
Respiratory Syncytial Virus (RSV) In Los Angeles

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RSV Disease in an Infant



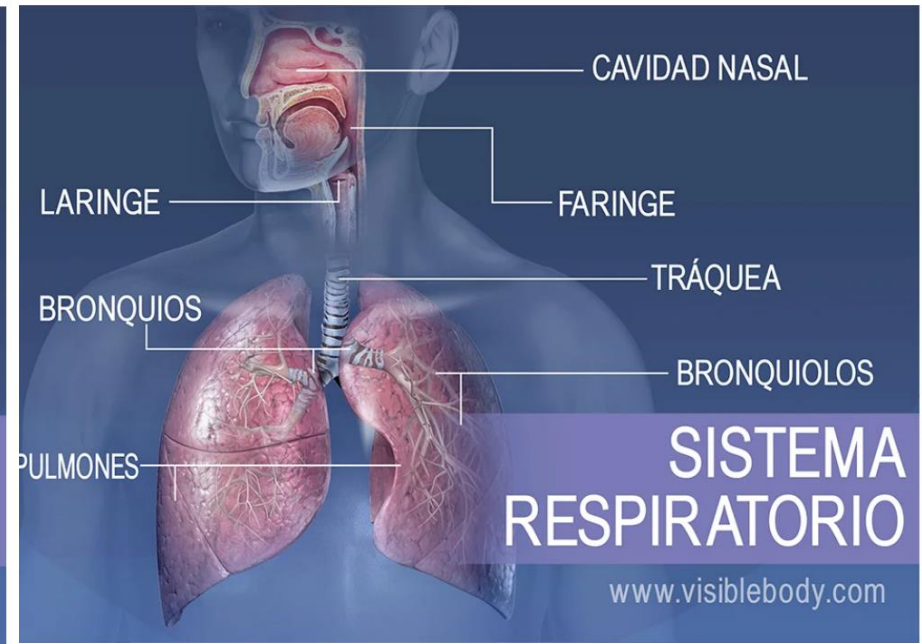
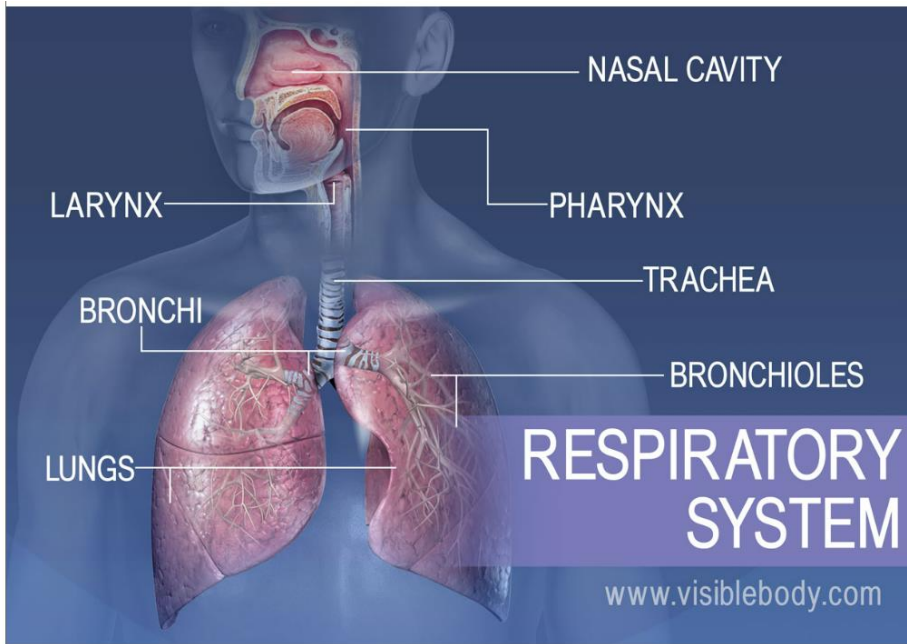
Topics for Discussion

1. Description of RSV and the annual public health threat it represents
 - How serious is it?
 - How different is it from Influenza (“the flu”) and COVID-19
2. Discussion of strategies for RSV prevention
3. How RSV is treated at home and in the hospital
4. Discuss means of supporting families and young children/infants with RSV

Conflicts of Interest

I have no financial conflicts of interest to report.

The Respiratory Tract



Upper respiratory tract: Nasal cavity, pharynx. The Sinuses and ears are directly connected.

Lower respiratory tract: below the larynx (bronchi, bronchioles, lungs)

Winter Respiratory Tract Illness – Common Conditions

Common cold – nasal discharge

Laryngitis (sore throat/difficulty speaking)

Croup (“barking seal” cough)

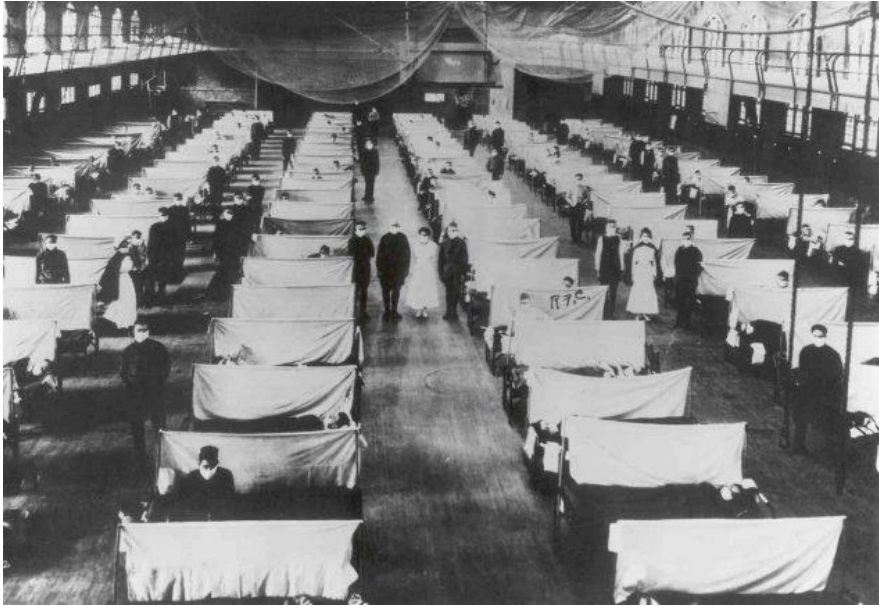
Worsening of chronic bronchitis in adults

Influenza: fever, fatigue, coughing (often with phlegm)

- Unless testing is done, similar conditions are referred to as Influenza like illness (abbreviated as “ILI”).

