Ipratropium Bromide Shortage

TABLE 1: **SUPPLIERS OF INHALED IPRATROPIUM BROMIDE**[1]

Product	Strength	DIN	Manufacturer
Pressurized Metered Dose Inhalers (pMDIs)			
Atrovent HFA	20 mcg/actuation	02247686	Boehringer Ingelheim (Canada) Ltd.
JAMP Ipratropium HFA		02542587	Jamp Pharma Corporation
Nebules*			
PMS-Ipratropium	125 mcg/mL x 2 mL	02231135	Pharmascience Inc.
	250 mcg/mL x 1 mL	02231244	
	250 mcg/mL x 2 mL	02231245	
Teva-Ipratropium Sterinebs	250 mcg/mL x 1 mL, 2 mL	02216221	Teva Canada Limited
Respirator Solution for Nebulization*			
AA-Ipravent	250 mcg/mL x 20 mL	02126222	AA Pharma Inc.

* Preferably use pMDI if available. See note about nebulization in text.
HFA = hydrofluoroalkane

Health Canada–approved indications for ipratropium pressurized metered dose inhalers (pMDIs) include:[2]

- as a bronchodilator for maintenance treatment of bronchospasm associated with chronic obstructive pulmonary disease (COPD), including chronic bronchitis and emphysema.

Health Canada–approved indications for ipratropium solutions for nebulization include:[3,4]

- the treatment of bronchospasm associated with acute exacerbations of chronic obstructive pulmonary disease (COPD), including chronic bronchitis and emphysema, and
- the treatment of bronchospasm associated with acute severe exacerbations of bronchial asthma when used in conjunction with a beta2-adrenergic agonist such as salbutamol in patients 5 years and older.

Considerations and Non-Pharmacological Management:[5-9]

- Ensure proper inhaler technique and adherence.
- Have written action plans. Example plans for chronic obstructive pulmonary disease (COPD) and asthma are available from the Canadian Lung Association[10] or the Canadian Thoracic Society.[11]
- Recommend smoking cessation when applicable.
- Identify and avoid triggers, when possible, such as environmental allergens, pollution, and occupational irritants.
- Manage conditions that may exacerbate asthma: obesity, anxiety, depression, rhinitis, sinusitis, gastroesophageal reflux disease and seasonal allergies.

- Assess potential for medication-induced asthma.
    - Acetylsalicylic acid (ASA) and non-steroidal anti-inflammatory drugs (NSAIDs) may cause asthma exacerbations in some patients; they are generally not contraindicated in patients with asthma unless they have caused previous exacerbations.
    - Oral and ophthalmic beta-blockers may cause bronchospasm. Continuation or initiation of these agents should be under close supervision when benefits outweigh risks.
- Recommend strategies to prevent respiratory infections, including up-to-date vaccination for influenza, COVID-19, pneumococcal, pertussis and respiratory syncytial virus.[9,12]
- Encourage physical activity.
- For patients with COPD, refer to pulmonary rehabilitation if appropriate and available.
    - Living Well with COPD[13] is a resource accessible to patients and healthcare professionals (requires free registration) that offers print and video resources, including at-home pulmonary rehabilitation exercises.

Therapeutic Alternatives/Considerations:

- Refer to Tables 2 and 3 for alternatives to ipratropium for use in COPD and acute severe exacerbations of asthma.
    - Availability of ipratropium and alternatives may fluctuate. **Inventory management, especially prevention of stockpiling, is key to maintaining adequate supply for patients.**
- Ensure optimal treatment of COPD and asthma.
    - **Note:** In general, nebulization is not preferred because of cost and lack of benefit compared to pMDI with spacer.[9,14] Nebulization generates aerosols, meaning potentially greater transmission of respiratory pathogens.[9,14] However, in some cases, nebulization may be the only option. This is most likely to be the case in the very young, very old, and/or for severe exacerbations.[14]
    - See CPS[6], RxFiles[8], and Global Initiative for Chronic Obstructive Lung Disease (GOLD) guidelines[12] for stepped-care COPD treatment.
    - See CPS (Asthma in Adolescents/Adults[5], Asthma Infants and Children[15]) and Global Initiative for Asthma (GINA) Management and Prevention 2025 Update[9] for management of **severe acute asthma exacerbation**.
        - Ipratropium is considered for exacerbations requiring emergency medical care in which it is added to other therapies including short-acting $beta_2$-agonists, oxygen, and corticosteroids.[7,9,15]
        - **Prevention of exacerbations is of most importance.** See *Considerations and Non-Pharmacological Management*.
- There are advantages and disadvantages to the various devices, making some less appropriate for some patients. Patients for whom **device selection** may be important include children and those with reduced dexterity, those unable to achieve forceful inspiration, those with dementia and those concerned about environmental impacts. RxFiles has resources to help select the best device: pros and cons of devices[14]; COPD inhalers: hand vs. lung approach[16]; and information on inhaler technique.[17] Device selection may not be possible based on product availability.

TABLE 2: **PHARMACOLOGIC AGENTS FOR RELIEF OF COPD SYMPTOMS**

Medication **Dosage Form** **Strength**[6]	**Dosage**
Short-Acting Beta$_2$-Agonists (SABA)	
Salbutamol (Ventolin, g) pMDI 100 mcg/ACT	1–2 INH TID-QID PRN[6] Max: 800 mcg/day[6] Onset: 5–8 min[18]
Salbutamol (Ventolin) Diskus (DPI) 200 mcg/ACT	1 INH TID-QID PRN[6] Max: 800 mcg/day[6] Onset: ~5 min[18]
Salbutamol (Ventolin, g) Nebules* 2.5 mg/2.5 mL; 5 mg/2.5 mL	2.5-5 mg QID PRN[6] Max: 15 mg/day[8] Onset: ~5 min[18]
Terbutaline (Bricanyl) Turbuhaler (DPI) 0.5 mg/ACT	1 INH Q4-6H PRN[6] Max: 3 mg/day[6] Onset: ~5 min[18]
Short-Acting Muscarinic Antagonist (SAMA)	
Ipratropium (Atrovent, g) pMDI 20 mcg/ACT	2–4 INH TID–QID[2] Max: 12 INH/day[2] Onset: within 15 min[19]
Ipratropium (g) Nebules* 250 mcg/1 mL; 500 mcg/2 mL	500 mcg TID–QID[8] Max: 2000 mcg/day[8] Onset: within 15 min[19]
Short-Acting Muscarinic Antagonist (SAMA)/Short-Acting Beta$_2$-Agonist Combination (SABA)	
Ipratropium/Salbutamol (Combivent) Respimat 20 mcg/100 mcg per ACT	1 INH QID; additional doses PRN[6] Max: 6 INH/day[6] Onset: 5–8 min[18] (based on salbutamol)
Ipratropium/Salbutamol (g) Nebules* 0.5 mg/2.5 mg per 2.5 mL	1 NEB Q6H PRN[6] Max: 4 NEB/day[8] Onset: 5–8 min[18] (based on salbutamol)

*Devices (e.g., pMDI, DPI) are preferred over nebules. See note about nebulization in text.

ACT = actuation; COPD = chronic obstructive pulmonary disease; DPI = dry powder inhaler; H = hours; g = generics; INH = inhalation; Max = maximum; min = minutes; NEB = nebule(s); pMDI = pressurized metered dose inhaler; PRN = as needed; Q = every; QID = four times daily; TID = three times daily

