

COPD Update: Focus on Intensifying LABA, LAMA, and ICS Therapy

B.C. Provincial Academic Detailing Service

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References

Evidence: Intensification of Therapy

- 1. Kew KM, Dias S, Cates CJ. Long-acting inhaled therapy (beta-agonists, anticholinergics and steroids) for COPD: a network meta-analysis. Cochrane Database of Systematic Reviews 2014, Issue 3.Art.No.:CD010844.
- 2. Tricco A, Strifler L, Veroniki A, Yazdi F, Khan P, Scott A, et al. Comparative safety and effectiveness of long-acting inhaled agents for treating chronic obstructive pulmonary disease: a systematic review and network meta-analysis. BMJ Open 2015;5:e009183.
- 3. U.S. Food and Drug Administration. Chronic Obstructive Pulmonary Disease: Developing Drugs for Treatment. Guidance for Industry. May 2016. [Internet]. http://www.fda.gov/downloads/drugs/guidancecomplianceregulatoryinformation/guidances/ucm071575.pdf. (Accessed June 1, 2016).
- 4. From the Global Strategy for the Diagnosis, Management and Prevention of COPD, Global Initiative for Chronic Obstructive Lung Disease (GOLD) 2017. [Internet]. http://goldcopd.org/gold-2017-global-strategy-diagnosis-management-prevention-copd/. (Accessed December 10, 2016).
- 5. Kew KM, Mavergames C, Walters JAE. Long-acting beta2-agonists for chronic obstructive pulmonary disease. Cochrane Database of Systematic Reviews 2013, Issue 10. Art. No.: CD010177.
- 6. Karner C, Chong J, Poole P. Tiotropium versus placebo for chronic obstructive pulmonary disease. Cochrane Database of Systematic Reviews 2014, Issue 7. Art. No.: CD009285.
- 7. Farne HA, Cates CJ. Long-acting beta2-agonist in addition to tiotropium versus either tiotropium or long-acting beta2-agonist alone for chronic obstructive pulmonary disease. Cochrane Database of Systematic Reviews 2015, Issue 10. Art. No.: CD008989.
- 8. Sarai M, Sin D, FitzGerald JM, Aaron S. Long-acting beta2-agonists and long-acting muscarinic antagonists in a combined inhaler versus either agent alone or placebo for chronic obstructive pulmonary disease. Cochrane Database of Systematic Reviews 2014, Issue 9. Art. No.: CD011282.
- 9. From the Global Strategy for the Diagnosis, Management and Prevention of COPD, Global Initiative for Chronic Obstructive Lung Disease (GOLD) 2016. [Internet]. http://goldcopd.org/global-strategy-diagnosis-management-prevention-copd-2016/. (Accessed June 10, 2016).
- 10. Chong J, Karner C, Poole P. Tiotropium versus long-acting beta-agonists for stable chronic obstructive pulmonary disease. Cochrane Database of Systematic Reviews 2012, Issue 9. Art. No.: CD009157.
- 11. Karner C, Cates CJ. The effect of adding inhaled corticosteroids to tiotropium and long-acting beta2-agonists for chronic obstructive pulmonary disease. Cochrane Database of Systematic Reviews 2011, Issue 9. Art. No.: CD009039.
- 12. Aaron S, Fergusson D, Marks G, Suissa S, Vandemheen, Doucette S, et al. Counting, analyzing and reporting exacerbations of COPD in randomized controlled trials. Thorax 2008;63:122-28.
- 13. Suissa S, Ernst P, Vandemheen K, Aaron S. Methodological issues in therapeutic trials of COPD. Eur Respir J 2008;31:927-33.
- 14. Cazzola M, MacNee W, Martinez F, Rabe K, Franciosi L, Barnes P, et al. Outcomes for COPD pharmacological trials: from lung function to biomarkers. Eur Respir J 2008;31:416-68.
- 15. Tan DJ, White CJ, Walters JAE, Walters EH. Inhaled corticosteroids with combination inhaled long-acting beta2-agonists and long-acting muscarinic antagonists for chronic obstructive pulmonary disease. Cochrane Database of Systematic Reviews 2016, Issue 11. Art. No.: CD011600.

