



Emerging Infections Newsletter for Clinicians

Nov. 29, 2023

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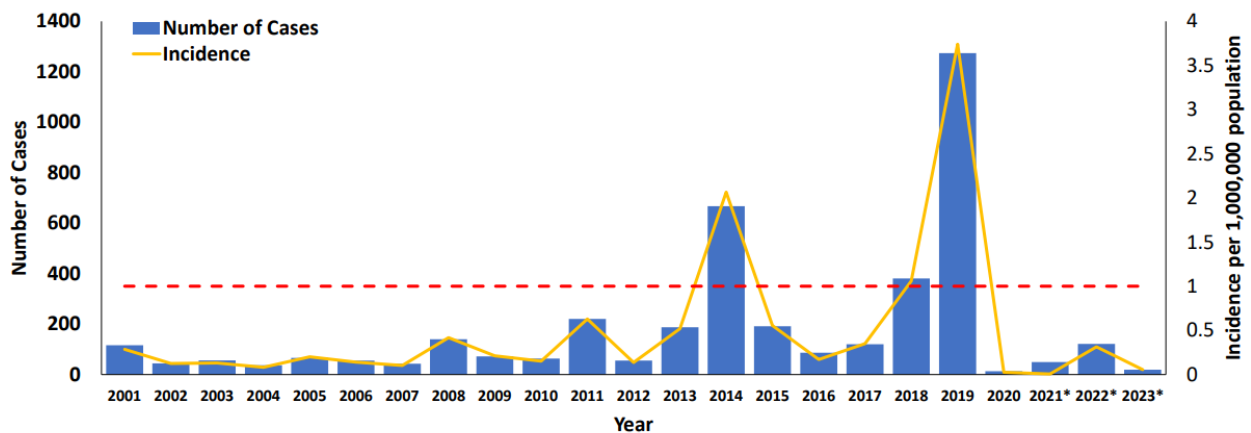
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Measles (Rubeola)

- Measles remains the most contagious, airborne-transmitted virus known to infect people. Measles vaccine is extremely effective and safe, but vaccination coverage has been declining in multiple areas of the world.
- The WHO estimates that 33 million children in the world did not receive two doses of the measles vaccine in 2022, with most of those never even receiving their first dose. [From 2021 to 2022](#), estimated cases of measles increased by 18% and deaths by 43%.
- In the United States, 41 cases have been reported in 2023 up to Nov. 2. For comparison, [Europe](#) has reported 1,331 cases of measles in the first 9 months of 2023.
- Most cases in the United States do not lead to outbreaks because of the rapid implementation of control measures by local and state health departments.
- The [graph](#) below shows that 2023 is about the same as 2021. Note that in [2019](#), there were 1,274 confirmed cases reported in 31 different states, mostly among unvaccinated persons.
- Misinformation resulted in under-vaccinated, vulnerable communities and disease transmission.

Number of reported measles cases, United States, 2001–2023

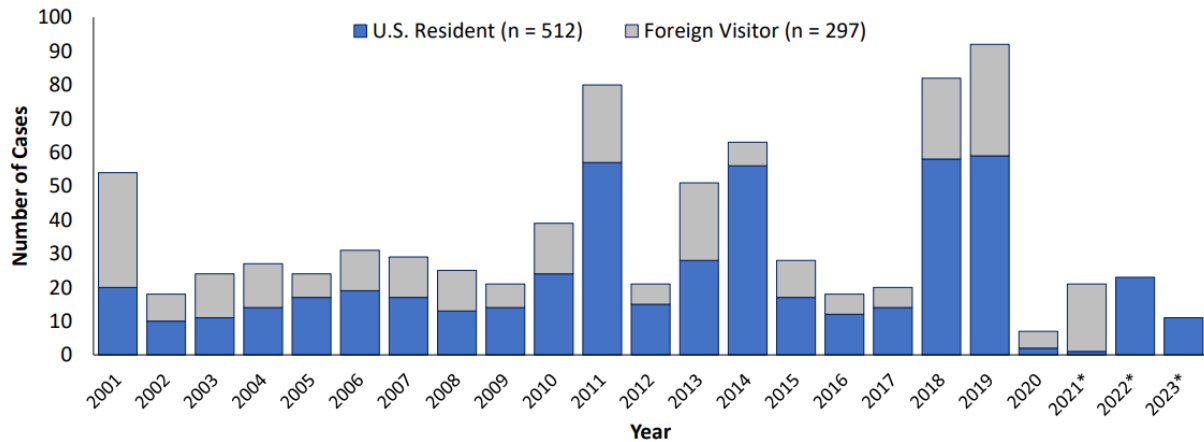


2001–2022: Median of 79 cases/year (range: 13–1,274)

- The CDC graph below demonstrates that most cases of measles are primarily in unvaccinated U.S. residents (blue bars) traveling abroad. The five most common travel locations were India, the Philippines, China, Pakistan and the UK.

Measles cases are imported primarily by unvaccinated U.S. residents traveling abroad

- Median 26 importations per year (range: 7–92)



512 (63%) importations among US residents

- The most important step in preventing an outbreak is vaccination. Second is recognition of a case.
 - Most commonly, the patient spent time within the prior 3 weeks in an area where measles frequently circulates or had contact with travelers from such an area.
 - The patient is usually under-vaccinated (received less than two doses of the MMR vaccine) or immunocompromised/immunosuppressed due to
 - ✦ Uncontrolled HIV
 - ✦ Stem cell or organ transplant
 - ✦ Alkylating agents
 - ✦ Corticosteroids



