

Respiratory Illnesses 101

Presented by: Heidi Gurov, RN, BSN, CMSRN
Nurse Consultant



PUBLIC HEALTH
DIVISION



IMMUNIZATION
UNIT

Continuing education learning objectives

1. Recognize patient populations that will benefit from age-appropriate vaccination.
2. Recognize important concepts related to successful vaccine therapy and increasing immunization coverage rates.
3. Define strategies to prevent vaccine storage and handling errors.
4. Name three ways to utilize reports from within the WylR to monitor data quality and manage vaccine inventories.
5. Recognize innovations in vaccine technology and trends and apply them in practice.
6. Describe different communication techniques that teams can use to achieve successful vaccine therapy in individuals and the community.

Remember when we just had “flu season”?

- It's now “Respiratory Season”
 - Flu, RSV, and COVID-19 co-circulation
- Most respiratory pathogens share similar transmission and disease characteristics
 - Direct contact and droplet transmission
 - Symptoms
 - Prevention through good hand and respiratory hygiene, avoiding contact with sick people

Influenza

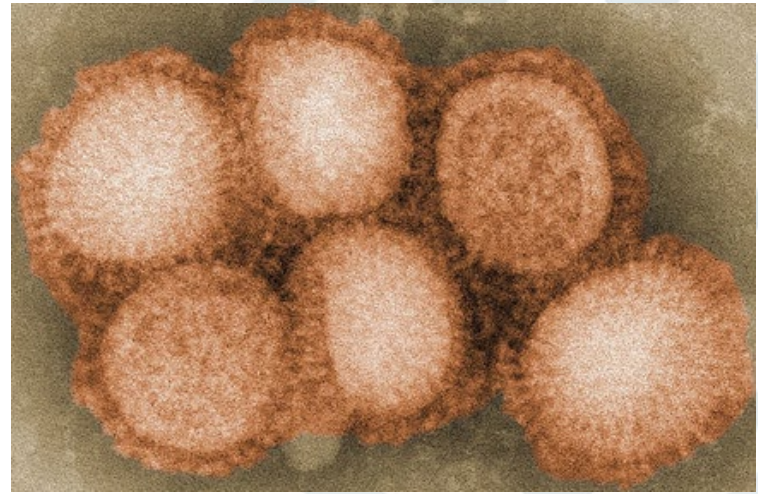
- Disease presentation
- Vaccination & ACIP recommendations

Influenza

Disease presentation

Influenza

- Virus
- Orthomyxoviridae family
- Two main types in humans: A & B
- Droplet and contact transmission
- Average incubation period of 2 days
- Contagious 1 day before symptoms to 5-7 days after
- Seasonality

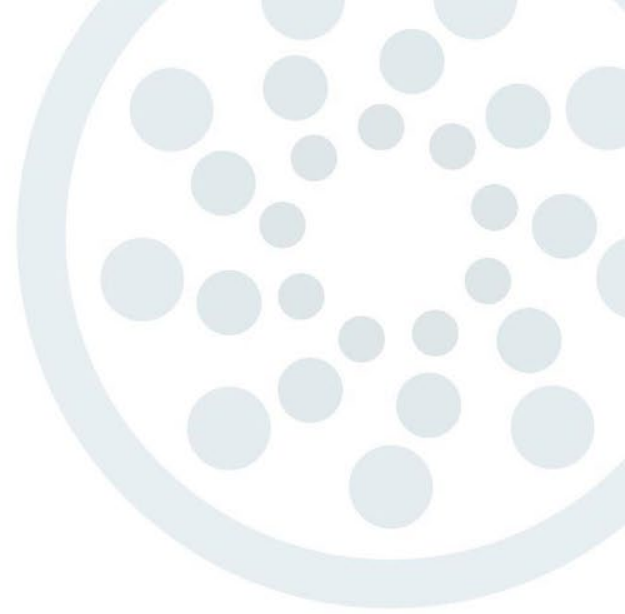


Symptoms

- Abrupt onset of:
 - Fever, muscle aches, sore throat, fatigue, and non-productive cough
 - May include runny nose, headache, substernal chest burning
- Symptoms last 1-2 weeks typically
- Diarrhea and vomiting are rare in adults
 - “Stomach flu” is not caused by influenza virus
- About ⅓ of people with influenza are asymptomatic or have very mild symptoms

Diagnosis

- Diagnostic tests
 - All tests require either a nasal or throat swab
 - Rapid influenza diagnostic tests
 - Results within 10-15 minutes
 - Not as accurate, false negatives possible
 - Rapid molecular assays
 - Results within 15-20 minutes
 - More accurate
 - Viral culture/PCR tests
 - Specialized tests usually performed in labs
 - Longer wait for results
- Many cases may not be diagnosed due to not visiting a provider

