



Identifying, Preventing, and Managing RSV in Pharmacy Practice: A Case-Based Approach

Sherilyn Houle

BSP, PhD, AFTM RCPS(Glasg)
Certificate in Travel Health™

Associate Professor
School of Pharmacy, University of Waterloo



Presenter Disclosures

- **Advisory boards:** AstraZeneca, GSK, Novavax, Pfizer, Sanofi, Seqirus, Valneva
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I will be receiving a speaker's fee from CPhA for this learning activity.



Provider Disclosure

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Learning Objectives

By the end of this webinar, pharmacists will be able to:

1. Identify symptom presentations consistent with respiratory syncytial virus (RSV) infection
2. Determine whether a patient's case is appropriate for self-management or requires referral
3. Educate patients on preventive measures they can take against RSV including those to reduce the risk of exposure and eligibility for vaccination
4. Provide care for patients with RSV, including application of both non-pharmacologic and pharmacologic measures



Poll Question

Which of the following describes your experience to date with RSV?

- A. I personally have experienced severe illness from suspected or confirmed RSV
- B. A patient of mine has experienced severe illness from suspected or confirmed RSV
- C. I'm sure I, or a patient of mine, has had RSV, but I've never seen a severe case
- D. I'm not sure if I've encountered it yet in practice



**Why is everyone
talking about RSV?
Why now?**

November 2022

Children's hospitals are overwhelmed across Canada. Experts weigh in on what's to blame – and what's not

CARLY WEEKS > HEALTH REPORTER
PUBLISHED NOVEMBER 14, 2022



<https://www.theglobeandmail.com/canada/article-kids-hospitals-rsv-infections/>

August 2023

Health Canada approves first RSV vaccine for adults age 60 and over

NICOLE IRELAND
OTTAWA, ONTARIO
THE CANADIAN PRESS
PUBLISHED AUGUST 4, 2023

<https://www.theglobeandmail.com/canada/article-health-canada-approves-first-rsv-vaccine-for-adults-age-60-and-over-2/>

Coming Soon...





Did you Know?¹⁻⁵

- In the U.S. **35%** of children <5 years who were hospitalized for an acute respiratory illness tested positive for RSV
- Among high-risk adults 18-64 and older adults ≥65, RSV contributes to:

11.4%	COPD hospitalizations = 5,800/year in Canada
10.6%	Pneumonia hospitalizations = 3,600/year in Canada
7.2%	Asthma hospitalizations = 860/year in Canada
5.4%	Heart failure hospitalizations = 3,600/year in Canada



Case 1: Dallas

Dallas (age 36) visits the pharmacy with his children and asks for your advice on managing symptoms that feel like the early signs of a cold (nasal congestion, pressure in ears). He has no medical conditions. His children are asymptomatic.

- Is this RSV?
- Should Dallas be tested?
- What should Dallas do or take?





Who Gets RSV?

- *Everyone!* 86% of people are infected at least once by age 3.⁶ Immune response from natural infection is incomplete and short-lived,⁷ so reinfection occurs over the lifespan



Antibody levels decline 25-30% within one year of an infection⁶

What Does RSV Look Like?

Respiratory virus presentations (older adults):⁸

	Fever	Headache	Nasal Congestion	Dyspnea	Wheezing	Cough	Sputum	Sore Throat	Myalgia	Fatigue	Hoarseness	Chest Pain
Influenza	+++	++++	+++	+++	++++	++	++++	++	++	+++	+++	++
Respiratory syncytial virus	++	+++	+++	+++	+++	+++	++++	++	++	++	+++	+
Human metapneumovirus	++	++	++	++++	+++	++	++++	++	++	++	+++	++
Parainfluenza virus	—	++	—	++	++	++	++	—	+	—	—	++
Rhinovirus	+	++	++	++	++	++	+++	++	+++	+	+++	++
Coronavirus NOT COVID-19	++	++	+++	+++	++	—	+++	—	++	++	++	—

+ 0-25% ++ 26-50% +++ 51-75% ++++ 76-100% - Unknown

- Children and adults most commonly present with symptoms resembling the common cold
- Infants may not experience cough, runny nose, etc. but instead fussiness, reduced appetite, or changes in their breathing pattern (faster or slower)⁹

