### Penn Medicine COVID-19 Clinical Guide: Helmet CPAP

**Updated 5/8/20 – Recommendations may evolve rapidly – See latest version at Penn COVID-19 Learning Homepage**

#### Indications
- SpO2 < 92% or increased work of breathing **despite 6LPM Nasal Cannula**
- **Rescue** for patients treated initially with HFNC or NRB, who have an SpO2 < 92% or increased work of breathing

#### Use & Titration
- Duration determined by patient comfort – typically 4-6 hour sessions with breaks for PO meds and meals. Sleeping in semi-recumbent position with helmet is safe.
- During breaks, transition to HFNC or alternate oxygen device

*Consider weaning off helmet (to HFNC or NC) once stable on FiO2 40-50% and PEEP 5

#### Safety
- Helmet currently recommended for use only in ICU or during transport to ICU
- Always maintain total gas flow above 50 LPM to avoid CO2 rebreathing
- Monitor for mental status changes; avoid use in patients with AMS or agitation
- If helmet deflates, check oxygen device and tubing connections for leak
- Self-proning has not been tested for safety with helmet

#### Tips
- A rolled-up hand towel may be placed inside helmet to provide neck support
- Monitor for skin breakdown at neck. Can use mepilex for skin protection
- Feeding tubes and IJ central lines can be threaded under rubber collar
- Straw can be fed through port at base of helmet for short periods of drinking
- Do not dispose after use; helmet can be sterilized and re-used

#### Oxygen Delivery Configurations

<table>
<thead>
<tr>
<th>Device</th>
<th>Image</th>
<th>Flow</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>MaxVenturi (preferred)</td>
<td><img src="https://via.placeholder.com/150" alt="Image" /></td>
<td>50-60 LPM</td>
<td>Easy transition to HFNC during breaks&lt;br&gt;Provides natural humidification (decreased at FiO2 &gt; 60%)&lt;br&gt;Use for patient transport</td>
</tr>
<tr>
<td>Ventilator</td>
<td><img src="https://via.placeholder.com/150" alt="Image" /></td>
<td>50-60 LPM</td>
<td>Ventilator with HFNC mode needed (Servo-U/Hamilton C-1)</td>
</tr>
<tr>
<td>Venturi – 50% FiO2</td>
<td><img src="https://via.placeholder.com/150" alt="Image" /></td>
<td>30 LPM Wall O2 (80 LPM Total flow)</td>
<td>Titrating FiO2 by changing setup (only two FiO2 options – 50% or 60%)&lt;br&gt;Louder due to high wall O2; provide patient with ear plugs</td>
</tr>
<tr>
<td>Venturi – 60% FiO2</td>
<td><img src="https://via.placeholder.com/150" alt="Image" /></td>
<td>30 LPM Wall O2 + 20 LPM Wall O2 to side port (100 LPM total flow)</td>
<td></td>
</tr>
<tr>
<td>Oxygen Blender</td>
<td><img src="https://via.placeholder.com/150" alt="Image" /></td>
<td>50-60 LPM</td>
<td>No natural humidification; monitor for discomfort with longer use</td>
</tr>
</tbody>
</table>

**Initial Settings: FiO2 50% PEEP 5**

- **Spo2 >96%**
  - Consider decreasing FiO2
- **Spo2 <92% and/or ↑ WOB**
  - Increase PEEP to 10 cm H2O
  - Can trial higher FiO2 (up to 100%) for 4-6 hours
- **Spo2 <92% but NL WOB**
- **Spo2 <92% and ↑ WOB**
  - Consider intubation

*Consider weaning off helmet (to HFNC or NC) once stable on FiO2 40-50% and PEEP 5