

2019–2020 Influenza Hospitalization Report



Oregon Emerging Infections Program
Acute and Communicable Disease Prevention
Oregon Public Health Division

Background

The Oregon Emerging Infections Program (EIP) has conducted surveillance for pediatric influenza hospitalizations in collaboration with the Centers for Disease Control and Prevention (CDC) since 2003. Surveillance for adult influenza hospitalizations was added in 2005.

The objectives of EIP influenza surveillance are to:

- Estimate age-specific hospitalization rates.
- Describe the temporal trends of laboratory-confirmed influenza hospitalization, including by influenza subtype.
- Describe characteristics of persons hospitalized with severe influenza illness.
- Describe the clinical features and course of influenza disease (e.g., severe illness and influenza-associated complications) among persons hospitalized with influenza.

In Oregon, the EIP surveillance area for influenza hospitalizations comprises the tri-county (Clackamas, Multnomah, and Washington) Portland metropolitan area with a population of 1,840,747 in 2020, approximately 43% of the population of Oregon.

This report summarizes incidence and severity of influenza in Oregon's EIP surveillance area during the 2019–2020 influenza season (October 1, 2019 to April 30, 2020).

Methods

Cases are defined as laboratory-confirmed influenza hospitalizations among residents of the EIP area (Clackamas, Multnomah, and Washington counties) that test for influenza within 14 days before or 3 days after admission. Cases are reported by hospitals in the tri-county area. Health record reviews using the EIP case report form are performed by trained personnel, who collected standardized data regarding demographic characteristics, clinical manifestations, underlying conditions, and illness outcomes. Due to the COVID-19 pandemic, only cases under the age of 18 were fully reviewed. Demographics, such as sex, race and ethnicity were collected for all cases.

Surveillance Results

Between October 1, 2019 and April 30, 2020, 698 influenza-related hospitalizations were reported in the EIP area—613 adults and 85 pediatric cases. This represents a crude rate of 37.9 cases per 100,000 residents of the EIP area for the season, the lowest rate since the 2013-2014 influenza season.

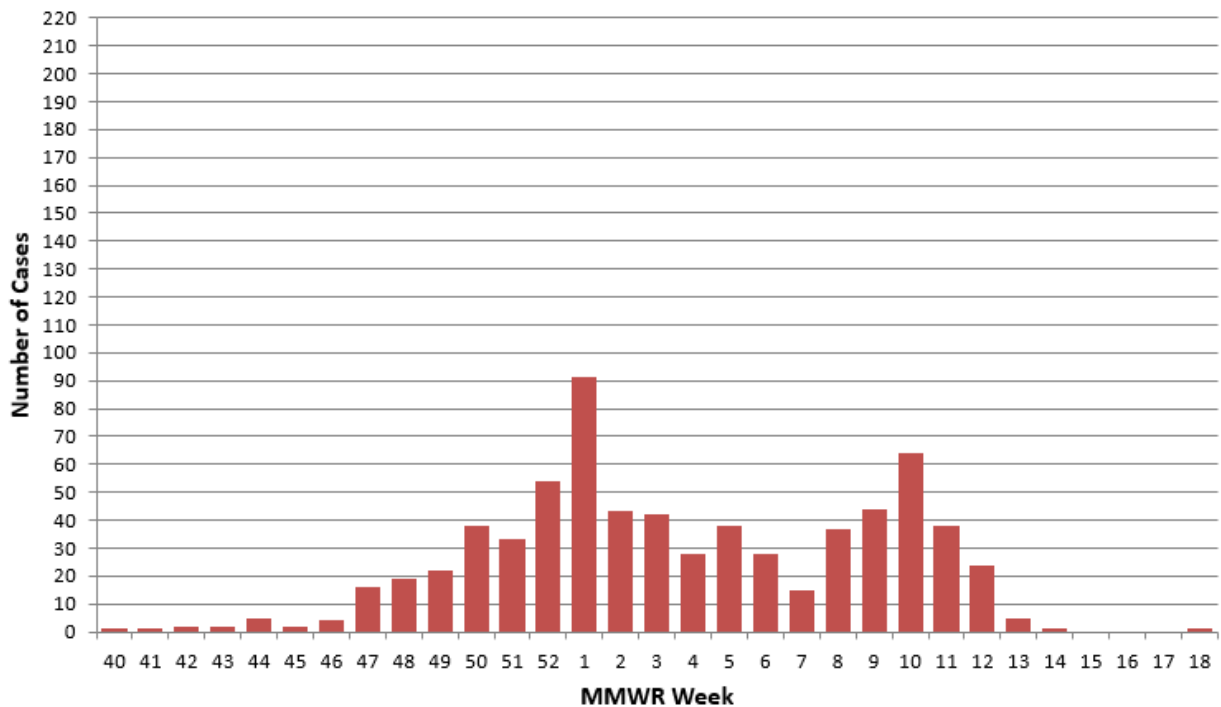
Table 1 shows the sex, age, ethnicity, and race of Oregon EIP cases in 2019–2020. The median age of hospitalized cases was 60 years (range 17 days – 104 years)—younger than the median age last influenza season (median age for the 2018-2019 season was 68 years). Persons 65 years and older accounted for the majority of influenza hospitalizations (39.8%) this season. Approximately 53% of cases were female. Nearly 75% of cases were reported as White; the next most commonly reported races were Black (7.3%) and Asian, Hawaiian, or Pacific Islander (5.9%). The majority of cases (89.3%) were reported as non-Hispanic.

