



Respiratory Risk: Vaccination is prevention!

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Introductions and Disclosures




Alan Kaplan MD CCFP(EM) FCFP, CPC(HC)

- Chairperson, Family Physician Airways Group of Canada
- Vice President, Respiratory Effectiveness Group
- Honorary Professor of Primary Care Respiratory Research, OPRI
- Senate member, International Primary Care Respiratory Group

Relationships with commercial interests

- Grants/Research Support: Sanofi
- Speaking Engagements/Honoraria/Consulting fees: ALK, Astra Zeneca, Boehringer Ingelheim, Cipla, Covis, Eisai, **GSK**, Idorsia, Moderna, Pfizer, NovoNordisk, Sanofi, Teva, Trudell, Valeo
- Educational companies: MD Briefcase, PeerView, Respiplus
- Other:
- Co-chair, Health Quality Ontario (HQO) COPD Community Standards
- Member of HQO Asthma Quality Based Standards
- Medical Director LHIN Pulmonary Rehabilitation Unit



Learning Objectives

- Review the Vaccine Preventable Diseases (VPD) for which you should consider immunizing your adult patients with **respiratory** disease
- Identify the optimal choices for each immunization strategy
- Discuss optimizing vaccination practices in our practices

How Vaccines Helped All But Eradicate Diseases

Annual 20th century morbidity and 2021 morbidity for vaccine-preventable diseases in the U.S.

Disease	Annual 20th century morbidity	Reported cases in 2021	Change
Measles	530,217	9	>-99%
Pertussis	200,752	1,608	>-99%
Mumps	162,344	157	>-99%
Rubella	47,745	3	>-99%
Smallpox	29,005	0	100%
Diphtheria	21,053	0	100%
Polio	16,316	0	100%

Bull World Health Organ. 2008;86(2):140-146

Be prepared!!



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This is topical!!





Leonard

Patient Profile: 66 year old man, needs RX updates

Patient Background and Details

Background

- Overall active man, married, works in film industry, ex smoker
- Hypertension, hyperlipidemia, COPD

Medications

- Ramipril 10 mg QD
- Atorvastatin 40 mg QD
- LABA/LAMA of your choice

Physical Exam and Labs

- BP 128/80
- BMI 24
- A1C 5.9%
- LDL-C 100 mg/dL
- eGFR 60
- FEV1 55%


Discussion

- Feeling well, here for review and to renew RXs
- Aware it is flu shot season and questions whether he needs this again, because last year he took the immunization and "got the flu" anyhow

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What would you consider to be Respiratory vaccinations for him?

- Adacel
- Covid Monovalent XBB
- Influenza
- Pneumonia
- RSV
- Shingrix

There are many risk factors for pneumococcal disease in adults (Hint, it is pretty well the same for every vaccine I will show you! 

HOST FACTORS		External Factors	Behavioral Factors	Age
Immunocompetent	Immunocompromised			
<ul style="list-style-type: none"> • Chronic heart disease • Chronic lung disease • Diabetes • Functional or anatomic asplenia • Chronic liver disease • Cerebrospinal fluid leaks • Cochlear implants • Chronic renal failure, nephrotic syndrome* 	<ul style="list-style-type: none"> • HIV infection • Cancer (solid, hematologic) • Solid organ transplantation • Autoimmune diseases • Immunosuppressive therapy • Primary immunodeficiencies • Prednisone (e.g. >20 mg/day) 	<ul style="list-style-type: none"> • Socioeconomic • Environmental • Preceding viral respiratory infection (e.g., influenza) • Residence in an institution 	<ul style="list-style-type: none"> • Smoking • Alcohol abuse • Homelessness • Illicit drug use 	<ul style="list-style-type: none"> • ≥ 65 years

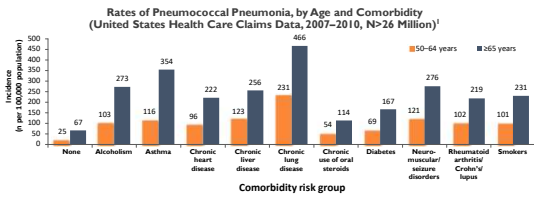
*Unless immunosuppressed by long-term corticosteroids
[Quach-Thuan et al. Clin Geriatr Dis Res 2013; 3(1):51-53]

Plus in other infections

- Covid and Influenza:
- PREGNANCY
- OBESITY

- Influenza:
- Children 6 months to 18 years of age undergoing treatment for long periods with acetylsalicylic acid (ASA)

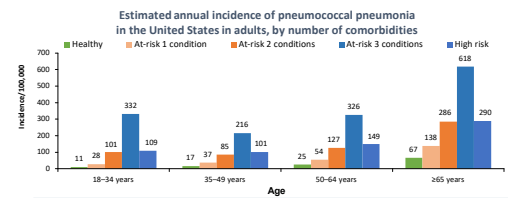
Age and comorbidities can increase pneumococcal pneumonia risk in adults



If the person has any disease related to kidney, lungs, heart, liver, or metabolic disease, they are at elevated risk

1. SHEA KM ET AL. OPEN FORUM INFECT DIS 2014; 11(11):OF124.

Multiple underlying medical conditions further increase pneumococcal pneumonia risk in adults



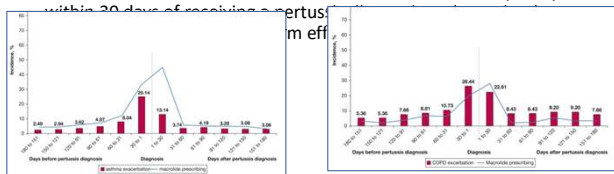
Persons with ≥2 at-risk conditions accounted for 9%-32% of all at-risk adults, depending on age

NOTE: AT-RISK—IMMUNOCOMPETENT WITH ≥1 SELECTED CHRONIC CONDITION, INCLUDING ALCOHOLISM, ASTHMA, CHRONIC HEART DISEASE, CHRONIC LIVER DISEASE, CHRONIC LUNG DISEASE, DIABETES, NEUROMUSCULAR/SEIZURE DISORDERS, AND SMOKING. IMMUNOCOMPROMISED OR IMMUNOSUPPRESSED PERSONS AND THOSE WITH A COCHLEAR IMPLANT WERE CLASSIFIED AS HIGH-RISK. 1. SHEA KM, EDLBERG J, WENZEL D, ET AL. OPEN FORUM INFECT DIS 2014; 11(11):OF124.

Pertussis

- Asthma or COPD increased the risk for pertussis disease and complications vs the general population.
- COPD and asthma exacerbations were observed most frequently within 30 days of receiving a pertussis vaccine.

Increased Burden of Pertussis Among Adolescents and Adults With Asthma or COPD in the United States, 2007 to 2019



Neager S, Poel V, Macina D. Increased burden of pertussis among adolescents and adults with asthma or COPD in the United States, 2007 to 2019. Chest. Published online December 19, 2023. doi:10.1016/j.chest.2023.12.020

Age remains the biggest risk factor for severe Covid-19



Rates compared to ages 18-29 years	Ages 0-4 years	Ages 5-17 years	Ages 18-29 years	Ages 30-39 years	Ages 40-49 years	Ages 50-64 years	Ages 65-74 years
Cases	0.5x	0.7x	Reference Group	1x	0.9x	0.8x	0.6x
Hospitalizations	0.6x	0.2x	Reference Group	1.5x	1.9x	3.1x	4.8x
Death	0.2x	0.1x	Reference Group	3.5x	10x	25x	60x

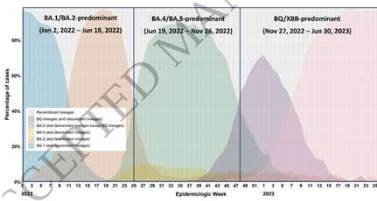
Many people under the age of 65 years of age don't feel they are at elevated risk of severe COVID-19 outcomes, but the risk of death among those aged 40+ years is at least 10 times higher than those aged 18-29 years.

Source: CDC. "Risk for COVID-19 Infection, Hospitalization, and Death by Age Group." Centers for Disease Control and Prevention, December 28, 2022. <https://www.cdc.gov/immization/2022/covid-19-risk-by-age.html>

XBB is a new(er) variant, we are not protected from previous infection/vaccination



- Protection from COVID-19 vaccines and/or prior SARS-CoV-2 infections against severe outcomes is reduced when immune-evasive variants/subvariants emerge and may also wane over time.
- The findings support a variant-adapted booster vaccination strategy with periodic review



Lee N, et al. Protection conferred by COVID-19 vaccination, prior SARS-CoV-2 infection, or hybrid immunity against Omicron-associated severe outcomes among community-dwelling adults. *Clinical Infectious Diseases*, 2023; : cia0716, <https://doi.org/10.1093/cid/cia0716>

ACIP Recommendations



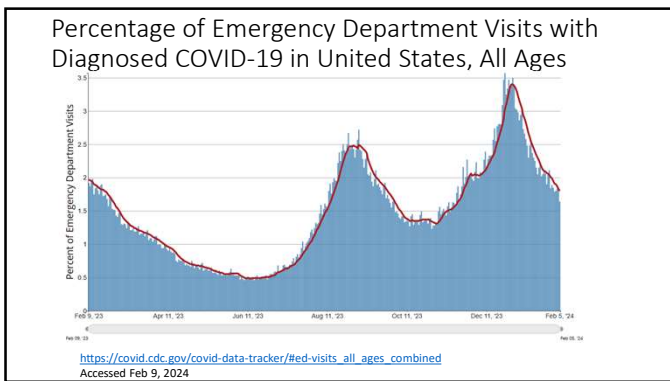
Question: Should 2023 – 2024 (monovalent, XBB containing) COVID-19 vaccines authorized under EUA or approved by BLA be recommended for use in persons ≥6 months of age?

