

Influenza Clinical Manifestation



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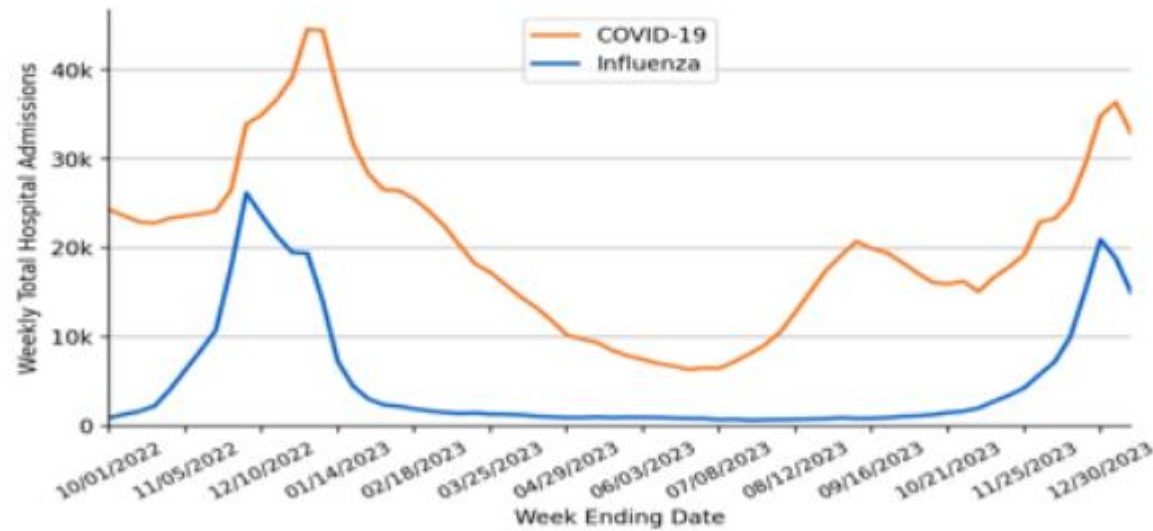
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Hospital Admissions Due to COVID-19 and Influenza