TABLE 3: **BRONCHODILATOR AGENTS FOR MANAGEMENT OF SEVERE ACUTE ASTHMA EXACERBATIONS**

Medication Dosage Form Strength[6]	**Dosage**	**Comments**
Short-Acting Beta$_2$-Agonists (SABA)		
Salbutamol (Ventolin, g) pMDI 100 mcg/ACT	6 y and older (including adults): 4 to 10 INH every 20 min x 3 doses If not controlled: 4 to 10 INH Q3-4H up to 6 to 10 INH Q1-2H, or more often[9] ≤ 5y: 4 to 6 INH every 20 min x 3 doses PRN If not controlled: 4 INH or more per hour PRN[9]	
Salbutamol (Ventolin, g) Nebules 2.5 mg/2.5 mL; 5 mg/2.5 mL	6 y and older (including adults): 2.5 to 5 mg every 20 min x 3 doses If not controlled: 2.5 to 5 mg Q1-4H PRN[18] ≤ 5y: 2.5 mg every 20 min x up to 3 doses If not controlled: 2.5 mg or more per hour PRN[9]	pMDI + spacer preferred over nebulization. See text.
Salbutamol (Ventolin) Diskus (DPI) 200 mcg/ACT	Off-label 6 y and older (including adults): 4 to 10 INH every 20 min x 3 doses If not controlled: 4 to 10 INH Q3-4H up to 6 to 10 INH Q1-2H, or more often[9]	DPI requires forceful inhalation to get full dose[14] so may not be appropriate during exacerbation.
Short-Acting Muscarinic Antagonist (SAMA)		
Ipratropium (Atrovent, g) Respimat 20 mcg/ACT	Off-label In conjunction with SABA 6 y and older (including adults): 4 to 8 INH every 20 min x 3 doses, then Q1H PRN for up to 3 hours[19] ≤ 5y: 4 INH every 20 min x 3 doses[9]	pMDI + spacer preferred over nebulization. See text. Initiated for severe exacerbation or for mild to moderate exacerbation that is unresponsive to salbutamol monotherapy.
Ipratropium (g) Nebules 250 mcg/1 mL; 500 mcg/ 2 mL	In conjunction with SABA 6 y and older (including adults): 500 mcg every 20 min x 3 doses, then 500 mcg every 1 hour PRN for up to 3 hours[19] ≤ 5y (off-label): 250 mcg every 20 min x 3 doses[9]	
Short-Acting Muscarinic Antagonist (SAMA)/Short-Acting Beta$_2$-Agonist Combination (SABA)		
Ipratropium/ Salbutamol (Combivent) Respimat 20 mcg/100 mcg per ACT	Off-label 6 y and older (including adults): 4 to 8 INH every 20 min x 3 doses then PRN[20]	Respimat preferred over nebulization. See text. Respimat is designed so spacers should not be required; however, if needed, a spacer specifically for Respimat devices, Odapt™, is available.[21,22] There is also limited data in COPD patients using Respimat with AeroChambers.[23] Initiated for severe exacerbation or for mild to moderate exacerbation that is unresponsive to salbutamol. Additional salbutamol may be required.
Ipratropium/ Salbutamol (g) Nebules 500 mcg/2.5 mg per 2.5 mL	Off-label 6 y and older (including adults): 1 NEB every 20 min x 3 doses then 1 NEB PRN[20]	

ACT = actuation; g = generics; H = hour(s); INH = inhalation(s); min = minutes; pMDI = pressurized metered dose inhaler; PRN = as needed; Q = every; y = year(s)