- 16. Nannini LJ, Lasserson TJ, Poole P. Combined corticosteroid and long-acting beta2-agonist in one inhaler versus long-acting beta2-agonists for chronic obstructive pulmonary disease. Cochrane Database of Systematic Reviews 2012, Issue 9. Art. No.: CD006829.
- 17. Calverley P, Anderson J, Celli B, Ferguson G, Jenkins C, Jones P, et al. Salmeterol and fluticasone propionate and survival in chronic obstructive pulmonary disease. N Engl J Med 2007;356:775-89.
- 18. Vestbo J, Anderson J, Brook R, Calverley P, Celli B, Crim C, et al. Fluticasone furoate and vilanterol and survival in chronic obstructive pulmonary disease with heightened cardiovascular risk (SUMMIT): a double-blind randomised controlled trial. Lancet 2016;387:1817-26.
- 19. Horita N, Goto A, Ota E, Nakashima K, Nagai K, Kaneko T. Long-acting muscarinic antagonist plus long-acting beta agonist versus long-acting beta agonist plus inhaled corticosteroid for stable chronic obstructive pulmonary disease. Cochrane Database of Systematic Reviews 2016, Issue 2. Art. No.: CD012066.
- 20. Hidalgo MP, Celis PA, Rojas-Reyes MX, Dennis RJ. Once-daily LABA/ICS combined inhalers versus inhaled long-acting beta2-agonists for people with chronic obstructive pulmonary disease (COPD). Cochrane Database of Systematic Reviews 2016, Issue 2. Art. No.: CD012100.
- 21. Wesh EJ, Cates CJ, Poole P. Combination inhaled steroid and long-acting beta2-agonist versus tiotropium for chronic obstructive lung disease. Cochrane Database of Systematic Reviews 2013, Issue 5. Art. No.:CD007891.
- 22. Sliwka A, Jankowski M, Gross-Dondej I, Nowobilski R, Bala MM. Once daily long-acting beta2-agonists/inhaled corticosteroids combined inhalers versus inhaled long-acting muscarinic antagonists for people with chronic obstructive pulmonary disease. Cochrane Database of Systematic Reviews 2016, Issue 9. Art. No.: CD012355.

Clinical Considerations: LABA

- 1. Health Canada Product Monograph. Foradil (formoterol fumarate). [Internet]. http://webprod5.hc-sc.gc.ca/dpd-bdpp/ (Accessed December 1, 2016).
- 2. Health Canada Product Monograph. Onbrez Breezhaler (indacaterol maleate). [Internet]. http://webprod5.hc-sc.gc.ca/dpd-bdpp/ (Accessed December 1, 2016).
- 3. Health Canada Product Monograph. Serevent, Serevent Diskhaler Disk, Serevent Diskus (salmeterol xinafoate). [Internet]. http://webprod5.hc-sc.gc.ca/dpd-bdpp/ (Accessed December 1, 2016).
- 4. Health Canada Product Monograph. Duaklir Genuair (aclidinium bromide and formoterol fumarate dehydrate). [Internet]. http://webprod5.hc-sc.gc.ca/dpd-bdpp/ (Accessed December 1, 2016).
- 5. Health Canada Product Monograph. Ultibro Breezhaler (indacaterol maleate and glycopyrronium bromide). [Internet]. http://webprod5.hc-sc.gc.ca/dpd-bdpp/ (Accessed December 1, 2016).
- 6. Health Canada Product Monograph. Inspiolto Respimat (tiotropium bromide and olodaterol hydrochloride). [Internet]. http://webprod5.hc-sc.gc.ca/dpd-bdpp/ (Accessed December 1, 2016).
- 7. Health Canada Product Monograph. Anoro Ellipta (umeclidinium bromide and vilanterol trifenatate). [Internet]. http://webprod5.hc-sc.gc.ca/dpd-bdpp/ (Accessed December 1, 2016).
- 8. Health Canada Product Monograph. Symbicort Turbuhaler (budesonide and formoterol fumarate dehydrate). [Internet]. http://webprod5.hc-sc.gc.ca/dpd-bdpp/ (Accessed December 1, 2016).
- 9. Health Canada Product Monograph. Breo Ellipta (fluticasone furoate and vilanterol trifenatate). [Internet]. http://webprod5.hc-sc.gc.ca/dpd-bdpp/ (Accessed December 1, 2016).
- 10. Health Canada Product Monograph. Advair, Advair Diskus (salmeterol xinafoate and fluticasone propionate). [Internet]. http://webprod5.hc-sc.gc.ca/dpd-bdpp/ (Accessed December 1, 2016).
- 11. McDonagh M, Holmes R, Blazina I, Holzhammer B, Thompson M. Drugs to Treat Asthma and Chronic Obstructive Pulmonary Disease (COPD). Final Update 1 Report prepared by the Pacific Northwest Evidence-based Practice Center for the Drug Effectiveness Review Project. Oregon Health & Science University, Portland, Oregon, June 2016.
- 12. Health Canada Product Monograph. Atrovent HFA (ipratropium bromide). [Internet]. http://webprod5.hc-sc.gc.ca/dpd-bdpp/ (Accessed December 1, 2016).
- 13. From the Global Strategy for the Diagnosis, Management and Prevention of COPD, Global Initiative for Chronic Obstructive Lung Disease (GOLD) 2017. [Internet]. http://goldcopd.org/gold-2017-global-strategy-diagnosis-management-prevention-copd/. (Accessed December 10, 2016).
- 14. CredibleMeds®. QTDrugs Lists. [Internet]. https://www.crediblemeds.org/. (Accessed December 1, 2016)