Table 1. Characteristics of all Oregon EIP influenza-associated hospitalized cases, 2019–2020.

Case Characteristics	No. n = 698	Percent
Sex		
Male	329	47.1
Female	369	52.9
Age		
<6 months	12	1.7
6–23 months	23	3.3
24–59 months	14	2.0
5–10 years	26	3.7
11–17 years	10	1.4
18–49 years	159	22.8
50–64 years	176	25.2
>64 years	278	39.8
Ethnicity		
Hispanic and Latino	58	8.3
Non-Hispanic	623	89.3
Not specified	17	2.4
Race		
White	523	74.9
Black	51	7.3
Asian/Hawaiian or Pacific Islander	41	5.9
American Indian/Alaska Native	8	1.2
Multiple Races	15	2.2
Unknown	60	8.6

Figure 1 shows the distribution of cases during the influenza season. The peak of influenza-associated hospitalizations occurred during MMWR week 1 of 2020 (the week ending 1/4/2020). During the peak week, 91 influenza hospitalizations were reported. During the surveillance period, the first case was reported during week 40 of 2019 (the week ending 10/5/2019), and the last cases were reported week 18 of 2020 (the week ending 5/2/2020).

Figure 1. Number of Oregon EIP influenza-associated hospitalized cases by MMWR week, 2019–2020.



During the 2019-2020 influenza season, only pediatric (persons 17 years and younger) health records were fully reviewed. Adult (persons 18 years and older) medical records were not reviewed for procedures, conditions, antiviral use, and vaccination status due to staff shortages resulting from the COVID-19 pandemic. As a result of not completing full health medical reviews for adult cases, we are unable to provide risk factor and clinical data for adults in this annual report. Demographic data such as sex, race and ethnicity were still collected for all influenza cases.

Table 3. Case characteristics by vaccination status (vaccinated prior to admission) for pediatric influenza-associated hospitalized cases, Oregon EIP, 2019–2020.

	Vaccine Status			Total No. (%) n=85
	Unvaccinated No. (%) n=30	Vaccinated No. (%) n=49	Unknown No. (%) n=6	
Sex				
Male	16 (40.0)	18 (45.0)	6 (15.0)	40 (47.1)
Female	14 (31.1)	31 (68.9)	0 (0.0)	45 (52.9)
Age				
<6 months	12 (100.0)	0 (0.0)	0 (0.0)	12 (14.1)
6-23 months	4 (17.4)	17 (73.9)	2 (8.7)	23 (27.1)
24-59 months	3 (21.4)	11 (78.6)	0 (0.0)	14 (16.5)
5-10 years	9 (34.6)	13 (50.0)	4 (15.4)	26 (30.6)
11-17 years	2 (20.0)	8 (80.0)	0 (0.0)	10 (11.8)
Ethnicity				
Hispanic and Latino	12 (54.6)	7 (31.8)	3 (13.6)	22 (25.9)
Non-Hispanic	17 (27.4)	42 (67.7)	3 (4.8)	62 (72.9)
Not specified	1 (100.0)	0 (0.0)	0 (0.0)	1 (1.2)
Race				
White	12 (28.6)	26 (61.9)	4 (9.5)	42 (49.4)
Black	2 (25.0)	6 (75.0)	0 (0.0)	8 (9.4)
Asian or Pacific Islander	5 (41.7)	7 (58.3)	0 (0.0)	12 (14.1)
American Indian/ Alaska Native	1 (50.0)	1 (50.0)	0 (0.0)	2 (2.4)
Multiple races	4 (44.4)	4 (44.4)	1 (11.1)	9 (10.6)
Unknown	6 (50.0)	5 (41.7)	1 (8.3)	12 (14.1)

Tables 3 and 4 show demographic characteristics, procedures, and antiviral use for pediatric cases by vaccination status. Over 40% of hospitalized children—45.0% of males and 68.9% of females—were vaccinated prior to being hospitalized for influenza. About half of hospitalized children (27 of 85) had underlying medical conditions; 20 (74.1%) of the children with underlying medical conditions were vaccinated.

Table 4. Procedures, underlying conditions, and antiviral use by vaccination status for pediatric influenza-associated hospitalized cases, Oregon EIP, 2019–2020.

