

Influenza and Other Respiratory Viruses Weekly Report

California Influenza Surveillance Program

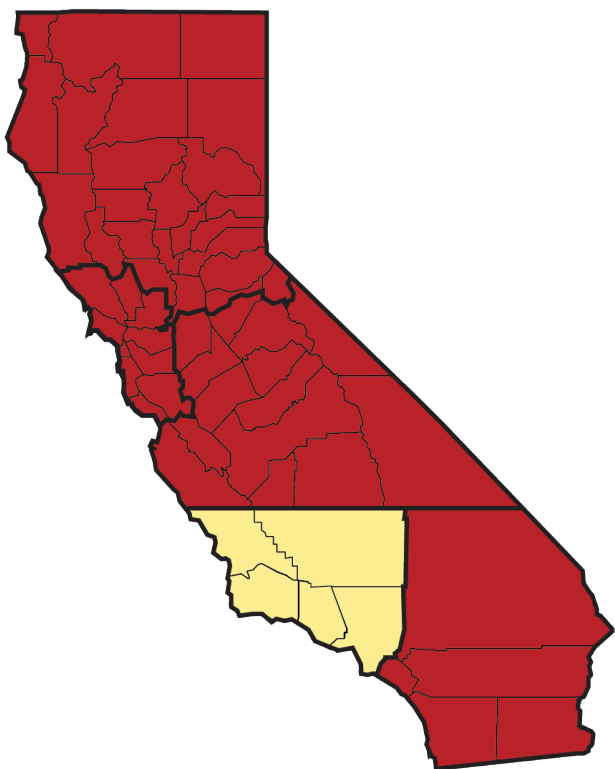


Highlights (Week 14: March 31, 2019 – April 6, 2019)

Statewide Activity



Regions with Elevated Activity



- ▶ **Deaths:** 486* since Sept. 30, 2018
- ▶ **Outbreaks:** 170 since Sept. 30, 2018
- ▶ **Laboratory:** 18.5% flu positive
- ▶ **Outpatient ILI:** Above expected levels
- ▶ **Hospitalizations:** Above expected levels

*Influenza-coded deaths from death certificates
Click on images and links for more information

Key messages:

- Flu activity is decreasing but remains elevated in California; Influenza A (H3N2) viruses are now the predominant circulating virus in California.
- Clinicians should continue to have a high suspicion for flu and rapidly treat high-risk patients suspected to have flu with antivirals.
- Several more weeks of flu activity are expected.
- It's not too late to get vaccinated.

Note: This report includes data from many sources of influenza surveillance and it should be viewed as a preliminary "snapshot" of influenza activity for each surveillance week. Because data are preliminary, the information may be updated in later reports as additional data are received. These data should not be considered population-based or representative of all California public health jurisdictions.

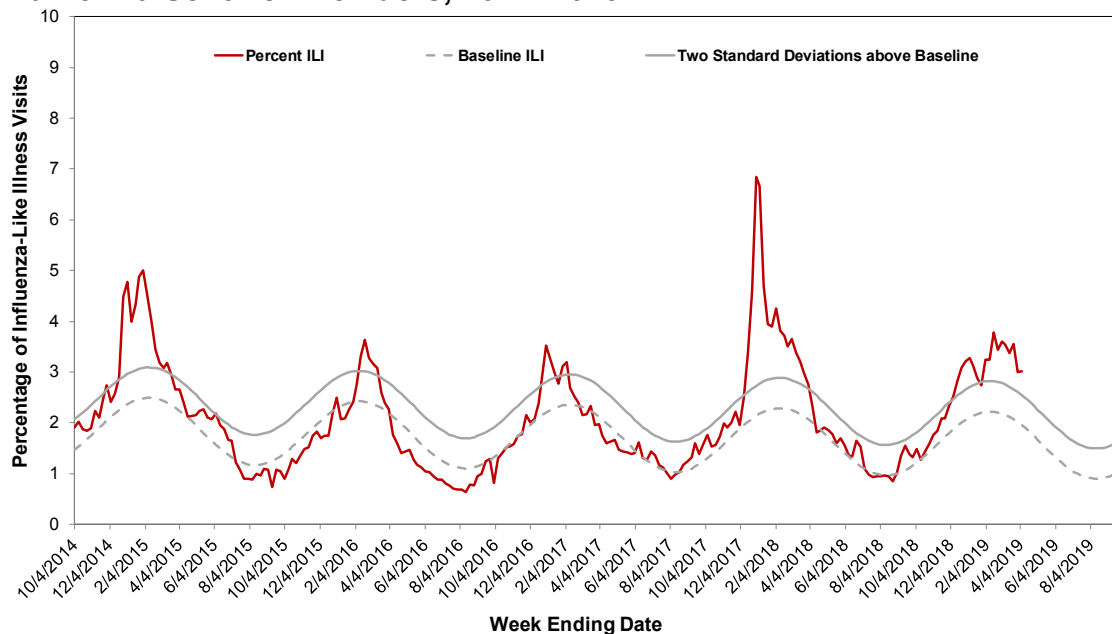
A. Outpatient, Inpatient, and Death Data

1. Influenza Sentinel Providers

Sentinel providers (physicians, nurse practitioners, and physician assistants) situated throughout California report on a weekly basis the number of patients seen with influenza-like illness (ILI) and the total number of patients seen for any reason. ILI is defined as any illness with fever ($\geq 100^{\circ}\text{F}$ or 37.8°C) AND cough and/or sore throat (in the absence of a known cause other than influenza).

A total of 85 enrolled sentinel providers have reported data for Week 14. Based on available data, the percentage of visits for ILI during Week 14 was 3.0% compared to Week 13 (3.0%) and is above expected levels for this time of year (Figure 1).

Figure 1. Percentage of Influenza-like Illness Visits Among Patients Seen by California Sentinel Providers, 2014–2019



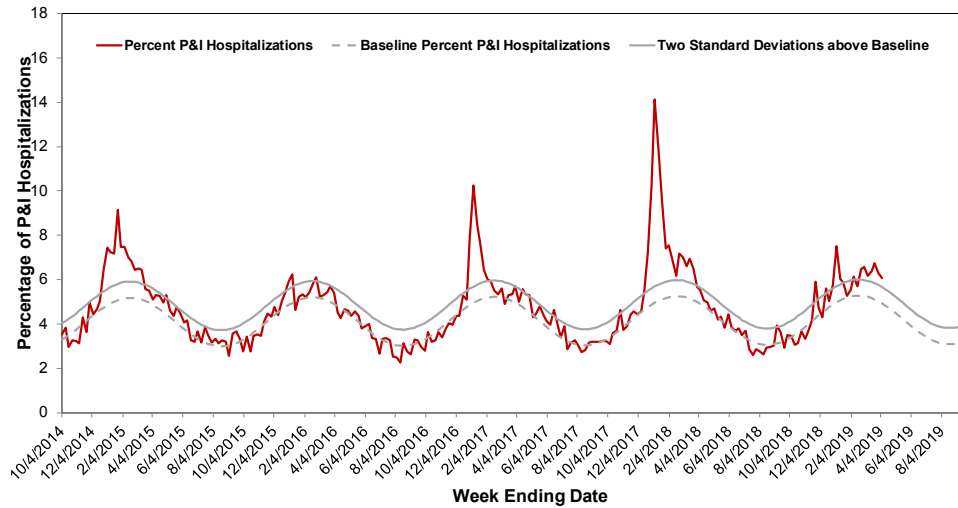
The seasonal baseline was calculated using a regression model applied to data from the previous five years. Two standard deviations above the seasonal baseline is the point at which the observed percentage of ILI is significantly higher than would be expected at that time of year.