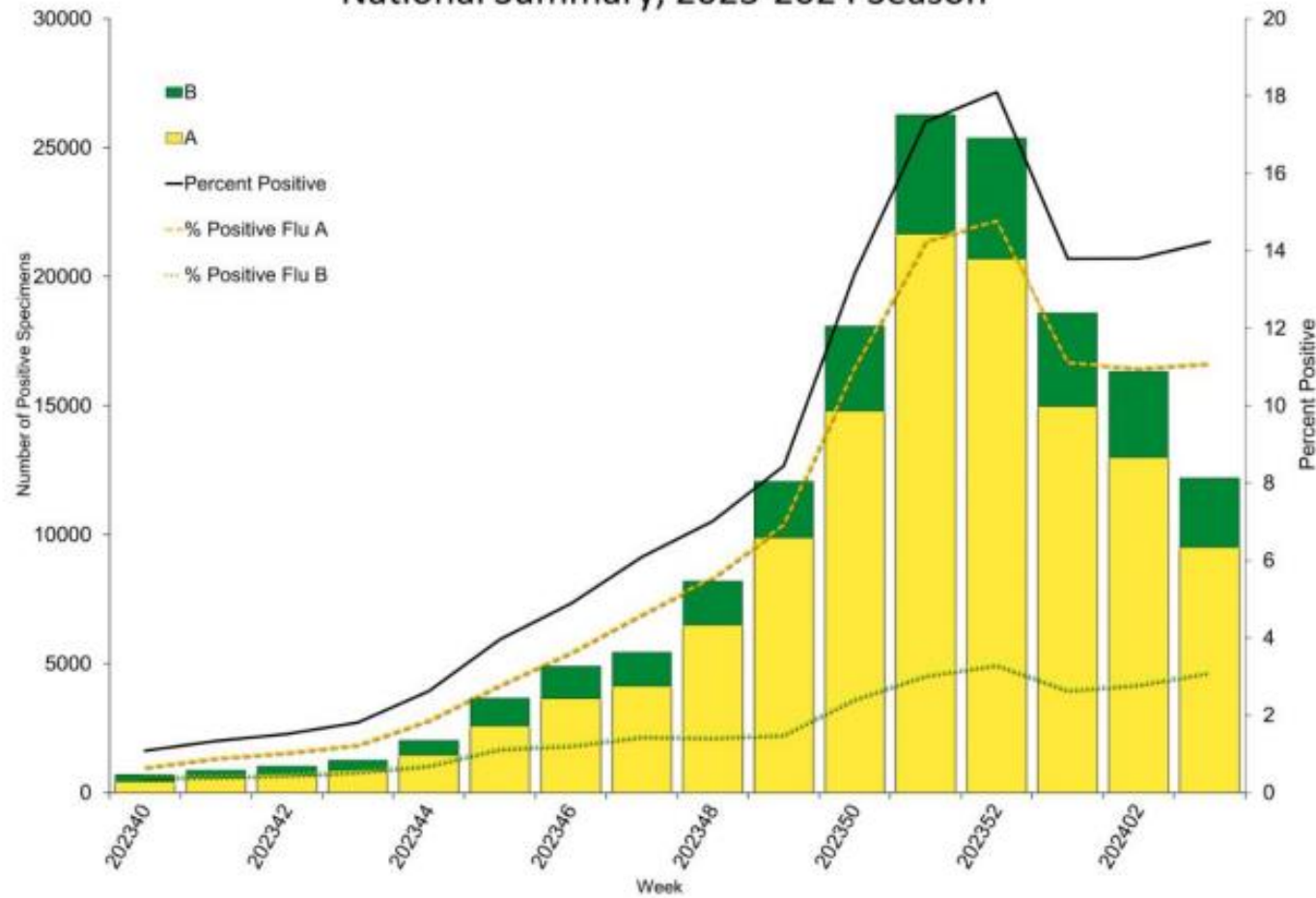


Trends in Hospital Admissions Attributed to COVID-19 and Influenza through 1/13/2024



Total number of new hospital admissions of patients with laboratory-confirmed COVID-19 and influenza in the previous week (including both adult and pediatric patients), reported to CDC's National Healthcare Safety Network (NHSN); data as of 1/26/24, data through 1/13/24. See [Data Sources and Methods](#) for details.

Influenza Positive Tests Reported to CDC by U.S. Clinical Laboratories, National Summary, 2023-2024 Season