Population: People 6 months of age and older

Intervention:

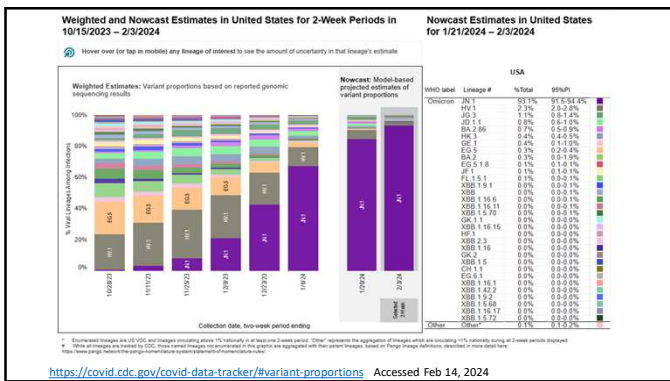
- A single dose of a 2023 – 2024 COVID-19 vaccine for everyone ages 5 years and older
- A multi-dose initial series with at least one dose of the 2023 – 2024 COVID-19 vaccine for children ages 6 months – 4 years (2 doses of Moderna or 3 doses of Pfizer-BioNTech mRNA COVID-19 vaccine)
- A 3-dose initial series with at least one dose of the 2023 – 2024 COVID-19 vaccine (may receive 1 or more additional 2023 – 2024 COVID-19 vaccine doses) for people who are moderately or severely immunocompromised

<https://www.cdc.gov/vaccines/acip/recs/grade/covid-19-2023-2024-Monovalent-etr.html>
Accessed Nov 28, 2023



JN.1 is the circulating variant currently: transmissible++ but not terribly virulent!

Robin R. As COVID-19 Cases Surge, Here's What to Know About JN.1, the Latest SARS-CoV-2 "Variant of Interest" JAMA. 2024;331(5):382-383. doi:10.1001/jama.2023.27841



‘Fortunately, laboratory research and rates of COVID-19 hospitalizations and deaths suggest that the XBB.1.5 vaccine still protects against severe illness in the JN.1 era.’



Rubin R. As COVID-19 Cases Surge, Here's What to Know About JN.1, the Latest SARS-CoV-2 "Variant of Interest". JAMA. 2024;331(5):382-383. doi:10.1001/jama.2023.27841

Same arm or switch arms?

JCI The Journal of Clinical Investigation
 Contralateral second dose improves antibody responses to a two-dose mRNA vaccination regimen

- This looked at initial vaccine only, but might be worth considering??

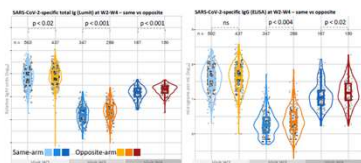
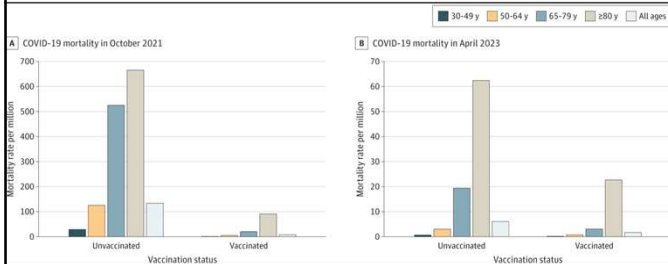


Figure 2 – Serological responses to vaccination after contralateral- and ipsilateral-arm boosting (enrolled Analysis Group). Comparison of serum SARS-CoV-2-specific total immunoglobulin (left panel) and IgG (right panel) in 947 individuals receiving the 2nd vaccine dose in the same or opposite arm relative to the 1st vaccine dose. Measurements were performed at visit W2 (shortly



Vaccination saves lives!!

Is Vaccination Approaching a Dangerous Tipping Point?



Marks P, Califf R. Is Vaccination Approaching a Dangerous Tipping Point? JAMA. Published online January 05, 2024. doi:10.1001/jama.2023.27685

S. pneumoniae is a major cause of human infection, mainly involving the respiratory tract

Among the > 100 recognized serotypes of *S. pneumoniae*, invasive disease caused by 24 serotypes can be prevented by vaccination*.

Adults

- Meningitis
- Bacteraemia
- Bacteremic Pneumonia
- Nonbacteremic Pneumonia
- Pneumococcal Pneumonia

25% (Bacteremic Pneumonia + Meningitis + Bacteraemia)

75% (Nonbacteremic Pneumonia + Pneumococcal Pneumonia)

S. pneumoniae is commonly called pneumococcus. *24 would only be in patients receiving both doses of vaccine, including Prevu-P-23 and Prevu-C-13.
 S. pneumoniae
 1. <https://www.cdc.gov/pneumococcal/laboratories.html>
 2. Huang SS, et al. Vaccine. 2013;29(39):8412-3. Said MA, et al. PLoS One. 2013;8:e60273.

Global Mortality from Bacterial Illness

A

B

Legend:

- Infectious systems
- U2 and all related infections of the theme
- Enterococcus infections
- Proteus and other abdominal infections
- Salmonella
- Shigella and pathogenicity
- Enterobacteriaceae of the flora and subcutaneous system
- Highly virulent and BPS
- Streptococcus and other bacterial infections
- Enteric infections
- Infections of bones, joints, and related organs
- Group A and Group B

Global mortality associated with 33 bacterial pathogens in 2019: a systematic analysis for the Global Burden of Disease Study 2019. *Lancet* November 21, 2022. DOI: [https://doi.org/10.1016/S0140-6736\(22\)0185-7](https://doi.org/10.1016/S0140-6736(22)0185-7)

Conjugate vaccines produce a more robust response compared to polysaccharide vaccines and induce immune memory

Polysaccharide vaccines^{1,2}

Polysaccharide antigens

- B-cell activation and antibody production
- (leading to **immune fatigue**)
- T-cell-independent immune response that cannot be boosted
- (Limited to **NO memory**)

Conjugate vaccines^{1,3}

Polysaccharide antigens
*covalently linked to carrier protein

- B-cell activation and antibody production
- T-cell-dependent immune response
- Memory B-cell activation with booster response to revaccination

1. SEGREST CA, IN VACCINES, FLOTKIN SA, ET AL, ED, 5TH ED, PHILADELPHIA, PA: SAUNDERS ELSEVIER, 2008:736-1. POLLARD AJ, ET AL, NAT REV IMMUNOL, 2009;9(3):213-220. 3. CLUTTERBUCK EA, ET AL, IMMUNOLOGY, 2006;119(3):328-337. 4. DE ROUX A, ET AL, CLIN VACCINE DEV, 2008;4(6):1015-1023.

Efficacy for PCV13 and PPSV23 in Adults

PCV13

IPD

- Demonstrated efficacy¹

Pneumococcal CAP

- Demonstrated efficacy¹

All-cause CAP

- Demonstrated efficacy¹

Long-term efficacy

- Efficacy does not wane over 5 years²

PPSV23

IPD

- Demonstrated efficacy¹

Pneumococcal CAP

- Inconclusive evidence¹

All-cause CAP

- Inconclusive evidence¹

Long-term efficacy

- Efficacy wanes after 5 years³

AES, ADVERSE EVENTS; CAP, COMMUNITY ACQUIRED PNEUMONIA; IPD, INVASIVE PNEUMOCOCCAL DISEASE; PCV, PNEUMOCOCCAL CONJUGATE VACCINE; PPSV, PNEUMOCOCCAL POLYSACCHARIDE VACCINE.
1. KAPLAN A, ET AL. CANADIAN FAMILY PHYSICIAN 2011;63:425-433. 2. PATTERSON S, ET AL. TRIALS IN VACCINOLOGY 2011;6:92-96. 3. ANDREWS NJ, ET AL. VACCINE 2012;30:4802-4808.

Vaccinations are a success

But mother nature has other plans, right?



Pneumococcal vaccine serotype overview

Vaccine	1	3	4	5	6A	6B	7F	9V	14	18B	19A	19F	23F	8	10A	11A	12F	15B	22F	33F	2	9N	17F	20	
PCV13	●	●	●	●	●	●	●	●	●	●	●	●	●												
PCV15	●	●	●	●	●	●	●	●	●	●	●	●	●	●											
PCV20	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
PPSV23	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

Predominant serotypes causing IPD in 2019: **3** (12%), **22F** (10%), **4** (7%), **9N** (7%) and **8** (6%)¹

Serotypes in Canada in 2019 with highest rates of antimicrobial resistance: **33F** (89%), **7C** (73%), **19A** (62%)¹

Predominant vaccine-preventable serotypes in adults hospitalized with pCAP or IPD in 2017: **22F**, **11A**, **9N**, **33F**²

IPD, INVASIVE PNEUMOCOCCAL DISEASE; PCAP, PNEUMOCOCCAL COMMUNITY ACQUIRED PNEUMONIA; PCV13, 13-VALENT PNEUMOCOCCAL CONJUGATE VACCINE; PCV15, 15-VALENT PNEUMOCOCCAL CONJUGATE VACCINE; PCV20, 20-VALENT PNEUMOCOCCAL CONJUGATE VACCINE; PPSV23, 23-VALENT PNEUMOCOCCAL POLYSACCHARIDE VACCINE.
1. <https://www.canada.ca/en/public-health/services/publications/drugs-health-products/national-laboratory-surveillance-invasive-streptococcal-disease-canada-annual-summary-2019.html>, 2. LEBLANC J, ET AL. VACCINE 2022;40(18):2433-2444.