Pneumonia

Influenza - the worldwide 1918 -1920 epidemic



First reported cases were in Kansas 1918 (195,000 deaths in 10/1918)

Cases continued worldwide; 10 to 50 million deaths by 1920

INFLUENZA

Influenza viruses cause annual outbreaks; some years worse than others

- *Short incubation period (~two days from exposure)*
- *High amounts of virus in respiratory secretions*

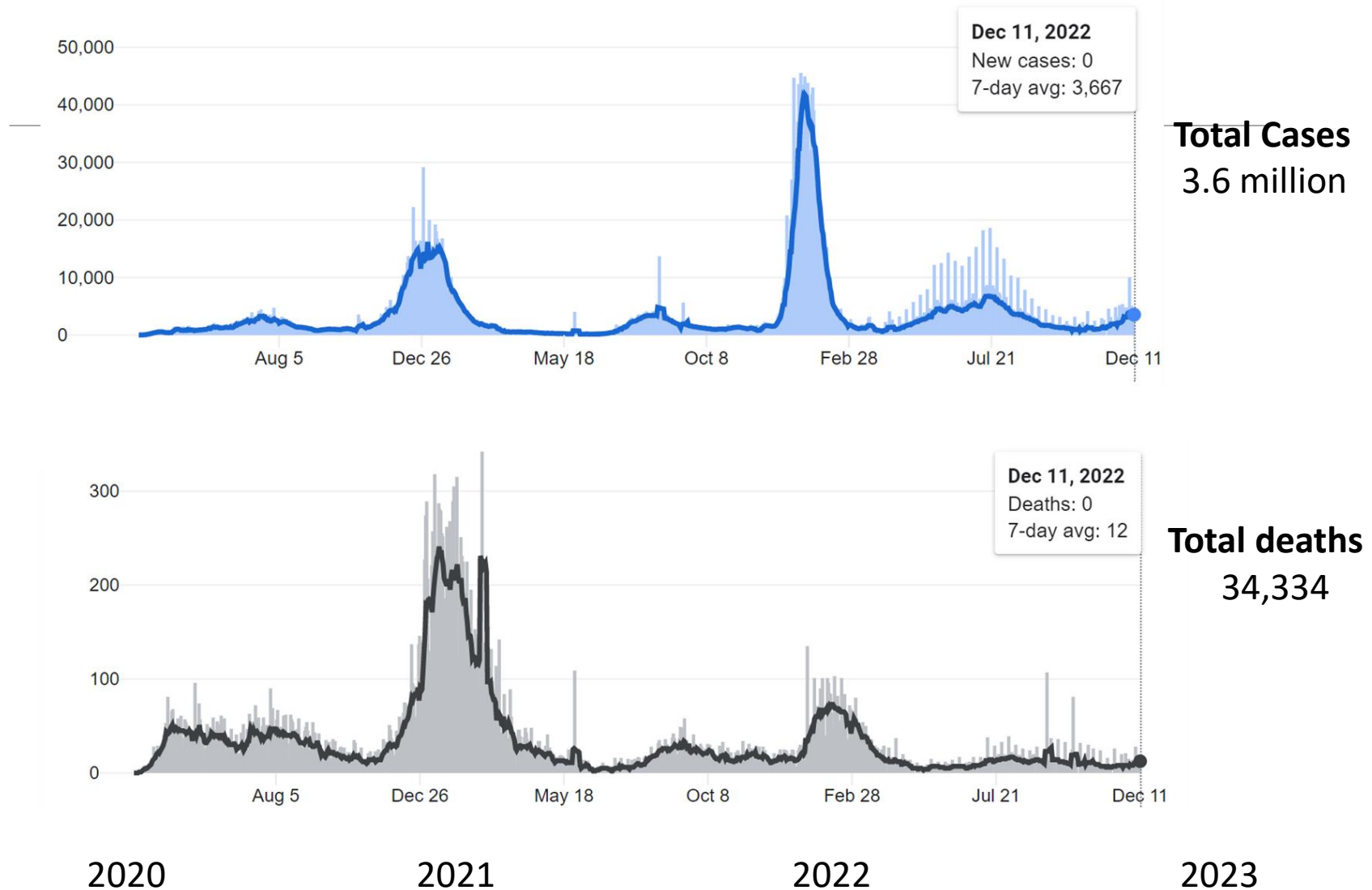
U.S. PUBLIC HEALTH IMPACT – *Enormous!*

1976 -2007: estimated influenza-associated deaths ranged from approximately 3,300 to 49,000 **annually**.

Elderly, infants, those with chronic cardiopulmonary disease at greatest risk

Annual vaccination against influenza is now recommended for everyone over the age of 6 months.