References

1. *Drug Product Database Online Query*. Health Canada. 2025. Accessed July 21, 2025. https://health-products.canada.ca/dpd-bdpp/
2. Atrovent HFA. Product monograph. Boehringer Ingelheim (Canada) Ltd.; 2019. Accessed July 22, 2025. https://pdf.hres.ca/dpd_pm/00053848.PDF
3. pms-Ipratropium. Product monograph. Pharmascience Inc.; 2017. Accessed July 22, 2025. https://pdf.hres.ca/dpd_pm/00039061.PDF
4. AA-Ipravent. Product monograph. AA Pharma Inc.; 2023. Accessed July 22, 2025. https://pdf.hres.ca/dpd_pm/00072339.PDF
5. Kaplan A. Asthma in adults and adolescents. CPS. Canadian Pharmacists Association. Updated March 28, 2024. Accessed July 22, 2025. https://cps.pharmacists.ca
6. McIVor RA, McIvor ER. Chronic obstructive pulmonary disease. CPS. Canadian Pharmacists Association. Updated October 18, 2023. Accessed July 22, 2025. https://cps.pharmacists.ca
7. Crawley A, Jensen B, Jin M, Regier L, Rutherford L. Asthma. RxFiles. University of Saskatchewan. Updated July 2025. Accessed July 22, 2025. https://www.rxfiles.ca/RxFiles/uploads/documents/members/CHT-Asthma.pdf
8. Crawley A. COPD. RxFiles. University of Saskatchewan. Updated July 2025. Accessed July 22, 2025. https://www.rxfiles.ca/RxFiles/uploads/documents/members/CHT-COPD-Tx.pdf
9. *Global Strategy for Asthma Management and Prevention* (2025 update). Global Initiative for Asthma. Updated May 2025. Accessed July 24, 2025. https://ginasthma.org/2025-gina-strategy-report/
10. Breathe. Canadian Lung Association. 2025. Accessed July 22, 2025. https://www.lung.ca/
11. Knowledge translation tools and resources. Canadian Thoracic Society. 2025. Accessed July 22, 2025. https://cts-sct.ca/guideline-library/knowledge-tools-resources
12. *Global Strategy for the Diagnosis, Management, and Prevention of Chronic Obstructive Pulmonary Disease* (2025 report). Global Initiative for Chronic Obstructive Lung Disease. 2025. Accessed July 23, 2025. https://goldcopd.org/2025-gold-report/
13. Living Well with COPD. 2025. Accessed January 20, 2025. https://www.livingwellwithcopd.com/en/home.html
14. Crawley A, Regier L, Jensen B. Asthma and COPD: Inhalation devices chart. RxFiles. University of Saskatchewan. Updated July 2025. Accessed July 22, 2025. https://www.rxfiles.ca/RxFiles/uploads/documents/members/AsthmaDevices.pdf
15. Adamko D. Asthma in infants and children. CPS. Canadian Pharmacists Association. Updated June 11, 2025. Accessed July 22, 2025. https://cps.pharmacists.ca
16. How to pick an inhaler for a COPD patient. RxFiles. University of Saskatchewan. Updated March 2025. Accessed July 22, 2025. https://www.rxfiles.ca/RxFiles/uploads/documents/members/hands%20vs%20lungs3.pdf
17. Crawley A. Asthma and COPD: Inhaler technique. RxFiles. University of Saskatchewan. Updated March 2025. Accessed July 23, 2025. https://www.rxfiles.ca/RxFiles/uploads/documents/members/COPD-Inhaler-Technique.pdf
18. Albuterol. In: *UpToDate Lexidrug*. Wolters Kluwer. Updated July 23, 2025. Accessed July 23, 2025. https://online.lexi.com/lco/action/doc/retrieve/docid/patch_f/6292
19. Ipratropium. In: *UpToDate Lexidrug*. Wolters Kluwer. Updated July 18, 2025. Accessed July 23, 2025. https://online.lexi.com/lco/action/doc/retrieve/docid/patch_f/1797824
20. Ipratropium and albuterol. In: *UpToDate Lexidrug*. Wolters Kluwer. Updated May 12, 2025. Accessed July 23, 2025. https://online.lexi.com/lco/action/doc/retrieve/docid/patch_f/7114
21. Mehri R, Alatrash A, Ogrodnik N, Lee Slew K, Matida EA. Comparison of tiotropium delivery with the ODAPT adapter and a valved holding chamber. Can J Resp Crit Care Sleep Med. 2020; 5(5), 293–299. doi.org/10.1080/24745332.2020.1787112
22. Odapt™ Soft Mist Adapter. McArthur Medical Sales Inc. 2025. Accessed July 23, 2025. https://softmistadapter.ca/
23. Ogasawara T, Sakata J, Aoshima Y, Tanaka K, Yano T, Kasamatsu N. Bronchodilator effect of tiotropium via Respimat® administered with a spacer in patients with chronic obstructive pulmonary disease (COPD). Intern Med. 2017;56(18):2401-2406.