• RSV in young children and Asthma

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Medical News in Brief

May 3, 2023

RSV Infection During Infancy Tied to Asthma Later

Emily Harris

Article Information

JAMA. 2023;329(20):1731. doi:10.1001/jama.2023.7765

Healthy children who were not infected with respiratory syncytial virus (RSV) during their first year of life were 26% less likely to have asthma by age 5 years than those who had been infected, according to results from an observational study that included 1946 participants. The researchers calculated that preventing RSV infections during infancy could avoid 15% of asthma cases in 5-year-olds.

Moreover, a child's risk of developing asthma was linked to the severity of their RSV infection. Children with milder RSV infections had a lower risk of asthma at age 5 years than did those who had more severe RSV infections.

Harris E. RSV Infection During Infancy Tied to Asthma Later. JAMA. 2023;329(20):1731. doi:10.1001/jama.2023.7765

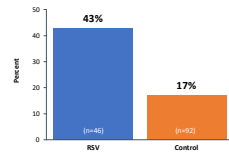
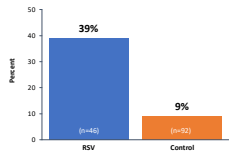
Horizontal lines for notes.

Increased Risk of Asthma After RSV-Associated Bronchiolitis Hospitalization Persists into Adulthood^{1*}

ASTHMA AND RECURRENT WHEEZE

ALLERGIC RHINOCONJUNCTIVITIS

Med Clin 32(2009) 1-18 November 2023

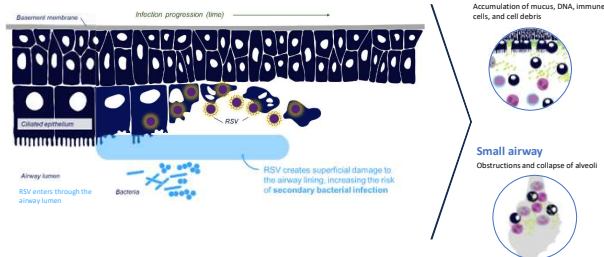


There is a 7.2-fold increased risk of asthma 18 years after RSV infection

*Matched cohort of infants aged <1 year with severe primary RSV bronchiolitis between December 2009 and April 2010. RSV respiratory syncytial virus. Lopez-Villar et al. Thorax. 2023;78(12):1045-1052.

Horizontal lines for notes.

RSV damages airway epithelium and can lead to lower airway obstructions^{1,2}



1. Cavaghi J, et al. Front Immunol. 2019;10:2152. 2. Griffin C, et al. Clin Microbiol Rev. 2013;16(1):277-319.

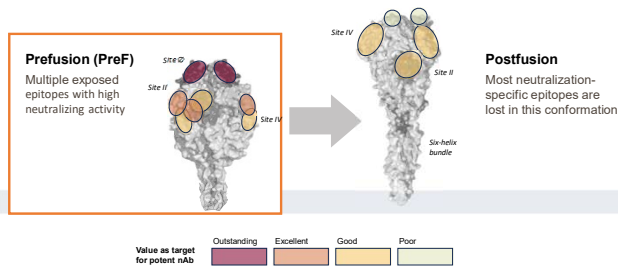
Horizontal lines for notes.

RSV Vaccines

- RSV identified in 1957
- 1960's a formalin-inactivated RSV vaccine entered clinical trials in infants and followed that winter:
 - RSV experienced infants did well
 - RSV naive infants had higher hospitalization and serious RSV-associated illness 80% of vaccinated vs. 5% of placebo recipients
 - It was to **post-fusion** version of RSV

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- Shape-shifting RSV-F: Visibility of nAb sites depends on the protein conformation^{1,2}



nAb, neutralising antibody; Images of F protein adapted from Graham BS et al. Curr Opin Immunol 2015;35:30-38. Copyright 2015, with permission from Elsevier. 2. Graham BS et al. Curr Opin Immunol. 2015;35:30-38. 3. Meijer A et al. Ann Allergy Asthma Immunol. 2010;115:268-266.

Monoclonal Antibodies, NOT Vaccines

Palivizumab vs. Nirsevimab



Palivizumab (2002)

- 5 monthly doses over RSV season (IM)
- Weight based dosing (15 mgs/kg/dose)
- Overall efficacy 55% reduction in RSV-associated hospital admissions



Nirsevimab (2023)

- One dose at the beginning of the season (IM)
- Weight <5 kgs, 50 mgs; >5 kgs, 100 mgs
- Overall efficacy ~75% reduction in medically attended RSV lower respiratory tract infection (LRTI)



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MATISSE: Deaths and fetal losses reported in the trial (all unrelated)^{1,2}

Event type	RSVpreF 120 µg (N=3682)	Placebo (N=3675)
Maternal death*¹: n=1		
• 1 death in a maternal participant who received RSVpreF	Maternal death 1 (<0.1%)	0
Fetal demise: n=18		
• 18 fetal demises in maternal participants who received vaccine/placebo*	Fetal death or stillbirth 10 (0.3%)	8 (0.2%)
Infant death*²: n=17		
• 16 deaths due to various causes		
• 1 infant death adjudicated "acute respiratory illness due to RSV" (placebo group)	Infant death 5 (0.1%)	12 (0.3%)

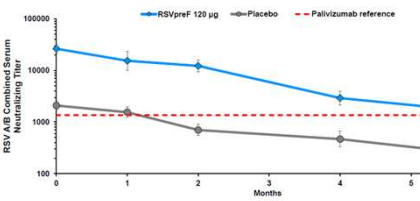
*Reported deaths and fetal losses were all determined to be unrelated to RSVpreF^{1,2}

¹ Wu, Respiratory syncytial virus (RSV)preF, mRNA-based, split-dose, subcutaneous. N Engl J Med. 2022;386(10):1011-1021. doi:10.1056/NEJMoa2114868

How long does the predelivery RSV shot work for?

Infant Neutralizing Titers Persist, Remaining High Through 6 Months of Age

RSV A/B Combined 50% Geometric Mean Neutralizing Titers by Month



Palivizumab reference line = 50% A/B neutralizing titer of a 100µg/mL palivizumab dose, demonstrated to be efficacious in preventing infant RSV-associated ICU admission (Peltola M, Kaurio O, Kangas O, et al. N Engl J Med. 2014;370(14):1311-1319)



CDC says:

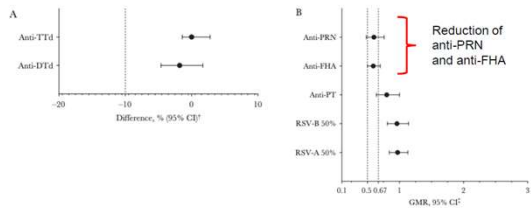
Use of the Pfizer Respiratory Syncytial Virus Vaccine During Pregnancy for the Prevention of Respiratory Syncytial Virus–Associated Lower Respiratory Tract Disease in Infants: Recommendations of the Advisory Committee on Immunization Practices — United States, 2023

- On August 3, 2023, CDC’s Advisory Committee on Immunization Practices (ACIP) and CDC recommended nirsevimab (Beyfortus, Sanofi and AstraZeneca), a long-acting monoclonal antibody for prevention of severe RSV disease, for:
 - infants aged <8 months who are born during or entering their first RSV season
 - children aged 8–19 months at increased risk for severe RSV disease entering their second RSV season.
- On September 22, 2023, ACIP and CDC recommended RSVpreF vaccine for pregnant persons as a one-time dose during 32–36 completed weeks’ gestation using seasonal administration (September–January in most of the continental United States) to prevent RSV-associated lower respiratory tract infection (LRTI) in infants.
- Either maternal RSVpreF vaccination during pregnancy or nirsevimab administration to the infant is recommended to prevent RSV-associated LRTI in infants, but **both are not needed** for most infants.”

MMWR. Use of the Pfizer Respiratory Syncytial Virus Vaccine During Pregnancy for the Prevention of Respiratory Syncytial Virus–Associated Lower Respiratory Tract Disease in Infants: Recommendations of the Advisory Committee on Immunization Practices — United States, 2023 (cdc.gov)

Can you give it WITH Tdap at 32-36 weeks?

