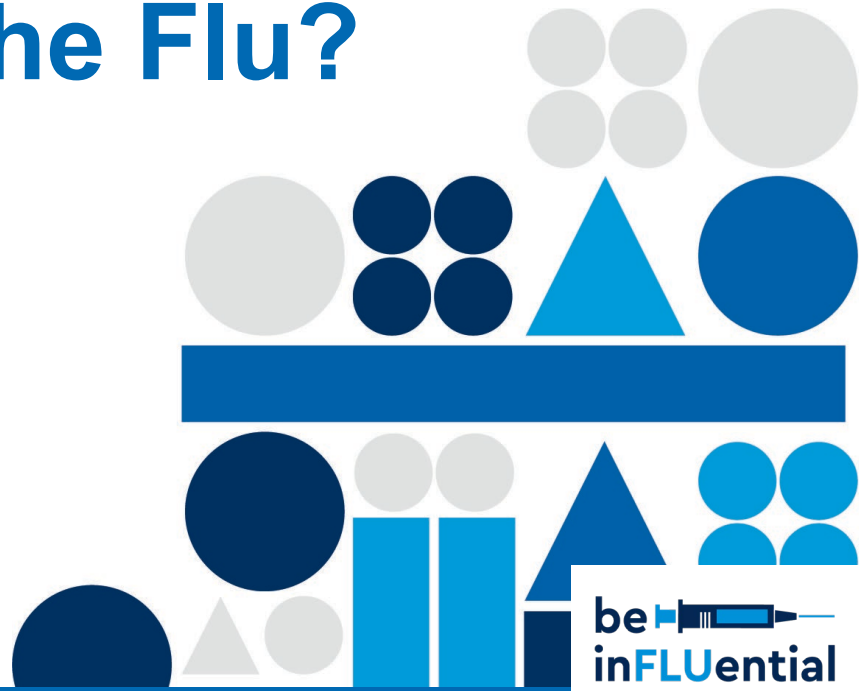
What's New with the Flu?

Suchitra Rao, MBBS, MSCS
Professor of Pediatrics
Infectious Diseases, Epidemiology and Hospital Medicine
University of Colorado School of Medicine
Children's Hospital Colorado



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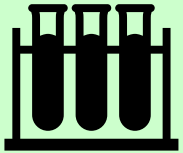
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Disclosures

No disclosures

Objectives

Epidemiology 

Testing 

Treatment 

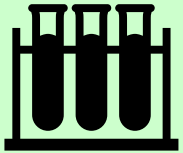
Vaccination 

Objectives

How severe was last season and what can we expect for the upcoming season?

What at home tests are available for influenza and COVID-19?

Epidemiology 

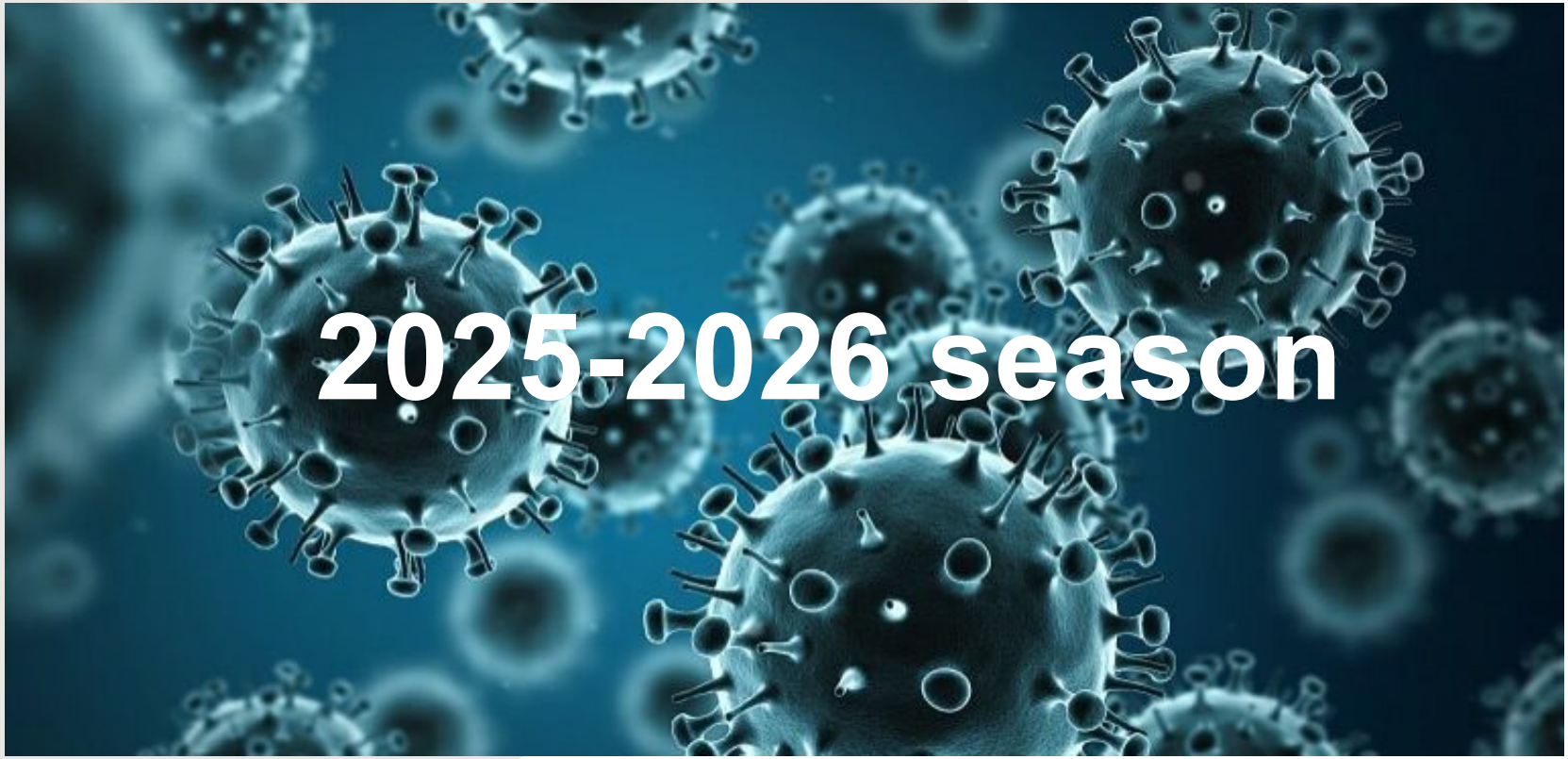
Testing 

Treatment 

Vaccination 

What are the current treatment recommendations for influenza and COVID-19?

What is the real world effectiveness of influenza and COVID-19 vaccines?


2025-2026 season

HEALTH • 4 MIN READ

Flu reaches highest level in the US in 25 years

UPDATED JAN 5, 2026

By Brenda Goodman

HEALTH & WELLNESS

Some flu symptoms are changing as a new variant spreads rapidly. What to expect

As cases reach "very high" levels in Illinois, a mutated and highly contagious variant known as "subclade K" has brought a change in telltale signs of the virus, experts have said.

Flu activity in US could continue to rise for weeks, top CDC epidemiologist says

The CDC estimates there have been at least 11 million illnesses so far.