- Classically, measles starts with a fever, often up to 104° F plus the three “C’s”—cough, coryza and conjunctivitis. Three to five days after symptom onset, a nonpruritic, maculopapular rash starts on the face and spreads down the body. Koplik’s spots (see figure) may be seen within the oral cavity prior to the prodromal illness.
- As with every other infectious disease, variations in presentation occur. The rash also may be more difficult to detect in persons with darker skin coloring.
- Implement airborne isolation for all suspected cases. Immediately contact the local health department for guidance and testing assistance.
- Diagnosis—acute disease
 - Requires both molecular testing and serology
 - Nasopharyngeal or oropharyngeal swab for pcr to rubeola—testing through health department
 - Urine for pcr for rubeola—testing through health department
 - Blood test for rubeola IgG and IgM serology

- ✦ False positive IgM titers are common and should not be used alone for diagnosis
- Diagnosis—immunity
 - Rubeola IgG titer
- **Take-home measles**
 - Measles presents an ongoing threat of re-introduction into the United States. Measles presents an ongoing threat of re-introduction into the United States. A highly vaccinated population is our best protection. Most imported cases of measles in the U.S. are primarily in unvaccinated, U.S. residents who travelled abroad.
 - Measles usually presents with high fevers, the 3 C's and a subsequent descending maculopapular eruption, but atypical presentations are possible, and the rash can be difficult to see in persons with darker skin colors.
 - Diagnosis of acute disease requires both serology and molecular testing. Do not order a rubeola IgM titer as a single diagnostic test.
 - Immediately place all suspected cases in airborne precautions and notify the health department to discuss and get approval for molecular testing.

Respiratory Infections in China

- China is experiencing a surge of pediatric respiratory infections including undiagnosed pneumonia and increased hospitalizations.
- Initially when the WHO asked for more disease information, [China's](#) response was non-specific, saying that there are no unusual pathogens.
- It is being attributed to a rebound in disease since this is the first winter in China without the strict COVID restrictions that were lifted last December.
- After additional follow-up by the [WHO](#), confirmation was made that the infections being identified are *Mycoplasma pneumoniae*, RSV, SARS-CoV-2 and influenza. No unusual new threats have been identified.

Chlorine Fails to Kill *C. difficile* Spores

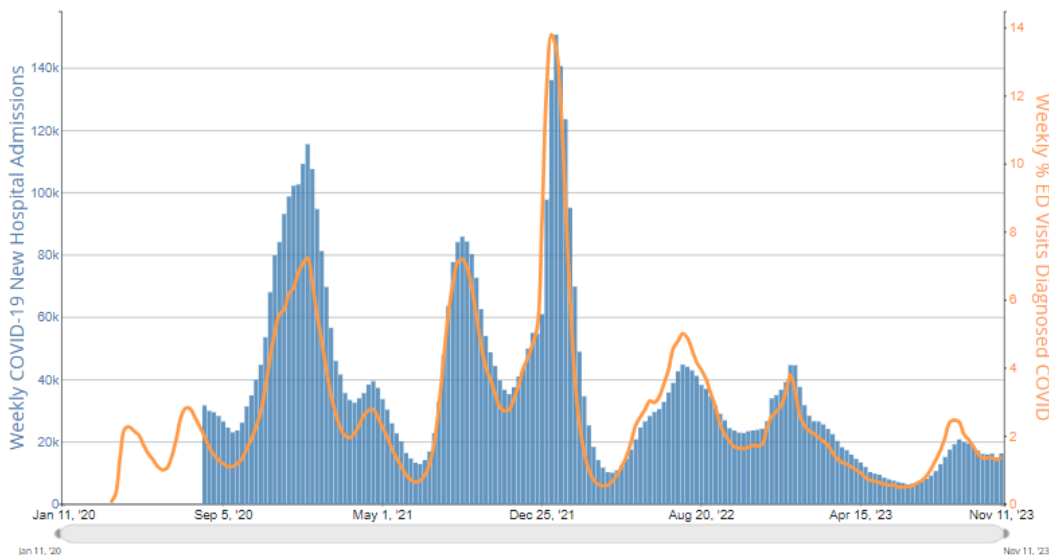
- *C. difficile* has been listed by the CDC as an urgent threat of antibiotic resistance. While infection is mostly identified in healthcare settings, it can be acquired in both healthcare and community environments.
- Spores are very resistant to killing. Quaternary ammonium compounds kill the germinated organisms but are ineffective against the metabolically inactive spores.
- Sodium hypochlorite is a sporicidal agent that is commonly used to clean surfaces possibly contaminated by *C. difficile*.
- [Microbiology](#), Nov. 21 published a United Kingdom study on the sporicidal activity of sodium hypochlorite bleach (NaOCl) and *C. difficile* spore survival. Free chlorine concentrations of 1,000, 5,000 and 10,000 ppm were tested utilizing a 10-minute dwell time. Three different *C. difficile* strains were used, two of which included the hypervirulent ribotype, RT027.
 - Methodologies included placing *C. difficile* spores at a concentration of $8 \log_{10}$ in a diluted bleach at the concentrations noted above for 10 minutes and then adding sodium thiosulfate to inactivate any residual bleach activity.
 - Spores exposed to water instead of NaOCl were used as a control. Spores were cultured and spore concentrations were decreased a maximum of $1 \log_{10}$. In addition, scanning electron microscopy did not identify any abnormalities in the surviving spores. Testing was also performed on surgical scrubs and patient gowns.
 - Bleach was found to not be any more effective at killing spores than water.

- Weaknesses of this study include the failure to look at the contribution of effective mechanical cleaning of surfaces, pH, and temperature.
- Additional studies need to be performed looking at genomic characteristics of the three strains tested and whether there is any associated antibiotic co-tolerance.
- **Take-Home Bleach and *C. difficile***
 - Bleach is a powerful, effective disinfectant but overuse, as we see with many other products, may lead to microbial tolerance. Additional studies need to be performed to validate these concerning results.