RSV Progression



Upper Respiratory Tract Infection^{10,11}

- Cough
- Stuffy and/or runny nose
- Conjunctivitis
- Sinus/ear involvement



Risk factors: Young children, older adults, immune compromised, LTC residents

Lower Respiratory Tract Infection

- Wheezing
- Shortness of breath
- Pneumonia, bronchiolitis, exacerbation of asthma/COPD/CHF

Testing for RSV – Rapid Antigen

- Sensitivity 80% (overall), specificity 97%¹²



Sensitivity is only 29% in adults
(lower viral load in upper airway)

- Available devices (sample collection by HCP):¹³⁻¹⁴



BD Veritor™ Plus System
(age <6)



Abbott BinaxNOW™ RSV Card
(age <5)



Testing for RSV – PCR

- Sensitivity 99%, specificity 100%¹⁵
- Often part of a Multiplex PCR that also tests for influenza, parainfluenza, rhinovirus, metapneumovirus, some coronaviruses (*not always COVID-19*), etc.¹⁶
- Community lab testing may be available (varies by location). Institutional testing often restricted to:
 - Symptomatic children visiting emergency department
 - People (all ages) admitted to hospital with symptoms of respiratory virus
 - Staff/residents of long-term care or other congregate facilities if suspected or confirmed outbreak



Treating Mild/Moderate RSV

- No antiviral options for outpatient use (inhaled ribavirin may be used for severely ill infants)
- Symptoms generally resolve in 1-2 weeks¹⁷
- Symptom management options:
 - Hydration
 - Rest
 - Humidifier for nasal congestion
 - Lozenges
 - Non-prescription nasal decongestant
 - Non-prescription analgesic/antipyretic



“Most children and adults with RSV infection require no more than the usual care given to ensure comfort, fever control, and adequate fluid intake”¹⁸



Reducing Spread

- Transmitted via droplets and contaminated surfaces



RSV virus can survive on hands for 1 hour and surfaces for 3-30 hours¹⁹

- Infected individuals are contagious for 3-8 days from infection (2-4 days after symptom onset)¹⁷
- R_0 is 3 (each case infects 3 others, on average)²⁰
- Strategies:
 - Cleaning of high-contact items
 - Hand hygiene
 - Cough etiquette
 - Mask

Back to Dallas

- Is this RSV? Maybe. Cannot distinguish from other respiratory viruses based on symptoms alone
- Should Dallas be tested? No, since:
 - Rapid antigen tests are not indicated in adults
 - Mild illness only
 - Test result has no impact on treatment plan. COVID-19 should be ruled out
- What should Dallas do or take?
 - Non-pharmacologic comfort measures
 - OTC decongestant or pain reliever if needed
 - Hand hygiene, cough etiquette, mask, surface cleaning to reduce spread



Back to Dallas

Dallas mentions that his 3-year-old son has asthma. Can he be vaccinated against RSV?

- RSV vaccine indicated for adults ≥ 60 years²¹
- Monoclonal antibodies (palivizumab, nirsevimab) indicated in children < 2 years.

Generally reserved for:²²

- Preterm infants (< 30 weeks gestation)
- Chronic lung disease (severe)
- Congenital heart disease
- Immunocompromised (severe)
- Residents of remote northern communities