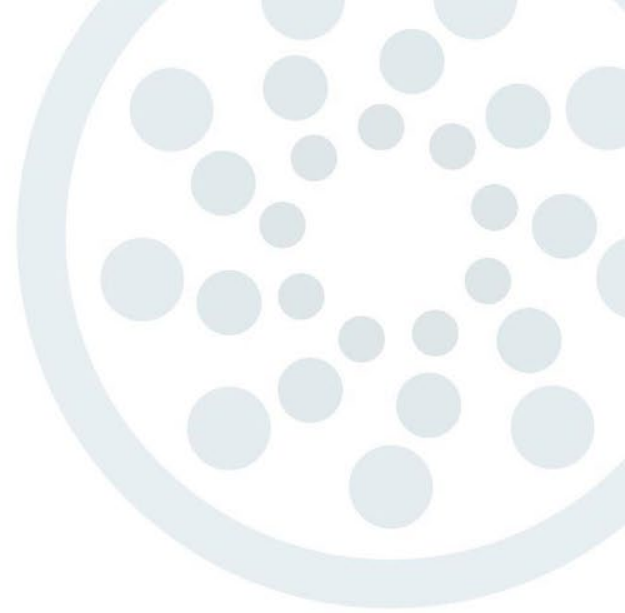


Treatment

- Supportive care
 - Rest, plenty of fluids, OTC pain and fever reducers
 - Do not use aspirin in children <18 years due to risk of Reye's syndrome
- Antiviral medications
 - Work best if started within 2 days of symptom onset
 - Recommended for the 2023-2024 season:
 - Tamiflu® (oseltamivir phosphate)
 - Relenza® (zanamivir)
 - Rapivab® (peramivir)
 - Xofluza® (baloxavir marboxil)
 - Antiviral resistance is currently low

High risk groups

- 65 years and older
- 2 years and younger
- Those with chronic medical conditions:
 - Asthma
 - Neurological and neurodevelopmental conditions
 - Hematological disorders (such as sickle cell disease)
 - Chronic lung disease
 - Endocrine disorders (including diabetes)
 - Heart disease
 - Liver disease
 - Metabolic disorders

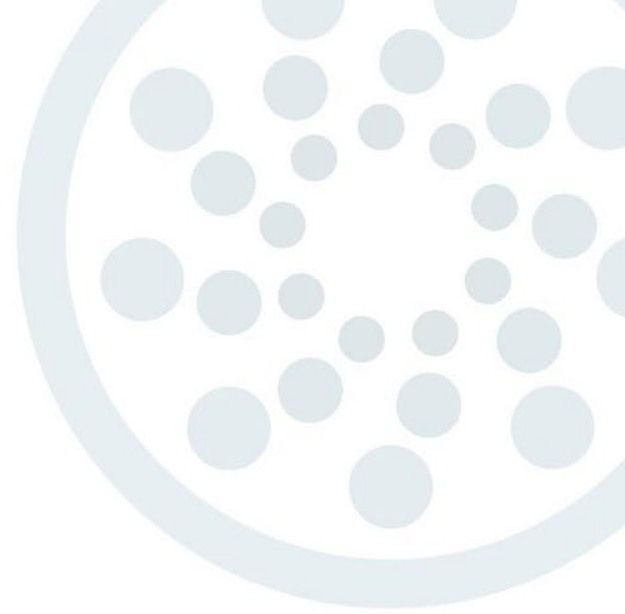


High risk groups continued

- Obesity (BMI ≥ 40)
- People younger than 19 years on long term aspirin or salicylate containing medications
- Immunocompromised people
 - HIV/AIDS
 - Cancer
 - Immunocompromising medication or therapy
- People who have had a stroke
- Pregnant persons
- Long-term care residents
- People from certain racial and ethnic minority groups
 - Non-Hispanic Black, Hispanic or Latinx, and American Indian or Alaska Native persons

Disease complications

- Pneumonia
- Myocarditis
- Encephalitis
- Rhabdomyolysis
- Sepsis
- Multi-organ failure
- Acute Respiratory Distress Syndrome (ARDS)
- Worsening of chronic pulmonary and cardiac conditions
- Reye's syndrome
- Death



Impact

- Worldwide annually:
 - 3-5 million cases of severe illness
 - 250,000-500,000 deaths
- In the United States, total average annual direct medical treatment costs of about \$11 billion
- 14.8 million to 61.7 million workdays may be lost in the United States per year due to influenza illness

CDC estimates* that, from **October 1, 2023** through **May 18, 2024**, there have been:

35 – 64 million
flu **illnesses**



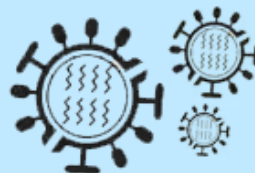
16 – 30 million
flu **medical visits**



390,000 – 820,000
flu **hospitalizations**



25,000 – 71,000
flu **deaths**



Pandemics

- Influenza pandemic
 - An epidemic of influenza that spreads on a worldwide scale and infects a large proportion of the world's population
- First pandemic described in 1580
- Five influenza pandemics since the 19th century
 - 1918-1920 pandemic killed an estimated 50-100 million people
 - $\frac{1}{3}$ of the world's population infected
 - Up to a 20% mortality rate
 - 99% of deaths occurred in people <65 years old
 - 2009-2010 was the latest influenza pandemic
 - 60.8 million U.S. cases
 - 80% of deaths occurred in people <65 years old

Questions?

