The CSRT Rapid Response Refresher Resource is intended to provide respiratory therapists with review materials. For information specific to the management of Coronavirus disease, please refer to the CSRT COVID-19 resource page: https://www.csrt.com/csrt-novel-coronavirus-resources/.

**CSRT Rapid Response Return to Practice Toolkit – High Flow Nasal Cannula (HFNC)**

**Resources (Basic Review):**

- Low flow oxygen devices vs. HFNC (video): [Click here](#)
- How High Flow Nasal Cannula Works: [Click here](#)
- HFNC: Adult and pediatric indications: [Click here](#)

**Industry-Developed Resources:**

- Fisher & Paykel Optiflow™ Nasal High Flow Therapy and Airvo 2 online courses: [Click here](#)
- Fisher & Paykel Airvo 2 video training: [Click here](#)
- Fisher & Paykel treatment algorithm: [Click here](#)
- Hamilton: Setting up high flow on Hamilton G-5 ventilator: [Click here](#)
- Vapotherm online courses: [Click here](#)

**Initial Settings and Titration (from Ischaki et al., 2017)**

**Initial Settings:**
FiO2 1.00, Flow 60 lpm, Temp 37°C

**Titrate:**
FiO2 based on target SpO2
Flow based on RR (less than 25-30 bpm) and patient comfort
Temperature based on patient comfort

**Weaning:**
Decrease FiO2 to less to 0.40, then decrease flow by increments of 5

The **ROX Index** (Roca et al., 2018) may be useful in identifying those patients with acute pneumonia and respiratory failure receiving HFN that are risk of failure and intubation. (See References and page 3 for more information.)
Recommended Algorithm (from Ischaki et al. [2017])

**Acute hypoxaemic respiratory failure**

Criteria for immediate or imminent intubation are present (i.e. impaired consciousness and/or persistent shock)

- **NHF initiation**
  - $F_0_2$ 100%, flow rate 60 L·min$^{-1}$
  - Temperature 37°C
  - Within 1–2 h

- **Intubation and invasive MV**
  - NHF for improving pre-oxygenation and per-lyngoscopy oxygenation
  - $F_0_2$ 100%, flow rate 60 L·min$^{-1}$

**Monitoring**

Presence of one of the following: respiratory rate $>$35 breaths·min$^{-1}$, $S_{pO_2}$ $<$88–90%, thoraco-abdominal asynchrony and/or persistent auxiliary muscle use, respiratory acidosis ($P_{aCO_2}$ $>$45 mmHg with pH $<$7.35)

**Titration**

- $F_0_2$ based on target $S_{pO_2}$ ($>$88–90%)
- Flow rate based on $<$25–30 breaths·min$^{-1}$ and patient comfort
- Temperature based on patient comfort

**Weaning from NHF**

- Firstly decrease $F_0_2$
- When $F_0_2$ $<$0.4% decrease flow rate by 5 L·min$^{-1}$
- When flow rate $<$15 L·min$^{-1}$ stop NHF and initiate SOT

**Intubation and invasive MV**

NHF for improving pre-oxygenation and per-lyngoscopy oxygenation

**Noninvasive MV**

Short trial (1–2 h)

Recommended algorithm for high-flow nasal cannula use in acute hypoxaemic respiratory failure in immunocompetent or immunocompromised patients. #: arterial oxygen tension ($P_{aO_2}$)/inspiratory oxygen fraction ($F_0_2$) $<$300 (patients with arterial carbon dioxide tension ($P_{aCO_2}$) $>$45 mmHg and pH $<$7.35 are excluded); ¶: systolic arterial blood pressure $<$90 mmHg despite adequate fluid administration; *: the rationale for change in nasal high flow (NHF) settings are as follows. 1) Flow rate could be adjusted downwards by 5–10 L·min$^{-1}$ per 1–2 h if none of the negative prognostic factors are present. However, if targets of arterial oxygen saturation measured by pulse oximetry ($S_{pO_2}$) and respiratory rate are not achieved, while the flow rate is $<$60 L·min$^{-1}$, increase of flow rate by 5–10 L·min$^{-1}$ is preferred to raising $F_0_2$; 2) increase in $F_0_2$ causes increases in $P_{aO_2}$ and $S_{pO_2}$; 3) temperature can be set.
at 37°C or lower (31–34°C), based on the patient’s comfort; §: haemodynamic instability is defined by heart rate >140 beats-min\(^{-1}\) or change >20% from baseline and/or systolic arterial blood pressure >180 mmHg, <90 mmHg or decrease >40 mmHg from baseline. MV: mechanical ventilation; SOT: standard oxygen treatment.

### The ROX Index
(Roca et al., 2018)

ROX Index = \(\frac{\text{SpO}_2}{\text{FiO}_2}\cdot \text{RR}\)

ROX Index greater than or equal to 4.88 measured at 2, 6, or 12 hours suggests the success of high flow nasal therapy.

ROX Index less than 2.85 at 2 hours, less than 3.47 at 6 hours, or 3.85 at 12 hours is predictive of the need for intubation. (Scores between 3.85 at 4.88 are in a “grey zone”. Roca et al. suggest that the score could be repeated again after 1-2 hours: an increasing score may indicate successful high flow therapy. If the score is decreasing, there may be an increased likelihood that intubation is required.) Consider the individual patient’s status and monitor closely.

### References