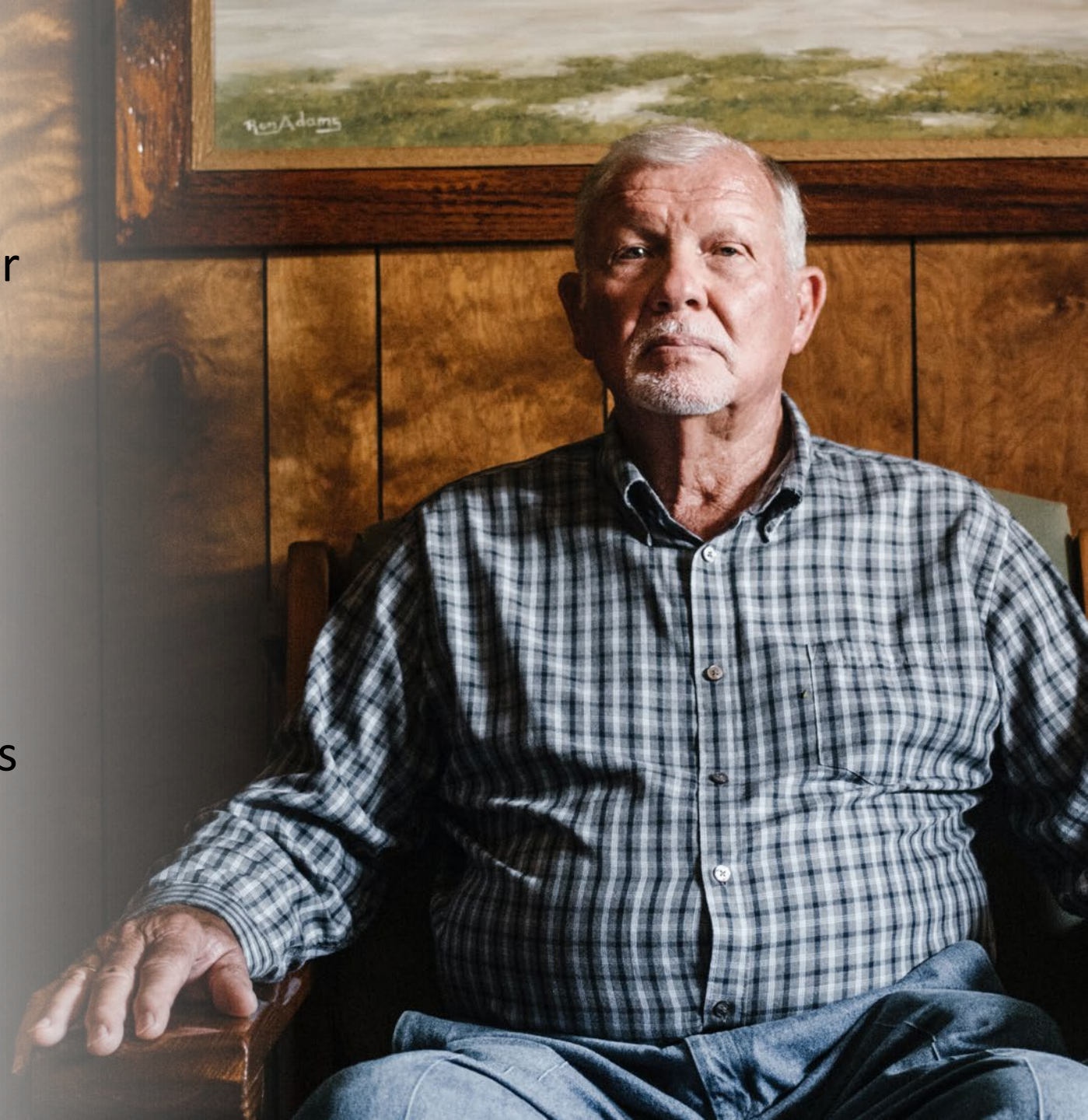


Case 2: Joe

Joe (age 78) is a regular patient visiting the pharmacy for refills of his inhalers (for COPD) and test strips (for type II diabetes). He appears to have lower energy than usual and has a frequent productive cough. He has had 1 COPD exacerbation this year.

Upon questioning, he reports not feeling fevered (he has not measured his temperature) but reports using his “blue puffer” a few times a day for the last 2-3 days.

“This cold is kicking my butt!”



- Can Joe self-manage these symptoms with OTC products?
- Joe has previously declined the influenza vaccine, saying: *“I can fight it off, and it doesn’t really work, anyway.”* How might he be encouraged to consider an RSV vaccine?





When to Refer an Older Adult²²⁻²³

- Fever $>104^{\circ}\text{F}$ (40°C) or lasting >3 days
- O_2 saturation $\leq 94\%$ at rest
- Severe cough
- Wheezing (high-pitched noise upon exhaling)
- Rapid breathing (e.g., >20 breaths/minute) or difficulty breathing
- Cyanosis
- Exacerbation of underlying chronic disease



RSV and COPD Exacerbation

COPD exacerbation is either symptom-based (change in dyspnea, sputum purulence, sputum volume), or event-based (change of at least one major symptom + use of antibiotics, systemic corticosteroids, and/or hospitalization)²⁴

- Treatment is consistent with that of COPD exacerbation due to any cause (short-acting bronchodilator + ipratropium ± antibiotics ± systemic corticosteroids ± oxygen)²⁵



Poll Question

What would be your strategy for Joe?

