Fluticasone Propionate Pressurized Metered Dose Inhaler Shortage

TABLE 1: SUPPLIERS OF FLUTICASONE PROPIONATE PRESSURIZED METERED DOSE INHALER (PMDI)

<table>
<thead>
<tr>
<th>Product</th>
<th>Strength</th>
<th>DIN</th>
<th>Manufacturer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flovent® pMDI</td>
<td>50mcg/actuation</td>
<td>02244291</td>
<td>GSK</td>
</tr>
<tr>
<td></td>
<td>125mcg/actuation</td>
<td>02244292</td>
<td></td>
</tr>
<tr>
<td></td>
<td>250mcg/actuation</td>
<td>02244293</td>
<td></td>
</tr>
</tbody>
</table>

Health Canada approved indications of orally inhaled fluticasone propionate:
- the prophylactic management of steroid-responsive bronchial asthma in adults and children. For children, this includes patients not controlled on currently available prophylactic medication.

Note: This document addresses inhaled corticosteroid (ICS) treatment of asthma. ICS is one of the later steps in treatment of chronic obstructive pulmonary disease (COPD) and, therefore, should not be used as monotherapy. Some patients with more severe COPD may be using fluticasone propionate along with a combination long-acting beta agonist/long-acting muscarinic antagonist (LABA/LAMA); if so, consider:
- is ICS required? (Note: ICS may increase risk of pneumonia in patients with COPD)
- switch to triple combination inhaler (LABA/LAMA/ICS) (e.g. Trelegy Ellipta)
- switch to LABA/ICS combination with separate LAMA

Considerations and Non-Pharmacological Management:
- Ensure proper inhaler technique and adherence.
- Recommend smoking cessation when applicable.
- Identify and avoid triggers such as environmental allergens and occupational irritants.
- Treat conditions that may exacerbate: obesity, anxiety, depression, rhinitis, sinusitis, gastroesophageal reflux disease.
- Encourage physical activity.
- Have written action plans.

Pharmaceutical Alternatives:
- Flovent Diskus in varying strengths MAY be available, but will likely be shorted as inhaler stocks dwindle.
- It is possible some acute-care institutions are considering Common Canister Protocols to conserve pMDIs. Refer to the article published by the Institute for Safe Medication Practices (ISMP) which explains the premise as well as provides merits and potential risks of the policy.

Therapeutic Alternatives:
- Consider reserving fluticasone propionate 50mcg pMDI for pediatric use only recognizing that therapeutic alternatives are more limited in this population (see below).
- Switch to an available ICS at the approximate clinically comparable dose. See below Table 2 (≥12 years of age, including adults), Table 3 (children 6 to 11 years) and Table 4 (children 0 to 5 years).
- Products are comparable:
  - Adverse effects: at clinically comparable doses, ICSs are associated with similar tolerability.
    - One possible exception is that ciclesonide may be associated with fewer topical effects (e.g. oropharyngeal candidiasis) because it is a prodrug that remains inert until activated by esterases in the lung.
  - Formulary Coverage: All products included in the tables are full formulary for the Saskatchewan Drug Plan and Non-Insured Health Benefits.
  - Daily Doses
    - twice daily: fluticasone propionate, beclomethasone, budesonide
    - once daily: ciclesonide (except at higher doses), fluticasone furoate, mometasone (except at higher doses)
  - Cost: ICS inhalers cost ~$30-35 per device with the exceptions of:
    - beclomethasone (QVAR®): ~$20
    - fluticasone furoate (Arnuity Ellipta): ~$50
Pediatric Considerations:

- Ages 0-5 years:
  - Only fluticasone propionate pMDI and budesonide nebulizers have Health Canada approval for use in this age group\(^{10}\) although some guidelines\(^{9,11}\) list beclomethasone pMDI and ciclesonide pMDI as suitable options.

- Ages 0-3 years:
  - The preferred inhaler device is pMDI via valved spacer with face mask.\(^{6}\) Nebulization with face mask would be an alternative option\(^{6}\), but not preferred during respiratory illness, such as COVID-19.\(^{8}\)
  - Children of this age are likely not able to achieve the forceful breath inspiration required for correct use of dry powder inhalers (DPIs) (e.g. Diskus, Ellipta, Turbuhaler, Twisthaler).\(^{12}\)

- Ages 4-5 years:
  - The preferred inhaler device is pMDI via valved spacer with mouthpiece.\(^{6}\) Alternatives would be spacer with face mask or nebulizer with mouthpiece or face mask\(^{6}\), again keeping in mind risks of nebulization during respiratory illness.\(^{8}\)
  - Children of this age may be able to properly use a DPI; assess on an individual basis.

Inhaled Corticosteroids (ICS) Doses by Age:

Please Note:

- Variations exist among different references; the below tables are largely based on Global Initiative for Asthma (GINA) guidelines, which considers doses to be clinically comparable\(^{6}\) (not dose equivalences), based on available studies and product information.\(^{6}\)

- 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, and those with dementia, for example. RxFiles has excellent resources to help select the best device and information on inhaler technique (Subscription to RxFiles or SHIRP https://shirp.usask.ca/home is required.).