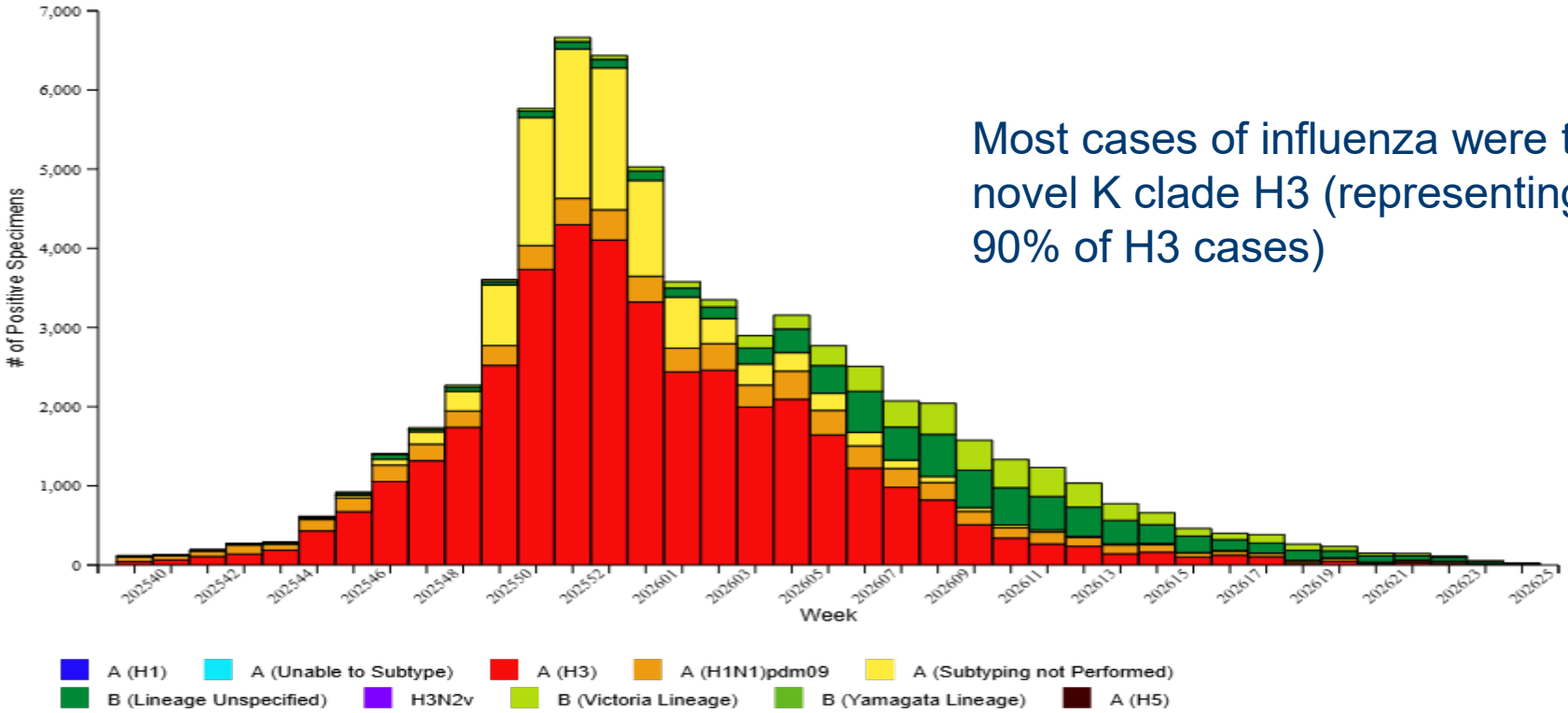
A New, Potentially Severe Flu Variant Is Spreading in the US. Watch for These Symptoms

A mutated strain of influenza A, H3N2 subclade K, is surging worldwide, sparking concern about a severe flu season in the U.S. Here's what to symptoms to look out for.

US CDC says 2025-26 flu season ‘moderately severe’ as cases hit 11 million

National Data

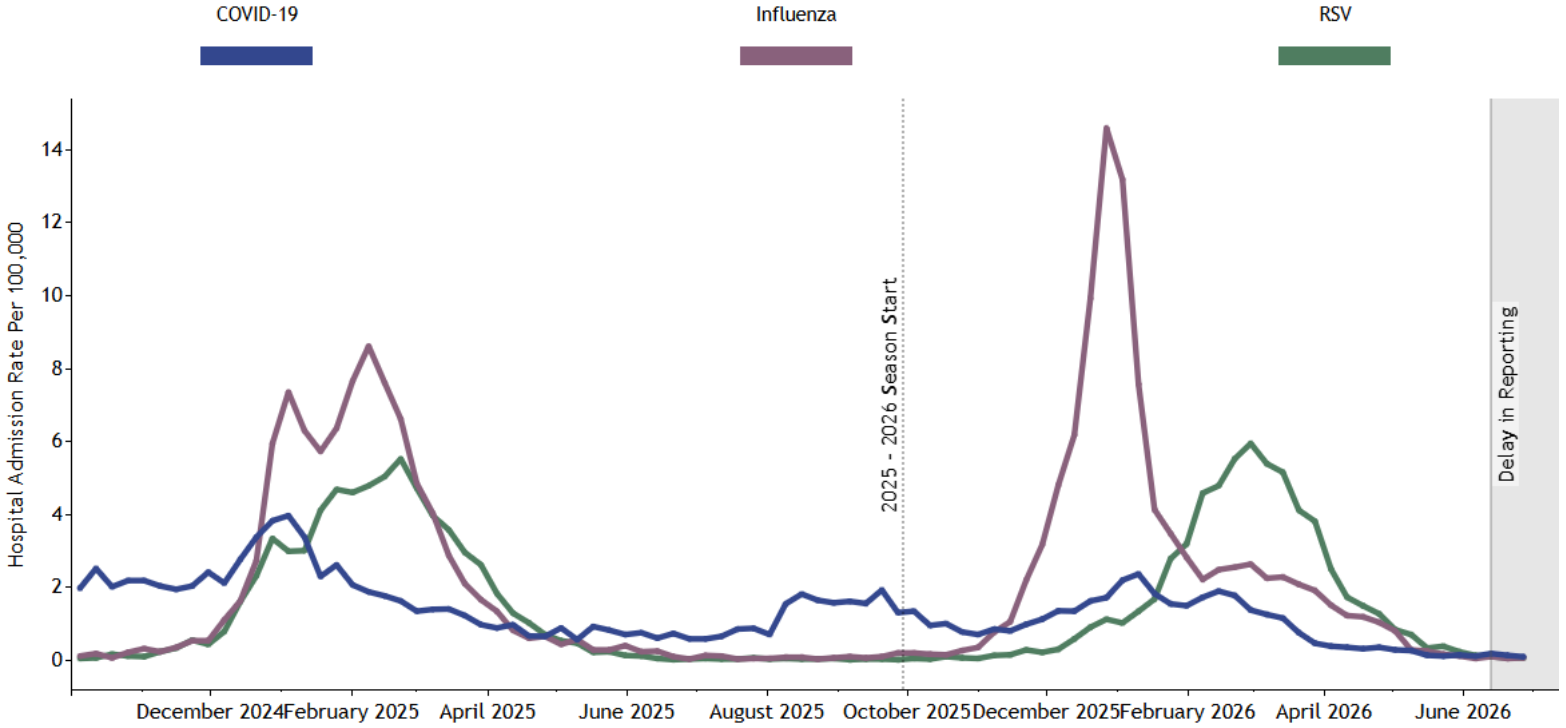
Influenza Positive Tests Reported to CDC by Public Health Laboratories,
National Summary, 2025-26 Season, week ending Jun 27, 2026



Most cases of influenza were the novel K clade H3 (representing 90% of H3 cases)

https://www.cdc.gov/fluview/surveillance/2026-week-28.html

Colorado Data

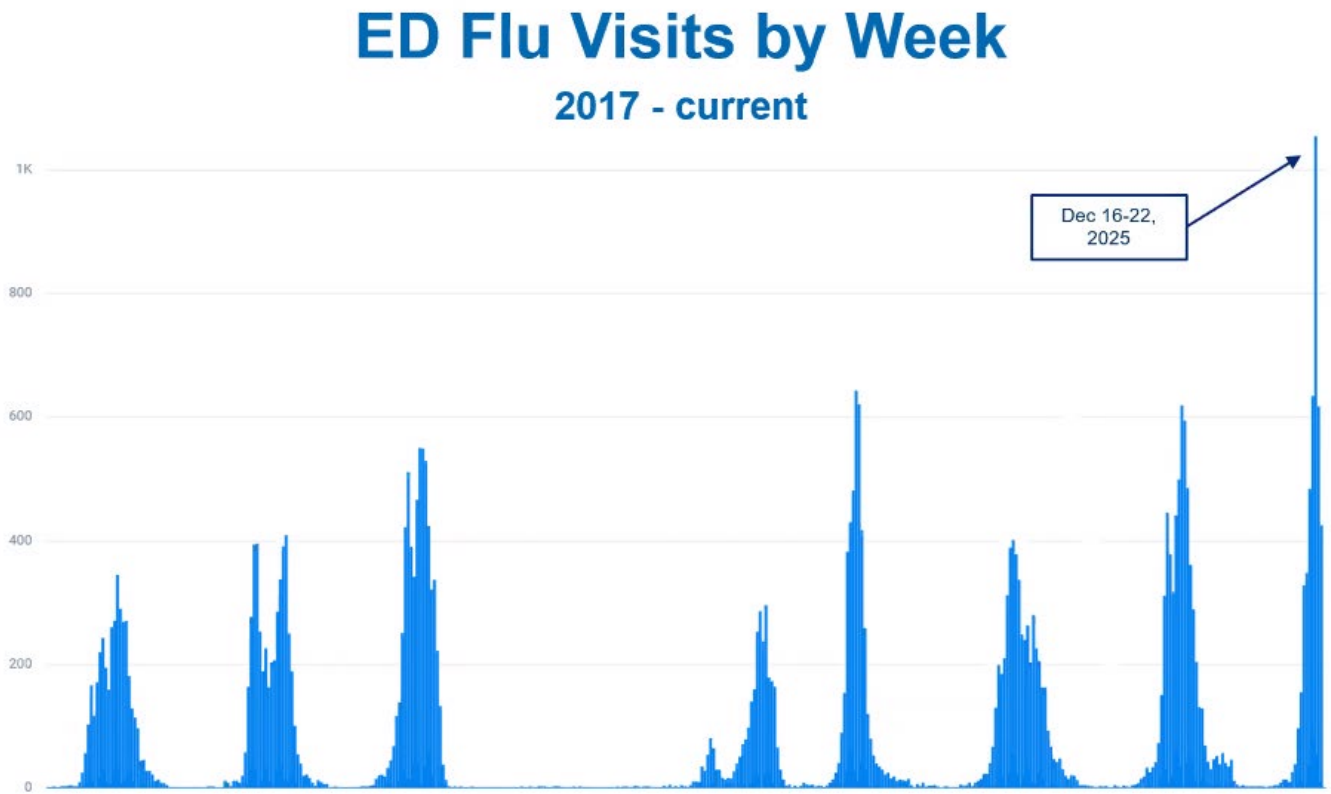


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Ref: https://cdphe.colorado.gov/viral-respiratory-diseases-report