- A. Counsel him on self-management of symptoms and advise more frequent testing of blood glucose until symptoms resolve
- B. Advise Joe to contact his physician if his symptoms do not resolve within 1 week
- C. Refer Joe for further assessment



RSV and Comorbidities

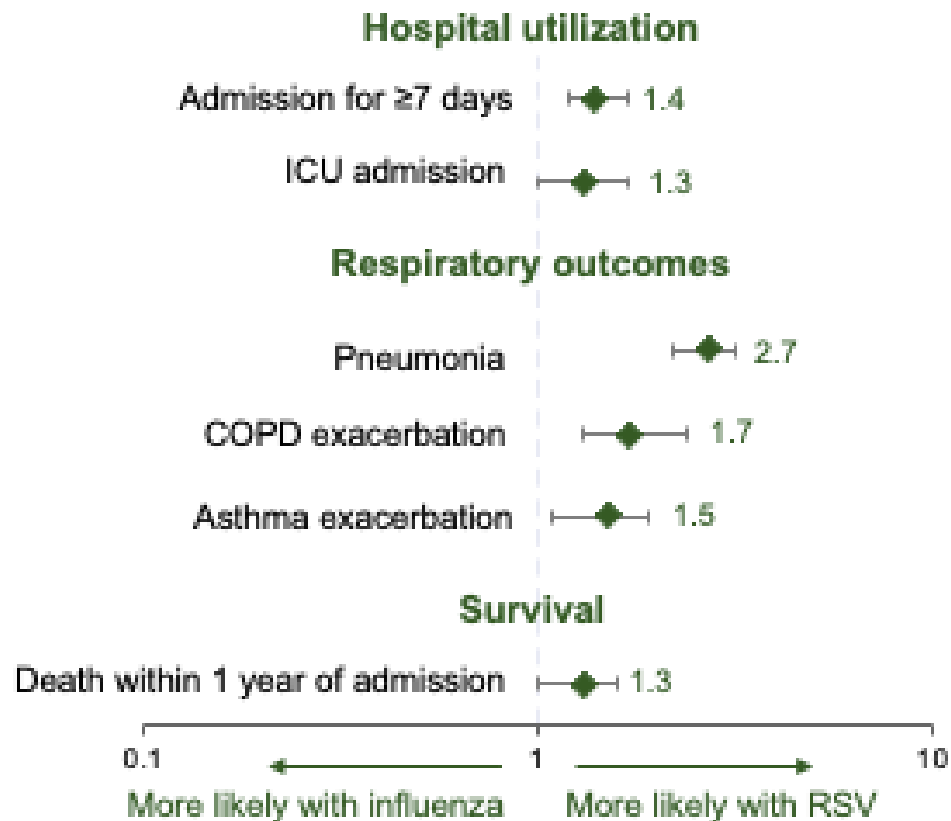
- Risk of hospitalization by comorbidity in adults ≥ 18 years vs. those without comorbidity:²²

Comorbidity	Incidence Rate Ratio
Asthma	2.0 – 3.6
COPD	3.2 – 13.4
Coronary artery disease	3.7 – 7.0
Diabetes	2.4 – 11.4
Heart failure	4.0 – 33.2



RSV vs. Influenza – Complications

- Odds ratios among adults aged ≥ 60 years hospitalized with influenza or RSV²⁶





RSV vs. Influenza – Vaccination

- RSV vaccine currently authorized in Canada – Arexvy®²¹
 - **Type:** Recombinant, adjuvanted with AS01_E
 - **Indication:** Prevention of lower respiratory tract disease (LRTD) caused by RSV in adults 60 years of age and older
- **Effectiveness:**
 - **RSV vaccine:** Any RSV LRTD = 82.6% (95%CI 57.9-94.1) overall. Severe RSV LRTD = 94.1% (95%CI 62.4-99.9) overall²¹
 - **Influenza vaccine:** Varies (19-52% in US in last 10 years)²⁷



No data yet on RSV vaccine effectiveness in immunocompromised older adults



RSV vs. Influenza – Vaccination Frequency

- Interim results of 3-year study on duration of protection from 1 dose of Arexvy®:²⁸