COVID-19 in Los Angeles County - 2020 to 2022



**60,000 more people died of COVID-19 during 2021 compared with 2020;
COVID-19 remained the 3rd leading cause of death**

PROVISIONAL 2021 DEATHS

1



Heart Disease

693K

2

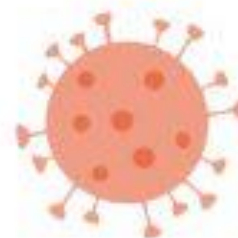


All Cancers

Cancer

605K

3



COVID-19

415K



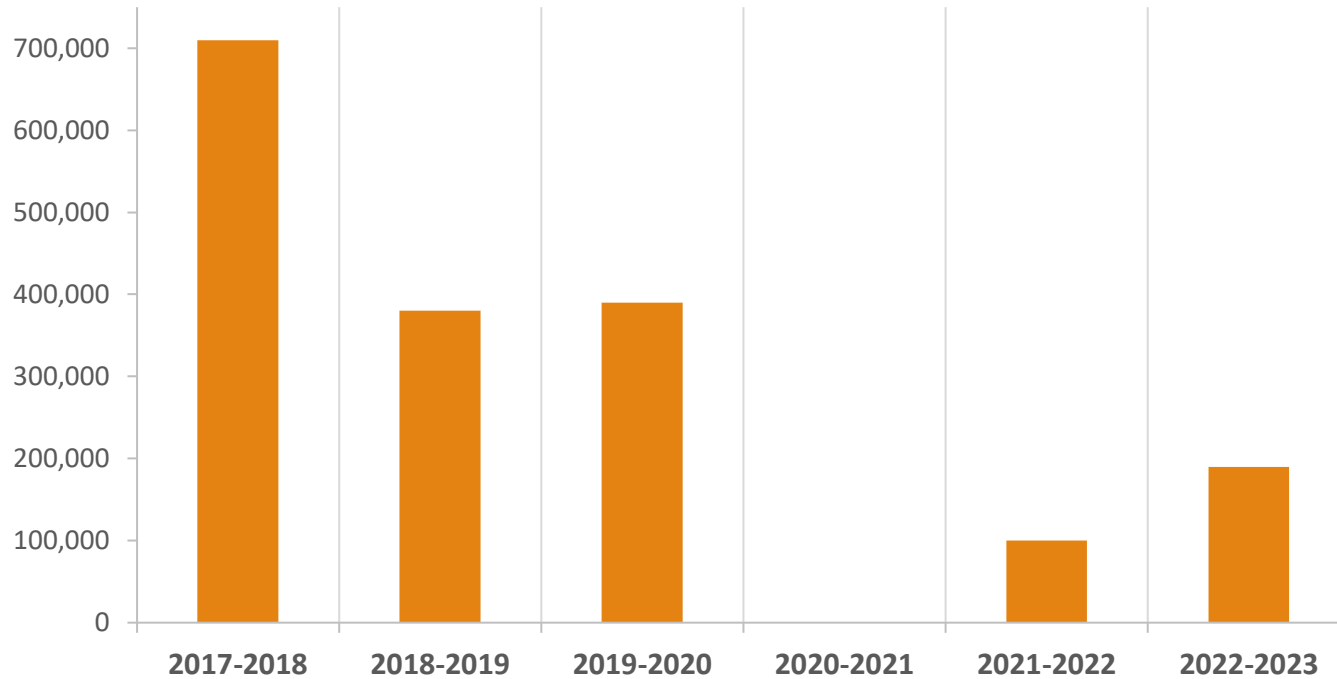
* Provisional National Vital Statistics System (NVSS) death certificate data on underlying causes of death among U.S. residents in the United States during January–December 2021

bit.ly/MMWR7117

APRIL 22, 2022

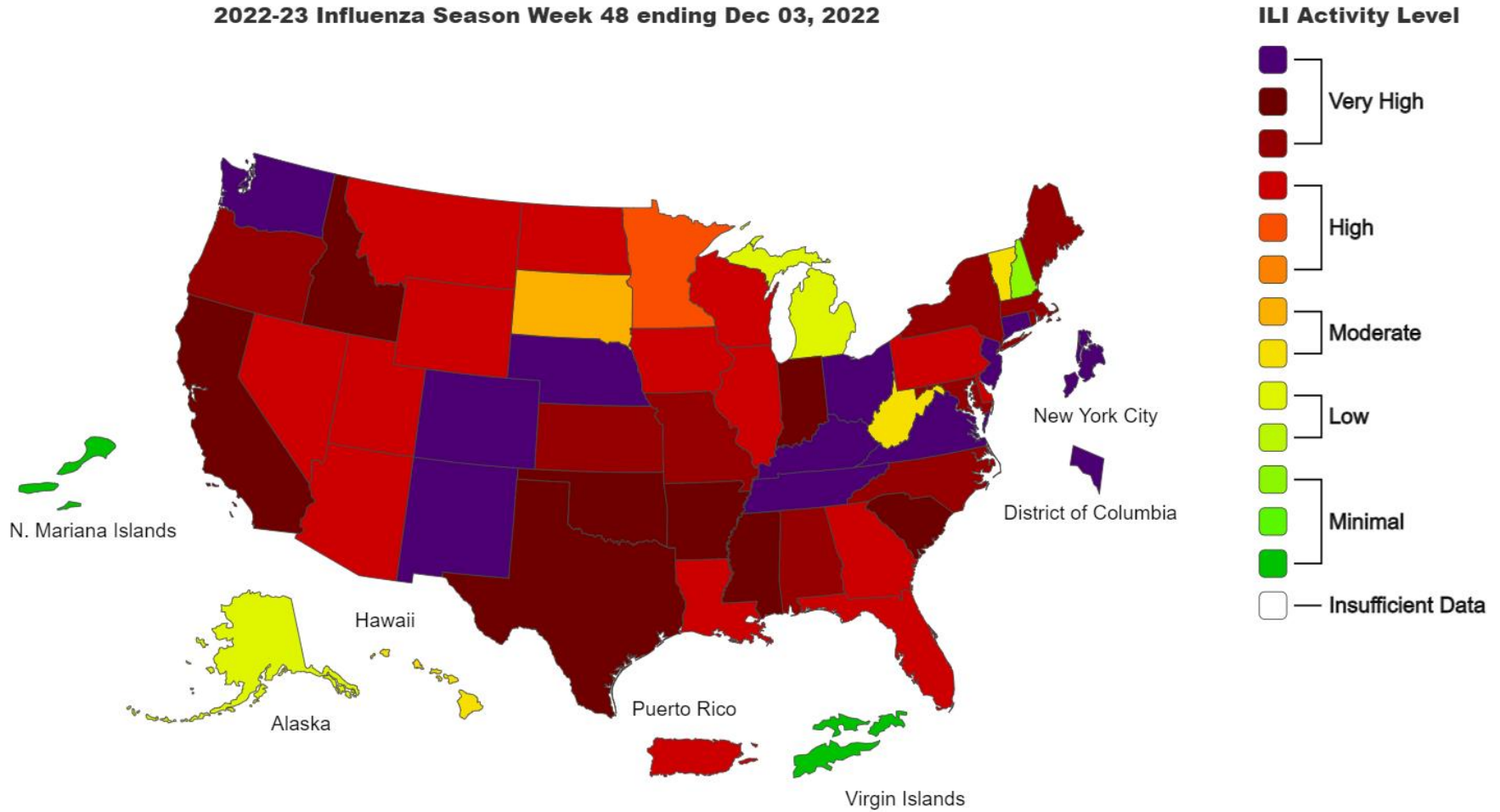
MMWR

Hospitalizations For Influenza in the United States: 2017 - 2022



Winter Season

2022-23 Influenza Season Week 48 ending Dec 03, 2022



This is an official
CDC HEALTH ADVISORY

Distributed via the CDC Health Alert Network
November 04, 2022, 3:30 PM ET
CDCHAN-00479

**Increased Respiratory Virus Activity, Especially Among Children,
Early in the 2022-2023 Fall and Winter**

Summary

The Centers for Disease Control and Prevention (CDC) is issuing this Health Alert Network (HAN) Health Advisory about early, elevated respiratory disease incidence caused by multiple viruses occurring especially among children and placing strain on healthcare systems. Co-circulation of respiratory syncytial virus (RSV), influenza viruses, SARS-CoV-2, and others could place stress on healthcare systems this fall and winter. This early increase in disease incidence highlights the importance of optimizing respiratory virus prevention and treatment measures, including prompt vaccination and antiviral treatment, as outlined below.