Public health laboratory testing

Influenza A: 82.6%

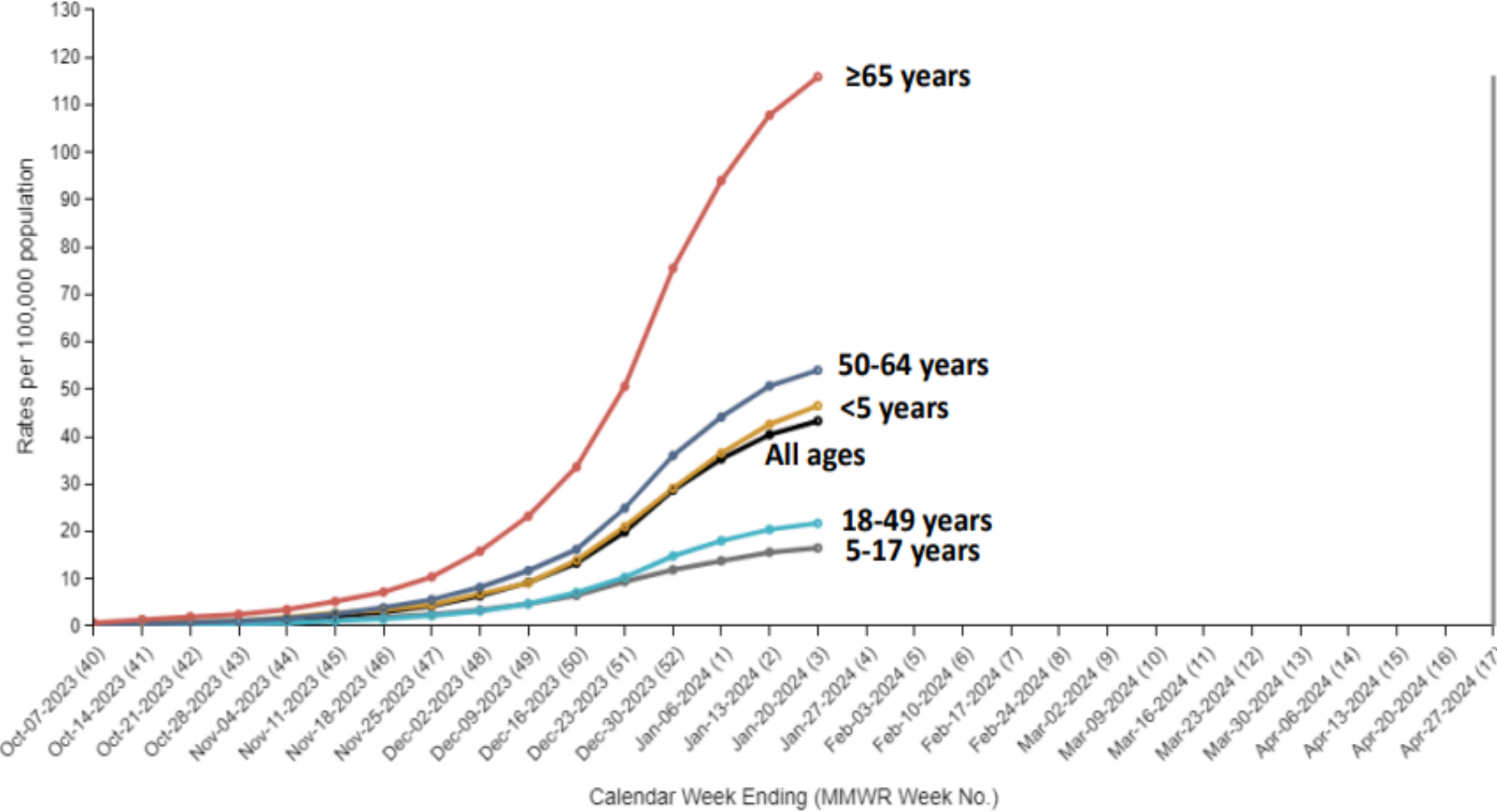
- A(H1N1)pdm09: 80.1%

- A(H3N2): 19.9%

Influenza B: 17.4%

Lab-confirmed Influenza Hospitalization Rates by Age Group, 2023-2024

FluSurv-NET :: 2023-24 :: Cumulative Rate

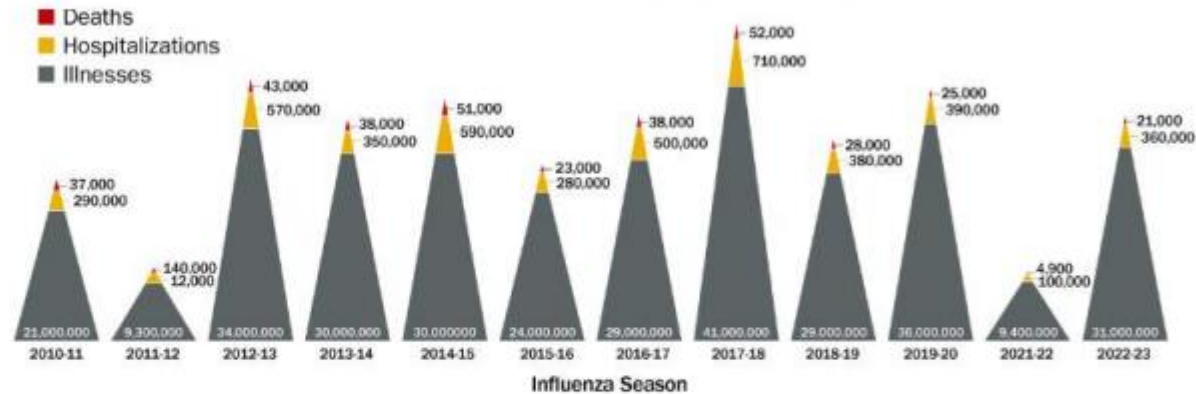


Estimated Influenza Disease Burden



Estimated Influenza Disease Burden 2010 - 2022

Estimated U.S. Influenza Burden, By Season (2010-2022)*



*Estimates are not available for the 2020-2021 season due to minimal flu activity.