- 15. Lexicomp Online. Lexicomp Interactions. [Internet]. http://online.lexi.com/lco/action/interact. (Accessed December 15, 2016).
- 16. Salpeter SR, Ormiston TM, Salpeter EE. Cardioselective beta-blockers for chronic obstructive pulmonary disease. Cochrane Database of Systematic Reviews 2005, Issue 4. Art. No.: CD003566.

Clinical Considerations: LAMA

- 1. Health Canada Product Monograph. Tudorza Genuair (aclidinium bromide). [Internet]. http://webprod5.hcsc.gc.ca/dpd-bdpp/ (Accessed December 1, 2016).
- 2. Health Canada Product Monograph. Seebri Breezhaler (glycopyrronium bromide). [Internet]. http://webprod5.hc-sc.gc.ca/dpd-bdpp/ (Accessed December 1, 2016).
- 3. Health Canada Product Monograph. Spiriva (tiotropium bromide monohydrate). [Internet]. http://webprod5.hcsc.gc.ca/dpd-bdpp/ (Accessed December 1, 2016).
- 4. Health Canada Product Monograph. Spiriva Respimat (tiotropium bromide monohydrate). [Internet]. http://webprod5.hc-sc.gc.ca/dpd-bdpp/ (Accessed December 1, 2016).
- 5. Health Canada Product Monograph. Incruse Ellipta (umeclidinium bromide). [Internet]. http://webprod5.hcsc.gc.ca/dpd-bdpp/ (Accessed December 1, 2016).
- 6. Health Canada Product Monograph. Duaklir Genuair (aclidinium bromide and formoterol fumarate dehydrate). [Internet]. http://webprod5.hc-sc.gc.ca/dpd-bdpp/ (Accessed December 1, 2016).
- 7. Health Canada Product Monograph. Ultibro Breezhaler (indacaterol maleate and glycopyrronium bromide). [Internet]. http://webprod5.hc-sc.gc.ca/dpd-bdpp/ (Accessed December 1, 2016).
- 8. Health Canada Product Monograph. Inspiolto Respimat (tiotropium bromide and olodaterol hydrochloride). [Internet]. http://webprod5.hc-sc.gc.ca/dpd-bdpp/ (Accessed December 1, 2016).
- 9. Health Canada Product Monograph. Anoro Ellipta (umeclidinium bromide and vilanterol trifenatate). [Internet]. http://webprod5.hc-sc.gc.ca/dpd-bdpp/ (Accessed December 1, 2016).
- 10. McDonagh M, Holmes R, Blazina I, Holzhammer B, Thompson M. Drugs to Treat Asthma and Chronic Obstructive Pulmonary Disease (COPD). Final Update 1 Report prepared by the Pacific Northwest Evidence-based Practice Center for the Drug Effectiveness Review Project. Oregon Health & Science University, Portland, Oregon, June 2016.
- 11. Health Canada Product Monograph. Atrovent HFA (ipratropium bromide). [Internet]. http://webprod5.hc-sc.gc.ca/dpd-bdpp/ (Accessed December 1, 2016).
- 12. From the Global Strategy for the Diagnosis, Management and Prevention of COPD, Global Initiative for Chronic Obstructive Lung Disease (GOLD) 2017. [Internet]. http://goldcopd.org/gold-2017-global-strategy-diagnosis-management-prevention-copd/. (Accessed December 10, 2016).
- 13. Karner C, Chong J, Poole P. Tiotropium versus placebo for chronic obstructive pulmonary disease. Cochrane Database of Systematic Reviews 2014, Issue 7. Art. No.: CD009285.
- 14. Wise R, Anzueto A, Cotton D, Dahl R, Devins T, Disse B, et al. Tiotropium Respimat Inhaler and the risk of death in COPD. N Engl J Med 2013;369:1491-501.
- 15. U.S. Food and Drug Administration. Transcript for the August 14, 2014 Pulmonary-Allergy Drugs Advisory Committee. [Internet]. http://www.fda.gov/downloads/AdvisoryCommittees/CommitteesMeetingMaterials/Drugs/Pulmonary-