2. Kaiser Permanente Hospitalization Data

Inpatients at Kaiser Permanente facilities with an admission diagnosis including the keywords “flu,” “influenza,” “pneumonia,” or variants of the keywords are defined as pneumonia and influenza (P&I)-related admissions. The number of P&I admissions is divided by the total number of hospital admissions occurring in the same time period to estimate the percentage of P&I admissions. Admissions for pregnancy, labor and delivery, birth, and outpatient procedures are excluded from the denominator.

The percentage of admissions for pneumonia and influenza (P&I) in Kaiser Permanente facilities in northern California during Week 14 was 6.1% compared to Week 13 (6.3%) and is above expected levels for this time of the year (Figure 2).

Figure 2. Percentage of P&I Admissions in Kaiser Permanente Northern California Hospitals, 2014–2019

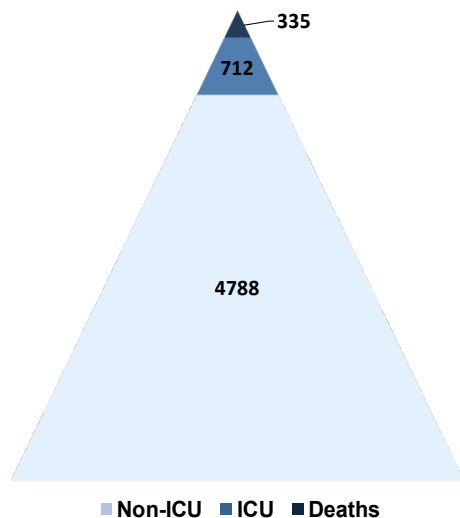


The seasonal baseline was calculated using a regression model applied to data from the previous five years. Two standard deviations above the seasonal baseline and is the point at which the observed percentage of pneumonia and influenza hospitalizations in Kaiser Permanente hospitals in Northern California is significantly higher than would be expected at that time of the year.

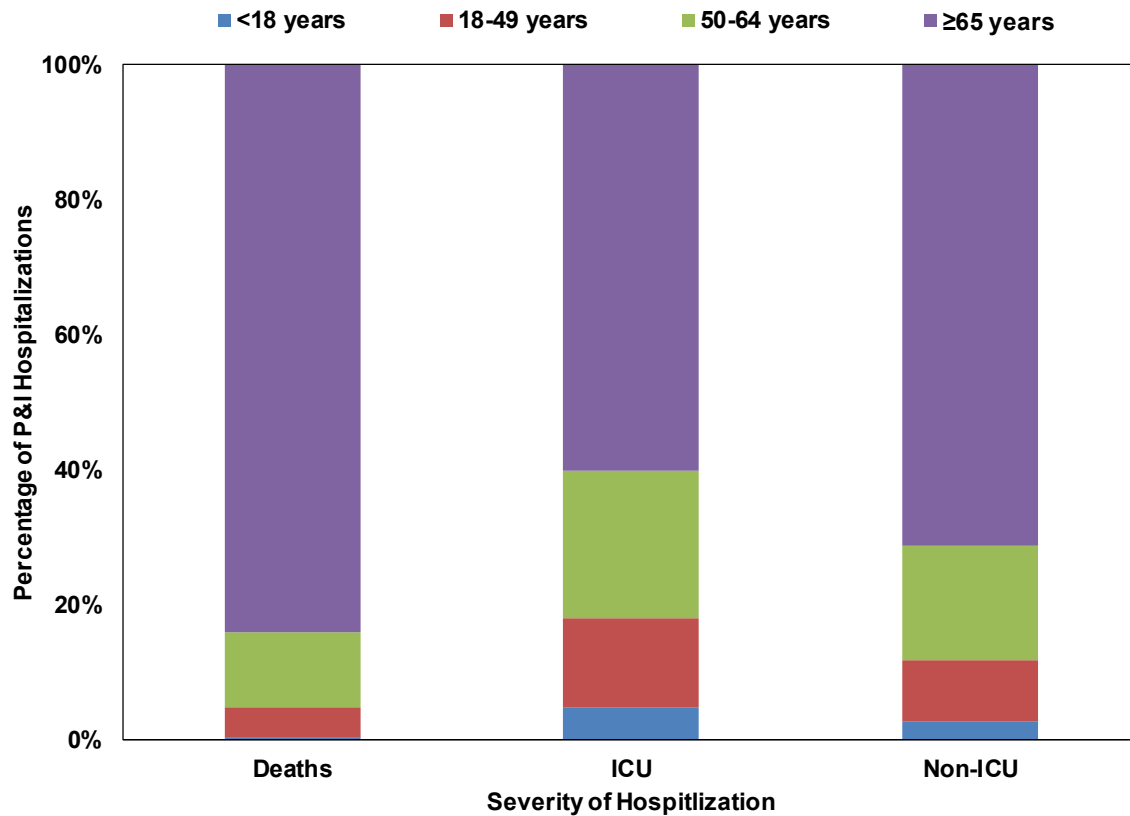
The majority of admissions for pneumonia and influenza did not result in intensive care unit (ICU) admission or death; however, 712 ICU admissions and 335 deaths have occurred among persons with P&I admission diagnoses (Figure 3a). The majority of P&I admissions occurred among persons ≥ 65 years of age across all severity categories, especially among deaths (Figure 3b). Please note that pneumonia and influenza admissions serve as a proxy for influenza activity, but do not necessarily represent influenza infections.

Figure 3. Number (a) and age group distribution (b) of non-ICU, ICU, and Deaths associated with P&I Admissions in Kaiser Permanente Northern California Hospitals, 2018–2019 Season to Date

(a)



(b)