Background

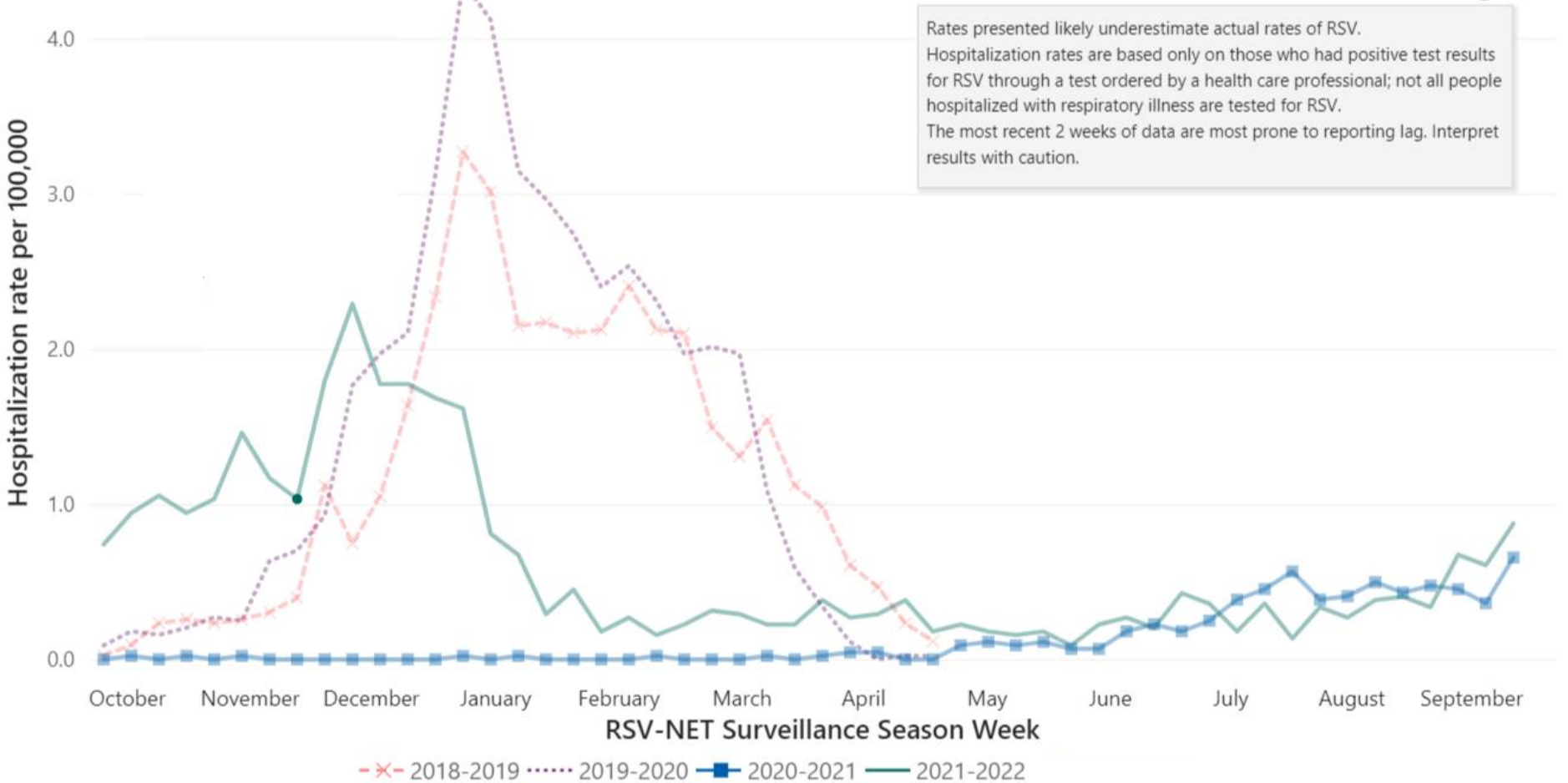
Many respiratory viruses with similar clinical presentations circulate year-round in the United States and at higher levels in fall and winter. In the past 2 years, respiratory disease activity has been dominated by SARS-CoV-2, and seasonal circulation of other respiratory viruses has been atypical or lower than pre-COVID-19 pandemic years. Currently, the U.S. is experiencing a surge and co-circulation of respiratory viruses other than SARS-CoV-2. CDC is tracking levels of respiratory syncytial virus (RSV), influenza, and [rhinovirus/enterovirus \(RV/EV\)](#) that are higher than usual for this time of year, especially among children, though RV/EV levels may have plateaued in recent weeks. SARS-CoV-2 also continues to circulate in all U.S. states.

RSV

[CDC surveillance](#) has shown an increase in RSV detections and RSV-associated emergency department visits and hospitalizations in all but two U.S. Department of Health and Human Services (HHS) regions (regions 4 and 6), with some regions already near the seasonal peak levels typically observed in December or January. This year, rates of RSV-associated hospitalizations began to increase during late spring and continued to increase through the summer and into early fall. Preliminary data from October 2022 show that weekly rates of RSV-associated hospitalizations among children younger than 18 years old are higher than rates observed during similar weeks in recent years. While RSV activity appears to be