AllergyDrugsAdvisoryCommittee/UCM416247.pdf. (Accessed December 13, 2016).

16. Lexicomp Online. Lexicomp Interactions. [Internet]. http://online.lexi.com/lco/action/interact. (Accessed December 15, 2016).

Clinical Considerations: ICS

- 1. Health Canada Product Monograph. Symbicort Turbuhaler (budesonide and formoterol fumarate dehydrate). [Internet]. http://webprod5.hc-sc.gc.ca/dpd-bdpp/ (Accessed December 1, 2016).
- 2. Health Canada Product Monograph. Breo Ellipta (fluticasone furoate and vilanterol trifenatate). [Internet]. http://webprod5.hc-sc.gc.ca/dpd-bdpp/ (Accessed December 1, 2016).
- 3. Health Canada Product Monograph. Advair, Advair Diskus (salmeterol xinafoate and fluticasone propionate). [Internet]. http://webprod5.hc-sc.gc.ca/dpd-bdpp/ (Accessed December 1, 2016).

- 4. McDonagh M, Holmes R, Blazina I, Holzhammer B, Thompson M. Drugs to Treat Asthma and Chronic Obstructive Pulmonary Disease (COPD). Final Update 1 Report prepared by the Pacific Northwest Evidence-based Practice Center for the Drug Effectiveness Review Project. Oregon Health & Science University, Portland, Oregon, June 2016.
- 5. U.S. Food and Drug Administration Prescribing Information. Advair Diskus (fluticasone propionate and salmeterol). [Internet]. http://www.accessdata.fda.gov/drugsatfda_docs/label/2008/021077s029lbl.pdf. (Accessed December 5, 2016).
- 6. European Medicines Agency. Pharmacovigilance Risk Assessment Committee (PRAC). Inhaled corticosteroids (ICS) containing medicinal products indicated in the treatment of chronic obstructive pulmonary disease. March 17, 2016. [Internet].
 - http://www.ema.europa.eu/docs/en_GB/document_library/Referrals_document/Inhaled_corticosteroids_Article _31/European_Commission_final_decision/WC500210491.pdf. (Accessed December 10, 2016).
- 7. Crim C, Calverley P, Anderson J, Celli B, Ferguson G, Jenkins C, et al. Pneumonia risk in COPD patients receiving inhaled corticosteroids alone or in combination: TORCH study results. Eur Respir J 2009;34:641-47.
- 8. Crim C, Dransfield M, Bourbeau, Jones P, Hanania N, Mahler D, et al. Pneumonia risk with inhaled fluticasone furoate and vilanterol compared with vilanterol alone in patients with COPD. Ann Am Thorac Soc 2015;12:27-34.
- 9. Yang IA, Clarke MS, Sim EHA, Fong KM. Inhaled corticosteroids for stable chronic obstructive pulmonary disease. Cochrane Database of Systematic Reviews 2012, Issue 7. Art. No.: CD002991.
- 10. Lexicomp Online. Lexicomp Interactions. [Internet]. http://online.lexi.com/lco/action/interact. (Accessed December 15, 2016).