CHCO data

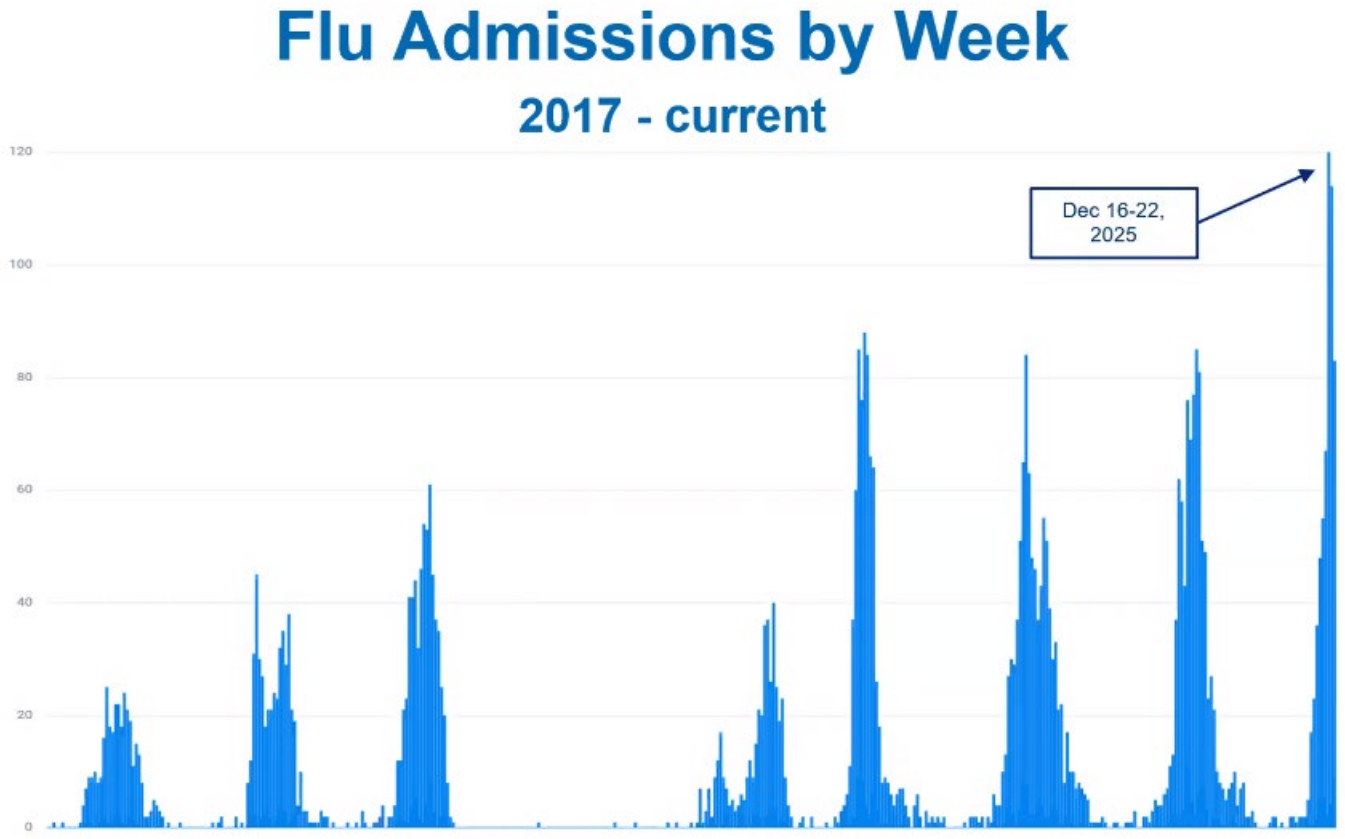


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Ref: internal CHCO data

CHCO data

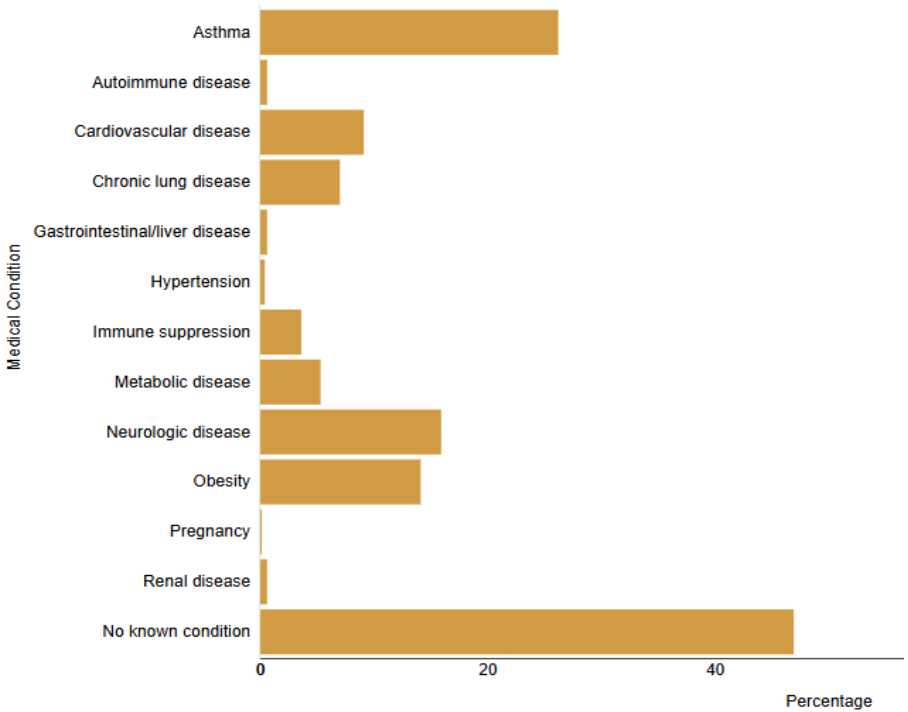


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Ref: internal CHCO data

Underlying medical conditions among those hospitalized



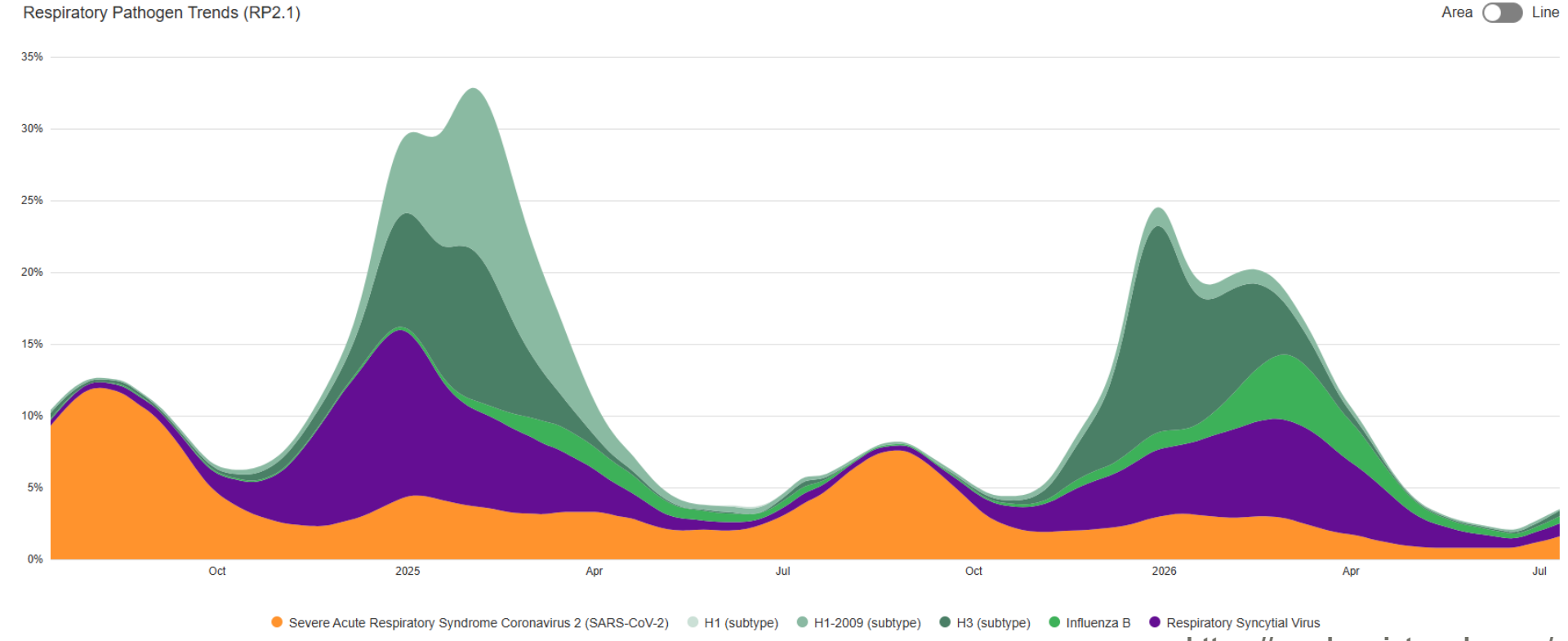
Most children admitted have no underlying medical condition
Of those with underlying medical conditions- asthma, neurologic disease, obesity
Higher proportion of males (56%)
17% end up in the ICU
21% diagnosed with pneumonia