### TABLE 2: ADULTS AND ADOLESCENTS ≥12 YEARS OF AGE\(^{6,10}\)

<table>
<thead>
<tr>
<th>Medication</th>
<th>Total Daily Dose in mcg</th>
<th>Doses per Day</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low</td>
<td>Medium</td>
</tr>
<tr>
<td>Fluticasone propionate (Flovent(®)) pMDI &amp; Diskus</td>
<td>≤250</td>
<td>251-500</td>
</tr>
<tr>
<td>Beclomethasone dipropionate (QVAR(®)) pMDI</td>
<td>≤200</td>
<td>201-400</td>
</tr>
<tr>
<td>Budesonide (Pulmicort(®)) Turbuhaler</td>
<td>≤400</td>
<td>401-800</td>
</tr>
<tr>
<td>Ciclesonide (Alvesco(®)) pMDI</td>
<td>≤200</td>
<td>201-400</td>
</tr>
<tr>
<td>Fluticasone furoate (Arnuity(®)) Ellipta</td>
<td>100</td>
<td>N/A</td>
</tr>
<tr>
<td>Mometasone furoate (Asmanex(®)) Twisthaler</td>
<td>200</td>
<td>201-400</td>
</tr>
</tbody>
</table>

\(^{*}\)Ciclesonide daily dose given once daily unless 800 mcg in which administered as 400 mcg twice daily.\(^{13}\)
\(^{*}\)Mometasone furoate: daily doses given as: 200 mcg: 200 mcg once daily; 400 mcg: 400 mcg once daily or 200 mcg twice daily; 800 mcg: 400 mcg twice daily.\(^{14}\)

### TABLE 3: CHILDREN 6 TO 11 YEARS OF AGE\(^{6}\)

<table>
<thead>
<tr>
<th>Medication</th>
<th>Total Daily Dose in mcg</th>
<th>Max Dose per PM</th>
<th>Doses per Day</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low</td>
<td>Medium</td>
<td>High</td>
</tr>
<tr>
<td>Fluticasone propionate (Flovent(®)) pMDI &amp; Diskus</td>
<td>100-200</td>
<td>201-400</td>
<td>&gt;400</td>
</tr>
<tr>
<td>Beclomethasone dipropionate (QVAR(®)) pMDI</td>
<td>50-100</td>
<td>101-200</td>
<td>&gt;200</td>
</tr>
<tr>
<td>Budesonide (Pulmicort(®)) Turbuhaler</td>
<td>100-200</td>
<td>201-400</td>
<td>&gt;400</td>
</tr>
<tr>
<td>Budesonide (Pulmicort(®)) nebules</td>
<td>250-500</td>
<td>501-1000</td>
<td>&gt;1000</td>
</tr>
<tr>
<td>Ciclesonide (Alvesco(®)) pMDI</td>
<td>100</td>
<td>101-200</td>
<td>&gt;200</td>
</tr>
<tr>
<td>Mometasone furoate (Asmanex(®)) Twisthaler</td>
<td>100-200</td>
<td>201-400</td>
<td>&gt;400</td>
</tr>
</tbody>
</table>

\(^{1}\)During COVID-19 pandemic, the use of nebulizers is discouraged because of potential for aerosolization.\(^{8}\)
\(^{*}\)Extrapolation from adults: daily doses of 400 mcg administered as 400 mcg once daily or 200 mcg twice daily.\(^{14}\)

PM = product monograph; pMDI = pressurized metered dose inhaler
TABLE 4: CHILDREN 0-5 YEARS OF AGE

<table>
<thead>
<tr>
<th>Medication</th>
<th>Age Approved by HC in y</th>
<th>Total Daily Dose in mcg*</th>
<th>Max Dose per PM</th>
<th>Doses per Day</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Low</td>
<td>Medium</td>
<td>1-4 y; 200^2</td>
</tr>
<tr>
<td></td>
<td>≥ 1 y</td>
<td>50-125^4</td>
<td>126-250^4</td>
<td>≥ 4 y; 400^2</td>
</tr>
<tr>
<td>Fluticasone propionate (Flovent*) pMDI</td>
<td>≥ 5 y</td>
<td>100^11</td>
<td>200^11</td>
<td></td>
</tr>
<tr>
<td>Beclomethasone dipropionate (QVAR*) pMDI</td>
<td>≥ 3 m</td>
<td>250-500^611</td>
<td>501-1000^611</td>
<td>2000^17</td>
</tr>
<tr>
<td>Budesonide (Pulmicort*) nebulizer</td>
<td>≥ 6 y</td>
<td>100^11</td>
<td>200^11</td>
<td>N/A</td>
</tr>
<tr>
<td>Ciclesonide (Alvesco*) pMDI</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mometasone furoate (Asmanex*) Twisthaler</td>
<td>For children ≥ 4 y</td>
<td>2000^17</td>
<td>N/A</td>
<td></td>
</tr>
</tbody>
</table>

*Agents do NOT have a Health Canada approved indication for use in this age group but are considered options for children ≥ 1 year.

During COVID-19 pandemic, the use of nebulizers is discouraged because of potential for aerosolization.8

High doses of ICS are not recommended in this age group and referral to an asthma specialist is suggested if asthma is not controlled on a medium dose of ICS.11

HC = Health Canada; m = month(s); pMDI = pressurized metered dose inhaler; y = year(s)

References