➤ Seasonal influenza epidemics vary in severity

2023-2024 (preliminary estimates as of January 20, 2024):

- * 18-35 million illnesses
- * 8.4-16 million medical visits
- * 210,000 to 440,000 hospitalizations

Respiratory Virus

- RSV
- Rhinovirus
- Human metapneumovirus
- Influenza
- Adenovirus
- Parainfluenza virus
- Covid-19



Persons Who Are at High Risk of Complications From **Influenza**

Persons at High Risk of Complications Children aged

Children aged <5 years, and especially aged

Adults aged ≥ 65 years

Persons with chronic pulmonary (including asthma), cardiovascular (except hypertension alone), renal, hepatic, hematologic (including sickle cell disease), or metabolic disorders (including diabetes mellitus) or neurologic and neurodevelopment conditions (including disorders of the brain, spinal cord, peripheral nerve, and muscle such as cerebral palsy, epilepsy [seizure disorders], stroke, intellectual disability [mental retardation], moderate to severe developmental delay, muscular dystrophy, or spinal cord injury

Persons with immunosuppression, including that caused by medications or by HIV infection

Women who are pregnant or postpartum (within 2 weeks after delivery)

Children and adolescents through 18 years who are receiving aspirin- or salicylate-containing medications and who might be at risk for experiencing Reye syndrome after influenza virus infection

American Indian/Alaska Native people

Persons with extreme obesity (ie, body mass index ≥ 40 kg/m²)

Residents of nursing homes and other chronic care facilities

Signs and Symptoms of Uncomplicated **Influenza**

General	Head, Eyes, Ears, Nose, Throat	Neuromuscular	Gastrointestinal	Pulmonary
Fever	Headache	Nonproductive cough	Abdominal pain	Nonproductive cough
Chills	Nasal congestion	Weakness	Vomiting	Pleuritic chest pain
Malaise	Rhinorrhea	Chest pain	Diarrhea	
Fatigue	Sore throat/hoarseness			

Clinical Manifestations and Complications Associated With Influenza

Population	Clinical Manifestation/Complication
- Infants and preschool children	Fever without respiratory complications, “sepsis-like syndrome” Otitis media Parotitis Bronchiolitis Croup Reactive airway disease Pneumonia Myocarditis, pericarditis Rhabdomyolysis Febrile seizures Encephalopathy and encephalitis Invasive bacterial coinfection Reye syndrome (with aspirin exposure) Sudden death Exacerbation of chronic disease

Clinical Manifestations and Complications Associated With Influenza

Population	Clinical Manifestation/Complication
- School-aged children	Otitis media Parotitis Bronchitis Sinusitis Reactive airway disease Pneumonia Myocarditis, pericarditis Myositis (bilateral gastrocnemius, soleus) Rhabdomyolysis Encephalopathy and encephalitis Invasive bacterial coinfection Reye syndrome (with aspirin use) Toxic shock syndrome Sudden death Exacerbation of chronic disease

Clinical Manifestations and Complications Associated With Influenza

Population	Clinical Manifestation/Complication
- Adults	Parotitis Bronchitis Sinusitis Reactive airway disease Pneumonia Myocarditis, pericarditis Myositis Rhabdomyolysis Invasive bacterial coinfection Invasive fungal coinfection (rare) Toxic shock syndrome due to <i>Staphylococcus aureus</i> or <i>Streptococcus pyogenes</i> Precipitation of acute cardiovascular events (eg, cardiac failure, myocardial infarction, heart failure, cerebrovascular accident) Acute kidney injury and acute renal failure (with rhabdomyolysis or multiorgan failure) Encephalopathy and encephalitis Exacerbation of chronic disease

Clinical Manifestations and Complications Associated With Influenza

Population	Clinical Manifestation/Complication
- Elderly patients	Pneumonia Invasive bacterial coinfection Myositis Exacerbation of chronic disease

Clinical Manifestations and Complications Associated With Influenza

Population	Clinical Manifestation/Complication
- Special groups: pregnant and postpartum women	Dehydration Pneumonia Cardiopulmonary disease Premature labor Fetal loss

Clinical Manifestations and Complications Associated With Influenza

Population	Clinical Manifestation/Complication
- Special groups: immunocompromised, immunosuppressed	Complications similar to immunocompetent patients, but severe pneumonia and acute respiratory distress syndrome may be more common.