When you find out



a coworker is sick



**PUBLIC HEALTH
DIVISION**



**IMMUNIZATION
UNIT**

Influenza

Vaccination & ACIP recommendations



PUBLIC HEALTH
DIVISION



IMMUNIZATION
UNIT

Flu vaccination

- First licensed in 1945
- Due to rapid mutation of the virus, vaccines must be updated every year
- World Health Organization (WHO) predicts which strains are most likely to be circulation in the following season for each hemisphere
- Inactivated and live, attenuated vaccines are available in the United States

ACIP recommendations

- Annual vaccination recommended for **all** persons aged ≥ 6 months who do not have contraindications

*ACIP is meeting this week to vote on 2024-2025 recommendations

ACIP recommendations

- Adults aged ≥ 65 years preferentially receive any one of the following higher dose or adjuvanted influenza vaccines:
 - High-dose inactivated influenza vaccine (FluZone High-Dose)
 - Recombinant influenza vaccine (Flublok)
 - Adjuvanted inactivated influenza vaccine (Fluad)
- If none of these three vaccines are available at an opportunity for vaccine administration, then any other age-appropriate influenza vaccine should be used

ACIP recommendations

- People with egg allergy may get any vaccine (egg-based or non-egg-based) that is otherwise appropriate for their age and health status.
 - Previously it was recommended that people with severe allergy to egg be vaccinated in an inpatient or outpatient medical setting
 - Additional safety measures are no longer recommended for flu vaccination of people with an egg allergy beyond those recommended for receipt of ANY vaccine
 - All vaccines should be given in settings where allergic reactions can be recognized and treated quickly

Timing of vaccination

- July and August is too early for most persons
 - Possible waning of vaccine-induced immunity over the course of a season
- Vaccination should be offered ideally in September and October for those needing one dose of vaccine
- Vaccine should continue to be offered as long as flu viruses are circulating and unexpired vaccine is available
- Boosters in the same flu season are not recommended for those who are fully immunized
 - Exception: children under 9 years who have not received two doses by July 1st
- Immune system takes about 2 weeks to build immunity after receiving the vaccine

Timing of vaccination

- Considerations:
 - For most adults (especially those less than 65 years) and for pregnant persons in the first or second trimester:
 - Avoid July and August unless there is a concern that vaccination later in the season might not be possible
 - Children who require 2 doses:
 - These children should receive their first dose as soon as possible, including July and August if available, to allow the second dose to be received ideally by the end of October

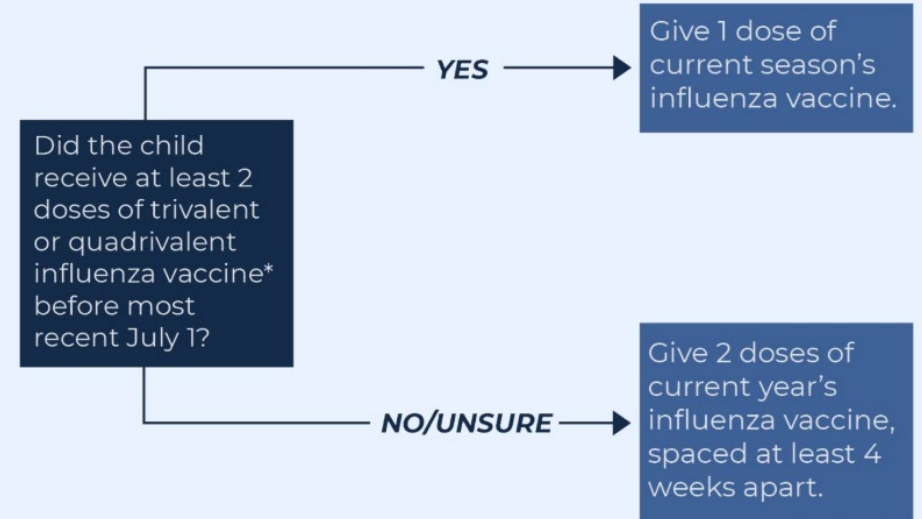
Timing of vaccination

- Considerations continued:
 - Children who require only one dose:
 - July and August can be considered due to vaccination opportunity (i.e. school-aged children receiving back to school physicals and other vaccines) and waning is seen less in this group
 - Pregnant persons in the third trimester:
 - July and August can be considered as vaccination might reduce risk of flu illness in their infants during the first months after birth, when they are too young to receive the vaccine themselves

Pediatric schedule

- Children aged 6 months through 8 years require 2 doses of flu vaccine administered a minimum of 4 weeks apart during their first season of vaccination for optimal protection

Guide for Determining the Number of Doses of Influenza Vaccine to Give to Children Age 6 Months Through 8 Years



* The two doses need not have been received during the same season or consecutive seasons.