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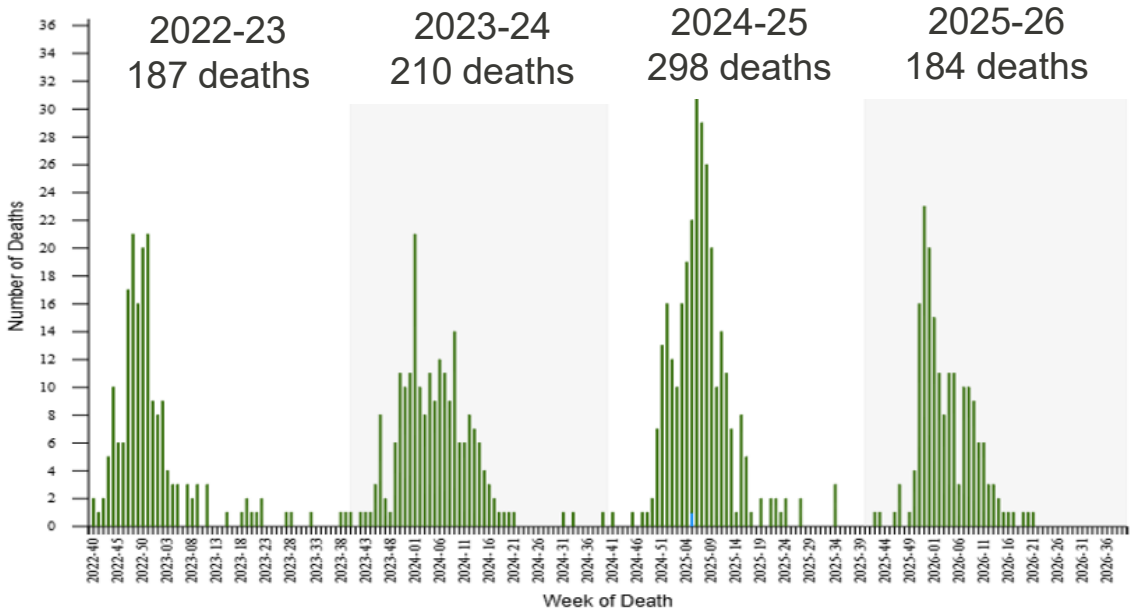
https://www.cdc.gov/flu/weekly/index.htm

Influenza, SARS CoV-2 and RSV co-circulation



https://syndromictrends.com/

Pediatric Influenza mortality over 4 seasons



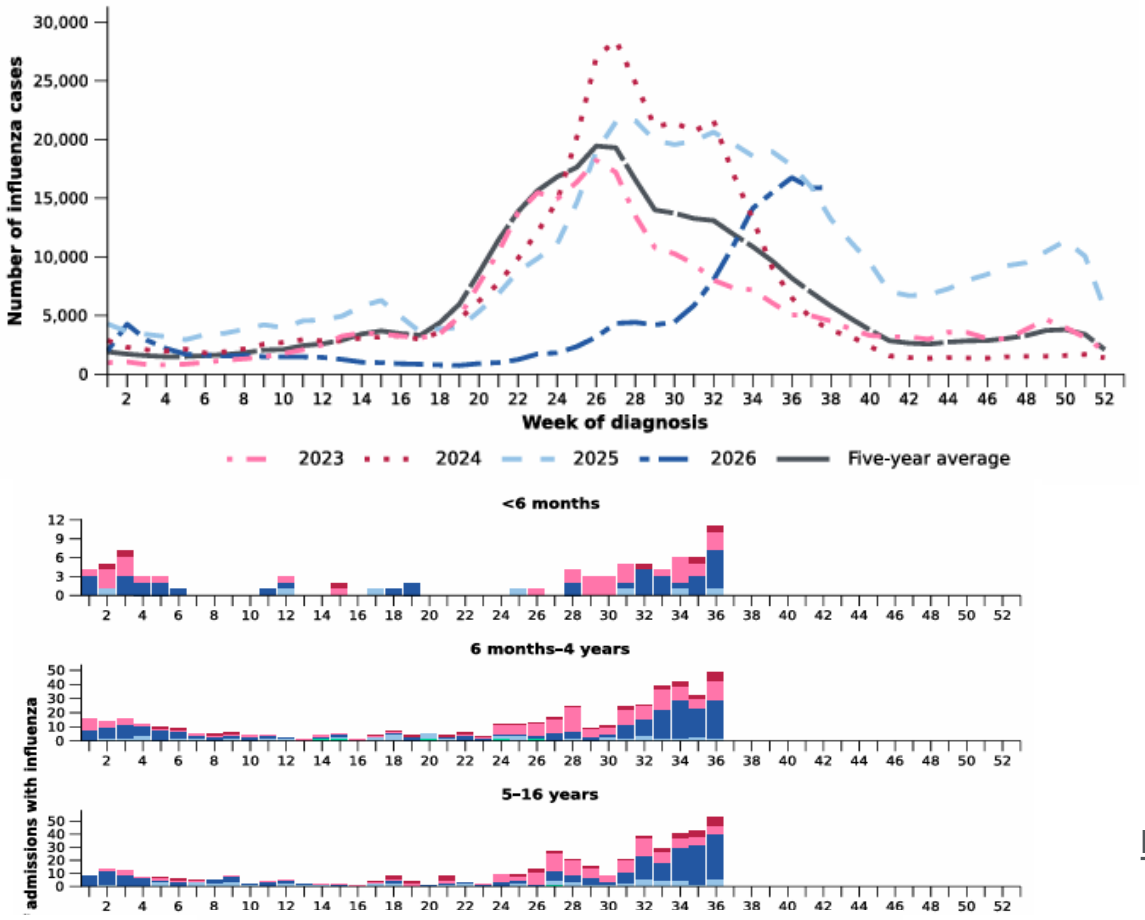
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https://www.cdc.gov/flu/weekly/index.htm

What to expect for upcoming respiratory season?