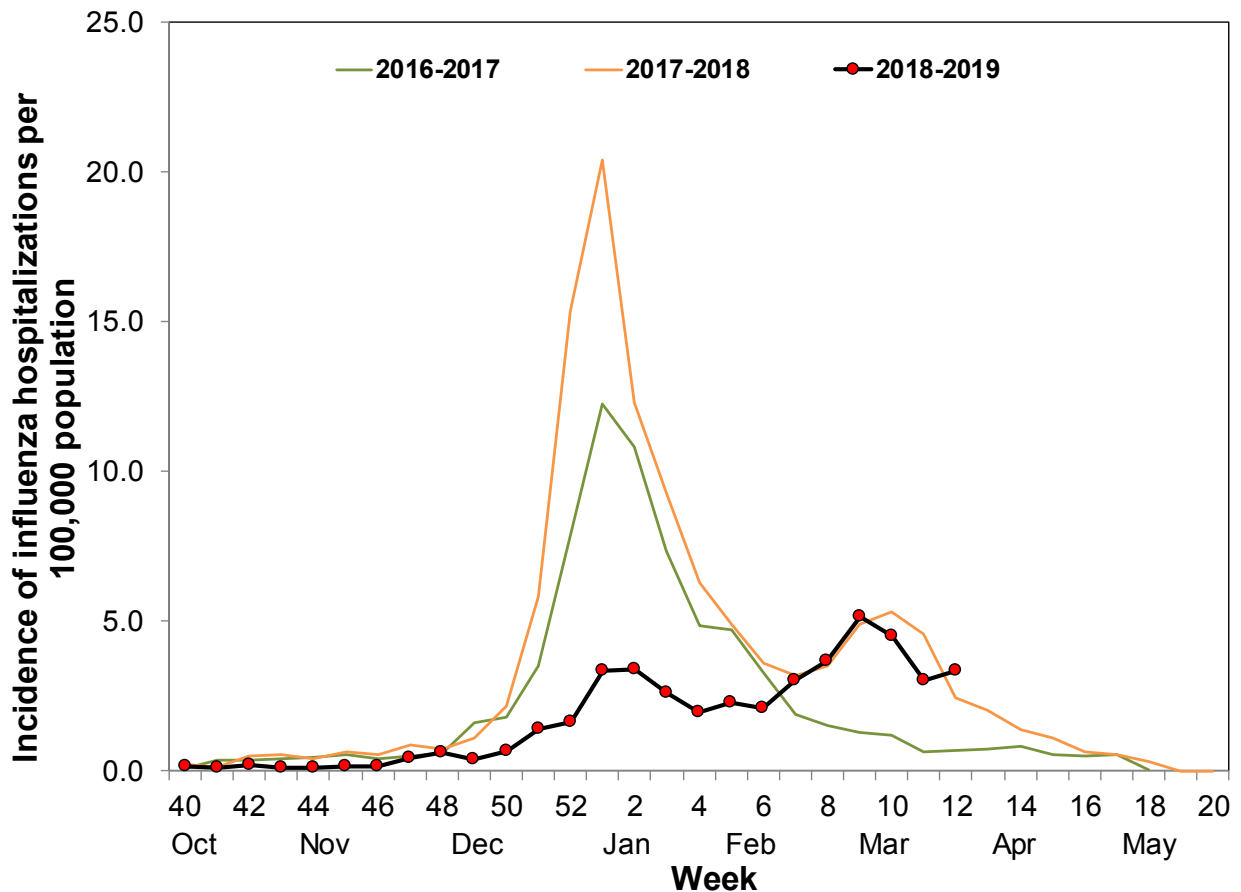


3. Influenza-Associated Hospitalizations, California Emerging Infections Program

The California Emerging Infections Program (CEIP), Influenza Surveillance Network (FluSurv-NET) conducts population-based surveillance for laboratory-confirmed influenza-associated hospitalizations among patients of all ages in Alameda, Contra Costa, and San Francisco counties.

The incidence of influenza-associated hospitalizations per 100,000 population was higher in Week 12 (3.32) compared to Week 11 (3.03) (Figure 4). Data for the most recent two weeks are not presented because results are still being collected and are likely to change.

Figure 4. Incidence of Influenza Hospitalizations in CEIP Counties, 2016–2019

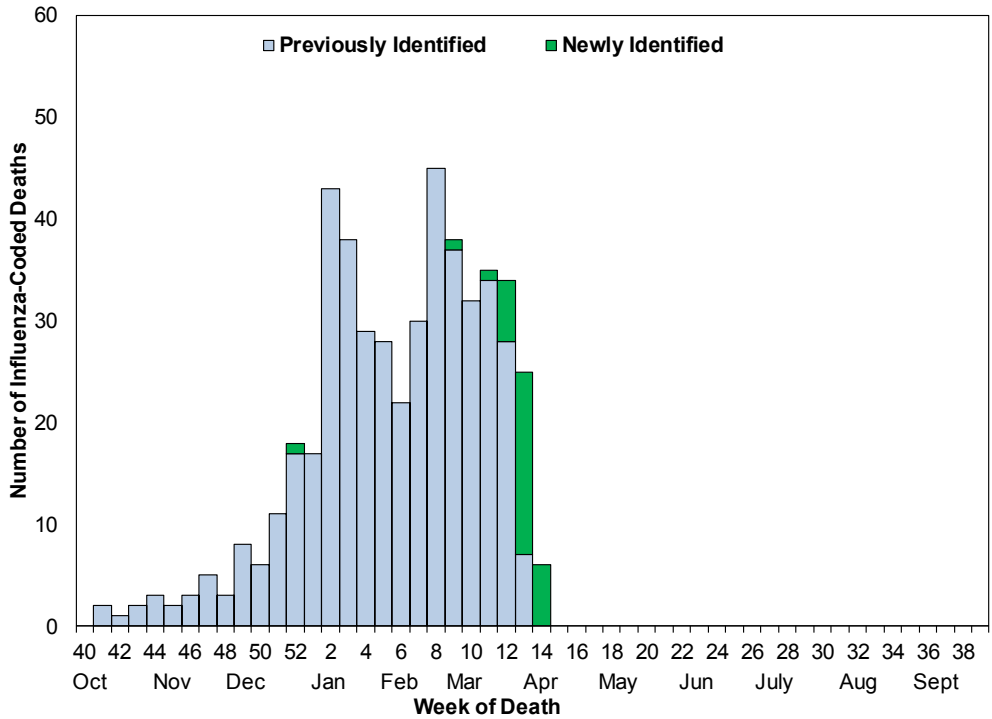


4. Influenza Mortality Surveillance from Death Certificates

Deaths occurring in California among residents who had influenza noted in any cause of death field on the death certificate (text or coded) are defined as influenza-coded deaths. The percentage of influenza-coded deaths is calculated by dividing the number of influenza-coded deaths by the total number of all cause deaths during the same period. Influenza-coded deaths are not necessarily laboratory-confirmed and are an underestimate of all influenza-associated deaths.

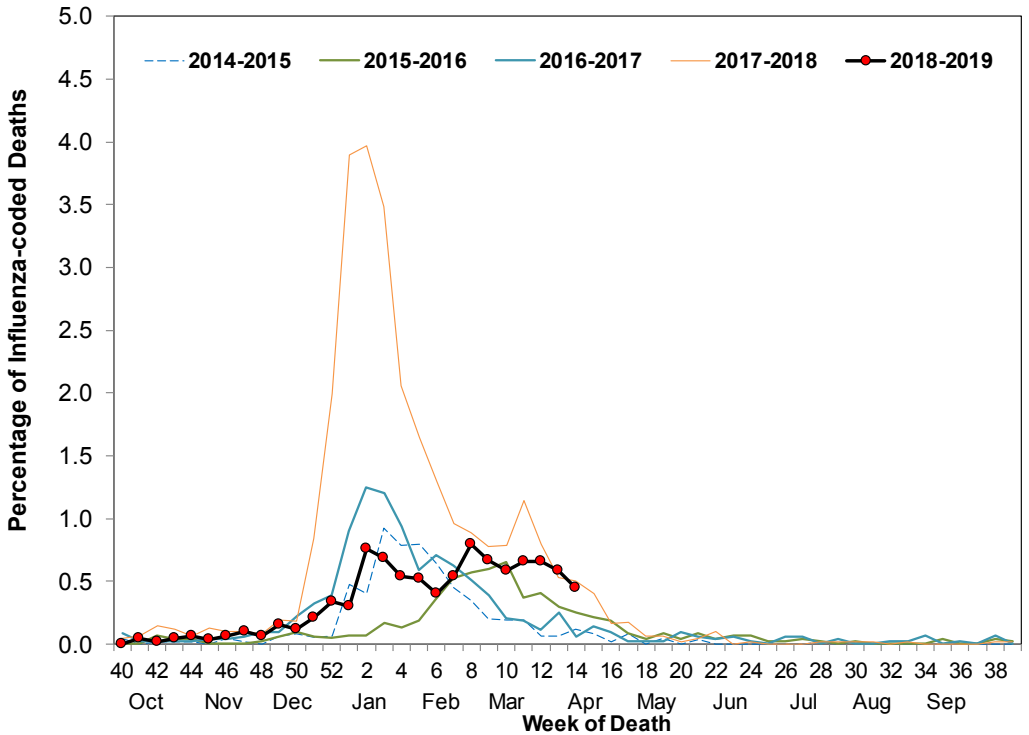
During Week 14, 33 new influenza-coded deaths were identified. To date during the 2018–2019 influenza season, 486 influenza-coded deaths have been identified (Figure 5). The percentage of deaths coded as influenza during Week 14 was 0.4% compared to 0.6% during Week 13 (Figure 6).