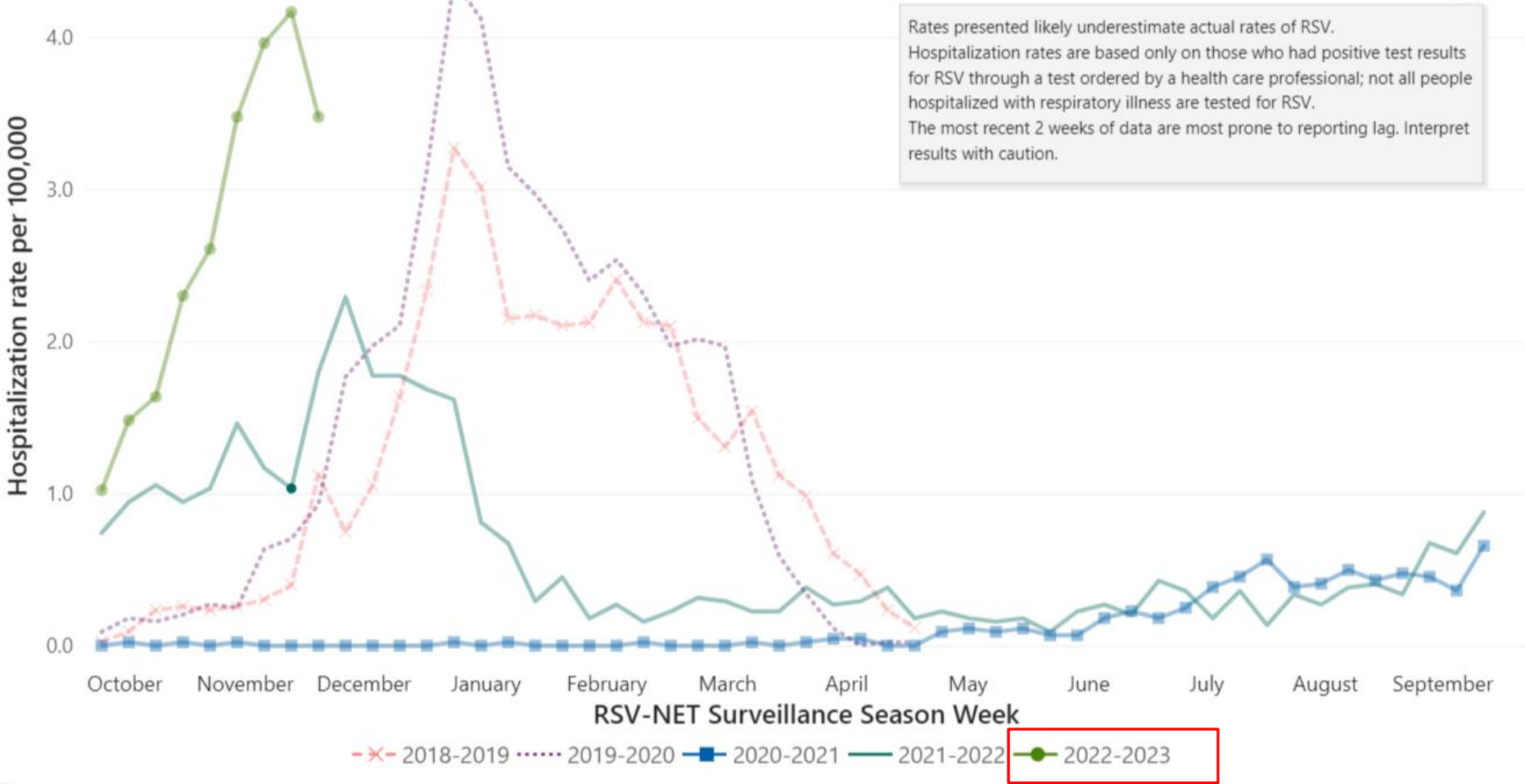
RSV cases in the United States

10/2018 to 9/2022



RSV cases in the United States

10/2018 to **December**/2022



Respiratory Syncytial Virus (RSV)

What is it?

A virus capable of causing disease in both the upper and lower respiratory tract tracts

What does it cause in children, adolescents, and adults?

- Common Cold
- Sore throat (Pharyngitis)
- Croup in young children (barking cough)
- May trigger attacks of asthma
- Pneumonia in young children, and severely immunocompromised people

How do you get it?

Contact with other's secretions by close contact OR with contaminated surfaces.

RSV: Who is at greatest risk?



Infants especially:

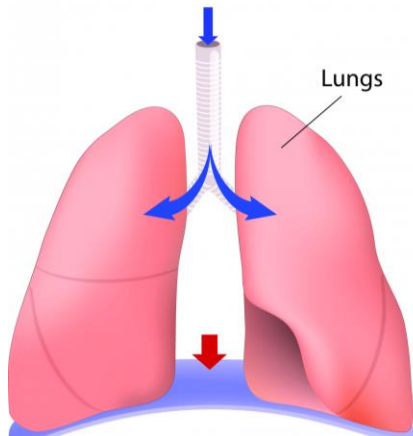
- Under 6 months of age
- Prematurely born infants
- Infants with chronic lung disease and some kinds of heart disease
- If mother smoked during pregnancy or
- If there is cigarette smoking at home
- Household crowding

Older adults (65 years of age and older) especially:

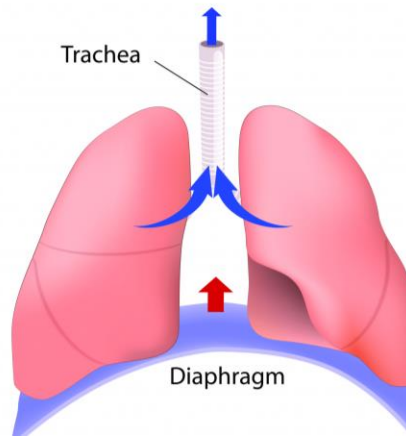
- Frailty – general weakness, fatigue, chronic illness...
- Chronic heart or lung disease (COPD/Emphysema)

RSV is the main cause of Bronchiolitis

Movements of the diaphragm During Breathing

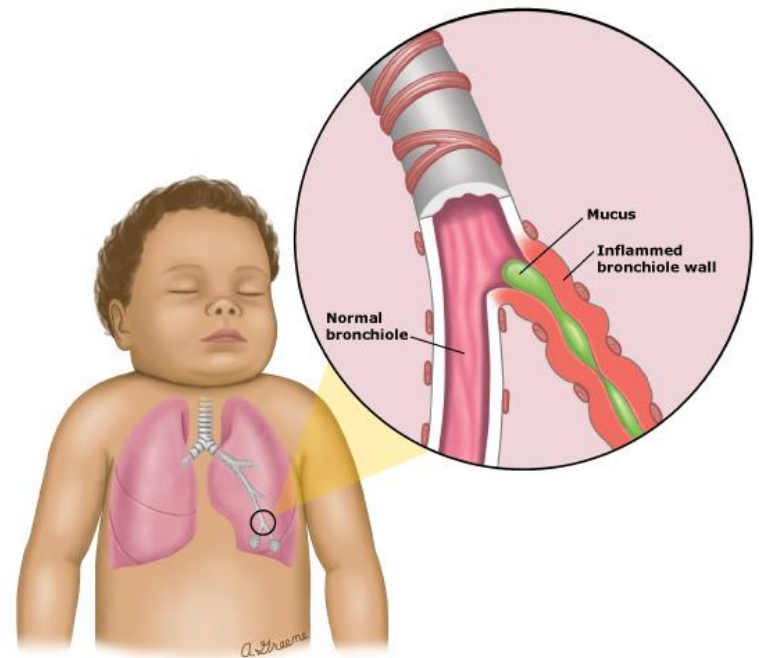


Inhalation



Exhalation

Bronchiolitis

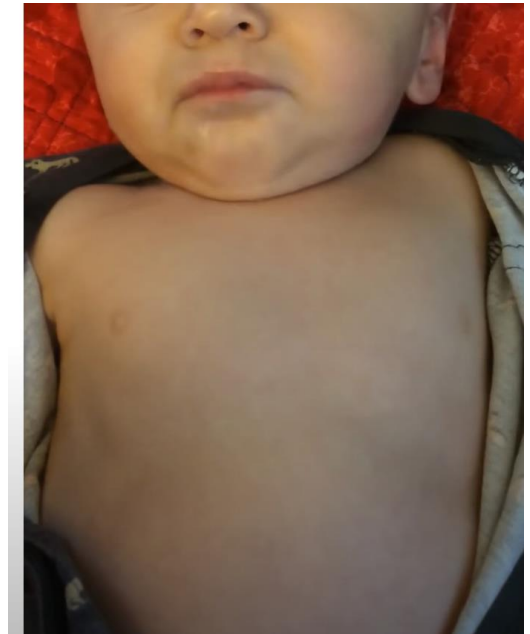


Bronchiolitis is an infection that affects the small tubes that carry air in and out of the lungs. When infected, these tubes (called bronchioles) get swollen and inflamed. That makes it harder to breathe.