Influenza circulation in Southern Hemisphere



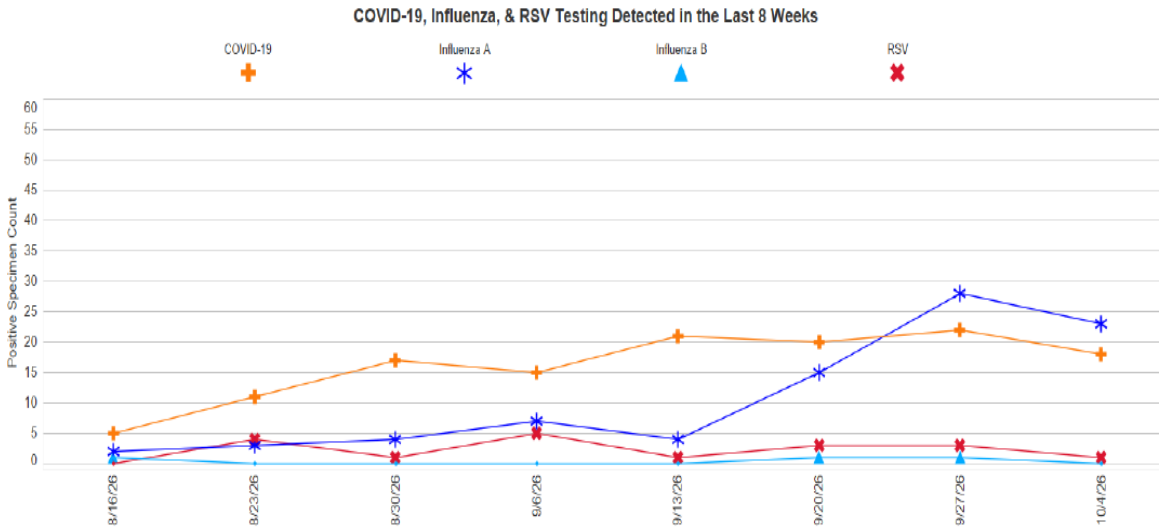
Delayed influenza season in Australia 2026

Greater number of influenza A(H3N2) notifications reported in the 0–4 year age group

Most influenza isolates (>81%) are a good match for the 2026 southern hemisphere vaccine components

Australian Respiratory Surveillance Report – 7 September to 20 September 2026 | Australian Centre for Disease Control

Influenza cases at CHCO

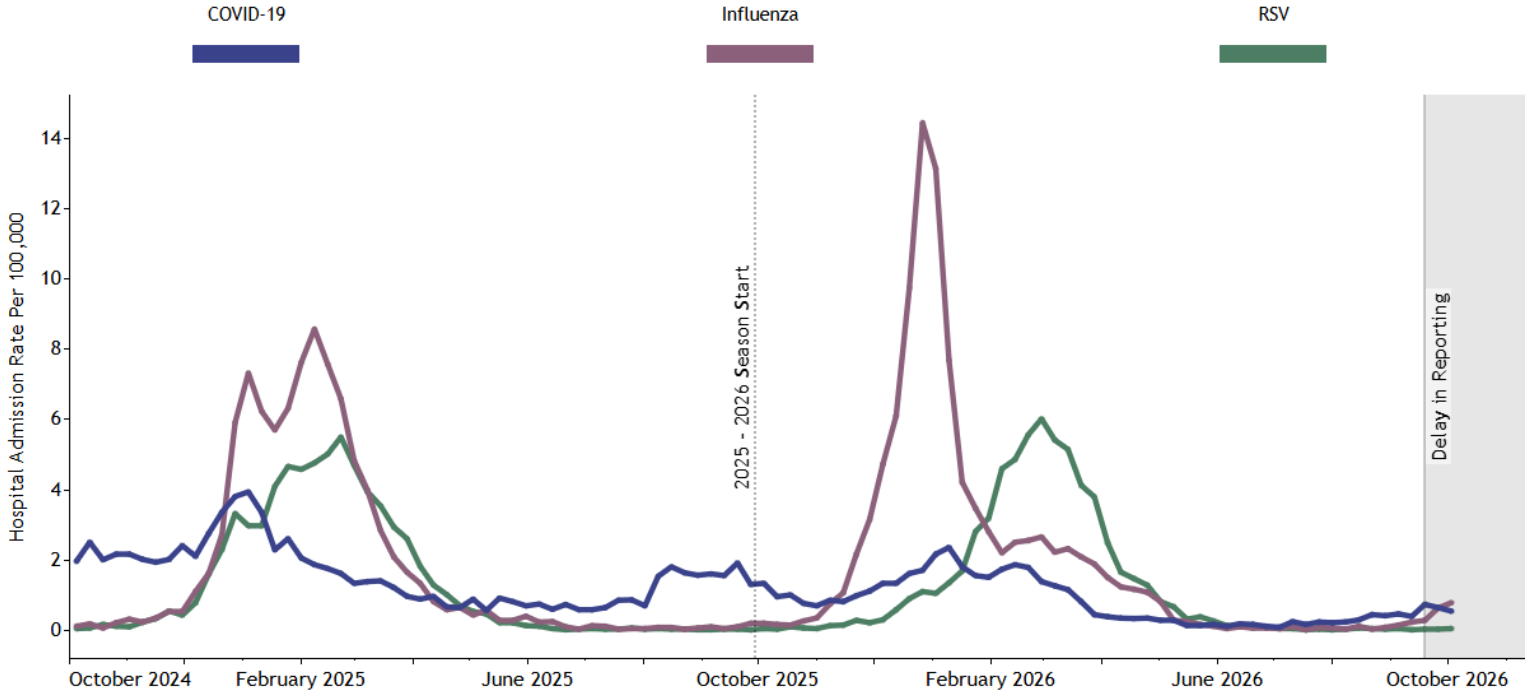


We are seeing influenza cases in Colorado

We are seeing influenza cases in Colorado

Nationally, most cases (96%) are H1N1

Hospitalization data – Colorado



Hospital admission data are preliminary and subject to change as more data become available. In particular, case counts and rates for recent hospital admissions are subject to lag. Delay for case identification and reporting may increase around holidays or during periods of increased hospital utilization. As data are received each week, prior case counts and rates are updated accordingly.

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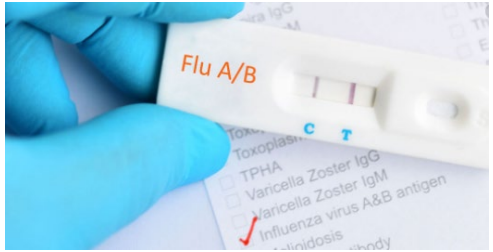
Influenza testing

Testing









Point of care tests

PCR NAAT DIA RAT

Decreasing sensitivity

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Source: Google images

What's new with influenza testing

News | **Articles** | January 23, 2026

FDA clears first at-home test to detect RSV, influenza, and COVID-19 in infants as young as 6 months

Author(s) *Morgan Ebert, Executive Editor*

Fact checked by: *Celeste Krewson, Assistant Editor*, *Justin Mancini*

FDA-cleared Flowflex Plus 4-in-1 home test detects RSV, influenza A/B, and COVID-19 in adults and children as young as 6 months.

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GlobalData.

FDA clears Visby Medical's at-home Covid-19 and Influenza PCR test

Ross Law

Updated Fri, July 3, 2026 at 8:36 AM MDT

2 min read

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2 min read

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Open Peer Review | Clinical Microbiology | Research Article | 30 April 2026

Analytical comparison of over-the-counter multiplex tests for influenza A, influenza B, and SARS-CoV-2

Authors: Sarah Lohsen, Yana Hoy-Schulz, Annie Taing, Beth Coughlin, Jordan Kim, Heather B. Bowers, Julie Sullivan, Wilbur A. Lam, Anuradha Rao, Sarah W. Satola, Gregory L. Damhorst | AUTHORS INFO & AFFILIATIONS

https://doi.org/10.1128/spectrum.00110-26 • Check for updates

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Influenza treatment

Influenza Treatment



oseltamivir



zanamivir



peramivir

Neuraminidase inhibitors



baloxavir

Endonuclease inhibitor

Influenza Treatment



oseltamivir

Preferred agent for influenza at this time

Oseltamivir can be given down to the newborn period

SE in 10-15% of courses: nausea, vomiting



zanamivir

Breath activated inhaler device

7 years of age and older

Not recommended in patients with underlying airway disease due to risk of bronchospasm.