Concomitant administration of RSV and Tdap vaccine demonstrates decreased immunogenicity of pertussis component of Tdap vaccine



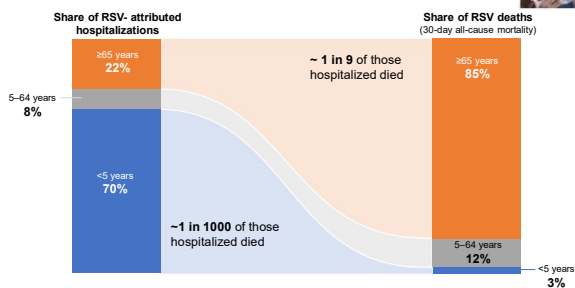
Summary – interventions to prevent RSV associated illness in infants

- Short acting monoclonal antibody prophylaxis (Palivizumab, Synagis) is still available for high-risk children, according to jurisdiction
- Long-acting monoclonal antibody (Nirsevimab, Beyfortus)
- Maternal vaccines but they will last six months from the immunization done at 32-36 weeks
- So, Baby's Birthdate will be important on which strategy will work!




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Older adults make up a disproportionate number of RSV-attributed deaths (Ontario data)




You've seen more RSV than you might realize


RSV in adults is underestimated and underreported




Misdiagnosis¹⁻³
"Influenza-like illness"



Under-recognition⁶
Lack of routine screening and laboratory diagnosis

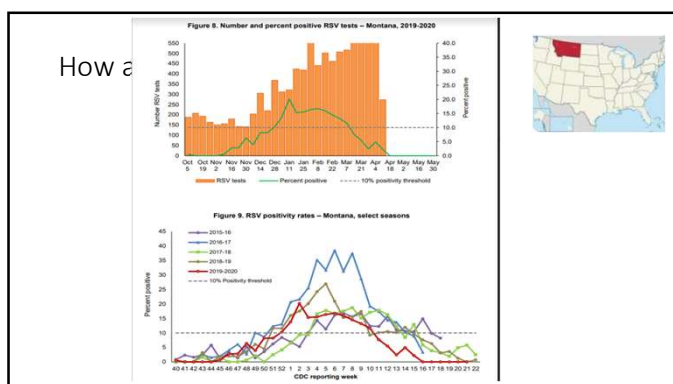


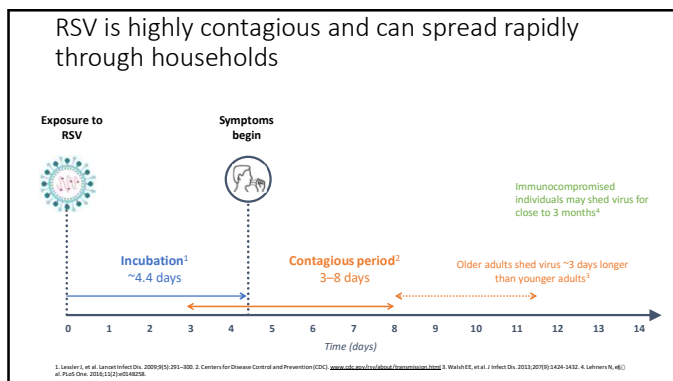
Perception that adult RSV is mild and manageable⁴

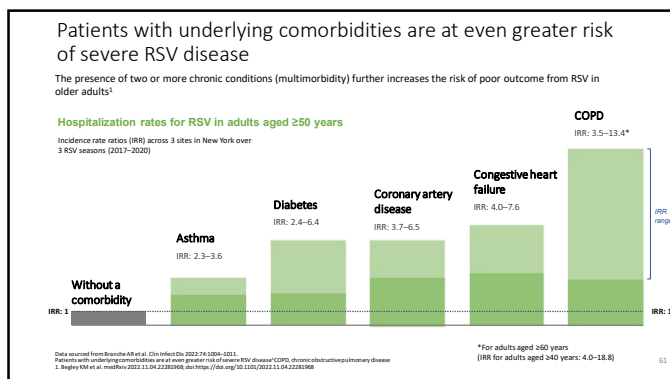


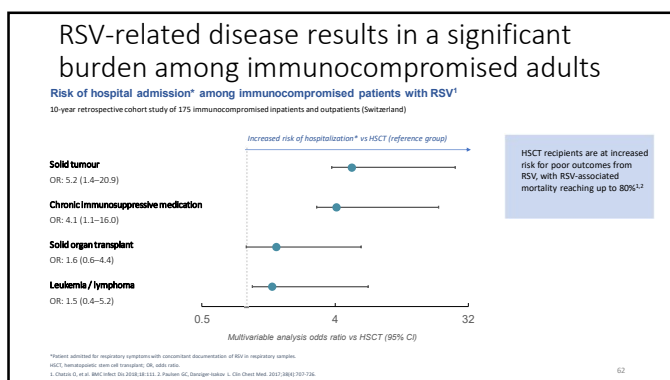
Apathy towards diagnosis in the absence of effective treatment⁵

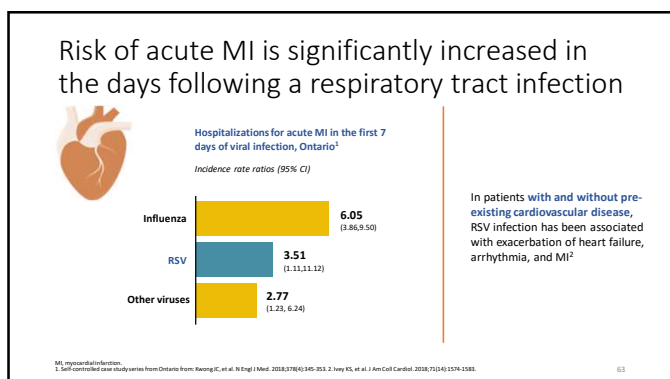
1. Omer-Domage L, et al. BMC Infect Dis. 2016;16:544. 2. Branche AR, Fahay AR. Drugs Aging. 2015;32(10):261-269. 3. Branche AR. Clin Infect Dis. 2019;69:204-206. 4. Alton KE, et al. Diagn Microbiol Infect Dis. 2018;62(2):206-209. 5. Hurley IP, et al. Vaccine. 2018;37(5):565-576. 6. Binder W, et al. Am J Emerg Med. 2017;35(8):1342-1355.







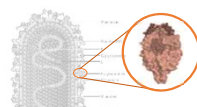




AREXVY combines a recombinant RSV-PreF3 antigen and an adjuvant with established activity in older adults

ANTIGEN

RSV-F stabilized in the prefusion state (120 µg)



The RSV-F antigen target is highly conserved between RSV-A and RSV-B subtypes¹

ADJUVANT

AS01E adjuvant system: liposomes containing two immunostimulants that boost RSV-specific T-cell response^{1,2}

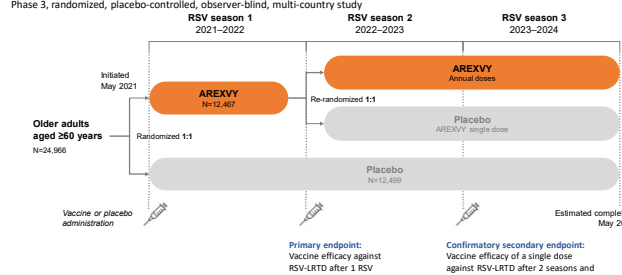
Monophosphoryl lipid A (MPL)
Saponin QS-21

Same adjuvant ingredients as the recombinant shingles vaccine Shingrix, with half the amount of MPL and QS-21^{2,3}

Image of RSV adapted from Bartlett MS, McElellan J, Nat Rev Microbiol. 2013;11(4):231-245; Image of RSV-F reproduced from Graham BS, et al. Curr Opin Immunol. 2015;35:30-38, with permission from Elsevier. AS01E Adjuvant System (C19 µg cholesterol squalene, cholesterol 27, 25 µg 3-O-deacyl-4'-phosphoryl lipid A, combination of liposomes formulation). 1. Graham BS et al. Curr Opin Immunol 2015, 35:30-38. 2. AREXVY (RSV vaccine recombinant, AS01E adjuvant), Product Monograph, AbbVie Inc., August 2023. 3. SHINGRIX (herpes zoster vaccine), Product Monograph, Merck Canada, ON: Canadian Centre for Drug Information, 2015.

AREXVY pivotal efficacy study designed to span 3 RSV seasons

Phase 3, randomized, placebo-controlled, observer-blind, multi-country study



Older adults aged ≥60 years
N=24,968

RSV season 1 2021-2022
RSV season 2 2022-2023
RSV season 3 2023-2024

Initiated May 2021

Randomized 1:1
 - AREXVY N=12,467
 - Placebo N=12,499

Re-randomized 1:1 (at start of RSV season 2)
 - AREXVY Annual doses
 - Placebo AREXVY single dose

Vaccine or placebo administration

Estimated completion May 2024

Primary endpoint: Vaccine efficacy against RSV-LRTD after 1 RSV season

Confirmatory secondary endpoint: Vaccine efficacy of a single dose against RSV-LRTD after 2 seasons and vaccine efficacy after annual revaccination

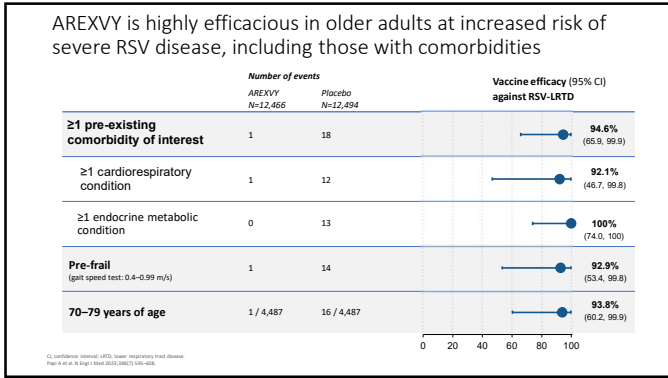
Peck A, et al. N Engl J Med. 2023;388(7):695-706.