NOTES:

- The two doses can both be inactivated influenza vaccine (IIV), or, for children age 2 through 8 years who have no contraindications to live attenuated influenza vaccine (LAIV), can both be LAIV, or alternatively, 1 dose of IIV and 1 dose of LAIV.
- Administer a second dose to a 9-year-old child who received their first dose in the current season when they were age 8 years, if they haven't or don't know if they have received 2 doses in prior years.

Flu vaccines for 2024-2025 season

- All flu vaccines for upcoming season are anticipated to be trivalent in the U.S.
 - B/Yamagata flu viruses have not circulated after March 2020
- Egg-based vaccines
 - A/Victoria/4897/2022 (H1N1)pdm-09-like virus
 - A/Thailand/8/2022 (H3N2)-like virus
 - B/Austria/1359417/2021 (B/Victoria lineage)-like virus
- Cell- or recombinant-based vaccines
 - A/Wisconsin/67/2022 (H1N1)pdm-09-like virus
 - A/Massachusetts/18/2022 (H3N2)-like virus
 - B/Austria/1359417/2021 (B/Victoria lineage)-like virus
- ACIP is meeting this week for recommendations

Questions?



Respiratory syncytial virus (RSV)

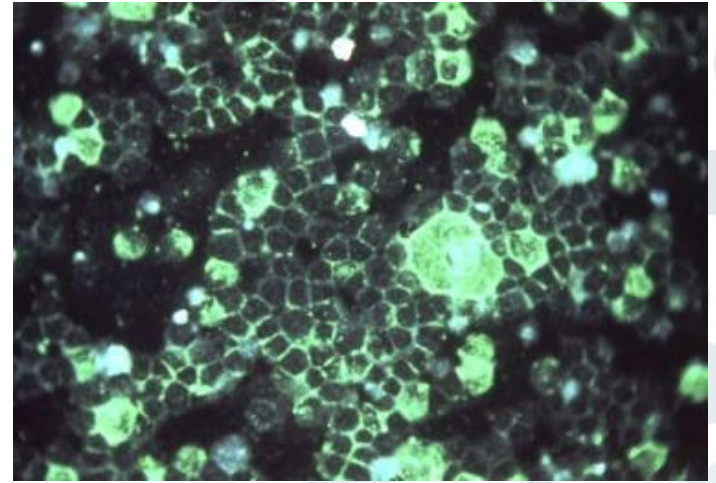
- Disease presentation
- Vaccination & ACIP recommendations

RSV

Disease presentation

RSV

- Belongs to the Orthopneumovirus genus and Pneumoviridae family
- Humans are natural host
- Two major antigenic subtypes in humans - A & B
- Droplet and contact transmission
- Average incubation period of 2-8 days
- Contagious 1-2 days before symptoms, and 3-8 after symptoms typically begin
 - Viral shedding can continue for over 20 days after clinical recovery
- RSV can survive for 3-30 hours on hard



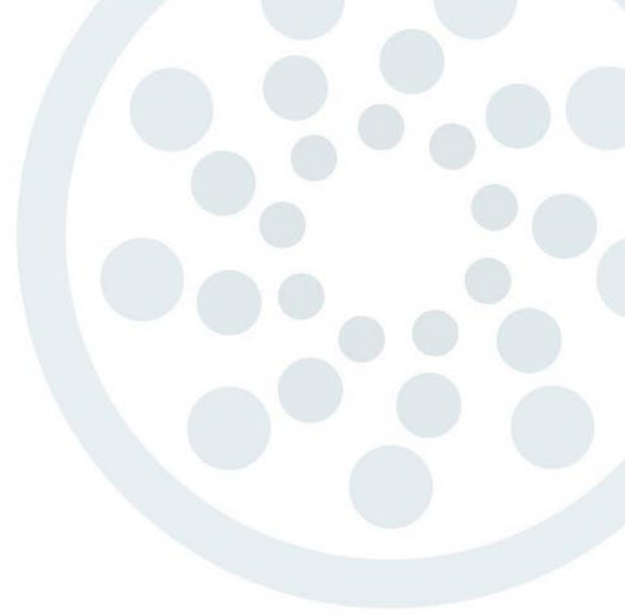
National Institute of Allergy and Infectious Diseases