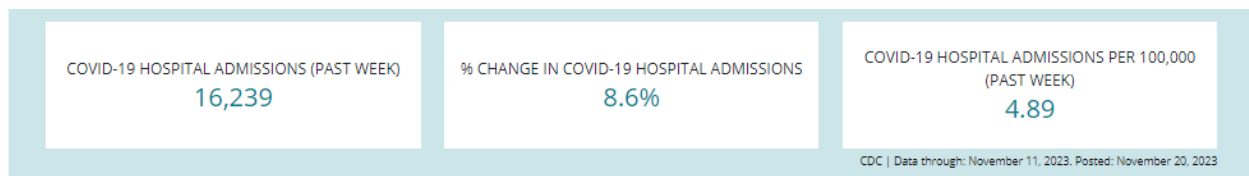
COVID-19

- [Hospitalizations](#) in the United States are a surrogate for the virulence of the circulating strain. The graph below and the subsequent table show:
 - Hospitalization rates (blue vertical bars) and percentage of patients being diagnosed with COVID in emergency departments (orange run line) are stable. Both of these measurements remain almost three times higher than the trough during the first week of July.

COVID-19 New Hospital Admissions and Percentage of Emergency Department (ED) Visits Diagnosed as COVID-19, by Week, in The United States, Reported to CDC

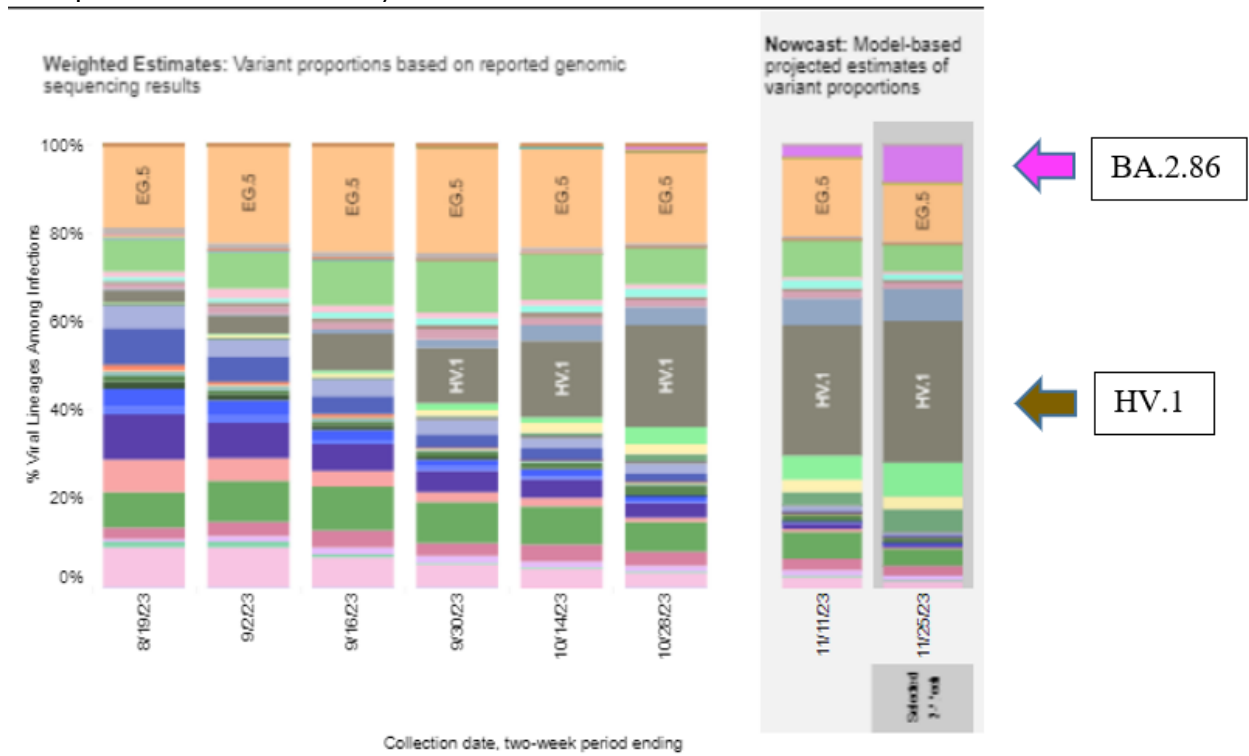


- The CDC tracks hospital admissions per 100,000 county population. Less than 10/100,000 is considered a low number of new hospital admissions. Nationally, rates remain below 5/100,000. The admissions percent change in the last week rose by the same amount that it had decreased in the prior week.



- [National genomic sequencing](#) is updated every 2 weeks by the CDC. The most recent information goes through Nov. 25 (graph below). HV.1 is still the most frequently sequenced isolate (brown arrow).