Figure 5. Number of Influenza-coded Deaths Identified from Death Certificates by Week of Death, 2018–2019 Season



Note: Coding of deaths can be delayed by several weeks. Influenza-coded deaths will be included once enough information is available to identify them.

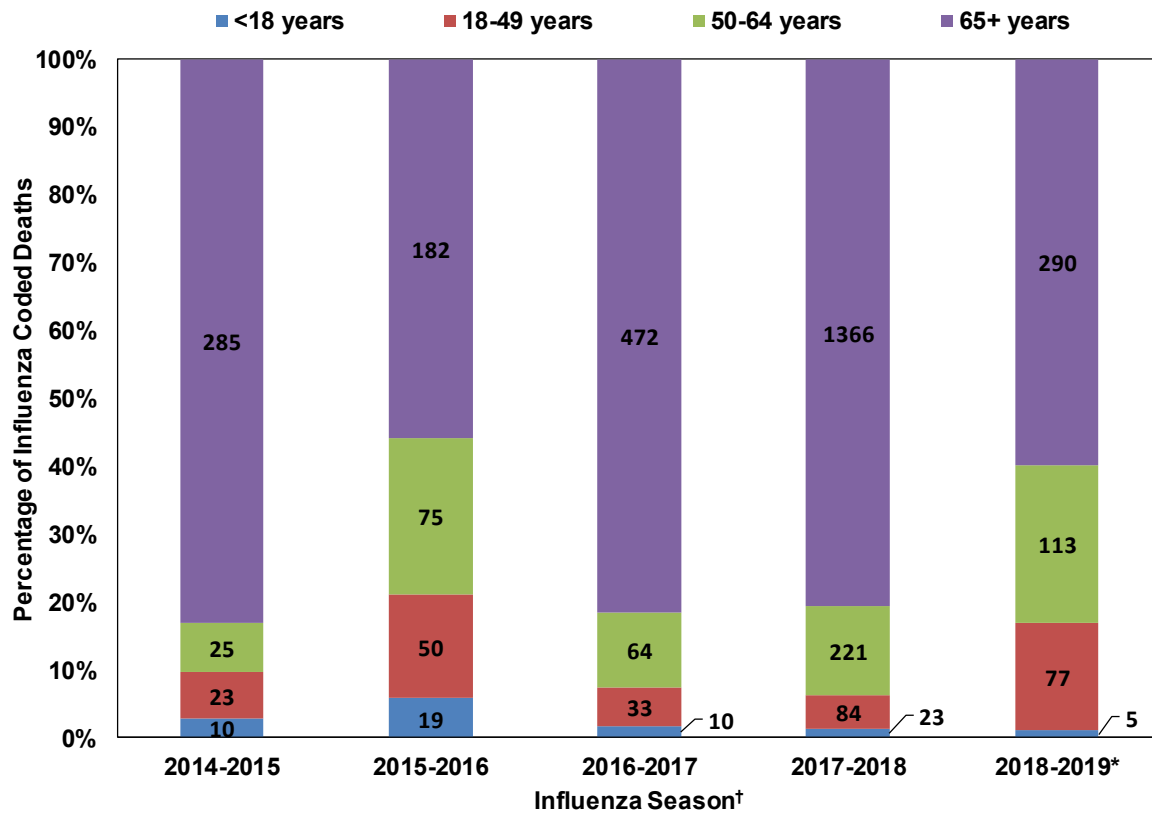
Figure 6. Percentage of Influenza-coded Deaths Occurring in California among California Residents, 2014–2019



Note: The 2014–15 season contains a week 53. Data have been shifted so that week 1 aligns across years.

To date, fewer deaths have occurred among persons <65 years of age (40.1%) than among persons ≥65 years of age during the 2018–2019 influenza season; however, the percentage of deaths occurring among persons <65 years of age is consistent with other seasons during which influenza A (H1N1)pdm09 has circulated in greater numbers, such as the 2015–2016 season (Figure 7).

Figure 7. Age Distribution of Influenza-coded Deaths Occurring in California among California Residents, 2014–2015 Season through 2018–2019 Seasons



*One death during the 2018–2019 influenza season has unknown age and is not included in the figure.

†2014–2015 influenza season: September 28, 2014–October 3, 2015; influenza A (H3N2) predominant season

2015–2016 influenza season: October 4, 2015–October 1, 2016; mixed influenza A and influenza B season

2016–2017 influenza season: October 2, 2016–September 30, 2017; influenza A (H3N2) predominant season

2017–2018 influenza season: October 1, 2017–September 29, 2018; influenza A (H3N2) predominant season

2018–2019 influenza season: September 30, 2018–September 28, 2019; influenza A (H1N1)pdm09 most common virus to date

5. Laboratory-Confirmed Severe Influenza-associated Pediatric Deaths

Influenza-associated deaths in children <18 years of age are nationally notifiable. The weekly influenza report includes confirmed deaths formally reported to CDPH through April 6, 2019 (Week 14).

One laboratory-confirmed influenza-associated fatality in a child <18 years of age was reported to CDPH during Week 14. To date, CDPH has received six reports of laboratory-confirmed influenza-associated deaths among persons <18 years of age during the 2018–2019 influenza season.

B. Laboratory Update – Influenza

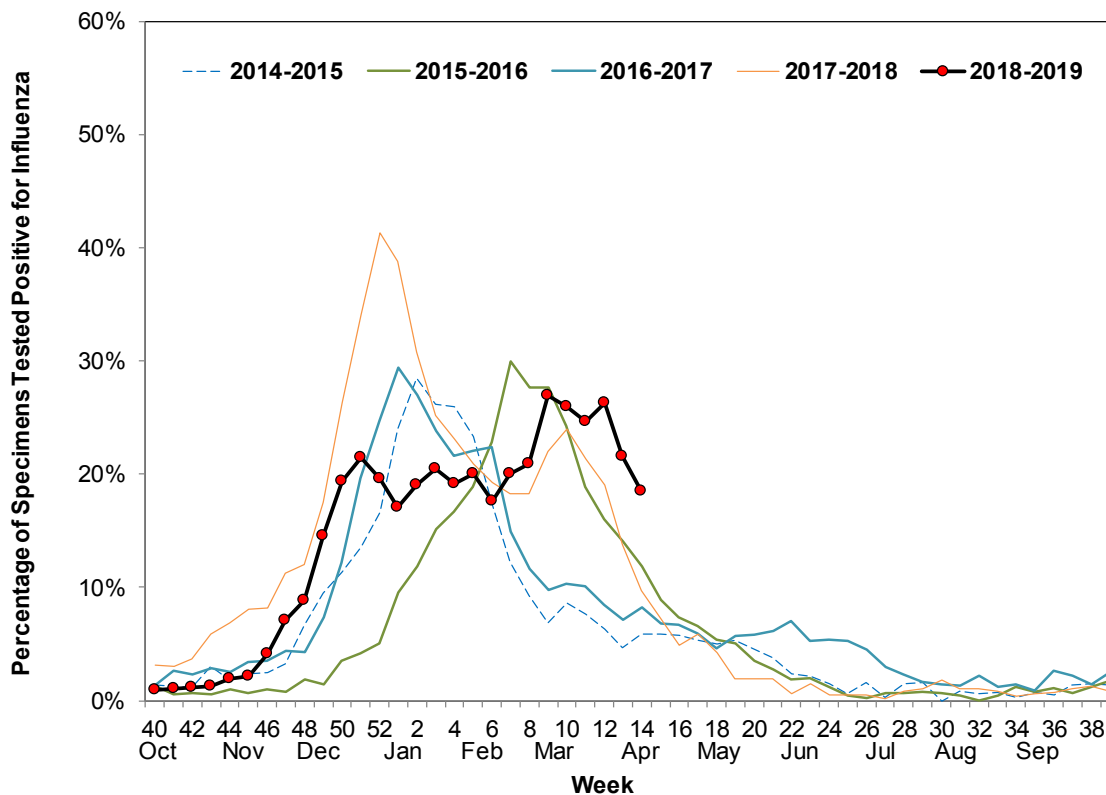
1. Respiratory Laboratory Network (RLN) and Clinical Sentinel Laboratory Surveillance Results