Symptoms

- Rhinorrhea, decrease in appetite, coughing sneezing, fever, and wheezing
- In young infants, only symptoms may be irritability, decreased activity, and breathing difficulties (like apnea)

Diagnosis

- Diagnostic tests
 - rRT-PCR assays
 - Most sensitive testing method
 - Antigen testing
 - Sensitive in children but less sensitive in adults
 - Less common
 - Viral culture
 - Serology
 - Research and surveillance studies only



Treatment

- Supportive care
 - Rest, plenty of fluids, OTC pain and fever reducers
- No antivirals have been found to be particularly effective in treating RSV



High risk groups

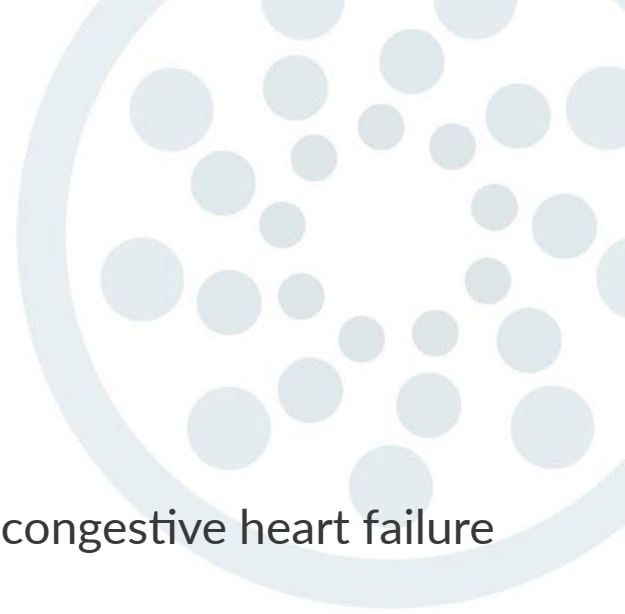
- Premature infants
- Infants up to 12 months old, especially those 6 months and younger
- Children <2 years with chronic lung disease or congenital heart disease
- Immunocompromised
- Children with neuromuscular disorders, including those who have difficulty swallowing or clearing mucus secretions

High risk groups

- Older adults 60 years and older
 - Those with certain chronic medical conditions
 - Cardiopulmonary, kidney, liver, neurological or neuromuscular, hematologic disease and disorders
 - Diabetes
 - Moderate to severe immune compromise
 - Advanced age (75 years and older)
 - Frailty
 - Residents of nursing homes or other long-term care facilities

Disease complications

- Bronchiolitis
- Pneumonia
- Dehydration
- Respiratory failure
- Worsening of conditions such as asthma, COPD, and congestive heart failure
- Death



Impact

- Almost all children will have had an RSV infection by their 2nd birthday
- Each year in the U.S., RSV leads to approximately
 - In children <5 years old
 - 2.1 million outpatient visits
 - 58,000-80,000 hospitalizations
 - 100-300 deaths
 - In adults 65 years and older
 - 60,000-160,000 hospitalizations
 - 6,000-10,000 deaths

Questions?



RSV

Vaccination & ACIP recommendations

New Immunizations to Protect Against Severe RSV



Adults 60
and over

RSV vaccine

Talk to your doctor first



Babies

RSV antibody given
to baby

All infants entering or born during
RSV season. Small group of
older babies for second season.

OR



Babies

RSV vaccine given
during pregnancy

Can get if you are 32–36 weeks
pregnant during September–January

www.cdc.gov/rsv



Vaccination for adults 60 years and older

- Licensed vaccines
 - Currently ACIP recommended
 - Abrysvo (Pfizer)
 - 0.5mL IM injection
 - Arexvy (GSK)
 - 0.5mL IM injection
 - Both licensed in May 2023
 - Pending ACIP recommendations (vote this week)
 - mRESVIA (Moderna)

ACIP recommendations for adults

- Adults 60 years of age and older may receive a single dose of RSV vaccine using shared clinical decision-making (SCDM)
 - Health care providers and their patients should have a conversation to determine if RSV vaccination will be beneficial
 - Decision may be informed by
 - Patient's health status
 - Patient's risk of severe RSV disease
 - Health care provider's clinical judgment
 - Patient's preferences
 - Safety profile of the RSV vaccines