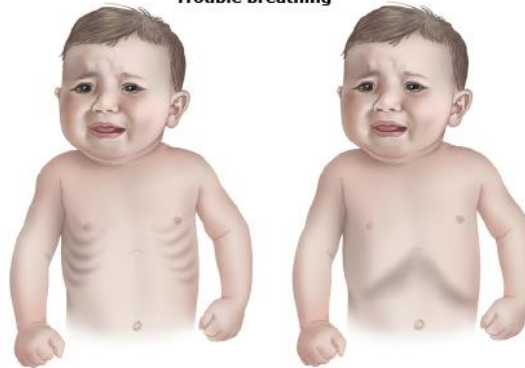
UpToDate®

Signs of Respiratory Distress in Infants

Normal



Trouble breathing



Respiratory Distress in Infants



Respiratory Distress in Infants



<https://youtu.be/iiX6vQ2F6ao>

RSV in the Elderly

Annual Impact of Respiratory Syncytial Virus (RSV) in the US



www.nfid.org



58,000

hospitalizations and an estimated 100 to 500 deaths among children <5 years old



177,000

hospitalizations and 14,000 deaths among older adults



\$500 million

Annual cost of bronchiolitis hospital admissions for children <2 years old



\$103 million

Annual cost of RSV-related acute respiratory infection in older adults 65+

Are we actually in a “Triple-demic?”

COVID-19 Summer to Winter in Los Angeles

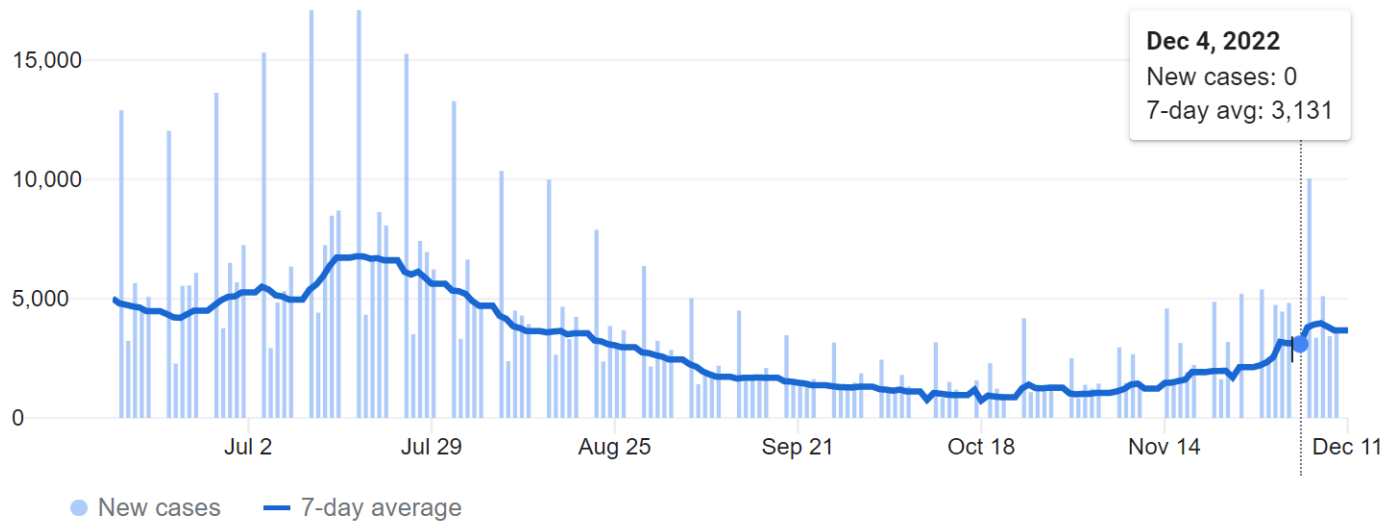
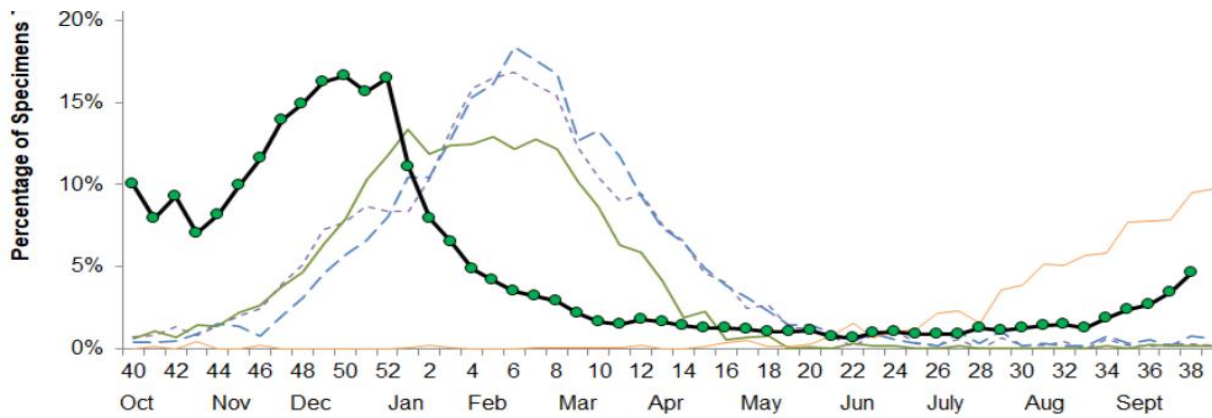
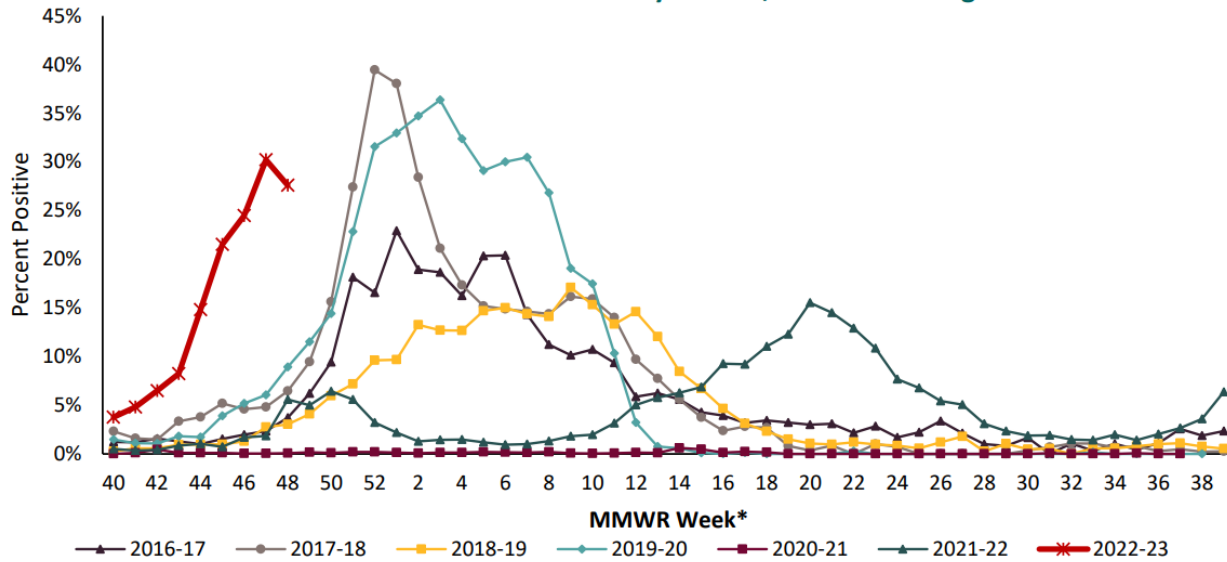