Laboratory surveillance for influenza and other respiratory viruses involves the use of data from clinical sentinel laboratories (hospital, academic, and private laboratories) and public health laboratories in the Respiratory Laboratory Network located throughout California. These laboratories report the number of laboratory-confirmed influenza and other respiratory virus detections and isolations on a weekly basis.

The overall percentage of influenza detections in clinical sentinel laboratories in Week 14 (18.5%) was lower than Week 13 (21.6%) (Figure 8). Additional details, including influenza typing and subtyping information from public health laboratories can be found in Figures 8 and 9 and Tables 1 and 2.

Neither the RLN nor CDPH-VRDL has identified any influenza viruses by polymerase chain reaction (PCR) that are suggestive of a novel influenza virus.

Figure 8. Percentage of Influenza Detections at Clinical Sentinel Laboratories, 2014–2019



Note: The 2014–15 season contains a week 53. Data have been shifted so that week 1 aligns across years.

Figure 9. Number of Influenza Detections by Type and Subtype Detected in the Respiratory Laboratory Network, 2017–2019

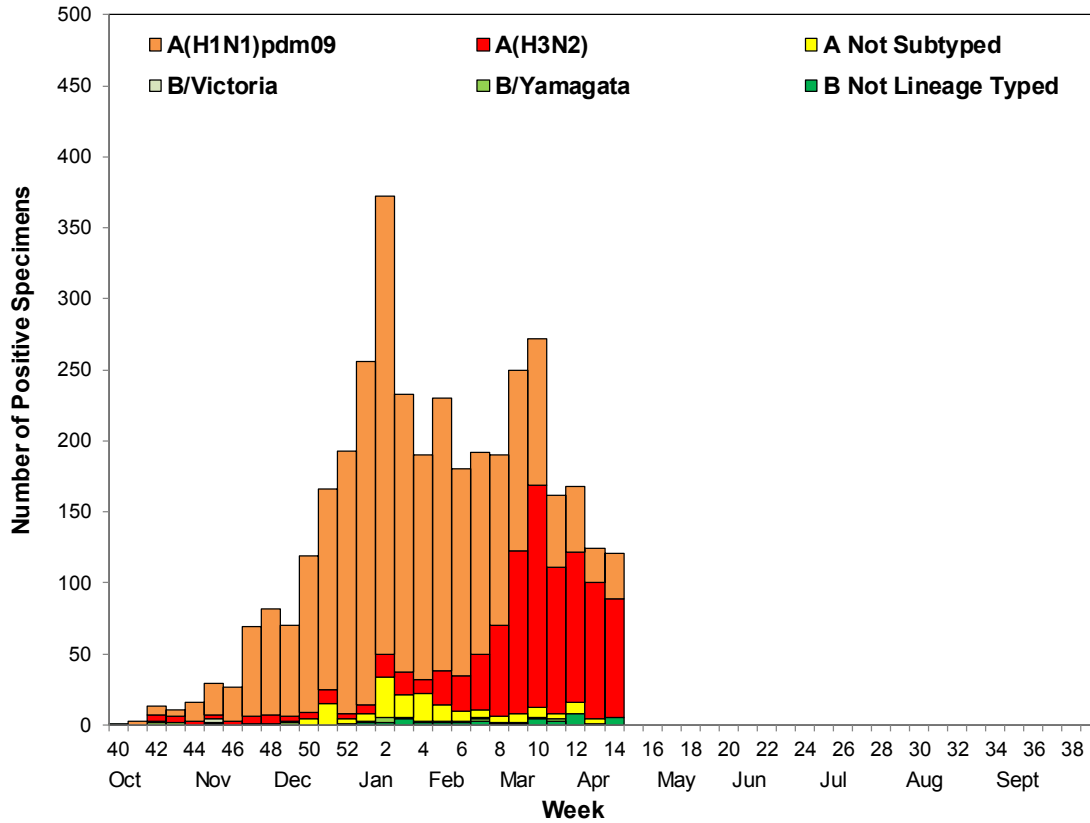


Table 1. Respiratory Specimens Testing Positive for Influenza — Clinical Sentinel Laboratories, Current Week and Season to Date

	Current Week Number	Current Week Percent	Season to Date Number	Season to Date Percent
Number of Specimens Tested	3,898		101,561	
Influenza Positive	722	18.5	18,513	18.2
A	700	97.0*	18,192	98.3*
B	22	3.0*	321	1.7*

* Percent of specimens positive for influenza

Table 2. Respiratory Specimens Testing Positive for Influenza by Influenza Type and Subtype — Respiratory Laboratory Network, Current Week and Season to Date

	Current Week Number	Current Week Percent	Season to Date Number	Season to Date Percent
Influenza Positive	121		3,736	
A	116	95.9*	3,668	98.2*
A (H1)pdm09	32	27.6†	2,608	71.1†
A (H3)	84	72.4†	908	24.8†
A (H3) and A (H1)pdm09	0	0.0†	3	0.1†
A, not subtyped	0	0.0†	149	4.1†
B	5	4.1*	68	1.8*
B Victoria	0	0.0‡	8	11.8‡
B Yamagata	0	0.0‡	17	25.0‡
B, not lineage typed	5	100.0‡	43	63.2‡

* Percent of specimens positive for influenza

† Percent of influenza A positives

‡ Percent of influenza B positives

2. Antiviral Resistance Testing

Of the influenza specimens tested by the CDPH-VRDL to date this season, one influenza A (H1)pdm09 virus has been found to be resistant to Oseltamivir (Table 3).

Table 3. Number of Specimens Tested for Oseltamivir Resistance, 2018–2019

	Oseltamivir Resistance
Influenza A (H1)pdm09	1/92
Influenza A (H3)	0/46
Influenza B	0/9

3. Influenza Virus Strain Characterization

To date in California, all influenza A (H1)pdm09 and A (H3) antigenically characterized viruses have matched their respective influenza A (H1)pdm09 and A (H3) components included in the trivalent and quadrivalent influenza vaccines (Table 4). In addition, all influenza B antigenically characterized viruses in California have matched the influenza B Yamagata lineage virus included in the quadrivalent influenza vaccine.