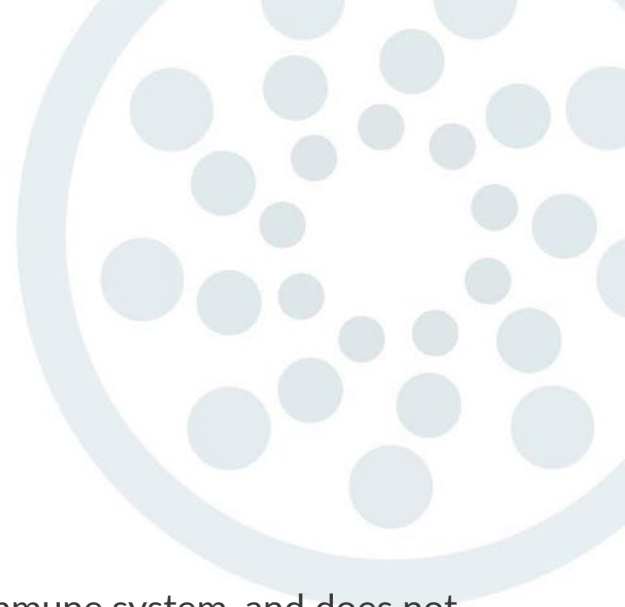
*ACIP is voting this week on RSV recommendations

ACIP recommendations for adults

- Timing of vaccination
 - For those who have not already received an RSV vaccine
 - To maximize benefit, administer in late summer or early fall
- RSV vaccine is not currently an annual vaccine
 - Only a single dose of RSV vaccine is recommended
- Coadministration with other adult vaccines during the same visit is acceptable
 - May increase local or systemic reactogenicity

Immunization for infants

- Two routes
 - Maternal immunization
 - Abrysvo (Pfizer)
 - Monoclonal antibody product
 - Beyfortus (nirsevimab, Sanofi)
 - Passive immunity
 - Monoclonal antibodies do not activate the immune system, and does not provide long term protection
 - IM injection
 - Dosage depends on size of infant



ACIP recommendations for maternal vaccination

- Pregnant persons should get a single dose of Abrysvo (Pfizer) during 32 through 36 weeks of pregnancy during September through January to prevent severe RSV disease in infants
- Arexvy (GSK) vaccine is not recommended or licensed for maternal vaccination

ACIP recommendations for nirsevimab

- One dose of nirsevimab is recommended for infants younger than 8 months of age who were born shortly before or are entering their first RSV season if:
 - The mother did not receive RSV vaccine during pregnancy
 - The mother's RSV vaccination status is unknown
 - The infant was born within 14 days of maternal RSV vaccination
- May be administered October through the end of March in most of the continental U.S.

ACIP recommendations for nirsevimab

- A dose of nirsevimab is recommended for some children aged 8-19 months old who are at increased risk for severe RSV disease and entering their 2nd RSV season
 - American Indian/Alaska Native children
 - Children with chronic lung disease of prematurity who require medical support during the 6 months before the start of their 2nd RSV season
 - Children with severe immunocompromise
 - Children with severe cystic fibrosis
- Children ages 8 months and older who are not at increased risk of severe RSV disease should not receive nirsevimab

ACIP recommendations for nirsevimab

- Infants born during the RSV season should receive a single dose of nirsevimab (50 mg for infants <5 kg and 100 mg for infants ≥5 kg) in the first week of life
 - Nirsevimab administration should be offered during the season to those who have not received a dose
- In infants younger than age 8 months born outside the RSV season, a single dose of nirsevimab (50 mg for infants <5 kg and 100 mg for infants ≥5 kg) is recommended
 - Administration should be targeted shortly before the start of their first RSV season and continued during the season for those who have not received a dose
- In children ages 8 through 19 months who are at increased risk of severe RSV disease, administration of a single 200 mg dose of nirsevimab should be targeted shortly before the start of their second RSV season and continued during the season for those who have not received a dose

ACIP recommendations for nirsevimab

- Children ages 8 months and older who are not at increased risk of severe RSV disease should not receive nirsevimab
- Can be coadministered with other vaccines

Questions?



COVID-19

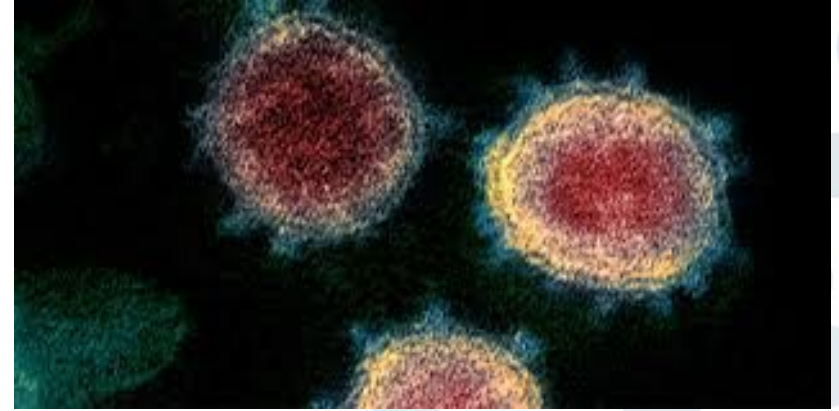
- Disease presentation
- Vaccination & ACIP recommendations