Figure 2. Percentage of Respiratory Specimens Testing Positive for Influenza at LAC Sentinel Surveillance Laboratories by Season, 2016-17 Through 2022-23



Prevention of RSV Infections

- Cover your **coughs** and **sneezes** with a tissue or cough or sneeze into your elbow not your hand
- **Wash your hands** often with soap and water for at least 20 seconds
- **Avoid close contact**, such as kissing and shaking hands with others
- **Avoid sharing cups and eating utensils** with others



Prevention of RSV Infections

- **Frequently touched surfaces** should be frequently cleaned
- **Stay home from work or school when sick**, until symptoms improve
- Keeping infants (under 1 year of age) out of **daycare** during the RSV season

Treatment

Treat the symptoms

- Keep nose of infants free of secretions
- Monitor and treat fever (100.4 or more) if present
- Decongestants and other “cold medications” are not recommended for children

Prevent dehydration

- Continuing feedings and offering water
- Encourage adults with RSV symptoms to drink extra fluids

Antibiotics have no effect on RSV

- Bacterial complications are very uncommon (~3%)
- No antiviral medications exist. None of the antiviral medications for other viruses have any effect

Long Term Prevention Against RSV

Are there vaccines for RSV?

None so far but several have been tested

Vaccine for pregnant women- to protect newborns

Vaccines for adults over 65 years of age

Monoclonal antibodies?

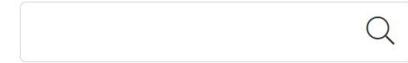
- Palivizumab (Synagis™) is effective for infants (monthly injections)
- A second longer lasting monoclonal antibody may be approved in the US soon (2023) (one dose for the entire RSV season)

How you can you help

1. Share your knowledge (and not the virus)
 - Be a model for effective prevention with handwashing, mask wearing, and cough hygiene.
2. Recognize the signs of respiratory distress
3. Help identify sources of information
 - American Academy of Pediatrics
 - CDC
 - Los Angeles County Department of Public Health

Review: Topics Covered

1. Description of RSV disease annual public health threat it represents
 - Viral illness that causes both upper and lower respiratory tract disease
 - Most severe in infants (especially < 6 months of age) and the elderly
2. Discussion of strategies for RSV prevention during the winter
 - Personal Hygiene – Cough hygiene, handwashing
 - Cleaning high contact surfaces, avoidance of exposures
3. Discuss how RSV is treated at home
 - Treatment of symptoms, maintaining hydration, monitoring
4. Discuss means of supporting families / clients at risk
 - Share what you know, share trusted sources of information



Respiratory Syncytial Virus Infection (RSV)

- ! CDC surveillance has shown an increase in RSV detections and RSV-associated emergency department visits and hospitalizations in multiple U.S. regions, with some regions nearing seasonal peak levels. Clinicians and public health professionals should be aware of increases in respiratory viruses, including RSV.



Respiratory syncytial (sin-SISH-uhl) virus, or RSV, is a **common respiratory virus that usually causes mild, cold-like symptoms**. Most people recover in a week or two, but RSV can be serious, especially for infants and older adults. RSV is the most common cause of bronchiolitis (inflammation of the small airways in the lung) and pneumonia (infection of the lungs) in children younger than 1 year of age in the United States.

Symptoms & Care



Know the symptoms to look for and how to care for people with RSV.

[Symptoms & Care](#)

Infants & Children



RSV can be dangerous for some infants and young children.

[Infants & Children](#)

Transmission



Help protect yourself and your loved ones from RSV infection.

[Transmission](#)

LA County Public Health Department

- Acute Communicable Disease Control**
- ACDC Main Page
- Diseases & Conditions
 - Guidelines/Manuals
 - Reporting a Disease
 - Materials for Health Professionals
 - Los Angeles Health Alert Network (LAHAN)
 - Skilled Nursing Facilities
 - Public Health Resources
 - Report a Problem
 - Health Advisories
 - Health Ed Materials
- Disease Reports and Special Studies
- Frequently Used Links
 - ACDC Manual (B73)

Contact Information

County of Los Angeles
Department of Public Health
Acute Communicable Disease Control
313 N. Figueroa Street, #212
Los Angeles, CA 90012
Phone: (213) 240-7941
Fax: (213) 482-4856
Email: acdc2@ph.lacounty.gov

Public Health Programs

[Other Public Health Departments in L.A. County](#)

Call 211 For Information
24/7

Acute Communicable Disease Control

Respiratory Syncytial Virus Infection (RSV)

- [Flu Main Page](#)
- [Flu Materials](#)
- [Healthcare Outreach Unit \(HOU\)](#)
- [LA Health Alert Network \(LAHAN\)](#)

About RSV

Respiratory syncytial (sin-SISH-uhl) virus, or RSV, is a common respiratory virus that usually causes mild, cold-like symptoms. Most people recover in a week or two, but RSV can be serious, especially for infants, older adults and those with weakened immune systems. RSV is the most common cause of bronchiolitis (inflammation of the small airways in the lung) and pneumonia (infection of the lungs) in children younger than 1 year of age in the United States. RSV circulation in the United States usually starts during fall and peaks in the winter. The timing and severity of RSV circulation can vary from year to year.