Influenza A (H3) viruses are being detected both nationally and in California. Genetic analysis shows that many of these belong to a new clade of influenza A (H3) viruses. This A (H3) clade is not antigenically well-matched to the influenza A (H3) component of this season's influenza vaccines. Antigenic characterization of influenza viruses has a substantial delay in results availability; thus, results presented in Table 4 below might not reflect viruses currently circulating in California. For more information on circulating influenza A (H3) clades, please see the [CDC Influenza Report](#).

Table 4. Number of Influenza Viruses Antigenically Characterized that Matched Vaccine Strains — California and the United States, 2018–2019

Influenza Subtype/Lineage	Vaccine Strain	California	United States
Influenza A (H1)pdm09	A/Michigan/45/2015-like	23/23	283/292
Influenza A (H3)	A/Singapore/INFIMH-16-0019 /2016-like	11/11	156/272
Influenza B Victoria*	B/Colorado/06/2017-like	0/0	63/83
Influenza B Yamagata†	B/Phuket/3073/2013-like	3/3	100/100

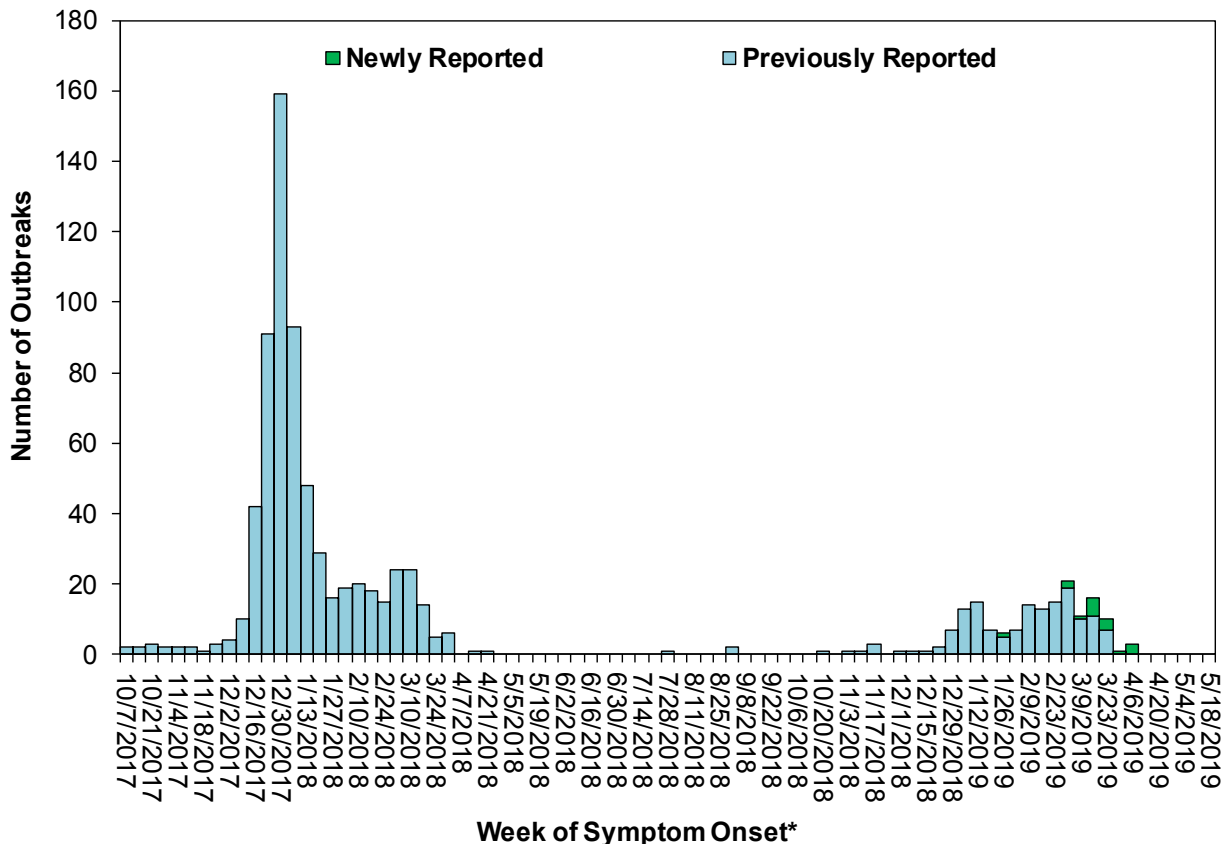
* The influenza B Victoria lineage virus is included in both the 2018–2019 trivalent and quadrivalent influenza vaccines

† The influenza B Yamagata lineage virus is included in only the 2018–2019 quadrivalent influenza vaccine

D. Influenza-Associated Outbreaks

Sixteen laboratory-confirmed influenza outbreaks were reported to CDPH during Week 14. To date, 170 laboratory-confirmed influenza outbreaks have been reported to CDPH for the 2018–2019 season.

Figure 10. Number of Laboratory-Confirmed Influenza-Associated Outbreaks by Week of First Onset, 2017–2019



*Earliest date associated with the outbreak was used for outbreaks without reported date of first patient's symptom onset.

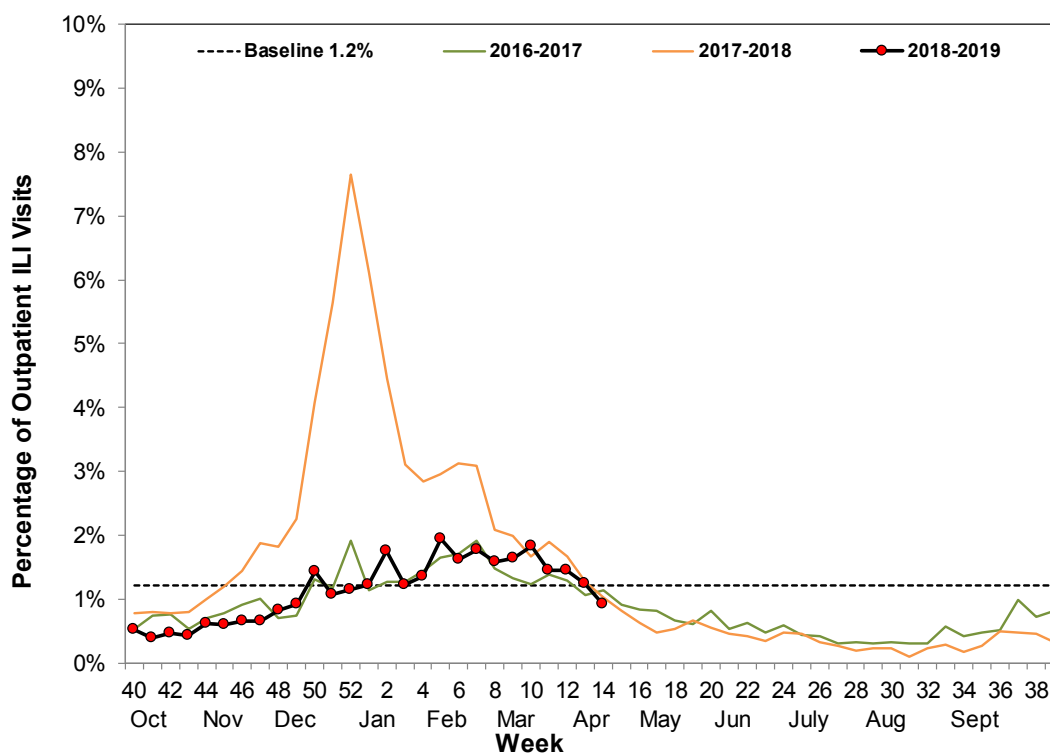
E. California Border Region Influenza Surveillance Network Data

The border influenza surveillance network is comprised of outpatient provider sentinel sites whose geographical coverage extends approximately 100 kilometers (60 miles) north of the California-Baja California border and includes Imperial and San Diego Counties, as well as some parts of Riverside County.