	Vaccine Status			Total No. (%) n=85
	Unvaccinated No. (%) n=30	Vaccinated No. (%) n=49	Unknown No. (%) n=6	
Chest X-ray				
Chest X-ray within 3 days	16 (42.1)	19 (50.0)	3 (7.9)	38 (44.7)
No Chest X-ray within 3 days	13 (29.6)	28 (63.6)	3 (6.8)	44 (51.8)
Unknown	1 (33.3)	2 (66.7)	0 (0.0)	3 (3.5)
Mechanical ventilation				
Yes	0 (0.0)	1 (100.0)	0 (0.0)	1 (1.2)
No	29 (35.8)	46 (56.8)	6 (7.4)	81 (95.3)
Unknown	1 (33.3)	2 (66.7)	0 (0.0)	3 (3.5)
ICU				
Yes	3 (27.3)	7 (63.6)	1 (9.1)	11 (12.9)
No	26 (36.6)	40 (56.3)	5 (7.0)	71 (85.5)
Unknown	1 (33.3)	2 (66.7)	0 (0.0)	3 (3.5)
Treated with Antivirals^{&}				
Treated	25 (37.3)	38 (56.7)	4 (6.0)	67 (78.8)
Not treated	4 (26.7)	9 (60.0)	2 (13.3)	15 (17.7)
Unknown	1 (33.3)	2 (66.7)	0 (0.0)	3 (3.5)
Any medical condition				
None or unknown	24 (41.4)	29 (50.0)	5 (8.6)	58 (68.2)
At least one	6 (22.2)	20 (74.1)	1 (3.7)	27 (31.8)
Type of medical condition[†]				
Asthma	1 (12.5)	7 (87.5)	0 (0.0)	8 (9.4)
Cancer	0 (0.0)	0 (0.0)	0 (0)	0 (0.0)
Cardiovascular disease	0 (0.0)	1 (100.0)	0 (0.0)	1 (1.2)
Chronic lung disease	0 (0.0)	3 (100.0)	0 (0.0)	3 (3.5)
Chronic metabolic disease	0 (0.0)	2 (100.0)	0 (0.0)	2 (2.4)
Cognitive dysfunction	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Hemoglobinopathy	0 (0.0)	1 (100.0)	0 (0.0)	1 (1.2)
History of Guillain-Barre Syndrome	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Immunosuppressive condition	1 (33.3)	2 (66.7)	0 (0.0)	3 (3.5)
Neurologic condition	3 (60.0)	2 (40.0)	0 (0.0)	5 (5.9)
Pregnant [‡]	0 (0.0)	1 (100.0)	0 (0.0)	1 (20.0)
Renal disease	0 (0.0)	2 (100.0)	0 (0.0)	2 (2.4)
Seizure disorder	1 (100.0)	0 (0.0)	0 (0.0)	1 (1.2)

[&] Treated with antivirals defined as antiviral treatment during the course of illness.

^{*} Cases may have more than one underlying condition; categories are not mutually exclusive. Not all categories or subcategories shown.

[‡]Percent of females 14-49 years (n=5).

During the 2019–2020 influenza season, influenza A predominated in Oregon, with both flu A (H3) and flu A (H1N1) co-circulating. Table 5 shows the frequency of virus types and subtypes detected among influenza-associated hospitalized cases in the Oregon EIP area. Influenza A was detected in 57.4% of all hospitalizations. Among influenza A specimens that were subtyped, 7.5% were flu A (H3) and 92.5% were flu A (2009 H1N1). Influenza B was detected in 42.6% of hospitalizations. Influenza B Victoria accounted for 98% of specimens for which B lineage testing was performed.

Table 5. Influenza virus types and subtypes among Oregon EIP influenza-associated hospitalized cases, 2019–2020.

Virus	No. N=698	Percent
Influenza A	401	57.4
H3	6	1.5
2009 H1N1	74	18.5
Unknown subtype*	321	80.0
Influenza B	297	42.6
Yamagata Lineage	1	0.3
Victoria Lineage	58	19.5
Unknown Lineage*	238	80.1
Both A and B	0	0.0

*Specimen not subtyped or lineage not performed.

The age distribution of influenza cases hospitalized during the 2019–2020 season (Figure 2) shows that the highest rate of hospitalization occurred among persons 65 years and older, at 98 cases per 100,000 population over the 2019-2020 season. During 2008–2009 and 2009–2010 (when a novel H1N1 emerged), the highest rates of hospitalization occurred among children 0–4 years of age (40 and 68 cases per 100,000 population, respectively). Other than these two years, the rate of influenza hospitalization has consistently been greatest among the elderly. Over the 2019-2020 season, the rate of hospitalization among those 0–4 years was 51 cases per 100,000 population.

Deaths: Among all individuals hospitalized for flu during the 2019-2020 flu season, 25 (3.6%) died during their hospitalization. Adults accounted for all 25 of these deaths (4.1% of all flu-associated adult hospitalizations). This overall percentage of deaths among hospitalized patients is lower than the 2018–2019 season (4.1%). Data on deaths includes only those who died while hospitalized.

Figure 2. Rates of Oregon EIP influenza-associated hospitalizations by age group, comparison by influenza season, 2010–2011 to 2019–2020.