Outcome	RSV Season #1	RSV Seasons 1&2
Any RSV LRTD	82.6% (96.95%CI 57.9-94.1)	67.2% (97.5%CI 48.2-80.0)
Severe RSV LRTD	94.1% (95%CI 62.4-99.9)	78.8% (95%CI 52.6-92.0)

- Second dose 1 year after first dose had no impact on efficacy in seasons 1&2 = **67.1%** (97.5% CI, 48.1-80.0)
 - Success criterion: lower limit of 2-sided 97.5% CI for vaccine efficacy > 20% (**met**)

- Can Joe self-manage these symptoms with OTC products?
 - Joe should be referred for assessment of possible COPD exacerbation
- How might Joe be encouraged to consider an RSV vaccine?
 - Diabetes and COPD as risk factors
 - Complications from RSV as likely or more likely than from influenza
 - High vaccine effectiveness against any RSV LRTI and severe RSV LRTI
 - Single dose provides protection for at least 2 RSV seasons
 - If diagnosed with RSV this year, should be vaccinated next year due to recurrent infection cycles





Case 3: Lena

Lena (age 63) has an appointment for COVID-19 and influenza vaccines. She mentions feeling anxious as she has experienced body aches and fatigue after COVID-19 and herpes zoster vaccines lasting for 2-3 days and dreads it happening again.

She regularly visits her 90-year-old mother at a long-term care facility and believes vaccination is important but worries about how her body will react each time.





Poll Question

As Lena is over 60 years of age, she also has an indication for RSV vaccine. What would you advise to Lena?

- A. Delay RSV vaccination until next year when we will have more experience with it to know how she may react
- B. Advise she receive RSV vaccination as soon as possible with counseling on management of potential adverse effects



RSV Vaccine Tolerability²¹

Reaction	Vaccine	Placebo
Any local reaction	62%	10%
• Pain	61%	9.3%
• Erythema >20 mm	7.5%	0.8%
• Swelling >20 mm	5.5%	0.6%
Any systemic reaction	49%	23%
• Fatigue	33.6%	16.1%
• Myalgia	28.9%	8.2%
• Headache	27.2%	12.6%
• Arthralgia	18.1%	6.4%
• Fever $\geq 38^{\circ}\text{C}$	2.0%	0.3%

- No significant difference in serious adverse events between vaccine and placebo groups
- Post-marketing surveillance for Guillain-Barré Syndrome (GBS):
 - 1 case of GBS among ~15,000 vaccine recipients in phase 3 trials²¹
 - Baseline rate of GBS is mean 1.6 cases per 100,000²⁹



RSV + Influenza Vaccine Tolerability

- Solicited reactions within 4 days of vaccination:³¹

Reaction	RSV + IIV4-SD (n=438)	IIV4-SD only (n=438)
Local reactions: <ul style="list-style-type: none">• Pain• Swelling• Erythema	28.3% 1.4% 1.1%	20.5% 0.7% 0.5%
Systemic reactions: <ul style="list-style-type: none">• Fatigue• Myalgia• Headache• Arthralgia• Fever	22.4% 22.1% 21.7% 16.2% 2.5%	12.8% 9.4% 12.8% 4.8% 0.7%



RSV Vaccine Co-Administration

- Co-administration data exist for Arexvy® with:
 - Influenza vaccines (standard dose,²¹ high dose,³² adjuvanted³²)
 - Tdap vaccine³⁰
- ACIP (USA) advises RSV co-administration is acceptable (including with influenza, COVID-19, pneumococcal, Td/Tdap, and recombinant zoster vaccines)²⁸
- **No NACI statement yet on RSV co-administration**
- Some jurisdictions (e.g., Ontario) recommend spacing of RSV from other vaccines by 2 weeks³³

Recommendations: Clinical Considerations for the Co-administration of RSV, COVID-19 and Influenza Vaccines Among Older Adults in Long-term Care Facilities

Published: September 25, 2023

- “As a precaution, it is recommended that the RSV vaccine be administered at least 14 days before or after the administration of COVID-19 or influenza vaccines”
- “Co-administration of the GSK RSV vaccine with COVID-19 and influenza vaccines, or a shortened interval... should be considered in situations where, in the recommender/provider’s best judgement, the benefits outweigh the risks, including:
 - An outbreak of RSV, COVID-19 or influenza within the facility or others in the same geographic region
 - Community activity of COVID-19, influenza and/or RSV is high and increasing
 - Risk that the individual otherwise will not receive the recommended vaccine doses”