Inhalation Devices: Therapeutic Tips and Select Device Features

- 1. Ninane V, Vandevoorde J, Cataldo D, Derom E, Liistro G, Munghen E, et al. New developments in inhaler devices within pharmaceutical companies: a systematic review of the impact on clinical outcomes and patient preferences. Respiratory Medicine 2015;109:1430-38.
- 2. From the Global Strategy for the Diagnosis, Management and Prevention of COPD, Global Initiative for Chronic Obstructive Lung Disease (GOLD) 2017. [Internet]. http://goldcopd.org/gold-2017-global-strategy-diagnosis-management-prevention-copd/. (Accessed December 10, 2016).
- 3. Institute for Safe Medication Practices Canada. ISMP Canada Safety Bulletin. 2016, Volume 16: Issue 3. Safety Considerations with Newer Inhalation Devices. [Internet]. https://www.ismp-canada.org/download/safetyBulletins/2016/ISMPCSB2016-03_InhalationDevices.pdf. (Accessed January 16, 2017).
- 4. Drugs and Therapeutics Bulletin. Too many options, too little choice in COPD? 2016, Volume 54: Number 2. [Internet]. http://dtb.bmj.com/content/early/2016/02/04/dtb.2016.2.0379. (Accessed January 16, 2017).
- Saskatchewan Lung Association. RESPTRAC Resources. Delivery Device Instructions. [Internet]. https://sk.lung.ca/health-professionals/resources/resptrec-resources. (Accessed January 16, 2017).
- 6. RxFiles. COPD. New Drugs, New Devices, and Considerations for Best Practice. September 2015. [Internet]. http://www.rxfiles.ca/RxFiles/uploads/documents/COPD-Newsletter-Plus-Sept-2015.pdf. (Accessed January 16, 2017).

Inhaled Medications for COPD and Asthma in Canada

- 1. Health Canada Product Monograph. Ventolin HFA (salbutamol sulphate). [Internet]. http://webprod5.hcsc.gc.ca/dpd-bdpp/ (Accessed December 1, 2016).
- 2. Health Canada Product Monograph. Airomir (salbutamol sulphate). [Internet]. http://webprod5.hc-sc.gc.ca/dpd-bdpp/ (Accessed December 1, 2016).
- 3. Health Canada Product Monograph. Ventolin Diskus (salbutamol sulphate). [Internet]. http://webprod5.hcsc.gc.ca/dpd-bdpp/ (Accessed December 1, 2016).
- 4. Health Canada Product Monograph. Bricanyl Turbuhaler (terbutaline sulfate). [Internet]. http://webprod5.hc-sc.gc.ca/dpd-bdpp/ (Accessed December 1, 2016).
- 5. Health Canada Product Monograph. Atrovent HFA (ipratropium bromide). [Internet]. http://webprod5.hc-sc.gc.ca/dpd-bdpp/ (Accessed December 1, 2016).