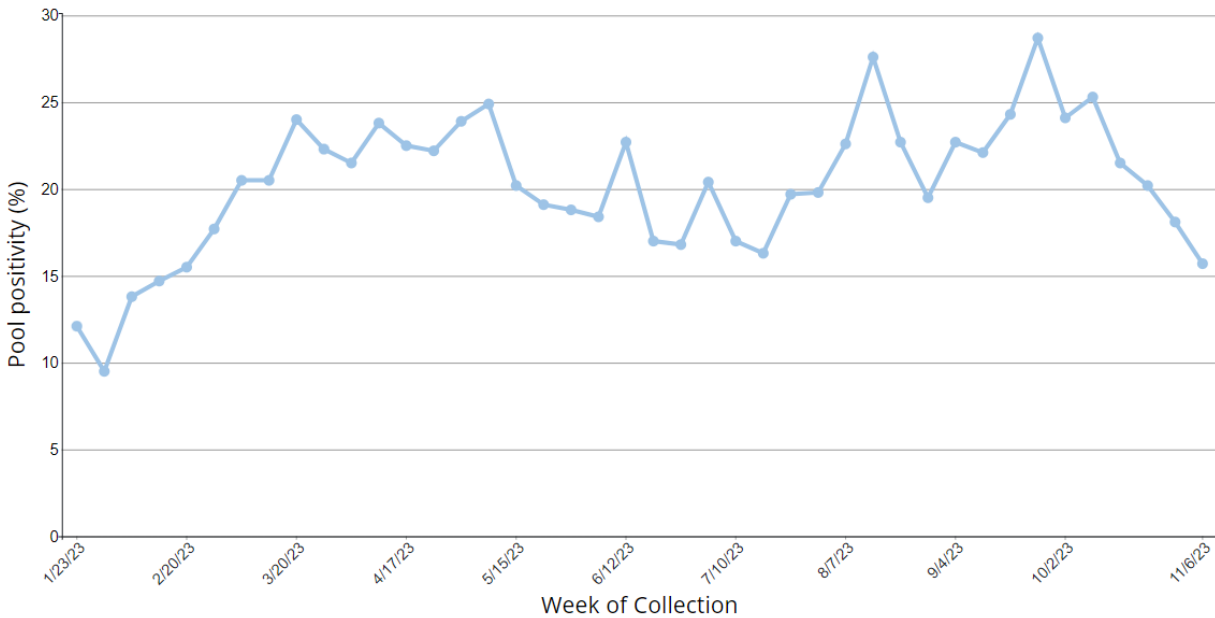
- BA.2.86 (pink arrow) has jumped up in the last 2 weeks and now comprises the third-most frequently sequenced isolate.
- Last August, this strain made news as a potential new surge threat. BA.2.86 has 34 more mutations than BA.2 (which led to a COVID surge in 2022) and 36 more than XBB.1 (peaked early 2023). Globally there has been a slow but steady increase in BA.2.86 from 1.8% to 8.9% in the last 4 weeks (ending Nov. 21).
 - Presentation and virulence appear to be similar to Omicron. Immune evasion may be higher than currently circulating variants and is thought to possibly be enough for BA.2.86 to peak at >50% prevalence.
 - However, immune escape from currently circulating variants, i.e., people who had recent infection, appears to be limited. In addition, sera from people who had Omicron in 2022 exhibited robust neutralizing activity against BA.2.86.
 - This suggests that the new monovalent vaccine should provide significant protection against severe disease.
 - BA.2.86 is listed as a [Variant of Interest](#) by both the European CDC and the WHO
 - The [WHO](#) reported Nov. 21 that the public health risk from this variant remains low, especially against severe disease. Diagnostic tests, treatments and vaccines are not expected to be affected by this variant.



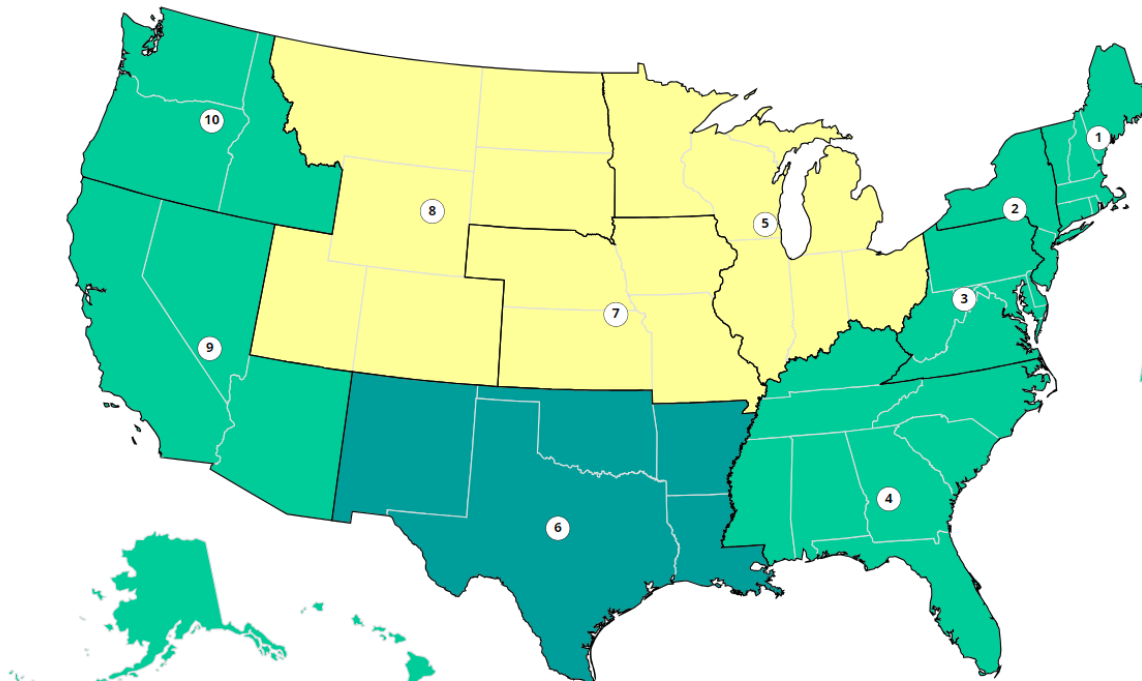
WHO label	Lineage #	%Total	95%PI
Omicron	HV.1	31.7%	28.3-35.2%
	EG.5	13.1%	11.8-14.7%
	BA.2.86	8.8%	4.8-15.2%
	JD.1.1	7.7%	5.8-10.0%
	HK.3	7.4%	6.0-9.1%
	FL.1.5.1	6.4%	5.4-7.6%
	JG.3	5.3%	3.7-7.5%
	XBB.1.16.6	4.0%	3.2-5.0%
	JF.1	2.8%	2.2-3.5%

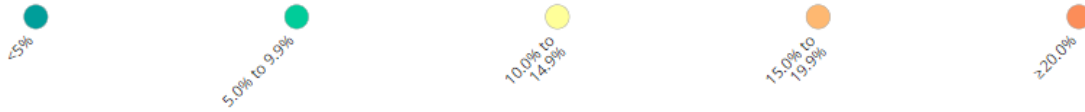
- Surveillance of international air travelers is conducted at several major U.S. airports as an early warning system and to fill gaps in worldwide genomic surveillance. It covers flights from more than 135 countries.
- The graph below finally shows a downward trend with the latest positivity rate just below 17%. One cannot conclude that this trend will continue.
- [Eleven](#) different strains (down from 15) were identified the week of Nov.16 (data not shown). BA.2.86 is now the most frequently sequenced international isolate at 21.2% (compared to 8.8% in the U.S.).