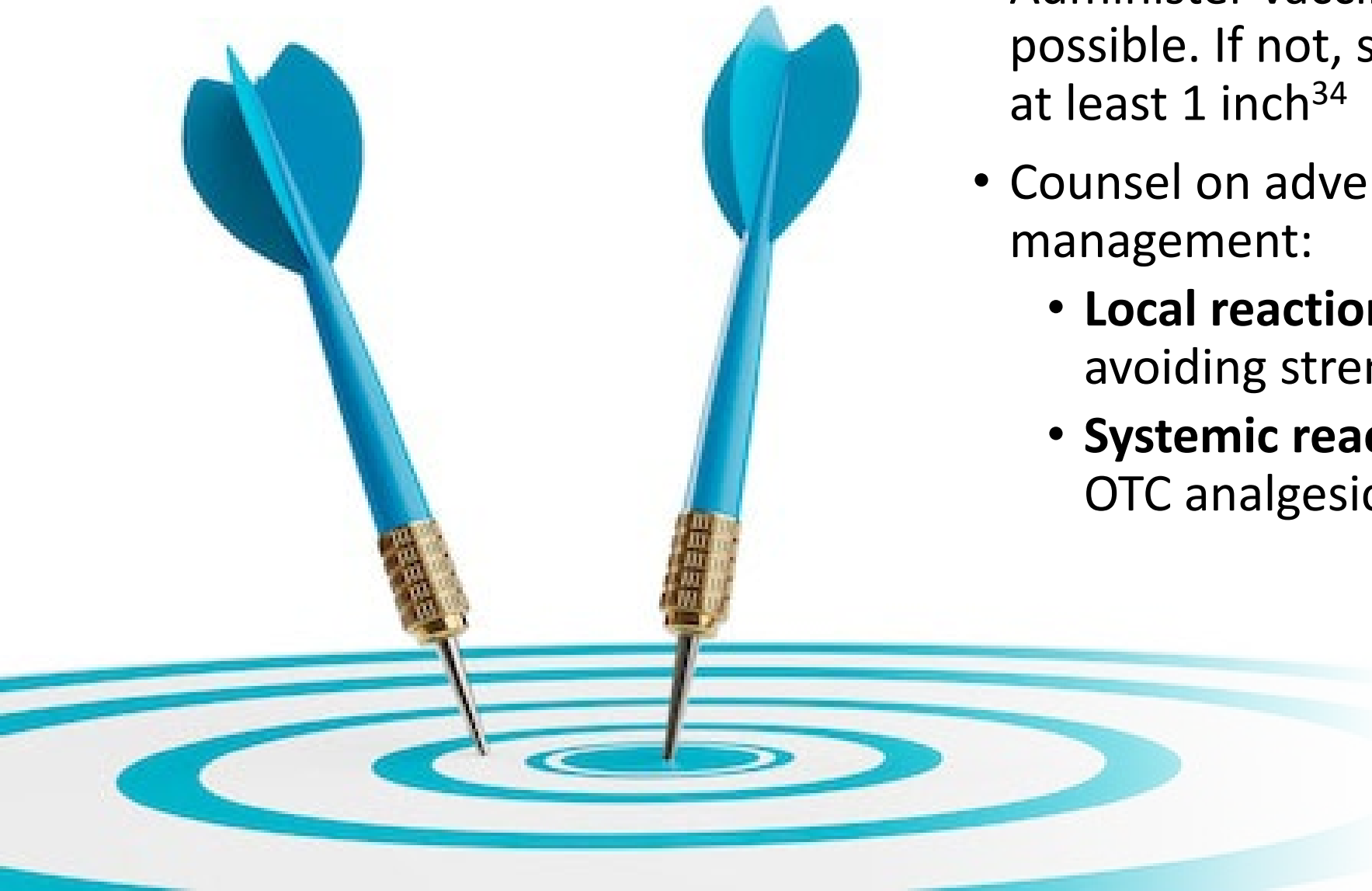
Advising Lena

- No data yet on side effects from RSV + COVID vaccine co-administration
- Conflicting recommendations:
 - ACIP: ✓
 - NACI: ?
 - P/T governments: ≥ 14 days spacing by some



Co-administration Technique

- Administer vaccines in separate limbs if possible. If not, space injection sites by at least 1 inch³⁴
- Counsel on adverse effect management:
 - **Local reactions:** Warm compress, avoiding strenuous use of limb
 - **Systemic reactions:** Rest, hydration, OTC analgesics/antipyretics





Poll Question

Lena asks you if the RSV vaccine contains the same ingredient to “boost” the immune response as the shingles vaccine she received last year. Which of the following is correct?