peramivir

Not superior to oseltamivir, so given if unable to provide enteral oseltamivir

Diarrhea, behavioral changes, neutropenia



baloxavir

Children 5 years of age and older

Well-tolerated

Avoid administration with dairy, calcium fortified drinks or polyvalent cations

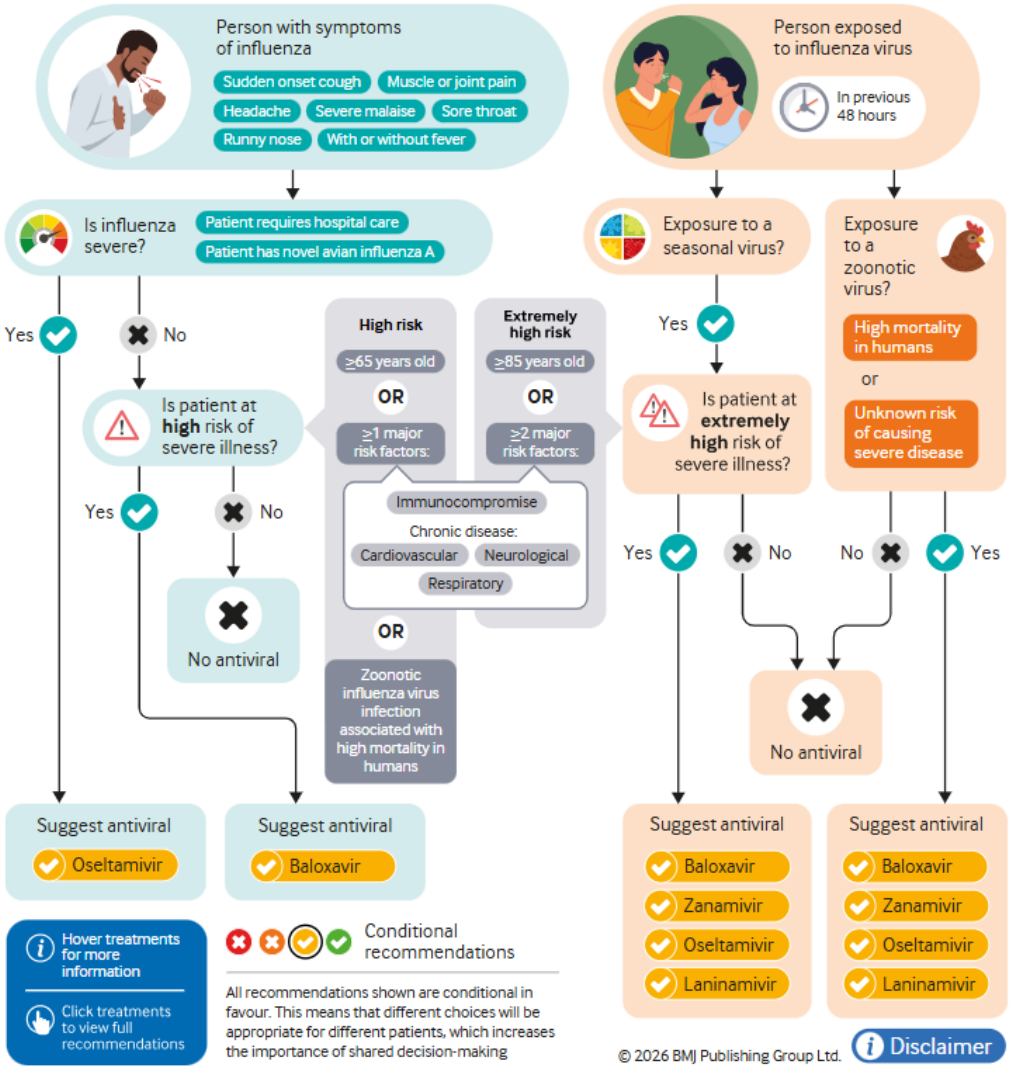
Now on formulary at CHCO for outpatient use

National Guidelines – AAP, CDC, IDSA

Hospitalized with influenza	Outpatients with severe or progressive illness	Outpatients who are high risk of complications
Children < 2 years, pregnant women and those within 2 weeks postpartum (IDSA)	Consider: Outpatients within 2 days of illness onset	Consider: Children with high-risk household contacts, esp. immunocompromised

Source: CDC, AAP, IDSA guidelines

Summary of WHO clinical practice guidelines for influenza



Ref: BMJ 2026;392:e087397

High Risk Conditions

- < 5 years (especially < 2)
- (≥ 65 years)
- Chronic pulmonary including asthma
- Neurologic and neurodevelopmental conditions
- Immunosuppression
- Cardiovascular
- Metabolic disorders including diabetes mellitus, obesity
- Renal, hepatic, hematologic
- Pregnancy and 2 weeks post-partum
- Native Americans/Alaska Natives
- Long term aspirin therapy

https://www.cdc.gov/flu/highrisk/index.htm

Baloxavir



Cap dependent endonuclease inhibitor, interferes with virus replication and rapidly reduces the level of flu viruses in the upper respiratory tract

Baloxavir approved by the FDA for post-exposure prophylaxis > 5 years

5 years and older who have been symptomatic for 48 hours or less and who are otherwise healthy or at high risk of influenza-related complications

Not recommended during pregnancy, while breastfeeding, for outpatients with complicated or progressive illness, severely immunosuppressed people, or hospitalized patients

Evidence for baloxavir in pediatric populations

Systematic review - 12 RCT or cohort studies comparing baloxavir and NAI or placebo

Advantages:

Decreased fever duration for H1N1 influenza

Shorter symptom duration

Greater reduction in influenza virus titers at 24 h from baseline

Minimal side effect profile

Downsides:

Mutation rates higher in children than in adults – can result in viral load rebound, prolonged duration of fever, clinical treatment failure

These variants retain their transmission capability

Indicates need for further studies to evaluate efficacy for pediatric populations

Influenza chemoprophylaxis

Whom to prophylax? High risk of influenza complications and exposure:

- during the first two weeks following vaccination after exposure
- cannot receive influenza vaccine due to a contraindication
- severe immune deficiencies or others who might not respond to influenza vaccination
- Not recommended in those < 3 months of age

How long to prophylax? 7 days from last exposure

- If not known, then 10 days
- Dosing is once a day compared with bid treatment dosing
- Can use oseltamivir, zanamivir, baloxavir (for those 12 yrs of age and older) within 48 hours of contact with an individual with influenza

Influenza vaccination

Current influenza vaccine recommendations AAP

Routine annual influenza vaccination of all persons aged ≥6 months who do not have contraindications

Offer vaccines in any healthcare setting

All influenza vaccines marketed in the US are trivalent (no Yamagata), no product preference

Ideally vaccinate before the end of October, but can also continue during the influenza season

2026-2027 AAP updates

All vaccines are trivalent

Updates to all vaccine strains

Afluria not available

New recs immuno-compromised

Package inserts re: febrile seizures

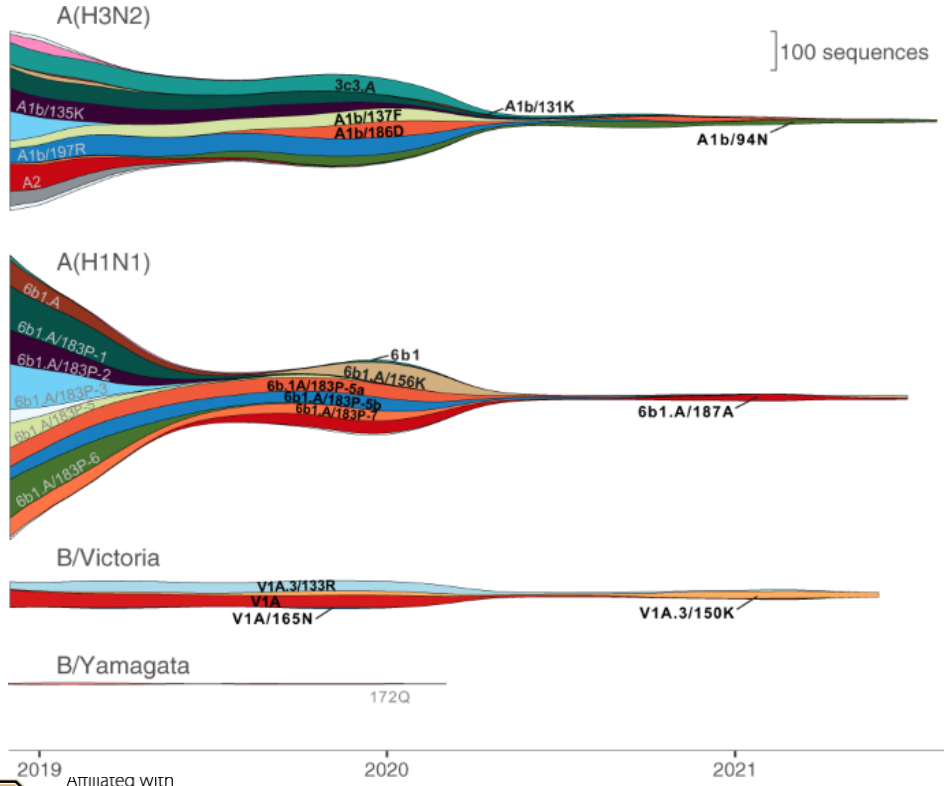
No chemoprophylaxis for < 3 months

Baloxavir

mRNA vaccine

Why are vaccines all back to trivalent?

Influenza B/Yamagata lineage has not been seen since April 2020

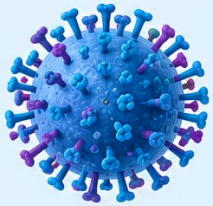
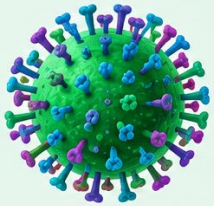
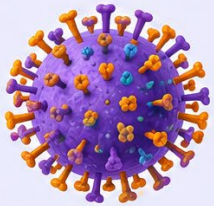


Dhanasekaran V et al. Nature Communications 13, 1721 (2022)

New vaccine strains

2026–2027 Influenza Vaccine Strains

Trivalent and quadrivalent influenza vaccines contain the following strains:

A H1N1	A H3N2	B Victoria
		
A/Missouri/11/2025 (H1N1)pdm09-like virus (egg-based)	**H3N2 A/Darwin/1564/2025 (H3N2)-like virus** (egg-based)	**B/Tokyo/EIS13-175/2025 (B/Victoria lineage)-like virus** (egg-based)
A/Missouri/11/2025 (H1N1)pdm09-like virus (cell culture-based or recombinant)	**A/Darwin/1415/2025 (H3N2)-like virus** (cell culture-based or recombinant)	**B/Pennsylvania/14/2025 (B/Victoria lineage)-like virus** (cell culture-based or recombinant)

These strains are included in the 2026–2027 influenza vaccines to provide protection against the viruses expected to circulate this season.