Clinical Manifestations and Complications Associated With Influenza

Population	Clinical Manifestation/Complication
All ages	Respiratory failure Acute respiratory distress syndrome Multiorgan failure Sepsis Liver inflammation

Groups in Whom to Consider a Diagnosis Of **Influenza**

When to Consider a Diagnosis of Influenza	Symptom and Group
During influenza activity	Acute onset of respiratory symptoms, with or without fever (all ages)
	<ul style="list-style-type: none"> ▪ Pneumonia (all ages)
	<ul style="list-style-type: none"> ▪ Acute exacerbation of underlying chronic lung disease (eg, chronic obstructive pulmonary disease, asthma), with or without fever (all ages)
	<ul style="list-style-type: none"> ▪ Fever without an obvious source (infants, young children)
	<ul style="list-style-type: none"> ▪ New-onset neurologic signs and symptoms (eg, seizures, altered mental status), with or without fever (infants, young children)
	<ul style="list-style-type: none"> ▪ Exacerbation or new onset of cardiovascular events (eg, heart failure, myocardial infarction or ischemia, cerebrovascular accident in adults) or altered mental status, with or without fever (all ages)
	<ul style="list-style-type: none"> ▪ Severe, complicated, or progressive (worsening) acute respiratory illness, without an alternative diagnosis (all ages)
	<ul style="list-style-type: none"> ▪ Hospitalized patients who develop new onset of acute respiratory symptoms, with or without fever (all ages)

Groups in Whom to Consider a Diagnosis Of **Influenza**

When to Consider a Diagnosis of Influenza	Symptom and Group
Year-round	<p>Acute onset of respiratory symptoms, with or without fever, especially those at high risk for influenza complications who are epidemiologically linked to recent influenza cases or outbreaks (all ages)</p>
	<ul style="list-style-type: none"> ▪ Healthcare personnel caring for influenza patients
	<ul style="list-style-type: none"> ▪ Healthcare personnel, residents, or visitors to an institution experiencing an influenza outbreak
	<ul style="list-style-type: none"> ▪ Close contacts of persons with suspected influenza (household or a congregate setting, such as daycare, school, or healthcare facility)
	<ul style="list-style-type: none"> ▪ Travelers who returned recently from areas where influenza viruses may be circulating
	<ul style="list-style-type: none"> ▪ Organized tour group participants
	<ul style="list-style-type: none"> ▪ Participants in international mass gatherings
	<ul style="list-style-type: none"> ▪ Summer camp attendees
	<ul style="list-style-type: none"> ▪ Cruise or military ship passengers

A typical presentations of **Influenza** virus infection

- Fever without source in infants
- New-onset neurologic signs and symptoms [seizures, altered mental status in infants and young children]
- New-onset cardiovascular events [heart failure, myocardial infarction or ischemia, cerebrovascular accident] in adults
- Exacerbation of chronic medical conditions, with or without fever [particularly cardiac, pulmonary, or neurologic disease], more commonly in adults.

INFLUENZA VIRUS

Common Signs and Symptoms



Fever



Aching
Muscles



Chills &
Sweats



Headache



Dry, Persistent
Cough



Shortness of
Breath



Tiredness &
Weakness



Runny or Stuffy
Nose



Sore
Throat



Eye Pain

INFLUENZA VIRUS

Complications of Influenza Virus



Pneumonia

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Bronchitis

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Asthma Flare-ups

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Heart Problems

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Ear Infections

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Acute Respiratory Distress Syndrome

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IS IT A COLD OR FLU?

