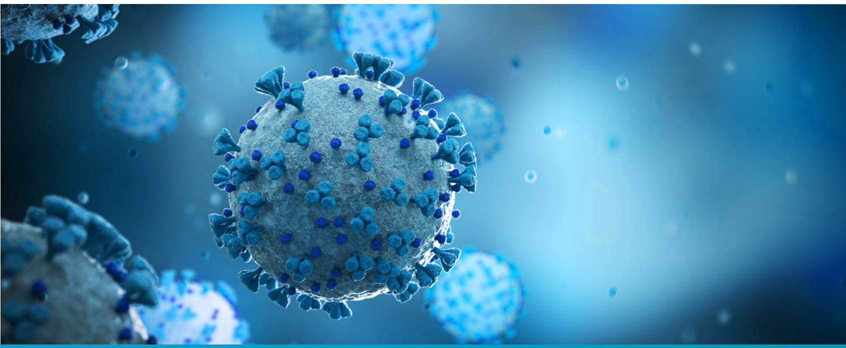
F&P Optiflow

Flow Matters

EDITION 10

4 February 2022



COVID-19 Edition

The outbreak and ongoing surges of COVID-19 have impacted healthcare services around the world. Optiflow™ Nasal High Flow (NHF) therapy is being used to treat patients, whilst its association with the risk of transmission continues to be challenged.

"Patients acutely requiring [NHF]... are likely to present a high disease transmission risk due to their propensity to produce aerosols, but we find no basis for withholding or delaying access to [this therapy]. We conclude instead that exertional respiratory activities themselves are the primary modes of aerosol generation and represent a greater transmission risk than is widely recognised currently." **– Wilson et al. Anaesthesia. 2021.[1]**

Summary

The following dual primary objectives, applied to clinical management of all patients, are particularly relevant for COVID-19:

- Improving patient outcomes e.g. by avoiding the need for tracheal intubation.
- Maintaining health care worker (HCW) safety e.g. by avoiding an increase in widespread nosocomial transmission.

Collectively, evidence based guidelines for COVID-19, published randomized controlled trials and clinical observations on outcomes from NHF use, investigational research on dispersion of exhaled particles, and expert recommendations indicate that:[1-56]

NHF is recommended as respiratory support for patients with hypoxemia caused by viral pneumonia, such as COVID-19.[2-27]

- NHF is currently not considered to represent an increased risk of HCW infection via contact, droplet or airborne transmission routes:[15-16,23,25-28]
  - » Advocacy for NHF is called for in recommendations for hospital preparedness.[29-32]
  - » The aerosol generating procedure (AGP) paradigm should be discussed in the context of emerging evidence.[1,30-32,49-55]
  - » Cough is now considered to be a relatively high risk respiratory activity which puts all forms of respiratory therapy into perspective.[1,33,45,48-53,56]

Improving patient outcomes

The use of NHF to improve outcomes for COVID-19 patients is well documented in published literature:

Evidence based guidelines

The number of organisations who have published evidence based guidelines recommending the use of NHF for COVID-19 patients continues to grow:

- World Health Organisation[2]
- National Institutes of Health[3]
- National Health Commission of the Peoples Republic of China[4]
- Surviving Sepsis Campaign[5]
- Australia and New Zealand Intensive Care Society[6]
- European Respiratory Society[7]
- International expert consensus statement[8]
- Expert recommendations from a French panel consisting of members from various intensive care societies[9]

Research on outcomes for COVID-19 patients

As NHF has been used as respiratory support throughout the pandemic, evidence on its impact on patient outcomes including randomized controlled trials, expert opinion and clinical observations have been peer reviewed, published and continue to emerge.[10-27]

NHF use on COVID-19 patients has been either shown or observed to:

- **Keep patients off mechanical ventilation and help them stay off.**[10-11,14-21,24]
- **Reduce clinical recovery time** and length of stay.[10,24-25]
- Reduce oxygenation failure.[13]
- Be successfully used outside of ICU settings.[21-23]
- **Increase comfort and compliance.**[11-12]
- **Facilitate awake prone positioning.**[11-13]
- **Reduce $PaCO_2$.**[12]

"Among patients with severe COVID-19, use of [NHF] through a nasal cannula significantly decreased need for mechanical ventilation support and time to clinical recovery compared with conventional low-flow oxygen therapy."**- Ospina-Tascón et al. 2021.**[10]