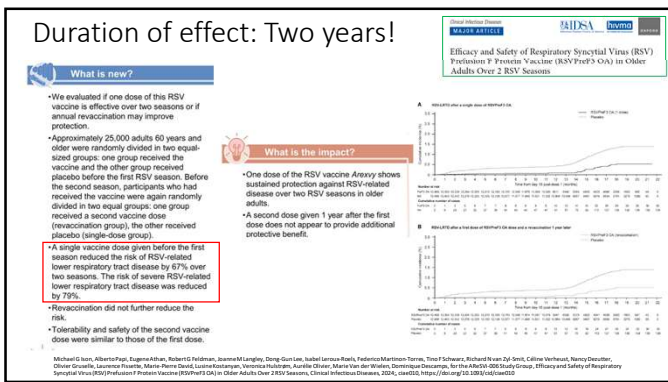
One dose of AREXVY is highly efficacious across a broad spectrum of RSV-associated disease

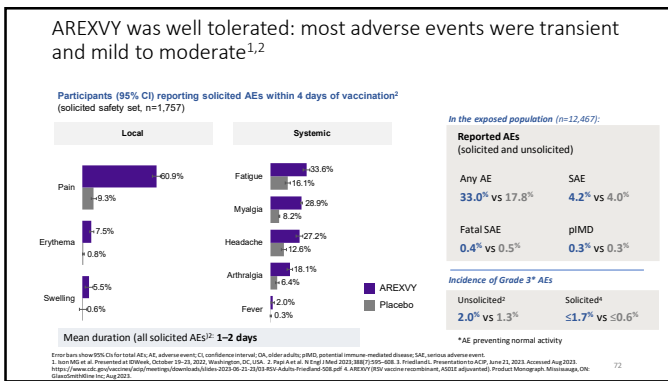
	Number of events			Vaccine efficacy (CI)*
	AREXVY N=12,466	Placebo N=12,494		
ARI				
Acute respiratory infection	27	95		71.7% (56.2, 82.3)
PRIMARY ENDPOINT	LRTD			
	Lower respiratory tract disease	7	40	
	Severe LRTD			
Severe lower respiratory tract disease	1	17		94.1% (62.4, 99.9)

Success criterion: lower limit of 2-sided 95.95% CI for vaccine efficacy >20%

CI, confidence interval. *95% CI for vaccine efficacy. *95% CI for vaccine efficacy. Peck A, et al. N Engl J Med. 2023;388(7):695-706.







• ABRYSVO (Pfizer)

• Vaccine efficacy

• 67% overall

• 85% if ≥ 3 symptoms

- i.e., sicker

Wahh EE, et al. N Engl J Med. 2023;388:1465-1477

RESEARCH HIGHLIGHT

Efficacy and Safety of a Bivalent RSV Prefusion F Vaccine in Older Adults

Wahh EE, et al. DOI: 10.1093/ncj/njz034

CLINICAL PROBLEM

Respiratory syncytial virus (RSV) infections cause well-established illness in older adults, yet an RSV vaccine is currently approved for the broad adult and pediatric populations.

CLINICAL RESEARCH

In a randomized, placebo-controlled trial, we evaluated the efficacy and safety of RSV prefusion F vaccine in adults 60 years of age during a single RSV season.

RESULTS

In the per-protocol population, we observed one serious adverse event in the RSV vaccine group and one in the placebo group. The most common adverse events were injection-site pain, injection-site redness, and injection-site swelling. The most common systemic adverse events were headache, fatigue, and muscle aches. The incidence of adverse events through 1 month of follow-up was similar in the two groups.

CONCLUSIONS

In a randomized trial, we found that a single dose of RSV prefusion F vaccine in older adults was safe and effective in preventing RSV-associated lower respiratory tract illness with ≥ 3 signs or symptoms.

KEY POINTS

- The RSV prefusion F vaccine was effective in preventing RSV-associated lower respiratory tract illness with ≥ 3 signs or symptoms.
- The most common adverse events were injection-site pain, injection-site redness, and injection-site swelling.
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Links: Full Article | MEDrxiv | Editorial

Conquer RSV study (Phase2/3) regarding mRNA Vaccine (Moderna)

	mRNA-1345 (n = 17,572)	Placebo (n = 17,516)
RSV LRTD with ≥ 2 symptoms, No. (%)	9 (0.05)	55 (0.31)
Vaccine efficacy, %		83.7
RSV LRTD with ≥ 3 symptoms, No. (%)	3 (0.02)	17 (0.10)
Vaccine efficacy, %		82.4

Wilson E, et al. Presented at 7th Annual RaSVNET Conference, February 22-24, 2023, Lisbon, Portugal.

ACIP recommends RSV vaccines for adults aged ≥ 60 years¹:

Advisory Committee on Immunization Practices (ACIP)

≥ 60 years of age

“Adults aged ≥ 60 years may receive a single dose of RSV vaccine, using shared clinical decision-making.”

ACIP recommendation, June 27, 2023

When...

Optimally, vaccination of eligible adults should occur before the onset of increased RSV activity in the community.

Providers should offer RSV vaccination to eligible aged ≥ 60 years using shared clinical decision-making to assess the vaccine’s benefit/burden.

Providers should continue to offer RSV vaccination to eligible adults who remain unvaccinated.

Other factors associated with increased risk

- Frailty
- Advanced age*
- Residence in a nursing home or other long-term care facility
- Other underlying factors that a health care provider determines might increase the risk for severe respiratory disease (including compromised immune status)

***Among older adults, RSV incidence increases with advancing age.**

However, there is no specific age threshold at which RSV vaccination is more strongly recommended within the age group of adults aged ≥ 60 years.

ACIP, Advisory Committee on Immunization Practices (US CDC); NACI, National Advisory Commission on Immunization (Canada).

1. Nahata M, et al. MMWR Morbidity and Mortality Weekly Report 2023;72(27):750-823.

75

RSV vaccine still very underused!!



Good morning Alan Kaplan Monday, December 11, 2023

LEADING THE NEWS

RSV vaccinations remain low among older Americans

The *New York Times* (12/9, Spain) reported, "So far, only about 15 percent of Americans over 60 have received one of the two new R.S.V. shots," which the FDA approved in May. Public health officials attribute the low uptake to a general lack of knowledge about the vaccine, as well as low awareness of the virus itself. However, the FDA "estimates that the virus sends 60,000 to 160,000 people over 65 to hospitals each year and causes 6,000 to 10,000 deaths."

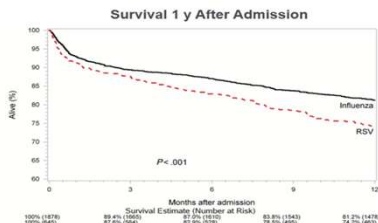
Comparing the burden of influenza, RSV, and pneumococcal disease in older adults

Burden	RSV	Influenza	Pneumococcal disease
Out-patient illness (per 100 person years)	1.5-2	2.5-3	0.14-0.3
Hospitalization (per 100,000/yr)	57-350	140-520	169
Case fatality rate in hospitalized cases	5-7%	5-7%	5-7%
Vaccine efficacy	>80% LRTD	30-40% v. cases 60% v. hospitalization	42% v. pneumonia 75% v. IPD FOR 50-70% of strains

Schanzer et al. IORV 2018;12:113-121. doi:10.1111/irv.12497; Goldstein IORV 2015;9:225-33. doi:10.1111/irv.12325; Nazareno IORV 2022;16:1082-1090. doi:10.1111/irv.13003; Zimmerman et al. IORV;2022. 16:1133-1140. doi:10.1111/irv.13040; Branche et al. Clin Infect Dis. 2022;74:1004-1011. doi:10.1093/cid/ciab595; Savic et al. IORV 2023;17:e13031. doi:10.1111/irv.13031;2022;16:276-288. doi:10.1111/irv.12914. National Advisory Committee in Immunization: Recommendations on the use of conjugate pneumococcal vaccine - 15 valent (PNV15) and 20 valent (PNV20) in adults: Economic evidence supplementary appendix (in press); Kwong et al. *PLoS ONE* 7(9):e44103. 37

Survival better for patients with Influenza (cf RSV)

Hospitalized Adults Aged ≥ 60 Years Who Tested Positive for RSV or Influenza, January 2011–June 2015, Kaiser Permanente (Southern California)



Ackerson B, et al. Clin Infect Dis. 2019;69:187-203

Acute Myocardial Infarction after Laboratory-Confirmed Influenza Infection

Jeffrey C. Kwong, M.D., Kevin L. Schwartz, M.D., Michael A. Campitelli, M.P.H., Hannah Chung, M.P.H., Natasha S. Crowcroft, M.D., Timothy Kamaachow, Ph.D., Kevin Katz, M.D., Dennis T. Ko, M.D., Allison J. McGuire, M.D., Deyre McNally, M.D., Ph.D., David C. Richardson, M.D., Laura C. Rosella, Ph.D., M.H.Sc., et al.