- A. Yes, it contains the same adjuvant in the same amount
- B. Yes, it contains the same adjuvant in ½ the amount
- C. No, it does not contain an adjuvant




AS01_E Adjuvant

- **Adjuvants:** Materials added to vaccines to improve the immunological response by:³⁵
 - Protecting vaccine antigen from hepatic clearance
 - Promoting the presentation of antigens to immune cells
 - Slowing the release of antigen
 - Recruiting immune cells to injection site
- Enhanced immune response may result in some corresponding increase in reactogenicity, which is dose-dependent³⁶



AS01_E is used in:^{21,37}

- Recombinant herpes zoster vaccine (Shingrix®): 100 µg
- Recombinant RSVPreF3 vaccine (Arexvy®): 50 µg

An illustration of human lungs in a light blue, semi-transparent style. Numerous red, spherical virus particles with spiky surfaces are shown both inside and around the lungs, representing the Respiratory Syncytial Virus (RSV). The background is a dark blue gradient with faint, glowing geometric patterns like hexagons and lines.

RSVPreF3 Vaccine Availability, Storage, Stability, and Reconstitution



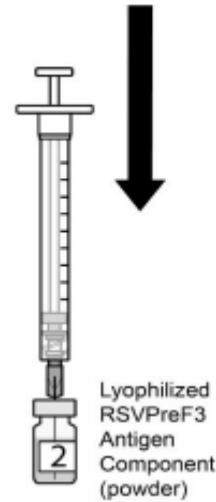
RSVPreF3 Availability, Storage, Stability²¹

- **Availability:** Packs of 1 dose or 10 doses. Each dose consists of 1 vial of antigen (powder) and 1 vial of adjuvant (suspension), which must be combined
- **Storage:** Refrigerated (2-8°C)
- **Stability:** After reconstitution, store refrigerated or at room temperature for up to 4 hours

RSVPreF3 Reconstitution²¹



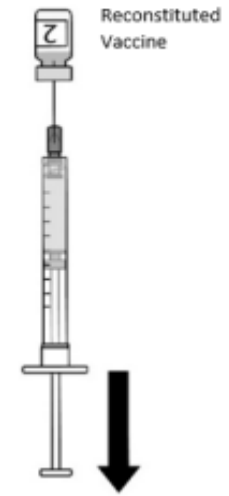
Step 1. Cleanse both vial stoppers. Using a sterile needle and sterile syringe, withdraw the entire contents of the vial containing the adjuvant suspension component (liquid) by slightly tilting the vial. Vial 1 of 2 (brown cap vial).



Step 2. Slowly transfer entire contents of syringe into the lyophilized RSVPreF3 antigen component vial (powder). Vial 2 of 2 (mustard-coloured cap vial).



Step 3. Gently swirl the vial until powder is completely dissolved. **Do not shake vigorously.**



Step 4. After reconstitution, using a new needle of suitable gauge and length for intramuscular vaccination, withdraw 0.5 mL of the reconstituted vaccine into the syringe and administer **intramuscularly**.



Instructional video (US resource) available at:
<https://arexvyhcp.com/administration/>



RSV Vaccine Pipeline and Status



- **April 14, 2023:**
 - Non-adjuvanted recombinant vaccine (RSVPreF) submitted to Health Canada for review for use in adults aged ≥ 60 years and in those who are pregnant (ideally in weeks 32-36)
- **May 31, 2023:**
 - RSVPreF (Abrysvo[®]) approved in USA
- **July 5, 2023:**
 - mRNA-1345 submitted for review in European Union, Switzerland, Australia, USA
- **August 4, 2023:**
 - RSVPreF3 (Arexvy[®]) approved in Canada

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Thank you!