Symptoms

In most people, RSV causes a mild, cold-like illness that lasts for 1-2 weeks. Symptoms usually appear 4 to 6 days after getting infected. Symptoms of RSV infection usually include:

- Runny Nose
- Decrease in appetite
- Coughing
- Sneezing
- Fever
- Wheezing

Symptoms usually appear in stages and not all at once. In very young infants with RSV, the only symptoms may be:

- Irritability
- Decreased activity
- Breathing difficulties*

***Call your healthcare provider right away if you or your child is having difficulty breathing, not drinking enough fluids, or your symptoms are getting worse.**

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Health Issues

Health Children > Health Issues > Conditions > Chest & Lungs > RSV: When It's More Than Just a Cold

HEALTH ISSUES

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RSV: When It's More Than Just a Cold

By: Andrea Jones, MD, FAAP

Almost all children get RSV at least once before they are 2 years old. For most healthy children, RSV is like a cold. But, some children get very sick with RSV.



What is RSV?
RSV (or respiratory syncytial virus) is one of the many viruses that cause respiratory illness—illnesses of the nose, throat and lungs. This virus usually occurs in the late fall through early spring months, but can vary in different parts of the country.

With mask-wearing and physical distancing for COVID-19, there were fewer cases of RSV in 2020. However, once safety measures relaxed with the arrival of COVID-19 vaccines, a rise in RSV cases began in spring 2021. The spread of RSV and other seasonal respiratory illnesses like influenza (flu) has also started earlier than usual this year.

Pediatrician Discusses RSV Cases

From an accredited healthcare educator ▶

Watch later Share

- Fever (temperature of 100.4 or higher)
- Cough (dry or wet sounding)
- Congestion
- Runny nose
- Sneezing
- Fussiness
- Poor feeding

- Fast breathing
- Flaring of the nostrils & head bobbing with breathing
- Rhythmic grunting during breathing (see sound clip clip, below)
- Belly breathing, tugging between the ribs and/or the lower neck (see video, below)
- Wheezing

How hard is your baby breathing? What to look for.

Chest wall retractions happen when a baby must use muscles between the ribs or in the neck to breathe. It is a sign that your baby is having to work harder than normal to breathe.

Watch your child's rib cage as they inhale. If you see it "caving in" and forming an upside-down "V" shape under the neck, then they are working too hard.

Signs of RSV in Babies

Signs of RSV in Babies | American Academy of Pediatrics

Watch later Share

From an accredited healthcare educator ▶



- Fast or short breaths
- Grunting noises
- Chest caving in with each breath
- Skin turns blue or purple due to lack of oxygen. On darker skin, look for changes to lips, tongue, gums and around eyes

Watch on YouTube

healthychildren.org

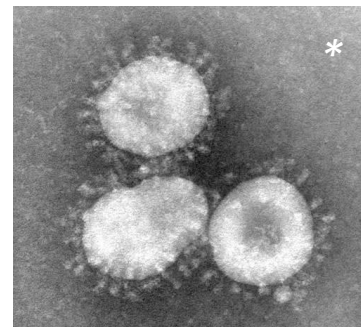
Extra Slides

Symptoms	COVID-19	RSV	Flu
Onset	Gradual, then sudden escalation	Mild with sudden escalation	Abrupt
Severity	Mild to severe	Mild to severe	Mild to severe
Duration	7-25 days	3-7 days	7-14 days
Loss of taste/smell	Common	Rare	Rare
Trouble breathing	Sometimes (can be severe)	Common	Not common
Cough	Common dry	Common	Common dry
Sneezing	Not common	Common	Rare
Runny/stuffy nose	Not common	Common	Sometimes
Sore throat	Sometimes	Common	Common
Fever	Common	Common	Common
Fatigue	Sometimes	Sometimes	Common
Headache	Sometimes	Rare	Common
Body aches	Sometimes	Rare	Common
Diarrhea/nausea/vomiting	Sometimes	Rare	Sometimes

Source: [Children's National Hospital](#)

TIME

Coronaviruses*



Clinical Patterns

- Common Cold
- Pharyngitis
- Bronchiolitis
- Life threatening pneumonia with MERS-CoV and SARS-Cov

Vaccines? Feasible, and research underway for MERS-CoV

Treatment? No antiviral agents yet available

Major causes of LRTI (lower respiratory tract disease)

Acute, mild, self-limited, upper respiratory tract condition with:
Rhinorrhea, sneezing, cough, and throat irritation; usually no fever

Usual Causes	Less Common
Influenza Parainfluenza Adenovirus* Respiratory syncytial virus Metapneumovirus	Rhinovirus Coronavirus**

*Adenoviruses covered elsewhere

** Including rare epidemic coronaviruses

Influenza - classic disease

Sudden onset of:

- Fever
- Malaise
- Myalgia (muscular pain)
- Sore throat
- Cough

Malaise and fatigue frequently last 1 to 2 weeks

Influenza viruses

Clinical Manifestations

- Fever
- Pharyngitis
- Otitis media in children
- Croup
- Bronchitis / Bronchiolitis
- Pneumonia – which can be life-threatening
 - Bacterial infections common
- Encephalopathy
- Myocarditis

Types of vaccines for Influenza

Inactivated influenza vaccines (IIV)

Recombinant viruses grown up in eggs, combined, inactivated

Inactivated influenza vaccine, quadrivalent (cIIV)

Viruses are produced in mammalian cell cultures, combined, inactivated

Recombinant influenza vaccine (RIV)

H and N proteins are expressed in insect cells and purified.

Live attenuated influenza vaccine (LAIV)

Attenuated viruses that are cold adapted are engineered to express desired H and N proteins.

Efficacy varies year to year and depends on the antigenic similarity of strains used for production to the strains that actually circulate that year.
Current research goal: produce vaccines against less variable flu proteins

Antiviral Agents For Influenza Viruses

*Antiviral agents shorten symptoms by 1 to 3 days on average
Perhaps more importantly, they reduce hospitalizations and antibiotic use*

NEURAMINIDASE INHIBITORS

Zanamavir (Inhaled)

Peramivir (Injected)

Oseltamivir (Oral)

INHIBITORS OF VIRAL ENDONUCLEASE THAT MEDIATES “CAP-STEALING”

Baloxavir

* These “Adamantanes” have not been used in last 10 years due to resistance by circulating viruses