COVID-19

Disease presentation

COVID-19

- SARS-CoV-2 virus
 - Emerged in December 2019
- Belongs to the Betacoronavirus genus and Coronaviridae family
- Droplet and contact transmission
- Average incubation period of 2-14 days
- Seasonality has not yet been identified



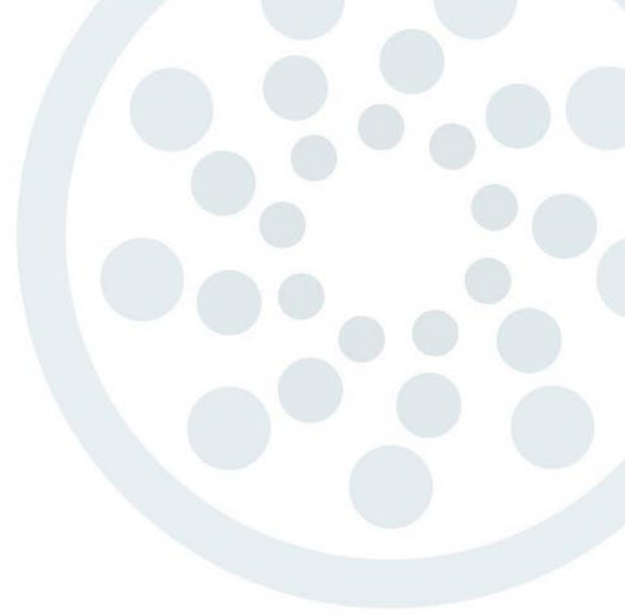
American Museum of Natural History

Symptoms

- Most commonly reported are
 - Fever or chills, headache, muscle or body aches, dry cough, fatigue, and dyspnea
- Less common are
 - Tastelessness, diarrhea, rhinorrhea, liver damage, kidney damage, nausea, and vomiting

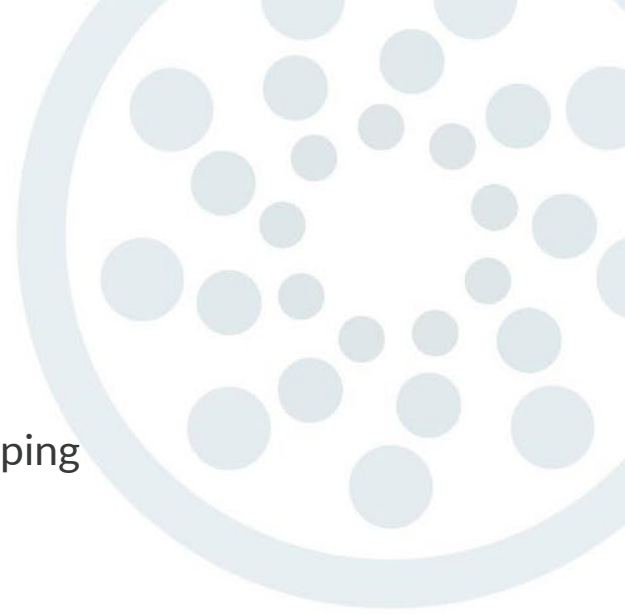
Diagnosis

- At-home tests
- Health care and testing facilities
 - Antigen tests
 - Rapid tests similar to at-home tests
 - PCR
 - Up to 3 days to receive results
 - Most accurate method



Treatment

- Supportive care
 - Rest, plenty of fluids, OTC pain and fever reducers
- Antivirals
 - Must be started 5-7 days within symptoms first developing
 - Paxlovid, Veklury, and Lagevrio

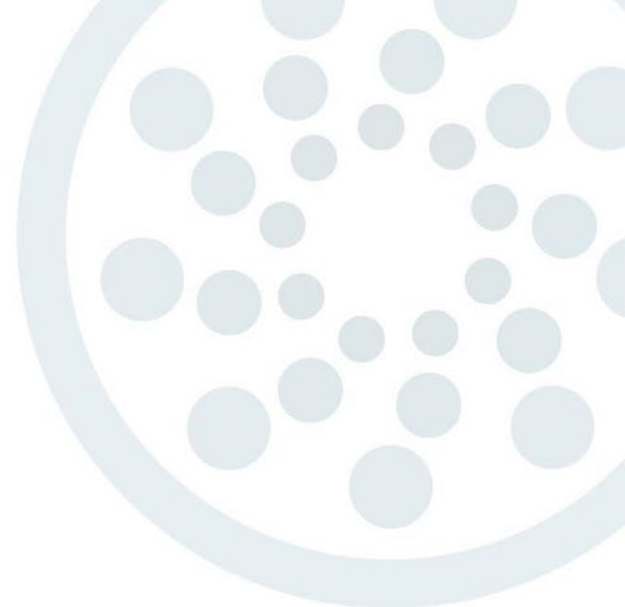


High risk groups & conditions

- Those with
 - Cancer
 - Chronic liver, kidney, heart, or lung disease
 - Dementia or other neurological conditions
 - Diabetes
 - Disabilities
 - HIV infection
 - Sickle cell disease or thalassemia
- People who are
 - Overweight or obese
 - Pregnant
 - Immunocompromised
 - Smokers
 - Physically inactive
- Older adults