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Vaccine type		0-6 months	6-23 months	2-17 years	18-49 years	50-64 years	≥ 65 years
IIV3	Standard-dose, unadjuvanted Inactivated IIV3		~~Afluria trivalent~~ Fluarix trivalent FluLaval trivalent Fluzone trivalent				
	Cell-culture based inactivated (ccIIV3)		Flucelvax trivalent				
	Adjuvanted inactivated (aIIV3)						Fluad trivalent
	High-dose inactivated (HDIIV3)						Fluzone high-dose trivalent
RIV3	Recombinant (RIV3)				Flublox trivalent		
LAIV3	Live attenuated (LAIV3)			FluMist trivalent			

Indicated for pediatric population

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Adapted from ACIP meeting June 24, 2021

Immunocompromised populations



Chemotherapy, immunosuppression, anti-B cell therapies, administer vaccine least 2 weeks before starting these therapies



B cell depleting therapies, and CAR-T consider vaccine ≥ 3 to 6 months after last dose; consider earlier if virus is circulating



Consider 2 doses of high-dose IIV 28 - 42 days apart in pediatric HCT recipients 3 to 17 yrs in the first year after HCT (high-dose IIV not approved for use in children



SOT 6 mo - 17 years of age, consider IIV or RIV ≥1 month after transplantation. (if ≥ 18 years, HD or aIIV are acceptable options

Febrile seizures

Package insert updated:

"In two separate postmarketing observational studies, an increased risk of febrile seizures was observed during the first day following vaccination with standard dose trivalent (2024-2025) and quadrivalent (2023-2024) influenza vaccines in children 6 months through 4 years of age."

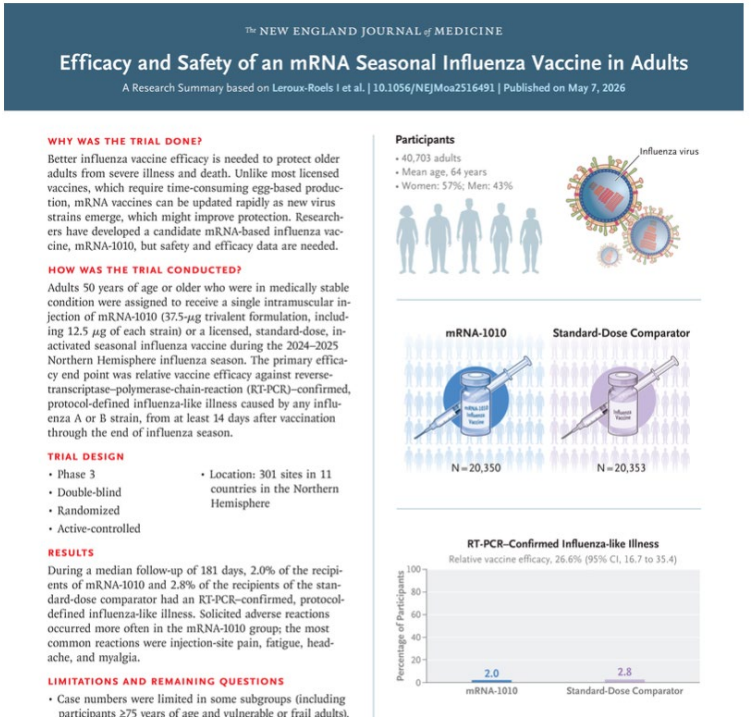
Overall risk is low: 1 excess febrile seizure per 22,624 doses of trivalent vaccinations

mRNA influenza vaccine

Phase 3 Influenza mRNA vaccine – 50 years and older

mRNA vaccine was 26.6% more effective than the standard dose vaccine in adults 50 years of age or older, but more side effects were observed (pain, fatigue, muscle aches)

June 18: FDA vaccine advisory committee VRBPAC voted unanimously to recommend Moderna's mRNA influenza vaccine, mFlusiva, for adults 50 and over.



The NEW ENGLAND JOURNAL of MEDICINE

Efficacy and Safety of an mRNA Seasonal Influenza Vaccine in Adults

A Research Summary based on Leroux-Roels I et al. | 10.1056/NEJMoa2516491 | Published on May 7, 2026

WHY WAS THE TRIAL DONE?

Better influenza vaccine efficacy is needed to protect older adults from severe illness and death. Unlike most licensed vaccines, which require time-consuming egg-based production, mRNA vaccines can be updated rapidly as new virus strains emerge, which might improve protection. Researchers have developed a candidate mRNA-based influenza vaccine, mRNA-1010, but safety and efficacy data are needed.

HOW WAS THE TRIAL CONDUCTED?

Adults 50 years of age or older who were in medically stable condition were assigned to receive a single intramuscular injection of mRNA-1010 (37.5-μg trivalent formulation, including 12.5 μg of each strain) or a licensed, standard-dose, inactivated seasonal influenza vaccine during the 2024–2025 Northern Hemisphere influenza season. The primary efficacy end point was relative vaccine efficacy against reverse-transcriptase–polymerase-chain-reaction (RT-PCR)–confirmed, protocol-defined influenza-like illness caused by any influenza A or B strain, from at least 14 days after vaccination through the end of influenza season.

TRIAL DESIGN

- Phase 3
- Double-blind
- Randomized
- Active-controlled
- Location: 301 sites in 11 countries in the Northern Hemisphere

RESULTS

During a median follow-up of 181 days, 2.0% of the recipients of mRNA-1010 and 2.8% of the recipients of the standard-dose comparator had an RT-PCR–confirmed, protocol-defined influenza-like illness. Solicited adverse reactions occurred more often in the mRNA-1010 group; the most common reactions were injection-site pain, fatigue, headache, and myalgia.

LIMITATIONS AND REMAINING QUESTIONS

- Case numbers were limited in some subgroups (including participants ≥75 years of age and vulnerable or frail adults).

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Leroux-Roels I et al. NEJM 394(18), June 2026

mRNA vaccines induce broader B cell responses than standard influenza vaccines

Observational study of 75 healthy young adults receiving a standard or investigative mRNA-based quadrivalent seasonal influenza virus vaccine over two consecutive seasons.

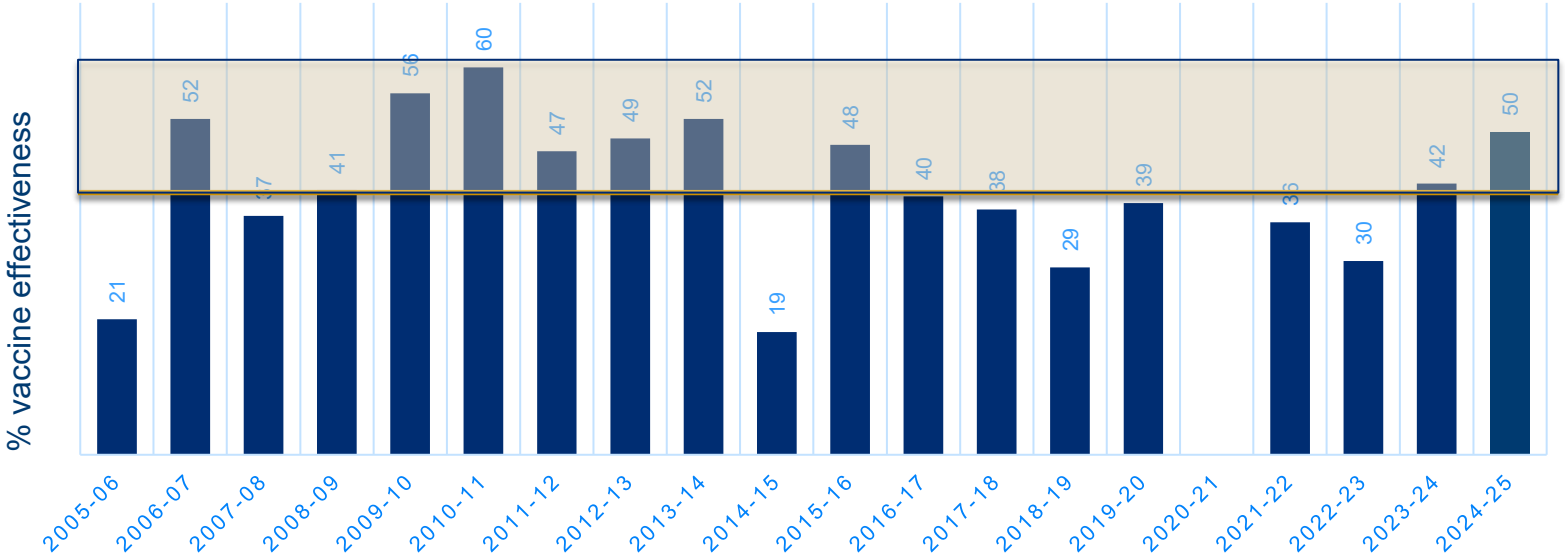
Measured B cell responses (ELISpot, ELISAs, Flow Cytometry and cell sorting, B cell receptor analyses, B cell clonal lineages, HAI assays, Ig-seq analysis

mRNA-based vaccines consistently elicited higher antibody titers (which persisted longer) and frequencies of memory B cells

mRNA vaccination increased the IgG repertoire and promoted intraclonal expansion

Higher antibody responses (higher frequency of germinal centers) were not impeded by pre-existing immunity