Positivity Rate for Pooled Samples, by Collection Week

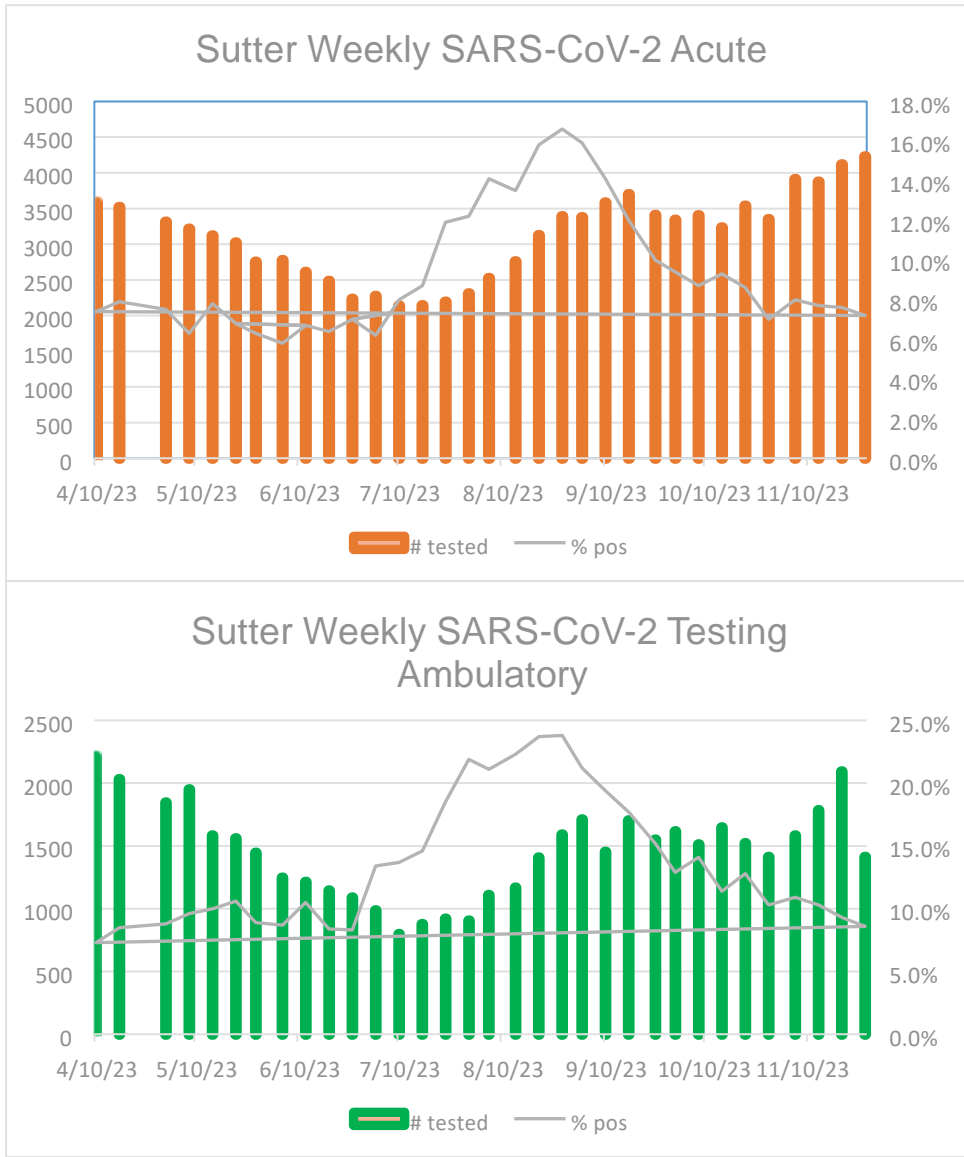


- The map below shows [national](#) molecular test positivity rates by region were updated through Nov.18. Region 9, including California, is now green instead of orange. This is more consistent with state and local data. Three regions (up from only one) are now yellow (10-14.9% positivity).





- Updated Sutter testing data below shows slowly decreasing positivity rates, well off of the peak reached over 2 months ago. Significant levels of testing are being performed in emergency departments and ambulatory environments.



- COVID-19 Take-Home:**
 - Hospitalizations, emergency department visits and Sutter testing positivity rates are all stable, but still elevated.
 - Although the most recent CDC genomic sequencing shows that HV.1 remains the most commonly identified variant in the United States, BA.2.86 is rapidly increasing and is believed to have the potential to become the overwhelming predominant variant in the next few months.