Signs and Symptoms	Cold	Flu
Symptom onset	Gradual	Abrupt
Fever	Rare	Usual
Aches	Slight	Usual
Chills	Uncommon	Fairly common
Fatigue, weakness	Sometimes	Usual
Sneezing	Common	Sometimes
Stuffy nose	Common	Sometimes
Sore throat	Common	Sometimes
Chest discomfort, cough	Mild to moderate	Common
Headache	Rare	Common

#FIGHT FLU
































































HOW TO TELL THE DIFFERENCE BETWEEN FLU, RSV, COVID-19, AND THE COMMON COLD

Common symptoms may include cough, headaches, sneezing, runny nose, and congestion. Different symptoms may include:

 Rarely
  Sometimes
   Often

	COLD	FLU	COVID-19	RSV
 ACHES	 	  	 	
 DIFFICULTY BREATHING			  	 
 FATIGUE	 	  	  	
 FEVER		  	 	 
 LOSS OF TASTE OR SMELL			 	
 SORE THROAT	  	 	  	
 WHEEZING				  

Flu, RSV, and COVID-19 Coinfection Data: 2023-2024 Season

One way CDC collects data on coinfections with influenza and other respiratory viruses (including SARS-CoV-2, the virus that causes COVID-19, and respiratory syncytial virus, or RSV) is by using data from the [Influenza Hospitalization Surveillance Network](#) (FluSurv-NET) which is part of the [Respiratory Virus Surveillance Network](#) (RESP-NET).

FluSurv-NET collects coinfection data among children and adults hospitalized with laboratory-confirmed flu, COVID-19, and RSV at affiliated acute care hospitals in 14 states. The following table provides preliminary data on coinfections reported in FluSurv-NET for October and November. The table provides the total number of COVID-19 and flu coinfections as well as the total number of flu and RSV coinfections reported during this time frame among patients hospitalized with laboratory-confirmed influenza virus infection. It also shows the percentages of flu and COVID-19 coinfections as well as flu and RSV coinfections among people hospitalized with laboratory-confirmed influenza virus infection during this time period.

Coinfections	Number of hospitalizations	% of total lab-confirmed influenza hospitalizations with selected coinfections (95% CI)
Flu and COVID	950	5.37% (95% CI: 4.02%-7.00%)
Flu and RSV	901	2.00% (95% CI: 1.19%-3.14%)

Stomach virus vs. influenza: What is the difference?

The symptoms of stomach flu include:

- Watery diarrhea
- Abdominal pain or cramping
- Nausea
- Vomiting
- Fever



Causes

Norovirus is the most common cause of stomach flu, but other viruses that can cause stomach flu include:



Rotavirus



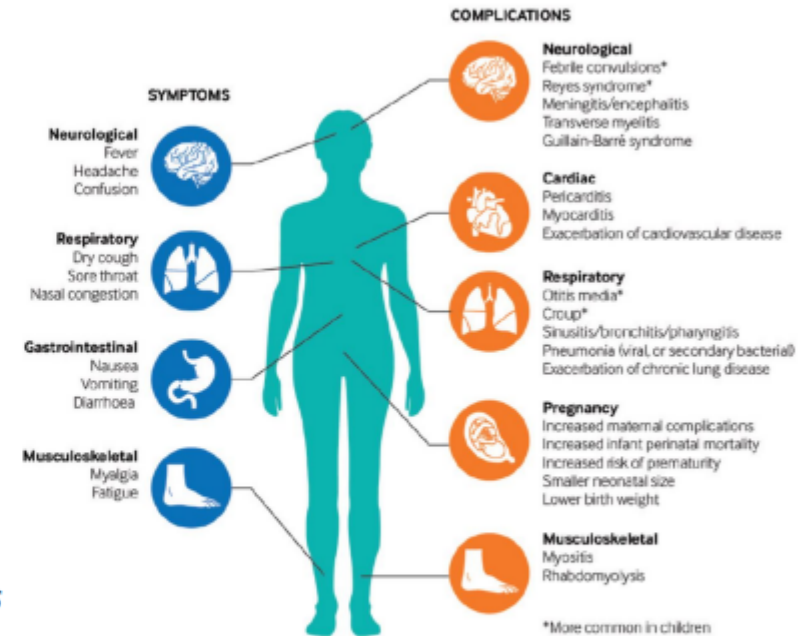
Adenovirus



Astrovirus

Influenza Complications

- **Moderate Illness:**
 - Otitis media in young children, sinusitis
 - Exacerbation of chronic disease
- **Severe to Critical Illness:**
 - **Exacerbation of chronic disease**
 - **Respiratory:** viral pneumonia, croup, status asthmaticus, bronchiolitis, tracheitis, ARDS
 - **Cardiac:** myocarditis, pericarditis, myocardial infarction
 - **Neurologic:** encephalopathy & encephalitis, cerebrovascular accident, Guillain-Barre syndrome (GBS), Acute Disseminated Encephalomyelitis (ADEM), Reye syndrome
 - **Bacterial co-infection:** invasive bacterial infection (e.g. community-acquired pneumonia)
 - *Staphylococcus aureus* (MSSA, MRSA), *Streptococcus pneumoniae*, Group A Streptococcus
 - **Musculoskeletal:** myositis, rhabdomyolysis
 - **Multi-organ failure** (respiratory, renal failure, septic shock)
 - **Healthcare-associated infections** (e.g. bacterial or fungal ventilator-associated pneumonia)





CDC A(H5N1) Bird Flu Response Update, July 19, 2024

AT A GLANCE

CDC provides an update on its response activities related to the multistate outbreak of avian influenza A(H5N1) virus, or "H5N1 bird flu," in dairy cows and other animals in the United States.

What to Know

In this week's Spotlight, we include the key findings from the recent Michigan-led study that tested the blood of farmworkers from two dairy farms that experienced an outbreak of highly pathogenic avian influenza A(H5N1) virus among cattle. The study looked for antibodies that would indicate infection with the virus. None of the blood samples collected from people who had been exposed to infected dairy cows showed avian influenza A(H5N1) neutralizing antibodies. This is an important finding because it suggests that asymptomatic infections in people are not occurring and provides support to the current testing approach – i.e., collecting samples from symptomatic people who have been exposed to sick animals.

Today's edition also includes details about CDC's analysis of the genetic sequence (RNA) from one of the infected Colorado poultry farm workers diagnosed with avian influenza A(H5N1) virus infection. The findings are reassuring, showing it is closely related to the first human case discovered in Michigan and that it does not have changes associated with

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CDC Reports First U.S. Human Infection in 2024 with Variant Influenza Virus

April 5, 2024 —On March 29, 2024, CDC reported this year's first U.S. human infection with an influenza (flu) virus that normally spreads in pigs and not people. The infection with an [influenza A\(H1N2\) variant \(v\) virus](#) occurred in a child living near a pig farm in Pennsylvania who had direct contact with pigs prior to illness onset. The person was hospitalized and has since recovered from their illness. CDC recommends that people in contact with pigs take [precautions](#) and provides specific [guidance](#) for people who are at higher risk of developing serious complications from flu.

The [patient](#) sought health care during the week ending March 9, 2024, and had the following symptoms: fever, vomiting, cough, and rhinorrhea (runny nose). The hospitalized patient received influenza antiviral treatment and recovered. The case was first reported by the Pennsylvania Department of Health. Local public health officials found that the patient had swine contact prior to illness onset. No person-to-person spread of the A(H1N2)v virus associated with this patient has been identified.

Additional investigation determined that two of the patient's close contacts had also contact with swine and had been ill before the patient developed symptoms. The two persons had mild illness; their symptoms resolved, and they were not tested for influenza.

Variant influenza virus infections usually cause mild illness; however, they can cause severe illness and are concerning because of their pandemic potential. Similar to seasonal flu, people with certain underlying conditions are at higher risk of developing serious complications from infections with swine-origin influenza viruses.

Antiviral Treatment

Focused on prompt treatment of persons with severe disease and those at increased risk of influenza complications

- **Antiviral treatment is recommended and has the greatest clinical benefit when started as soon as possible for patients with confirmed or suspected influenza who are:**
 - **Hospitalized*** (without waiting for testing results) **(oral/enteric oseltamivir)**
 - **Outpatients with complicated or progressive illness of any duration (oral oseltamivir)**
 - **Outpatients at high risk for influenza complications (oral oseltamivir or oral baloxavir)**
- Antiviral treatment can be considered for any previously healthy, non-high-risk outpatient with confirmed or suspected influenza (e.g. with influenza-like illness) on the basis of clinical judgment, if treatment can be initiated within 48 hours of illness onset; including empiric treatment (e.g. in-person visit or via telemedicine) **(e.g. oral oseltamivir or oral baloxavir)**



**Tanks for Your
Attention**