- Self controlled case series
- Ontario laboratory and administrative data
- Examining association between lab-confirmed influenza and MI

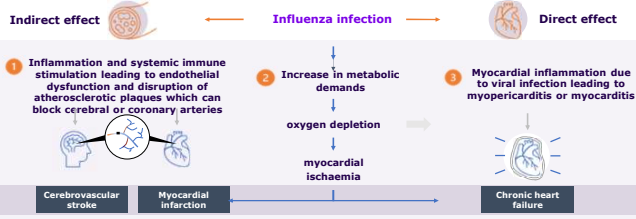
N Engl J Med 2018;378:345-353
DOI: 10.1056/NEJMoa1702090

Table 2. Incidence Ratios for Acute Myocardial Infarction after Laboratory-Confirmed Influenza Infection.^a

Variable	Incidence Ratio (95% CI)
Primary analysis: risk interval, days 1-7	6.05 (3.86-9.50)
Days 1-3	6.30 (3.25-12.22)
Days 4-7	5.78 (3.17-10.53)
Days 8-14	0.60 (0.15-2.41)
Days 15-28	0.75 (0.31-1.81)
Alternative exposure	
RSV	3.51 (1.11-11.12)
Respiratory virus other than influenza or RSV	2.77 (1.23-6.24)
Illness with no respiratory virus identified†	3.30 (1.90-5.73)
Hospitalization for diabetes and associated complications‡	1.35 (0.50-3.62)

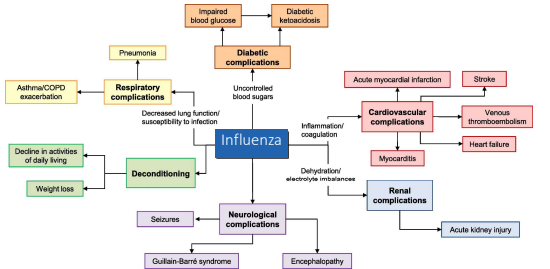
79

Possible mechanisms of influenza infection that trigger cardiovascular events¹⁻³




References: 1. Libal JA, et al. *Emerg Infect Dis*. 2015;21(12):2259-2266. DOI: 10.1093/emid/civ212. 2. Arora A, et al. *Microb*. 2020;36:4444-4935. DOI: 10.1016/j.mbs.2020.01.010. 3. Rosella L, et al. *CMAJ*. 2018;190(12):E1000-E1007. DOI: 10.1503/cmaj.201807.

Influenza is Associated with a Morbidity Cascade



Moran AL, McElroy R, Chavez JS, et al. The disease burden of influenza beyond respiratory illness. *Vaccine*. 2021;39(18):A18-A19. doi:10.1016/j.vaccine.2020.09.046

CDC Influenza Vaccine Recommendations



CDC Recommends the 2023-2024 updated vaccines

- ✓ For everyone age 6 months or older
Without contraindications
- ✓ For those who are immunocompromised
Should receive an age appropriate IIV4 or RIV4 – LAIV4 should not be used
- ✓ For those aged 65 or older
Should receive a higher dose or adjuvanted vaccine
- ✓ For those with an egg allergy
All persons older than 6 months with an egg allergy should receive the influenza vaccine. No additional safety measures are needed.

What was the Efficacy last year?

The Journal of Infectious Diseases MAJOR ARTICLE IDSA hivmo

Influenza Vaccine Effectiveness Against Influenza A–Associated Emergency Department, Urgent Care, and Hospitalization Encounters Among US Adults, 2022–2023

- VE against influenza A–associated ED/UC encounters was:
 - 44% (95% confidence interval [CI], 40%–47%) overall
 - 45% and 41% among adults aged 18–64 and ≥65 years, respectively.
- VE against influenza A–associated hospitalizations was:
 - 35% (95% CI, 27%–43%) overall
 - 23% and 41% among adults aged 18–64 and ≥65 years, respectively.

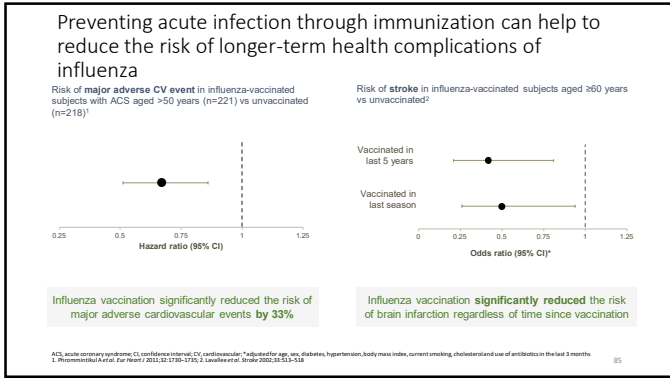
Tenforde MW, et al. Influenza vaccine effectiveness against influenza-A-associated emergency department, urgent care, and hospitalization encounters among U.S. adults, 2022–2023. J Infect Dis. 2023 Dec 2;juad542. doi:10.1093/infdis/juad542.

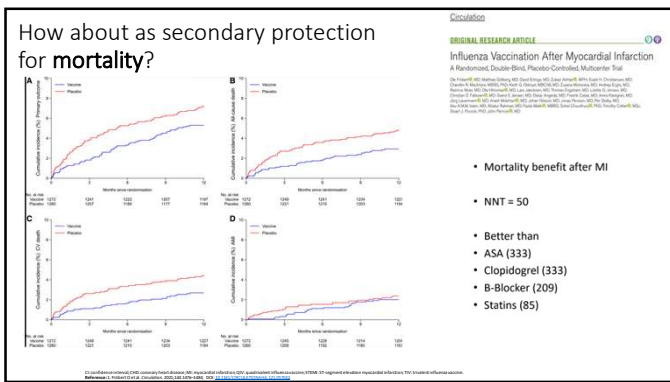
But...“The flu shot doesn’t work well enough”

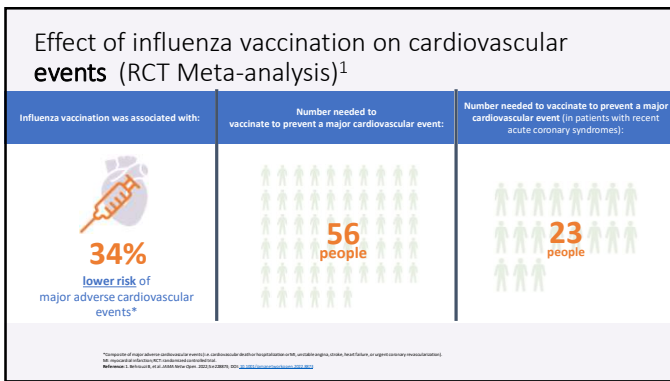
Influenza vaccine reduces your chances of influenza by 20-35% and your chances of hospitalization and death from influenza by 40-80%

- Statins reduce your risk of a heart attack, or of dying from coronary artery disease by 28%
- Lowering blood pressure reduces risk of MI by 20%-25%, and of stroke by 35%-40%
- Blood thinners for atrial fibrillation reduce the risk of stroke by 50-60%
- Bisphosphonates reduce the risk of recurrent osteoporotic hip fractures by 40-50%

Taylor F, Huffman MD, Macedo AE, Moore TH, Burke M, Davey Smith G, Ward K, Ebrahim S. Statins for the primary prevention of cardiovascular disease. Cochrane Database Syst Rev. 2013 Jan 31;2013(1):CD004816. Napian RC. Treatment of hypertension to prevent stroke: translating evidence into clinical practice. J Clin Hypertens (Greenwich). 2021 May;Jun;33(1):153-6. Muzini VM, Tejani AM, Bassett K, Pull L, Wright JM. Pharmacotherapy for hypertension in adults 60 years or older. Cochrane Database Syst Rev. 2019 Jun 5;4(6):CD000028. <https://www.fda.gov/drugs/news-events-human-drugs/atrial-fibrillation-and-new-oral-anticoagulant-drugs>; <https://www.ti.ucb.ca/2012/01/24/a-systematic-review-of-the-efficacy-of-NEP/NB/NM/NEP/NB/NM/bisphosphonates/>







So, how are we doing with Influenza Vaccination?



Flu Vaccination by State

Percentage of adults who reported receiving a seasonal flu vaccine in the past 12 months.

Flu Vaccination

Percentage of adults who reported receiving a seasonal flu vaccine in the past 12 months.



Top States	Rank	Value
Rhode Island	1	65.1%
Massachusetts	2	57.0%
Vermont	3	56.6%
Your State	Rank	Value
Oklahoma	38	41.2%
Georgia, Missouri, Tennessee	39	40.8%
Alabama	42	39.9%
Bottom States	Rank	Value
Wyoming	48	36.9%
Nevada	49	36.8%
Mississippi	50	35.1%

Data from CDC, Behavioral Risk Factor Surveillance System, 2022



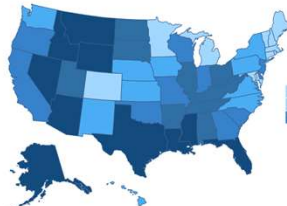
https://www.americashealthrankings.org/explore/measures/flu_vaccine/MT accessed Feb 9, 2024

Flu Vaccination by State: Ages 65+

Percentage of adults age 65 and older who reported receiving a seasonal flu vaccine in the past 12 months.