1. Syndromic Surveillance Update

A total of 15 border region sentinel providers reported data during Week 14. The total number of patients screened by all sentinel sites for ILI during Week 14 was 10,731. Outpatient ILI activity was 0.9% in Week 14. ILI activity for the California border region during Week 14 was lower when compared to activity for the same week during the 2016–2017 season and the 2017–2018 season (Figure 11). All influenza syndromic data summarized for the border region represent a subset of CDC influenza sentinel providers in California.

Figure 11. Percentage of Influenza-like Illness Visits among Patients Seen by Sentinel Providers – California Border Region, 2016–2019



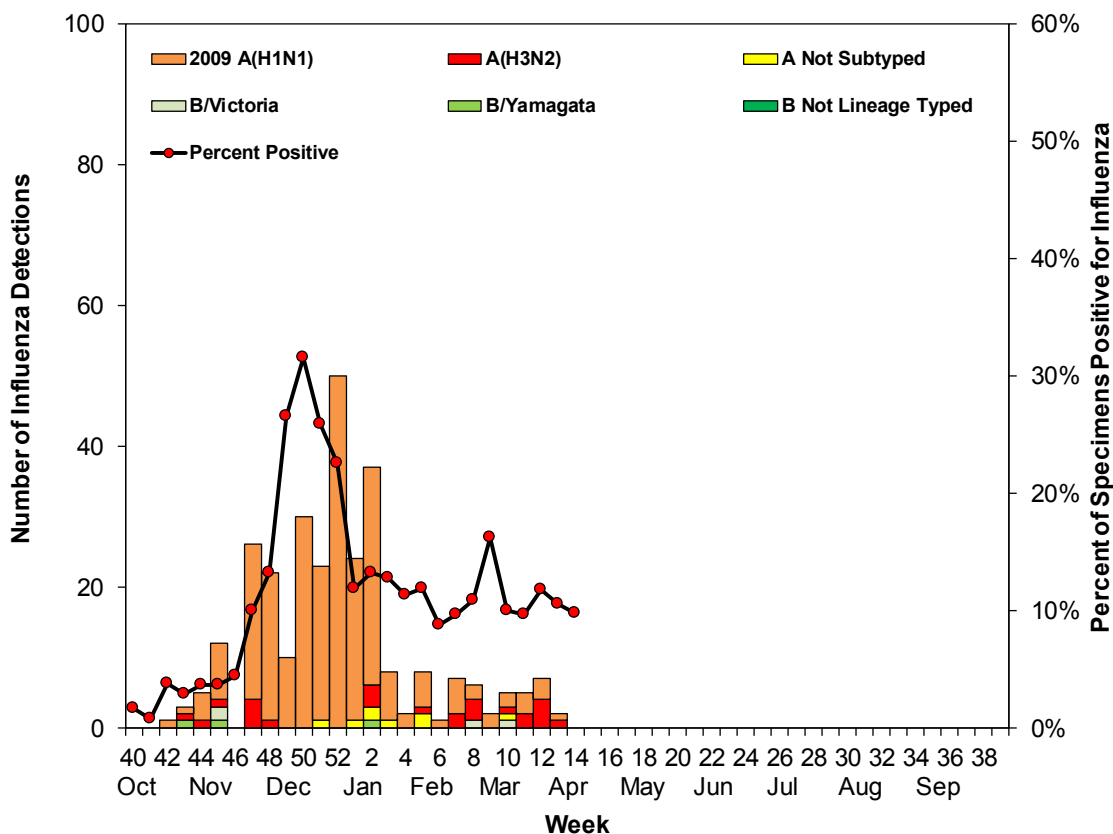
2. Virologic Surveillance Update

During Week 14, 359 respiratory specimens were tested from border region sentinel clinical laboratories; of these, 35 (9.7%) tested positive for influenza (30 [85.7%] influenza A and five [14.3%] influenza B). Cumulatively this season, a total of 10,683 respiratory specimens were tested from border region sentinel clinical laboratories; of these, 1,509 (14.1%) tested positive for influenza (1,448 [96.0%] influenza A; 61 [4.0%] influenza B).

Respiratory specimen result data from Week 14 has not yet been received from border region RLN laboratories. Cumulatively this season, a total of 296 influenza positive specimens have been detected at border region RLN laboratories; of which, 289 (97.6%) were influenza A and seven (2.4%) were influenza B. Of the 289 specimens that tested positive for influenza A at RLN laboratories, 256 (88.6%) were subtyped as A (H1)pdm09, 25 (8.7%) as A (H3), and eight (2.8%) had no further subtyping performed. Of the seven specimens that tested positive for influenza B, three (42.9%) were lineage typed as B (Yamagata) and four (57.1%) were lineage typed as B (Victoria).

Laboratory data summarized in Figure 12 include data from border region influenza clinical sentinel laboratories (percentage of specimens testing positive for influenza) as well as data from border region RLN laboratories (influenza type and subtype/lineage type).

Figure 12. Number of Influenza Detections by Type and Subtype Detected in Respiratory Laboratory Network Laboratories and the Percentage of Specimens Testing Positive at Clinical Sentinel Laboratories — California Border Region, 2018–2019



F. Other Respiratory Viruses

1. Laboratory-Confirmed Severe Respiratory Syncytial Virus Case Reports

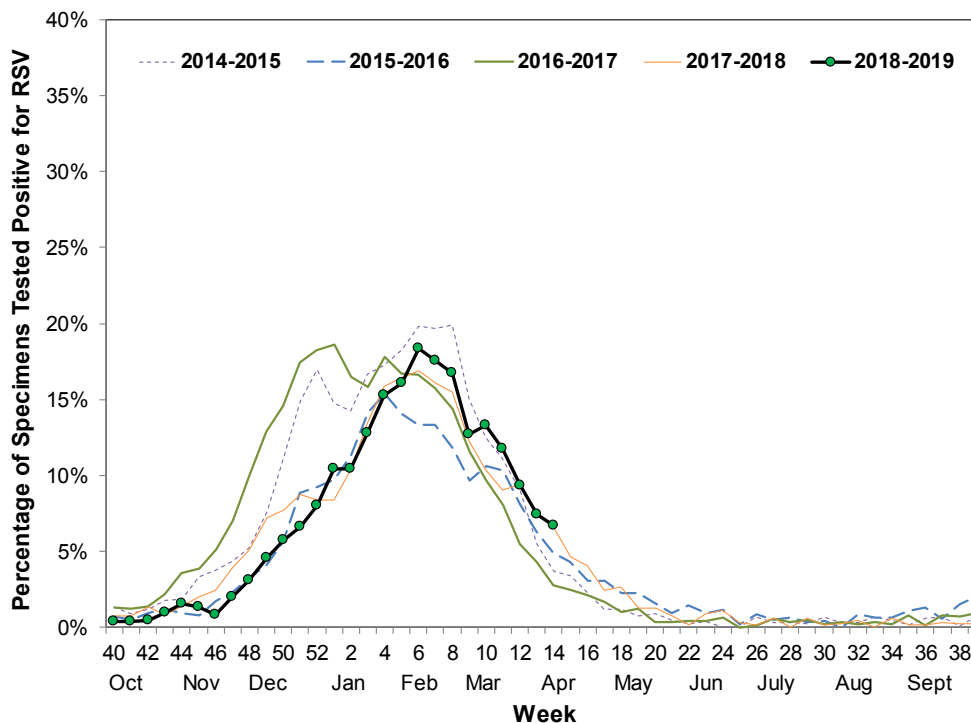
Currently, as mandated under Section 2500 of the California Code of Regulations, deaths among children aged 0–4 years with laboratory-confirmed respiratory syncytial virus (RSV) are reportable to CDPH. The weekly influenza report includes confirmed deaths formally reported to CDPH through April 6, 2019 (Week 14).