- 6. Health Canada Product Monograph. Combivent Respimat (ipratropium bromide and salbutamol sulfate). [Internet]. http://webprod5.hc-sc.gc.ca/dpd-bdpp/ (Accessed December 1, 2016).
- 7. Health Canada Product Monograph. Foradil (formoterol fumarate). [Internet]. http://webprod5.hc-sc.gc.ca/dpd-bdpp/ (Accessed December 1, 2016).
- 8. Health Canada Product Monograph. Oxeze Turbuhaler (formoterol fumarate dihydrate). [Internet]. http://webprod5.hc-sc.gc.ca/dpd-bdpp/ (Accessed December 1, 2016).
- 9. Health Canada Product Monograph. Onbrez Breezhaler (indacaterol maleate). [Internet]. http://webprod5.hc-sc.gc.ca/dpd-bdpp/ (Accessed December 1, 2016).
- 10. Health Canada Product Monograph. Serevent, Serevent Diskhaler Disk, Serevent Diskus (salmeterol xinafoate). [Internet]. http://webprod5.hc-sc.gc.ca/dpd-bdpp/ (Accessed December 1, 2016).
- 11. Health Canada Product Monograph. Tudorza Genuair (aclidinium bromide). [Internet]. http://webprod5.hcsc.gc.ca/dpd-bdpp/ (Accessed December 1, 2016).
- 12. Health Canada Product Monograph. Seebri Breezhaler (glycopyrronium bromide). [Internet]. http://webprod5.hc-sc.gc.ca/dpd-bdpp/ (Accessed December 1, 2016).
- 13. Health Canada Product Monograph. Spiriva (tiotropium bromide). [Internet]. http://webprod5.hc-sc.gc.ca/dpd-bdpp/ (Accessed December 1, 2016).
- 14. Health Canada Product Monograph. Spiriva Respimat (tiotropium bromide monohydrate). [Internet]. http://webprod5.hc-sc.gc.ca/dpd-bdpp/ (Accessed December 1, 2016).
- 15. Health Canada Product Monograph. Incruse Ellipta (umeclidinium bromide). [Internet]. http://webprod5.hc-sc.gc.ca/dpd-bdpp/ (Accessed December 1, 2016).
- 16. Health Canada Product Monograph. Duaklir Genuair (aclidinium bromide and formoterol fumarate). [Internet]. http://webprod5.hc-sc.gc.ca/dpd-bdpp/ (Accessed December 1, 2016).
- 17. Health Canada Product Monograph. Ultibro Breezhaler (indacaterol maleate and glycopyrronium bromide). [Internet]. http://webprod5.hc-sc.gc.ca/dpd-bdpp/ (Accessed December 1, 2016).
- 18. Health Canada Product Monograph. Inspiolto Respimat (tiotropium bromide monohydrate and olodaterol hydrochloride). [Internet]. http://webprod5.hc-sc.gc.ca/dpd-bdpp/ (Accessed December 1, 2016).
- 19. Health Canada Product Monograph. Anoro Ellipta (umeclidinium bromide and vilanterol trifenatate). [Internet]. http://webprod5.hc-sc.gc.ca/dpd-bdpp/ (Accessed December 1, 2016).
- 20. Health Canada Product Monograph. Symbicort Turbuhaler (budesonide and formoterol fumarate dihydrate). [Internet]. http://webprod5.hc-sc.gc.ca/dpd-bdpp/ (Accessed December 1, 2016).
- 21. Health Canada Product Monograph. Zenhale (mometasone furoate/formoterol fumarate dihydrate). [Internet]. http://webprod5.hc-sc.gc.ca/dpd-bdpp/ (Accessed December 1, 2016).
- 22. Health Canada Product Monograph. Advair Diskus, Advair (salmeterol xinafoate and fluticasone propionate). [Internet]. http://webprod5.hc-sc.gc.ca/dpd-bdpp/ (Accessed December 1, 2016).
- 23. Health Canada Product Monograph. Breo Ellipta (fluticasone furoate and vilanterol trifenatate). [Internet]. http://webprod5.hc-sc.gc.ca/dpd-bdpp/ (Accessed December 1, 2016).
- 24. Health Canada Product Monograph. Qvar (beclomethasone dipropionate). [Internet]. http://webprod5.hc-sc.gc.ca/dpd-bdpp/ (Accessed December 1, 2016)
- 25. Health Canada Product Monograph. Pulmicort Turbuhaler (budesonide). [Internet]. http://webprod5.hc-sc.gc.ca/dpd-bdpp/ (Accessed December 1, 2016)
- 26. Health Canada Product Monograph. Alvesco (ciclesonide). [Internet]. http://webprod5.hc-sc.gc.ca/dpd-bdpp/ (Accessed December 1, 2016)
- 27. Health Canada Product Monograph. Arnuity Ellipta (fluticasone furoate). [Internet]. http://webprod5.hc-sc.gc.ca/dpd-bdpp/ (Accessed December 1, 2016)
- 28. Health Canada Product Monograph. Flovent HFA, Flovent Diskus (fluticasone propionate). [Internet]. http://webprod5.hc-sc.gc.ca/dpd-bdpp/ (Accessed December 1, 2016)
- 29. Health Canada Product Monograph. Asmanex Twisthaler (mometasone furoate). [Internet]. http://webprod5.hc-sc.gc.ca/dpd-bdpp/ (Accessed December 1, 2016)