Complications

- Long COVID
 - Long-term effects from infection
 - General, respiratory, neurological, multi-organ
 - Can last weeks, months, or years
 - Anyone who has been infected can experience it
- Pneumonia
- Multisystem Inflammatory Syndrome
- Death



COVID-19

Vaccination & ACIP recommendations



PUBLIC HEALTH
DIVISION



IMMUNIZATION
UNIT

COVID-19 vaccines

- First authorized in late 2020
- Two types currently available
 - mRNA
 - Moderna
 - Moderna COVID-19 Vaccine (2023-2024 Formula) is authorized for children ages 6 months-11 years
 - Spikevax is licensed for ages 12 years and older
 - Pfizer-BioNTech
 - Pfizer-BioNTech COVID-19 Vaccine (2023-2024 Formula) is authorized for children ages 6 months-11 years
 - Comirnaty is licensed for ages 12 years and older
 - Protein subunit
 - Novavax COVID-19 Vaccine Adjuvanted is authorized for 12 years and older

ACIP recommendations

- COVID-19 vaccination is recommended for everyone 6 months and older in the U.S.
- Number of doses needed depends on prior vaccination history and immunocompetence
 - <https://www.cdc.gov/vaccines/covid-19/clinical-considerations/interim-considerations-us.html>

*ACIP is voting on 2024-2025 recommendations this week

COVID-19 vaccination history prior to updated (2023–2024 Formula) vaccine ¹	Updated (2023–2024 Formula) vaccine	Number of updated (2023–2024 Formula) doses indicated	Dosage (mL/ug)	Vaccine vial cap and label colors ¹¹	Interval between doses
Unvaccinated	Moderna	1	0.5 mL/50 ug	Dark blue cap; blue label	—
	OR				
	Novavax	2	0.5 mL/5 ug rS protein and 50 ug Matrix-M adjuvant	Blue cap; blue label	Dose 1 and Dose 2: 3–8 weeks ¹
	OR				
	Pfizer-BioNTech	1	0.3 mL/30 ug	Gray cap; gray label	—
1 or more doses any mRNA; 1 or more doses Novavax or Janssen, including in combination with any Original monovalent or bivalent COVID-19 vaccine doses	Moderna	1	0.5 mL/50 ug	Dark blue cap; blue label	At least 8 weeks after last dose
	OR				
	Novavax	1	0.5 mL/5 ug rS protein and 50 ug Matrix-M adjuvant	Blue cap; blue label	At least 8 weeks after last dose
	OR				
	Pfizer-BioNTech	1	0.3 mL/30 ug	Gray cap; gray label	At least 8 weeks after last dose
<p>People ages 65 years and older should receive 1 additional dose of any updated (2023–2024 Formula) COVID-19 vaccine (i.e., Moderna, Novavax, Pfizer-BioNTech) at least 4 months following the last recommended dose of updated (2023–2024 Formula) COVID-19 vaccine. For initial vaccination with updated (2023–2024 Formula) Novavax COVID-19 Vaccine, the 2-dose series should be completed before administration of the additional dose. If Moderna is used, administer 0.5 mL/50 ug; if Novavax is used, administer 0.5 mL/5 ug rS protein and 50 ug Matrix-M adjuvant; if Pfizer-BioNTech is used, administer 0.3 mL/30 ug.</p>					

Clinical considerations

- People can self-attest to their moderately or severely immunocompromised status, and do not have to provide proof
- Can be coadministered with other vaccines
- Intermixing of brands
 - COVID-19 vaccine doses from the same manufacturer should be administered whenever recommended. In the following circumstances, an age-appropriate COVID-19 vaccine from a different manufacturer may be administered:
 - Same vaccine not available at the vaccination site at the time of the clinic visit
 - Previous dose unknown
 - Person would otherwise not receive a recommended vaccine dose
 - Person starts but unable to complete a vaccination series with the same COVID-19 vaccine due to a contraindication

Questions?



Thank you!

Heidi Gurov, RN, BSN, CMSRN
307-777-8981
heidi.gurov@wyo.gov



PUBLIC HEALTH
DIVISION



IMMUNIZATION
UNIT