CANADIAN SOCIETY OF RESPIRATORY THERAPISTS
SOCIÉTÉ CANADIENNE DES THÉRAPEUTES RESPIRATOIRES

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

Resources (Basic Review):

- Low flow oxygen devices vs. HFNC (video): Click here
- Nishimura, M. (2016). High-Flow Nasal Cannula Oxygen Therapy in Adults: Physiological Benefits, Indication, Clinical Benefits, and Adverse Effects. Respiratory Care April 2016, 61 (4) 529-541. 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

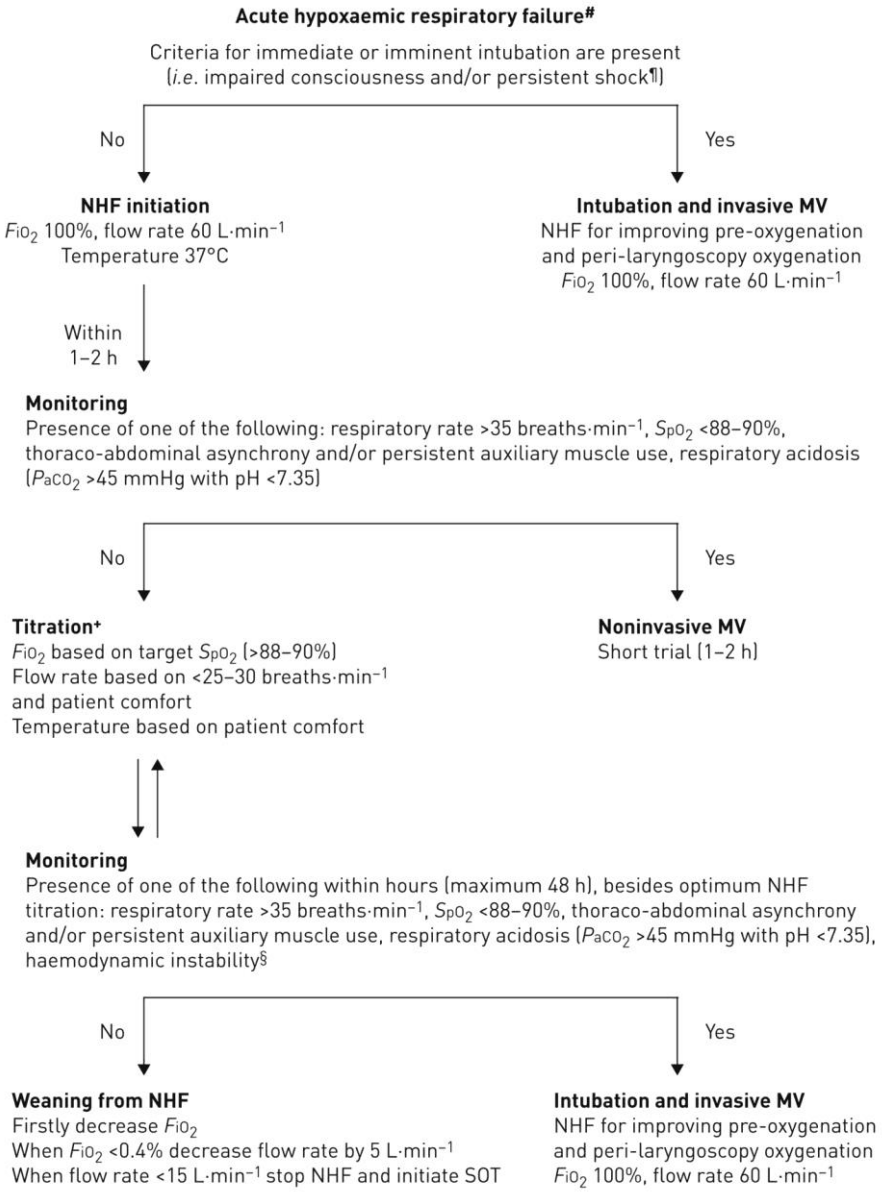
Initial Settings and Titration (from Ischaki *et al.*, 2017)

Initial Settings:
FiO_2 1.00, Flow 60 lpm, Temp 37°C
Titrate:
FiO2 based on target SpO_2
Flow based on RR (less than 25-30 bpm) and patient comfort
Temperature based on patient comfort
Weaning:
Decrease FiO_2 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.)

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/.

Recommended Algorithm (from Ischaki *et al.* [2017])



Recommended algorithm for high-flow nasal cannula use in acute hypoxaemic respiratory failure in immunocompetent or immunocompromised patients. #: arterial oxygen tension (P_{aO2})/inspiratory oxygen fraction (F_{iO2}) <300 (patients with arterial carbon dioxide tension (P_{aCO2}) >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_{pO2}) 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_{iO2}; 2) increase in F_{iO2} causes increases in P_{aO2} and S_{pO2}; 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)

$$\text{ROX Index} = \frac{SpO_2 / FiO_2}{RR}$$

ROX Index greater than or equal to 4.88 measured at 2, 6, or 12 hours suggests the success 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

- Ischaki, E., Pantazopolous, I., Zakynthinos, S. Nasal high flow therapy: a novel treatment rather than a more expensive oxygen device. Eur Respir Rev 2017; 26: 170028. https://err.ersjournals.com/content/errev/26/145/170028.full.pdf

- Roca, O., Caralt, B., Messika, J., Samper, M., Sztrymf, B., Hernández, G., Garcia-de-Acilu, M., Frat, JP., Masclans, JR., Ricard, JD. An index combining respiratory rate and oxygenation to predict outcome of nasal high-flow therapy. Am J Respir Crit Care Med 2019;199: 1368-1376. https://www.ncbi.nlm.nih.gov/pubmed/30576221 (Link is to abstract.)