Flu Vaccination - Ages 65+

Percentage of adults age 65 and older who reported receiving a seasonal flu vaccine in the past 12 months.

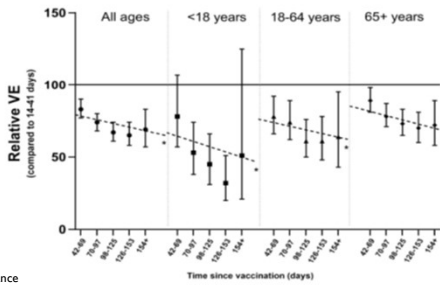


Top States	Rank	Value
Connecticut	1	76.3%
Rhode Island	2	75.6%
New Hampshire	3	75.0%
Your State	Rank	Value
Louisiana	41	64.2%
Montana	42	63.6%
Texas	43	63.1%
Bottom States	Rank	Value
Mississippi	48	60.2%
Nevada	49	59.7%
Wyoming	50	57.9%

Data from CDC, Behavioral Risk Factor Surveillance System, 2022



Waning efficacy over time, 8 influenza seasons in Ontario, so this **IS needed annually!**



Chung et al
In press, Eurosurveillance

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What different kinds of 'flushots' are there?

- 1) Quadrivalent Inactivated Influenza Vaccines (IIV4)
- 2) Trivalent Inactivated Influenza Vaccines (IIV3)
- 3) Quadrivalent Live Attenuated Influenza Vaccine (LAIV4)
-Nasal Spray Flu Vaccine
- 4) Quadrivalent Recombinant Influenza Vaccine (RIV4)
- 5) Quadrivalent Cell-Cultured Influenza Vaccine (ccIIV4)
- 6) Senior choices: High dose or Adjuvanted

3 Ways Flu Vaccines are Manufactured:

- a) Egg-Based Flu Vaccines
- b) Cell-Based Flu Vaccines
- c) Recombinant Flu Vaccines

<https://www.familiesfightingflu.org/types-of-flu-vaccines/> accessed Dec 15, 2023

Where is the future?

1. New technology
 - Cell based, Insect based
 - mRNA vaccines, Recombinant proteins, Nano-particles,
2. Adding/changing antigens
 - Exchanging B\Yamagata for a second clade of A(H3N2)
 - Adding/increasing neuraminidase or nucleoprotein
3. Combined respiratory viral vaccines
 - mRNA Flu and COVID vaccines

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Who to emphasize beyond just Age?

Pay attention to comorbidities:

- extreme obesity
- chronic lung
- cardiovascular
- metabolic
- neurologic
- liver diseases

ICU: range aOR, 1.22–1.56;
 IMV: range aOR, 1.17–1.54;
 Death: range aOR, 1.43–2.36

Open Forum Infectious Diseases | AIDS | HIVMO | CDC

Association of Chronic Medical Conditions With Severe Outcomes Among Nonpregnant Adults 18–49 Years Old Hospitalized With Influenza, FluSurv-NET, 2011–2019

Fattali E, et al. Association of Chronic Medical Conditions With Severe Outcomes Among Nonpregnant Adults 18–49 Years Old Hospitalized With Influenza, FluSurv-NET, 2011–2019, Open Forum Infectious Diseases, Volume 19, Issue 12, December 2022. doi:10.1093/ofid/ofac399. https://doi.org/10.1093/ofid/ofac399

Herpes Zoster (Shingles)

The natural course of HZ consists of an acute phase which can be followed by chronic complications

Prodrome

Headache, fever, myalgia¹

Recurrence rate of HZ over 8 years of follow-up ~5%²

Unilateral, vesicular rash, Associated acute pain³

Presentation as HZO (10–15% of patients with HZ)⁴

Chronic (1–3 months)⁵

Postherpetic neuralgia (PHN) is the most common complication of shingles.

5%–30% of people with HZ develop neuropathic pain that persists for ≥ 90 days after the onset of the HZ rash⁶

Other complications of HZ include:

- Complications from eye involvement⁷
- Cardiovascular and cerebrovascular events⁸
- Disseminated disease⁹
- Hearing loss⁸
- Scarring¹⁰
- Neurological complications (poly, nerve cell/fiber damage)^{11,12,13}
- Bacterial superinfection

Years

HZO, herpes zoster ophthalmicus; PHN, postherpetic neuralgia

1. Hayslip R, et al. JAMA Dermatol. 2017;153(12):1215–1216. 2. Kwan K, et al. BMJ Open. 2014;4:e004883. 3. Costantini W, et al. Ann Pract. 2002;10:471–6. 4. Dworkin RH, et al. J Pain. 2008;9:537–45. 5. Dworkin RH, et al. Clin Infect Dis. 2007;44:121–9. 6. Nagel MA and Collins D. Curr Neurol Neurosurg Rep. 2015;15:7. 7. Yoon JY, et al. Mayo Clin Proc. 2011;86:953–8. 8. Centers for Disease Control and Prevention. MMWR. 2008;57(1):1–6. 9. Australian Health Services Research Institute. PHN. Australian Immunisation Handbook, Australian Government Department of Health and Ageing. Canberra, 2022. <https://immunisationhandbook.health.gov.au/> (Accessed April 2023). 10. Erakovic N, PL. J Clin. 2017;12:1–18.

How about risk in our respiratory patients?



Sarkisova E, Yawn B, White T, et al. Risk factors for herpes zoster: should people with asthma or COPD be vaccinated? Respir Res 24, 35 (2023). <https://doi.org/10.1186/s12931-022-02305-1>



SHINGRIX

Non-live adjuvanted recombinant zoster vaccine (RZV)¹ SHINGRIX[®]

For the prevention of herpes zoster (HZ) in:

- Adults 50 years of age or older;
- Adults 18 years of age or older who are or will be at increased risk of HZ due to immunodeficiency or immunosuppression caused by known disease or therapy

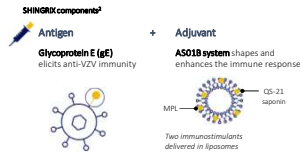
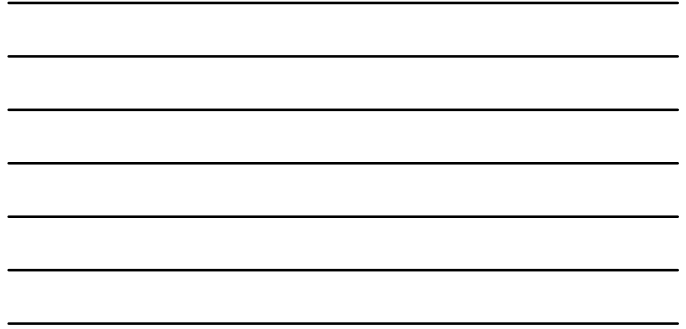


Figure adapted from Hejblum TC, et al. Curr Opin Immunol. 2019;59:42-48.

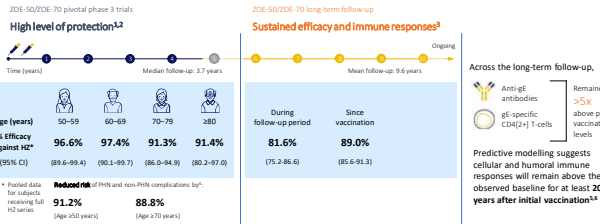
NACI recommends that SHINGRIX be offered to individuals ≥50 years of age who have previously been vaccinated with live zoster virus vaccine (strong recommendation)³

1. SHINGRIX [product monograph]. Merck/Sanofi, ON: GlaxoSmithKline Inc. Revised November 24, 2021. Accessed August 2022. <https://usa.gsk.com/en-ca/products/shingrix/> 2. Hejblum TC, et al. Curr Opin Immunol. 2019;59:42-48. 3. 5. All rights reserved. An Advisory Committee Statement (ACS), National Advisory Committee on Immunization (NACI) – Updated Recommendations on the Use of Herpes Zoster Vaccine. Public Health Agency of Canada, modified: 2018. Adapted and reproduced with permission from the Minister of Health, 2018.

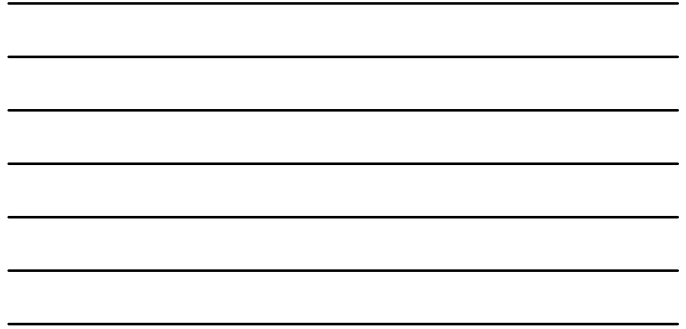


SHINGRIX provides strong, durable protection against both herpes zoster and its complications

Two doses of SHINGRIX appear to offer clinical benefit through Year 10 after vaccination.^{1,3}



1. Lau H, et al. N Engl J Med. 2018;372:2287-2296. 2. Cunningham AL, et al. N Engl J Med. 2016;76:1019-1032. 3. Shrivastava A, et al. Open Forum Infect Dis. 2022;9(10):ofac485. 4. Kivimäki M, et al. Vaccine. 2018;36(13):1337-1341. 5. Madala A, et al. J Infect Dis. 2023;224(12):2029-2034. 6. Schwartz TG, et al. Hum Vaccin Immunother. 2018;14(8):1370-1377.