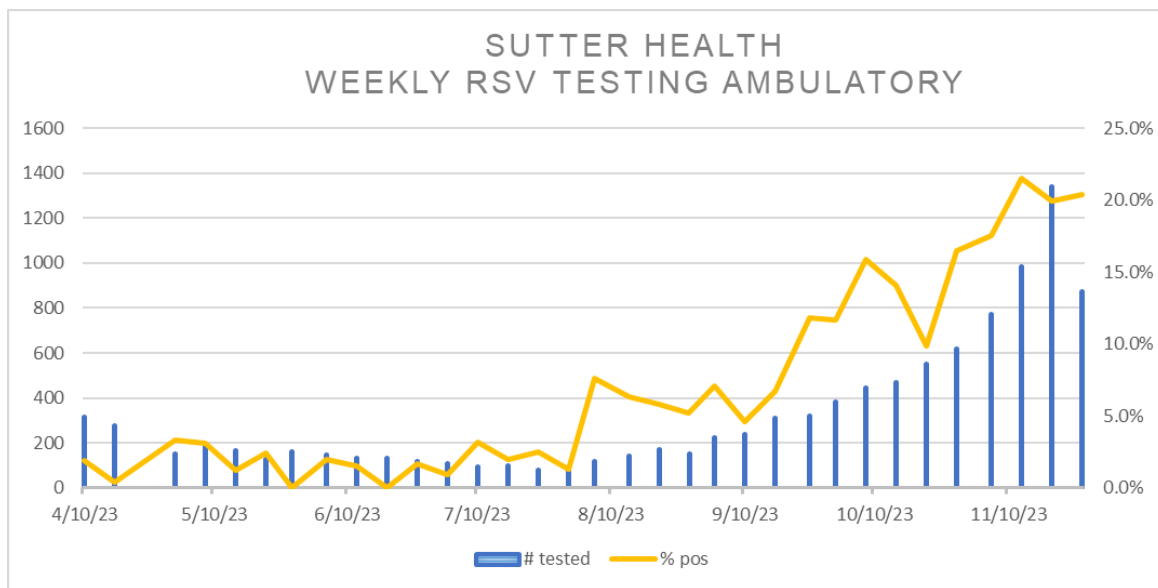
- Although there are concerns that this variant may have improved immune evasion, people with recent infections and possibly even back to prior Omicron in 2021, probably have good immunity.
- The new monovalent vaccine is anticipated to provide good protection against developing severe disease. By itself, BA.2.86 is not anticipated to stress the healthcare system.
- Even with that said, combined with the influenza and RSV trends discussed below, the risk from the tripledemic may be increasing.
- Positivity rates from random testing of international passengers are finally decreasing, but no predictions can be made as BA.2.86 increased.
- Sutter ambulatory and emergency department positivity rates are 8.6% and 7.2% respectively.
- The vaccine should provide coverage against BA.2.86. Encourage vaccinations.

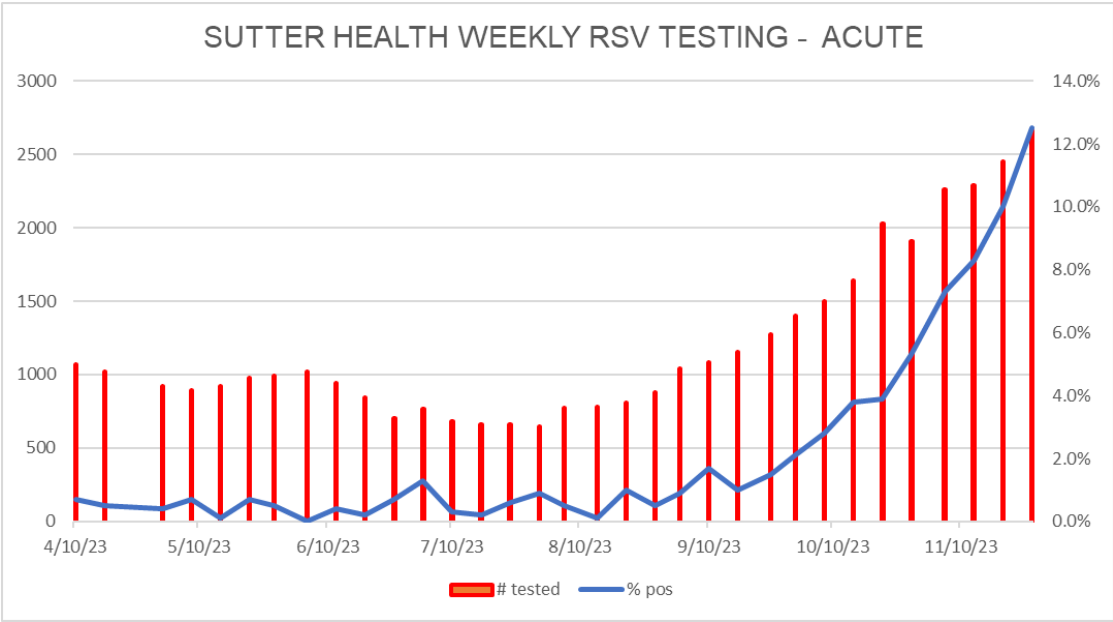
• **Related Links**

- [CDC Caring for Patients](#)
- [CDC Data Tracker](#)
- [CDC Latest Updates](#)
- [CDC Vaccine Information](#)
- [CDPH Tracking and Vaccination Updates](#)
- [Sutter Health for Clinicians](#)
- [Sutter Health for Patients](#)
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RSV

- RSV identification rates are escalating in both the ambulatory and emergency departments in Sutter. The amount of testing is simultaneously increasing and positivity rates in ambulatory are stable for three weeks over 20%. Emergency departments' positivity rates for RSV are 12%. Ambulatory testing in the last week was likely decreased due to the Thanksgiving holiday. The RSV season in Northern California seems widespread.
- See two graphs below.