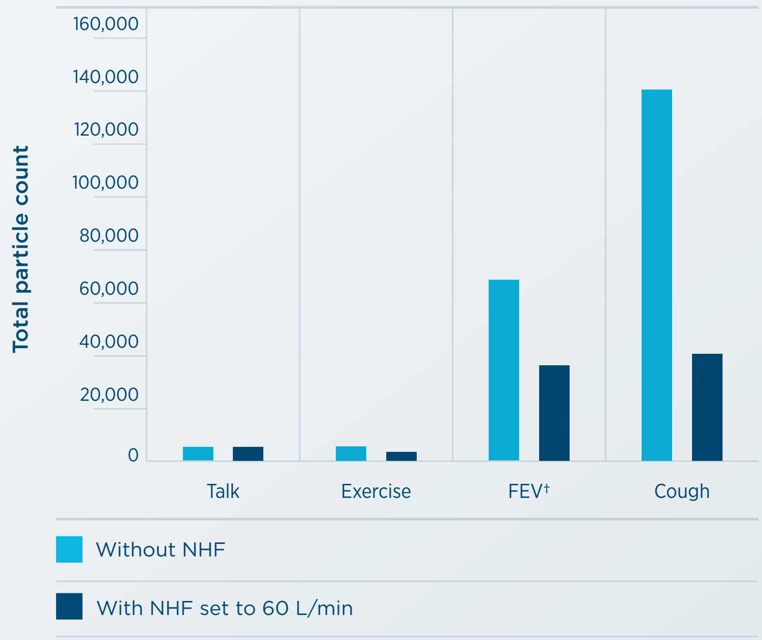
Note: Bolded outcomes above are findings from studies including randomized controlled trials.
The remaining outcomes listed are from observational studies only.

Maintaining healthcare worker safety

Collectively, clinical observations, investigative research and expert opinions highlight that NHF therapy is not considered to represent an increased risk of infection for HCWs.[1,15-16,23,26-56]

Wilson et al. 2021[1] compared the effect of respiratory activity, noninvasive respiratory support and facemasks on aerosol generation. This publication is the first to attempt to capture data from the entire respiratory plume. Results from the study are illustrated in the chart below.

Comparison of total particle count for respiratory activities*



* Data collated from Wilson et al. 2021.[1]
† FEV: Forced expiratory volume manoeuvres. Used as proxies for symptomatic laboured breathing and atelectasis.

Expert opinions

Advocacy for NHF

The publication from Wilson et al. adds to a body of research from experts advocating for the use of NHF for COVID-19 patients:[1,29,48-50]

"... administrators and policymakers must consider amending protocols to not only allow, but actually advocate for, the use of [NHF] for COVID-19 patients with significant hypoxemia who, without this option, would be placed on [mechanical ventilation]."
- Gershengorn et al. 2020.[29]

The AGP paradigm

Publications and articles question the accuracy and helpfulness of the term AGP with particular emphasis on the classification of respiratory support therapies like NHF as AGPs:[1,30-32,49-55]

“Recent data have raised questions as to whether procedures currently classified as AGPs actually generate aerosols, including tracheal intubation and extubation, non-invasive ventilation and high-flow nasal oxygen.”
– Cook et al. 2021.[49]

“We propose an end to the term aerosol generating procedure, as it is [not] accurate (aerosol is not generated above a cough for many of these procedures), implies aerosol emission is only from specific procedures (rather than being generated during normal respiratory events), potentially misidentifies the source of infection risk, and applies a binary definition to a situation that is more complex.” **– Hamilton et al. 2021.[50]**

Patient-related risks to HCWs

Researchers and experts have considered aerosols generated from COVID-19 patients’ respiratory activities (like cough) and the risk this represents to HCWs:[1,33,45,48-53,56]

“Aerosol emission from the respiratory tract does not appear to be increased by [NHF]. Although direct comparisons are complex, cough appears to be the main aerosol-generating risk out of all measured activities.”
– Hamilton et al. 2021.[51]

“[...] HCW exposure and nosocomial transmission may be more influenced by patient factors, such as coughing at earlier stages of infection, than the type of respiratory support used.” **- Winslow et al. 2021.[52]**

Helpful terms

Particle:
Matter with physical dimensions such as a water vapor molecule, a pathogen (virus or bacteria), an aerosol or a droplet.

Water vapor molecule:
Gas particle of H_2O. Size: < 0.001 microns.

Virus:
Infectious agent replicating in living cells. Size: 0.017 to 0.3 microns.

Bacteria:
Infectious organism. Size: 0.2 to 10 microns.

Aerosol:
Very small liquid particle, usually suspended in the air. Size: up to about 10 microns.

Droplet:
Larger liquid particle, usually falling to the ground. Size: about 5 microns or larger.

Medical-particle:
Aerosol or droplet including a suspended pharmaceutical agent such as salbutomol, for delivery to a patient.

Medical-aerosol:
Medical particle small enough to be delivered to a patient’s lower airway or lungs.

Bio-particle:
Aerosol or droplet expelled by a patient during exhalation which includes biological material (e.g. a suspended pathogen).

Bio-aerosol:
Very small bio-particle, usually suspended in the air. Size: up to about 10 microns.

Bio-droplet:
Larger bio-particle, usually falling to the ground. Size: about 5 microns or larger.

Bio-aerosol generating procedure:
A procedure which includes the type of patient airway interaction known to break fluids into aerosol sized particles.

Bio-aerosol dispersing procedure:
A procedure which doesn’t break fluids into aerosols but may disperse bio-aerosols generated by normal airway functions.

For further information, please visit the F&P webpage: www.fphcare.com/COVID-19 or click on the hyperlinked reference below.

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