No laboratory-confirmed RSV fatalities in children <5 years of age were reported to CDPH during Week 14. To date, CDPH has received three reports of laboratory-confirmed RSV-associated deaths among children <5 years of age during the 2018–2019 influenza season.

2. Other Respiratory Virus Laboratory Update

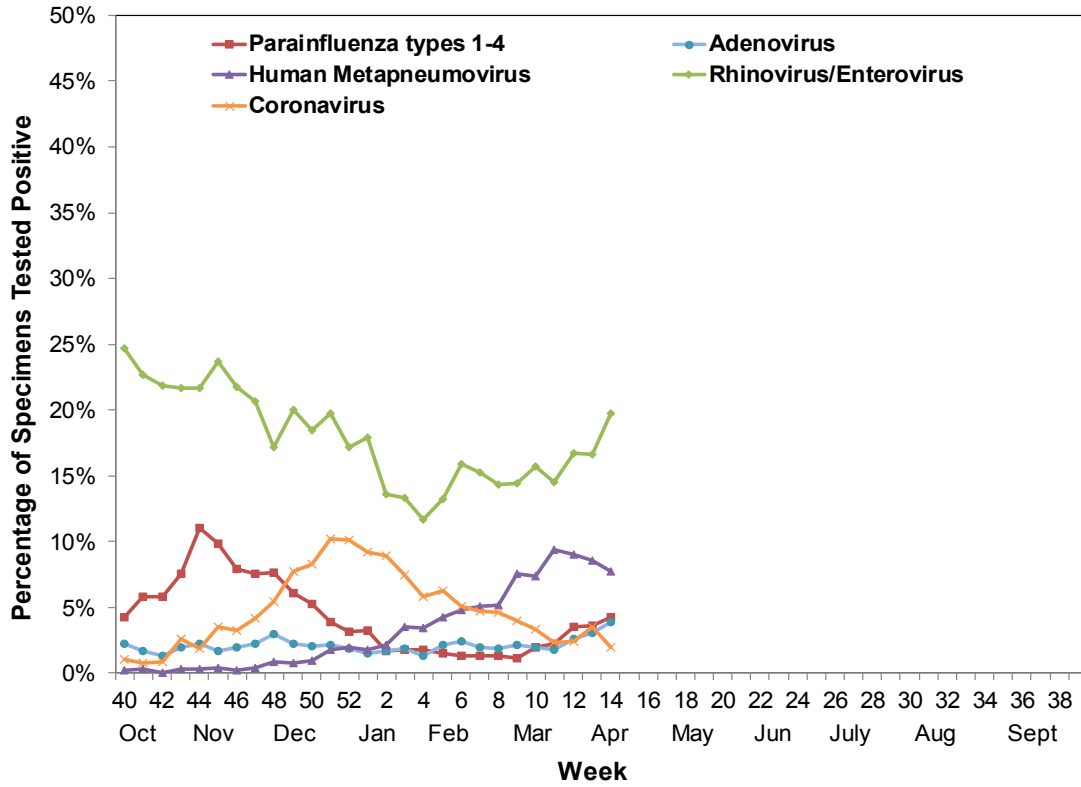
During Week 14, 3,474 specimens were tested for RSV and 232 (6.7%) were positive, which is lower than Week 13 (7.4%) (Figure 13). During Week 14, rhinovirus/enterovirus, parainfluenza, and adenovirus activity increased; coronavirus and human metapneumovirus activity decreased. (Figure 14).

Figure 13. Percentage of RSV Detections at Clinical Sentinel Laboratories, 2014–2019



Note: The 2014–15 season contains a week 53. Prior years' data have been shifted so that week 1 aligns across years.

Figure 14. Percentage of Other Respiratory Pathogen Detections at Clinical Sentinel Laboratories, 2018–2019



Activity Levels:

No Activity: No laboratory-confirmed cases of influenza and no reported increase in the number of cases of ILI.

Sporadic: Small numbers of laboratory-confirmed influenza cases or a single laboratory-confirmed influenza outbreak has been reported, but there is no increase in cases of ILI.

Local: Outbreaks of influenza or increases in ILI cases and recent laboratory-confirmed influenza in a single region of the state.

Regional: Outbreaks of influenza or increases in ILI and recent laboratory confirmed influenza in at least two but less than half the regions of the state with recent laboratory evidence of influenza in those regions.

Widespread: Outbreaks of influenza or increases in ILI cases and recent laboratory-confirmed influenza in at least half the regions of the state with recent laboratory evidence of influenza in the state.

California Regions:

Northern: Alpine, Amador, Butte, Colusa, Del Norte, El Dorado, Glenn, Humboldt, Lake, Lassen, Mendocino, Modoc, Nevada, Placer, Plumas, Sacramento, Shasta, Sierra, Siskiyou, Sutter, Tehama, Trinity, Yolo, and Yuba counties

Bay Area: Alameda, Contra Costa, Marin, Napa, Solano, San Francisco, San Mateo, Santa Clara, Santa Cruz, and Sonoma counties

Central Valley: Calaveras, Fresno, Inyo, Kings, Mono, Madera, Mariposa, Merced, Monterey, San Benito, San Joaquin, Stanislaus, Tulare, and Tuolumne counties

Upper Southern: Kern, Los Angeles, San Luis Obispo, Santa Barbara, and Ventura counties

Lower Southern: Imperial, Orange, Riverside, San Bernardino, and San Diego counties

For questions regarding influenza surveillance and reporting in California, please email InfluenzaSurveillance@cdph.ca.gov. This account is monitored daily by several epidemiologists.

To obtain additional information regarding influenza, please visit the [CDPH influenza website](https://www.cdph.ca.gov/Programs/CID/DCDC/Pages/Immunization/Influenza.aspx) (<https://www.cdph.ca.gov/Programs/CID/DCDC/Pages/Immunization/Influenza.aspx>).

A copy of the case report form for reporting any laboratory-confirmed influenza case that was either admitted to the ICU or died can be downloaded from the [CDPH influenza website](https://www.cdph.ca.gov/Programs/CID/DCDC/Pages/Immunization/Influenza.aspx) (<https://www.cdph.ca.gov/Programs/CID/DCDC/Pages/Immunization/Influenza.aspx>).

For information about national influenza activity, please visit the Centers for Disease Control and Prevention's [FluView](https://www.cdc.gov/flu/weekly/index.htm) (<https://www.cdc.gov/flu/weekly/index.htm>) and [FluView Interactive](https://www.cdc.gov/flu/weekly/fluviewinteractive.htm) (<https://www.cdc.gov/flu/weekly/fluviewinteractive.htm>) websites.

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