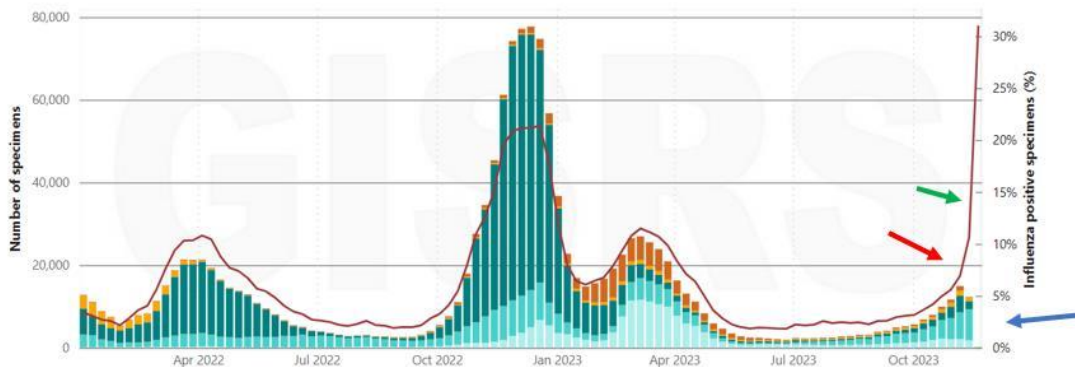
- RSV results by age are in the following table for the week ending Nov. 26. Children less than 6 years old dominate, with positivity rates of 41.6% in ambulatory and 32.9% in acute care settings.
- Smaller numbers of persons 6 to <12 years old are tested in general, but rates have also continued to increase. More people 60 years and older are being diagnosed with RSV in the emergency department, with a positivity rate of 3.4%. Low compared to other groups but still significant.

Location	<6 years old		6 to < 12 years old		≥ 60 years old	
	Number Tested	% Positive (number)	Number Tested	% Positive (number)	Number Tested	% Positive (number)
Ambulatory	281	41.6% (117)	106	17.9% (19)	170	8.8% (15)
Acute (ED)	732	32.9% (241)	131	13.0% (17)	1286	3.4% (49)

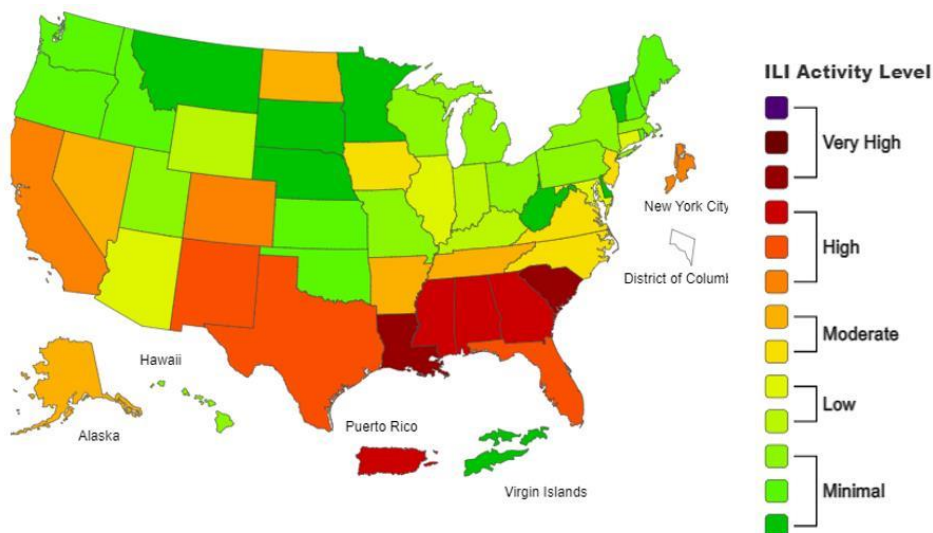
- **RSV Take-Home:**
 - The RSV season continues in California with rapidly escalating positivity rates. In Northern California, over 40% of children <6 years old, and tested for RSV in the outpatient environment are positive and 33% are now positive in the ED.
 - Positivity rates are increasing in all age groups.
 - Nirsevimab supply remains limited.
 - Vaccinate all eligible pregnant persons between 32-36 weeks of gestation against RSV.
 - Persons 60 years and older, especially with co-morbidities, should be vaccinated against RSV.

Influenza

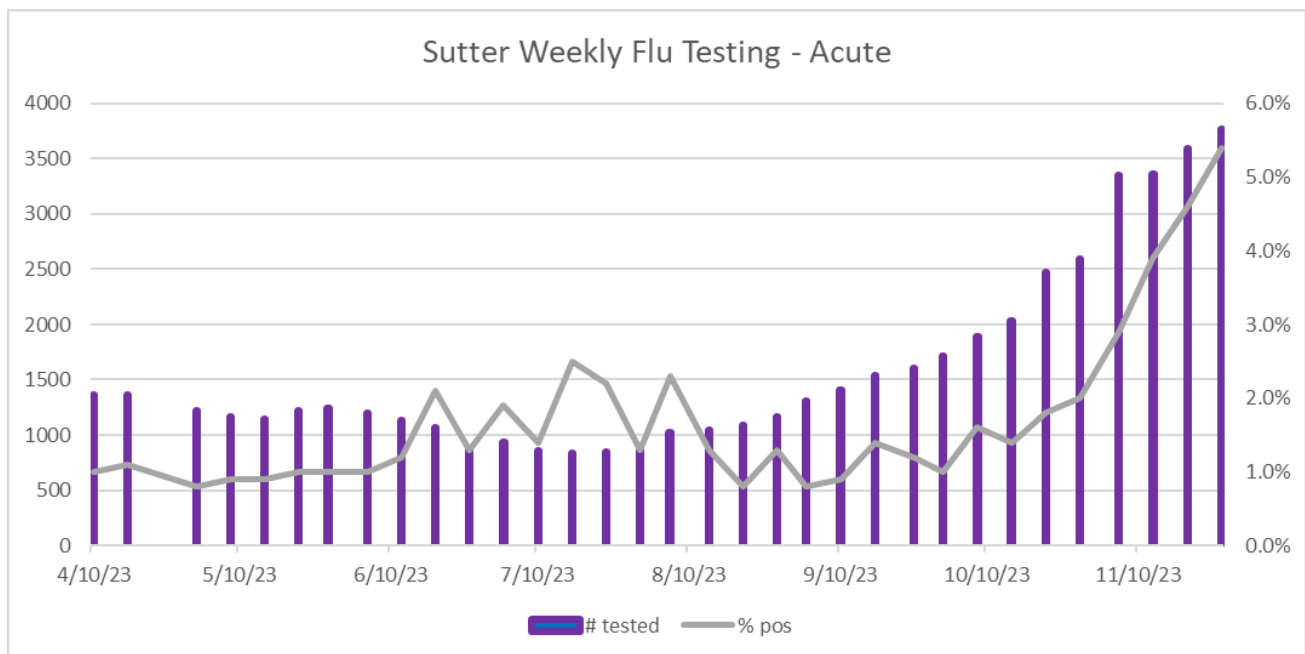
- The [WHO](#) released its biweekly global influenza update on Nov. 28. This includes the most recent two weeks of data up to Nov. 12.
 - Increased activity is being identified in parts of Europe, North America, and Central, Eastern and Western Asia.
 - Influenza A predominates with both A H3N2 and A H1N1 being detected.
 - The Southern Hemisphere has inter-seasonal, low levels of detection.
 - From Oct. 30 to Nov. 12, 431,756 specimens were tested. That is a 65% increase in the number of tests performed compared to the prior 2-week report.
 - ✦ 25,876 were positive (up from 5.5% to 6.0% with a 79% increase in positive results).
 - ✦ 84% were influenza A, with H3N2 now up to three times as common as H1N1.
- The graph below shows influenza activity in the Northern Hemisphere for the last 2 years. Cases are rising (shown by the blue arrow). Shades of teal represent influenza A and brown represents influenza B. The red arrow points out that the positivity rate continues to spike up. The sharp increase at the end is an artifact of incomplete data (green arrow).