Aging adults are at increased risk of poor outcomes from vaccine-preventable diseases; factors like chronic conditions compound that risk

OVERALL PATIENT RISK
Impact of multiple independent risk factors can be additive

INDEPENDENT RISK FACTORS

- Weakened immune status due to disease or therapy
- Chronic medical conditions
- Environmental factors
- Older age

For example:

- Chemotherapy
- Biologic therapy
- Immunocompromising medical condition
- HIV-positive status
- Bone marrow transplant
- COPD, asthma
- Cardiovascular disease
- Others (diabetes, CKD, RA, obesity)
- Long-term care home
- Overall stress/psychologic status
- Lifestyle contributors

CAD, chronic kidney disease; RA, rheumatoid arthritis. Mangan M, et al. *MMWR Morbidity and Mortality Weekly Report*. 2013;62:778-802.

Age-related decline in immunity presents a challenge to vaccine development

Baseline RSV-specific cellular immune response¹
RSVPreF3 CD4+ T cells (GMF range)

T-cell response declines with age, making it challenging for older adults to:^{2,3}

- mount immunity to infection
- achieve high levels of protection following vaccination

GMF, geometric mean frequency. 1. Linnon-Rasmussen M, et al. *Infect Dis*. 2013;27(5):761-772. 2. Stephens JM and Varga SM. *Vaccines (Basel)*. 2013;1(3):161-174. 3. Chervinskiy A, et al. *Chin Vaccine Immunol*. 2013;12(2):239-247.

Reduced responsiveness to vaccination in older adults requires novel strategies


Vaccine formulations with **higher antigen content**, such as high-dose influenza vaccines¹

Vaccine formulations with **adjuvants**^{2,3}

AS01 Adjuvant System (AS01), MF59, microfluidic emulsion-53.
1. Robertson CA et al. Expert Rev Vaccines. 2016;15:1495-1505. 2. Coleman BT et al. Influenza Other Respir Viruses. 2021;15:813-823. 3. Chikva R et al. J Infect Dis. 2013;208:1953-1961. 106

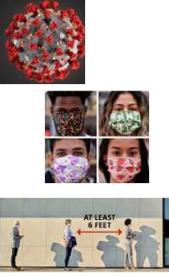
Non-Pharmacological Prevention

- **Recommendations**
 - Social distancing
 - Avoiding crowded spaces
 - Face masks
 - Frequent handwashing
 - Education
 - Patient awareness
 - Staying home when sick
- It is important to remind patients that these interventions do not replace the need for respiratory immunization



Clausing-Bil, A. et al. Impact assessment of non-pharmaceutical interventions against coronavirus disease 2019 and influenza in Hong Kong: an observational study. *The Lancet Public Health*. 2020;5(10):e479-e488. doi:10.1016/S2468-2667(20)30090-6. Smith SM, Samart T, Wachira G, Wainwright G, Wang J, et al. Non-pharmaceutical interventions to reduce the transmission of influenza in a public health care facility: a systematic review. *Respirology*. 2015;20(5):696-702. doi:10.1111/rsp.12541.

RSV infections were prevented!!

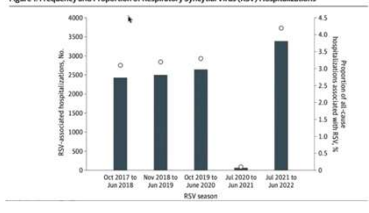


Pediatric RSV-Associated Hospitalizations Before and During the COVID-19 Pandemic

Wang, S. et al. *Journal of Pediatrics*. 2023;243:100-106. doi:10.1016/j.pediatrics.2023.03.010. <https://doi.org/10.1016/j.pediatrics.2023.03.010>

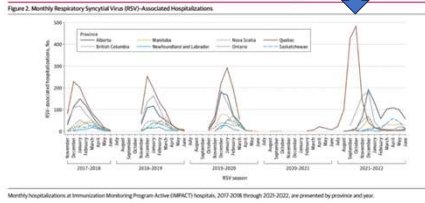
JAMA Network Open. 2023;6(10):e2336863. doi:10.1001/jamanetworkopen.2023.36863

Figure 1. Frequency and Proportion of Respiratory Syncytial Virus (RSV) Hospitalizations



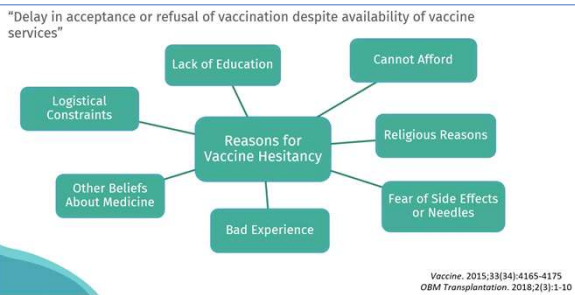
RSV season	Frequency (Number of Hospitalizations)	Proportion of Total Hospitalizations (%)
Oct 2017 to Jun 2018	~2500	~3.0
Nov 2018 to Jun 2019	~2500	~3.0
Oct 2019 to Jun 2020	~2500	~3.0
Jul 2020 to Jun 2021	~2500	~3.0
Jul 2021 to Jun 2022	~3500	~4.5

But, not sustainable, right?



Vaccination Barriers?

Vaccine Hesitancy



Perceived barriers to immunization **differ** between patients and physicians

#1 Barrier per Physicians for the patient

- Cost was seen as the main barrier by 92% to 95% of physicians

#1 Barrier to getting vaccinated among adults

Not receiving a **recommendation** from an HCP was seen as the main barrier


Cost was seen as a barrier in only 18% to 19% of participants

So, do NOT assume, please offer all the appropriate vaccines recommended!!


1. STEIN ET AL. / OBSTET GYNECOL CAN 2019;41:994-1002; 2. STEIN ET AL. / OBSTET GYN 2019;41:123-33

FRAILITY: Just remember these images!

• Pre:



• Post:



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CONCOMITANT Administration OF INFLUENZA VACCINE AND OTHER VACCINES

- Influenza vaccines can be administered concomitantly with any other vaccine
- When more than one injection is given at a single clinic visit, it is preferable to administer them in different limbs. If it is not possible to do so, injections given in one limb should be separated by a distance of at least 2.5 cm (1 inch).
- A separate needle and syringe should always be used for each injection.

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• ACIP advises that co-administration of RSV vaccines with other adult vaccines is acceptable*

In clinical studies, co-administration of an RSV vaccine with a seasonal influenza vaccines (quadrivalent, high dose, and adjuvanted influenza vaccines) met non-inferiority criteria for immunogenicity**

Seasonal influenza vaccines

COVID-19 vaccines

Pneumococcal vaccines

Td/Tdap

Recombinant zoster vaccine (Shingrix)

Evidence of increased reactivity with coadministration of RSV and influenza vaccines is mixed.

**Given the lack of data on coadministration of RSV with other recommended vaccines, ACIP recommends that decisions to co-administer should consider:

- Patient immunization status for recommended vaccines
- Risk for acquiring vaccine-preventable disease
- Feasibility of the patient attending multiple appointments
- Vaccine reactivity profiles
- Patient preferences

**Using the FluA/Geneva H3N2 strain when AS03R was co-administered with adjuvanted quadrivalent inactivated influenza vaccine. RSV and influenza antibody titers were compared lower with coadministration, however, the clinical significance of this outcome is unclear.

ACIP, Advisory Committee on Immunization Practices.

GOLD Update released Fall 2023

Vaccination for Stable COPD Figure 3.6

- Influenza vaccination is recommended for people with COPD **(Evidence B)**
- The WHO and CDC recommends SARS-CoV-2 (COVID-19) vaccination for people with COPD **(Evidence B)**
- The CDC recommends one dose of 20-valent pneumococcal conjugate vaccine (PCV20), or one dose of 15-valent pneumococcal conjugate vaccine (PCV15) followed by 23-valent pneumococcal polysaccharide vaccine (PPSV23) for people with COPD **(Evidence B)**
- Pneumococcal vaccination has been shown to reduce the incidence of community-acquired pneumonia and exacerbations for people with COPD **(Evidence B)**
- The CDC recommends the new respiratory syncytial virus (RSV) vaccine for individuals over 60 years and/or with chronic heart or lung disease **(Evidence A)**
- The CDC recommends Tdap (Tdap/DTaP) vaccination to protect against pertussis (whooping cough) for people with COPD that were not vaccinated in adolescence **(Evidence B)**, and Zoster vaccine to protect against shingles for people with COPD over 50 years **(Evidence B)**

<https://pubmed.org/2024-gold-recent/> 116

CLINICAL PEARLS www.fnaac.com
for4kids@gmail.com

Pearl #1

Our Respiratory Patients are amongst the highest risk for bad outcomes from VPDs (vaccine preventable diseases)

Pearl #2

Each patient, each visit, should be updated and reviewed at the very LEAST before the onset of the fall respiratory diseases

Pearl #3

Adult vaccine is an ongoing process of prevention and good health, stabilizing those with comorbid conditions, preventing CV and other outcomes including frailty.

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