Influenza vaccine effectiveness



Influenza vaccine effectiveness against death

Case cohort analysis evaluating VE against death from 2016-17 to 2024-25
1233 pediatric deaths, of these 194 (15%) had received vaccine

VE 80% (95% CI 75-84) overall

VE 77% (95% CI 71-82) among those with comorbidities

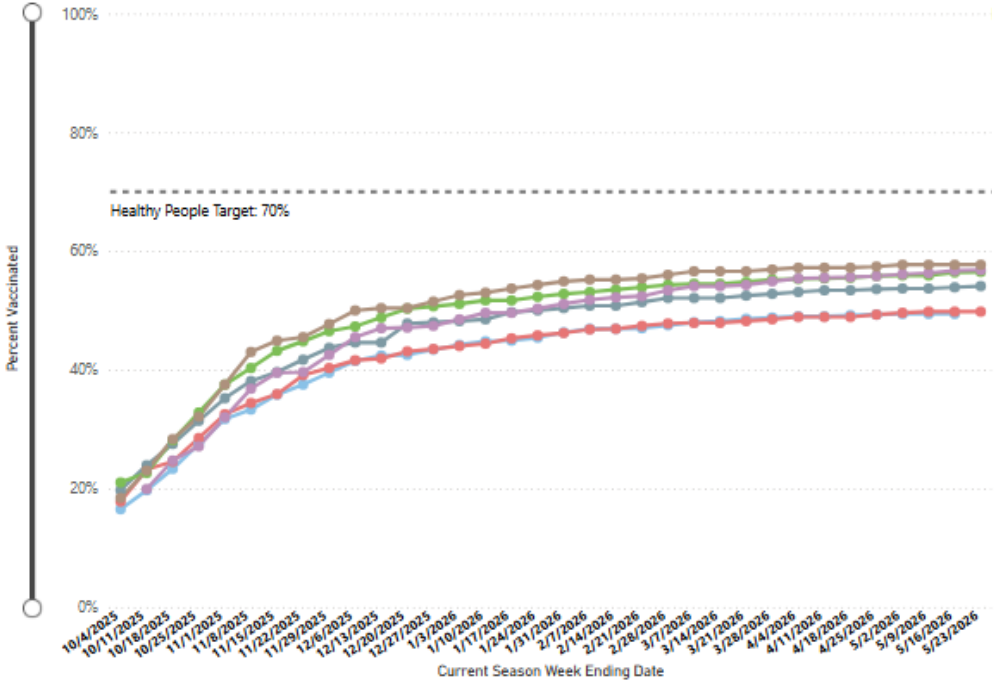
VE 87% (95% CI 84-89) among those with no comorbidities

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Leonard et al. *Pediatrics* e2026076453
July 2026

Decrease in vaccine uptake for influenza vaccines since COVID pandemic



As of May 15, 2026, 49.4% of children received an influenza vaccination, similar to last season

Flu Season, Jurisdiction, and Demographic

- 2025-2026, National. Overall (6 months-17 years)
- 2024-2025, National. Overall (6 months-17 years)
- 2023-2024, National. Overall (6 months-17 years)
- 2022-2023, National. Overall (6 months-17 years)
- 2021-2022, National. Overall (6 months-17 years)
- 2020-2021, National. Overall (6 months-17 years)

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https://www.cdc.gov/fluvaxview/dashboard/children-vaccination-coverage.html

Potential strategies to overcome declining vaccination rates



How to make a strong vaccine recommendation

- Normalize the process - *We routinely provide influenza vaccination to our patients at CHCO.*
- Use presumptive language - *We can take care of your child's flu vaccine during this visit/hospital stay.*
- Be respectful of their concerns- *Do you mind if I ask why you are not wanting your child to receive the flu vaccine today?*
- Tailor the discussion to address concerns - *Thanks for letting me know about your concerns. I've been thinking a lot about this and we get a lot of education about influenza vaccines- would it be alright if I shared some of this information with you?*
- Find common ground - *I know you are a wonderful parent, and you want to do what's best for your child. We also want to do everything possible to keep your child as healthy as possible, and vaccination is one of those ways.*

Influenza Vaccination in Other Healthcare settings

be inFLUential



INPATIENT FLOORS

- Identify eligible patients during admission
- Offer influenza vaccine before discharge
- Protect patients, families, and staff
- Document in EHR and provide VIS



EMERGENCY DEPARTMENT

- Screen all patients for vaccine eligibility
- Vaccinate before discharge when appropriate
- An important opportunity for prevention
- Link to primary care for follow-up



SUBSPECIALTY CLINICS

- Check vaccine status at every visit
- Protect patients with chronic conditions
- Coordinate with primary care
- Make vaccination part of specialty care



PERIOPERATIVE SETTING

- Screen during pre-op assessment
- Vaccinate well in advance of surgery when possible
- Reduce risk of postoperative complications
- Coordinate timing and documentation

Children's Hospital
Here, it's different.™

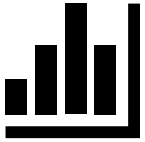
Generated using Chat GPT

New influenza vaccines in development

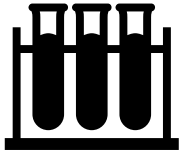


https://ivr.cidrap.umn.edu/universal-influenza-vaccine-technology-landscape

Main takeaway points



Already starting to see influenza circulating in Colorado (H1N1) – usually better match to vaccine



FDA clears combined RSV, influenza, COVID testing down to 6 months of age



Baloxavir now recommended by WHO for outpatient use among high-risk individuals



Influenza vaccines highly effective against UC/ED visits, hospitalization, death

Questions?

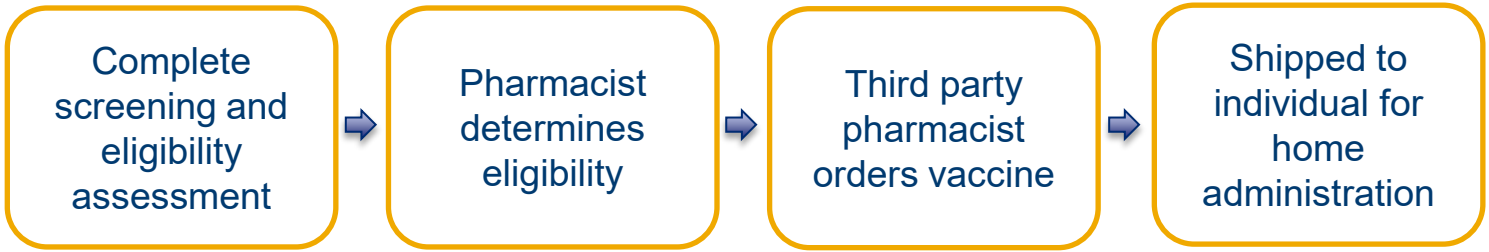
Live attenuated influenza vaccine at home administration

FDA approved home administration in September 2024

Ages 2-49 years

Home delivery anticipated for 2025-26 season

Will be available through third-party online pharmacy



Contraindications and Precautions

	Contraindications	Precautions
IIV	Severe allergic reaction to any component of vaccine	GBS within 6 weeks of prior influenza vaccine
LAIV	Severe allergic reaction to any component of vaccine Receiving aspirin therapy < 5 years of age with recurrent wheezing Immunosuppression CSF leak/active communication, cochlear implant Concurrent antiviral use	Asthma GBS within 6 weeks of prior influenza vaccine Underlying high risk conditions

* Conditions for which there is either uncertain but biologically plausible potential risk associated with live viruses or limited data for use of LAIV

Grohskopf LA et al. MMWR 2024 / 73(5);1–25