- Influenza-like activity (ILI), the surrogate for influenza used by the [CDC](#), is on the map below showing data in the week ending Nov. 18. Disease in the United States is increasing.
- California has now moved up from moderate to high. Since influenza is not a reportable disease in many states, except for hospitalizations and deaths, it is difficult to get accurate numbers. As identifications continue to increase, this map is likely a good surrogate for true influenza.



- The [CDC](#) reports that out of 52,451 specimens tested by clinical labs during week 46 (ending Nov. 18), 2,584 were positive (up to 4.9% from 3.0% two weeks earlier). Influenza A H1N1 continues to dominate, representing almost 80% of the influenza A isolates. Influenza-associated hospitalizations are increasing.
- There are four different subclades of A H3N2 that have been identified by the CDC since May 2023. Over 90% are from one subclade.
- [Anticipated vaccine match](#) is determined by measuring the activity of ferret-derived vaccine antibodies against samples from circulating strains. Since May 2023, all the circulating strains were recognized by the vaccine antibodies.
- The graph below shows Sutter emergency department influenza positivity rates. Testing rates have increased as all symptomatic persons being seen in emergency departments are being tested for influenza and SARS-CoV-2. RSV testing has age-preferred criteria. Positivity rates are now 5.4% consistent with increasing circulation of influenza.



- On Nov. 6, [Clinical Infectious Diseases](#) published a prospective, surveillance study looking at pre-pandemic influenza vaccine effectiveness (VE) among adults who were of advanced age or had underlying CHF or COPD during the 2018-2019 and 2019-2020 influenza seasons.
 - This study's focus is on reduction of hospitalization in a defined high-risk population whereas most studies look at the effectiveness of the vaccine (VE) to prevent all infections.
 - Looking at 2 seasons was important as two or more strains commonly circulate in one season, and the influenza strains can undergo antigenic drift leading to very significant, intra-seasonal changes in VE.
 - In Season 1 (2018-2019), A H1N1 initially appeared but a poorly matched A H3N2 later became dominant. VE against that A H3N2 was only 5%, with a 95% CI of -10% to 19%.
 - In Season 2 (2019-2020), Victoria/B and A H1N1 viruses circulated. However, late-season antigenic drift of A H1N1 caused a flu vaccine mismatch that reduced seasonal VE to 39% nationally.
 - The study included 1,562 adults (701 vaccinated and 861 unvaccinated), 18 years and older, with admission resulting from exacerbation of CHF or COPD or ≥ 50 years with

acute respiratory infection (ARI). Patients had a molecular test for influenza and VE was calculated using a test-negative case-control design.

- Pooled VE estimate against influenza hospitalization was 63.1% for both Seasons 1-2 when adjusted for age, race/ethnicity, immunosuppression, season, and calendar time.
- Adjusted VE against influenza-related hospitalization in adults ≥ 50 years was 55.9%.
- Adjusted VE against hospitalization for only CHF/COPD exacerbation was 80.3% in adults ≥ 18 years
- Even during seasons with a suboptimal, vaccine and circulating strain match, influenza vaccine was effective in preventing influenza-related hospitalizations in adults 50 years and older and in those with CHF or COPD exacerbations. The fact that over 50% of the patients were unvaccinated exposes a continued gap in vaccinating the high-risk population against influenza.

- **Take Home Influenza:**

- Influenza in the Northern Hemisphere is increasing. In the last 2 weeks between WHO reports, testing increased by 65% and positive results increased by almost 80%.
- Influenza A comprises 84% of the positive results. Notably influenza A H3N2 is now found three times more frequently than A H1N1 in most of the Northern Hemisphere.
- Influenza activity and influenza-associated hospitalizations are increasing in the United States.
- Influenza A also predominates in the United States but contrary to what the WHO is finding in the world, influenza A H1N1 comprises almost 80% of the influenza A isolates and A H3N2 is just over 20%.
 - ✦ A H1N1 comprised 90% of the influenza A isolates 2 weeks earlier. It is too early to determine if this is a transition point where A H3N2 will ultimately dominate in the U.S., as it is in most of the Northern Hemisphere.
- Influenza detections in Sutter emergency departments are very likely similar to what is being seen in California, with a rapid increase in the last 4 weeks.
- Influenza vaccination is a critical strategy to help protect high-risk and older adults against influenza-related hospitalizations and continues to be recommended throughout the influenza season.