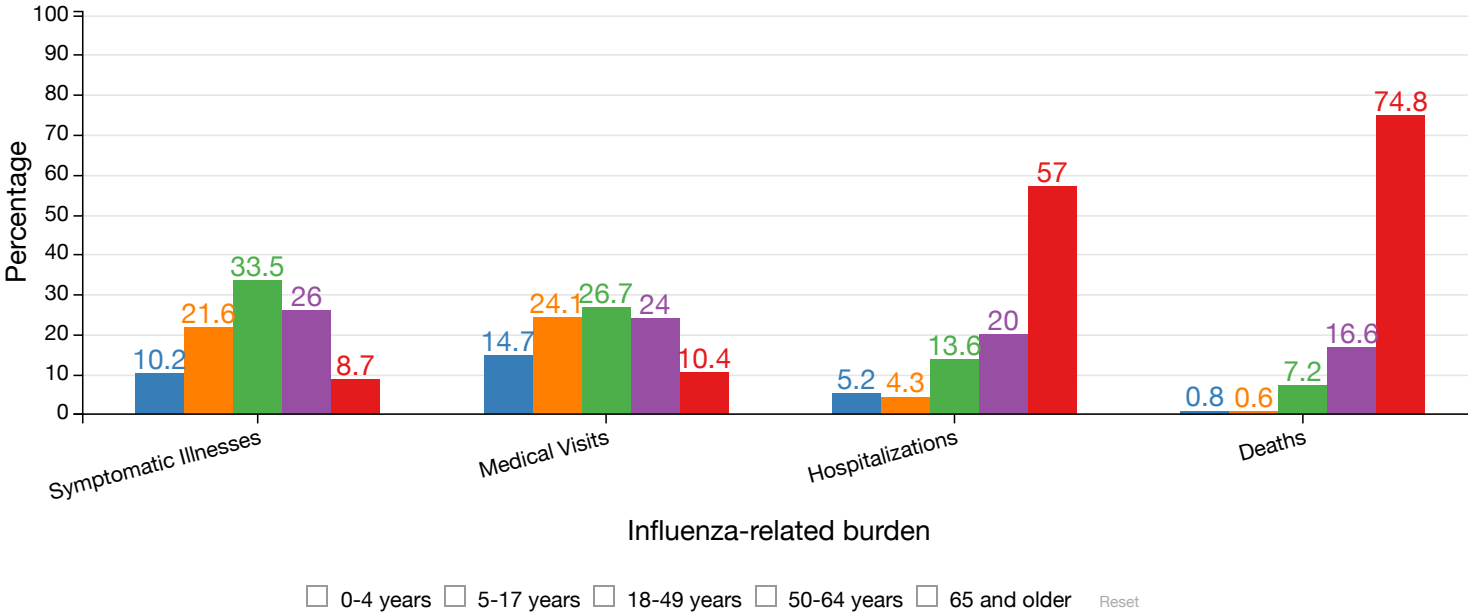
	Symptomatic Illnesses		Medical Visits		Hospitalizations		Deaths	
Age group	**Estimate**	**95% UI**	**Estimate**	**95% UI**	**Estimate**	**95% UI**	**Estimate**	**95%UI**
0-4 yrs	3,633,104	(2,506,551, 7,199,330)	2,434,180	(1,667,892, 4,820,252)	25,328	(17,475, 50,191)	266	(85, 713)
5-17 yrs	7,663,310	(6,027,982, 10,438,419)	3,984,921	(3,067,414, 5,415,715)	21,012	(16,528, 28,621)	211	(38, 640)
18-49 yrs	11,913,203	(10,077,523, 16,032,899)	4,407,885	(3,498,694, 6,064,550)	66,869	(56,565, 89,993)	2,450	(1,402, 5,813)
50-64 yrs	9,238,038	(6,582,690, 15,759,286)	3,972,356	(2,712,868, 6,886,487)	97,967	(69,808, 167,123)	5,676	(3,547, 13,486)
65+ yrs	3,073,227	(2,008,898, 6,030,701)	1,721,007	(1,097,482, 3,394,980)	279,384	(182,627, 548,246)	25,555	(17,874, 41,363)
All ages	35,520,883	(31,323,881, 44,995,691)	16,520,350	(14,322,767, 21,203,231)	490,561	(387,283, 766,472)	34,157	(26,339, 52,664)

Table 2: Estimated rates of influenza-associated disease outcomes, per 100,000, by age group — United States, 2018-2019 influenza season

	Illness rate		Medical visit rate		Hospitalization rate		Mortality rate	
Age group	**Estimate**	**95% UI**	**Estimate**	**95% UI**	**Estimate**	**95% UI**	**Estimate**	**95% UI**
		(12,652.8,		(8,419.3,				

0-4 yrs	18,339.50	36,341.4)	12,287.50	24,332.1)	127.9	(88.2, 253.4)	1.3	(0.4, 3.6)
5-17 yrs	14,300.10	(11,248.5, 19,478.6)	7,436.10	(5,724.0, 10,106.0)	39.2	(30.8, 53.4)	0.4	(0.1, 1.2)
18-49 yrs	8,621.50	(7,293.1, 11,602.9)	3,190.00	(2,532.0, 4,388.9)	48.4	(40.9, 65.1)	1.8	(1.0, 4.2)
50-64 yrs	14,627.10	(10,422.7, 24,952.5)	6,289.60	(4,295.4, 10,903.7)	155.1	(110.5, 264.6)	9	(5.6, 21.4)
65+ yrs	5,861.40	(3,831.5, 11,502.1)	3,282.40	(2,093.2, 6,475.1)	532.9	(348.3, 1,045.6)	48.7	(34.1, 78.9)

Percentage of Influenza-related illnesses, medical visits, hospitalizations, and deaths by age group, 2018-2019 Influenza Season



Percentage of Influenza-related burden by age group, 2018-2019 Influenza Season -

	Symptomatic Illnesses	Medical Visits	Hospitalizations	Deaths
0-4 years	10.2	14.7	5.2	0.8
5-17 years	21.6	24.1	4.3	0.6
18-49 years	33.5	26.7	13.6	7.2
50-64 years	26.0	24.0	20.0	16.6
65 and older	8.7	10.4	57.0	74.8

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Page last reviewed: January 8, 2020
Content source: Centers for Disease Control and Prevention, National Center for Immunization and Respiratory Diseases (NCIRD)