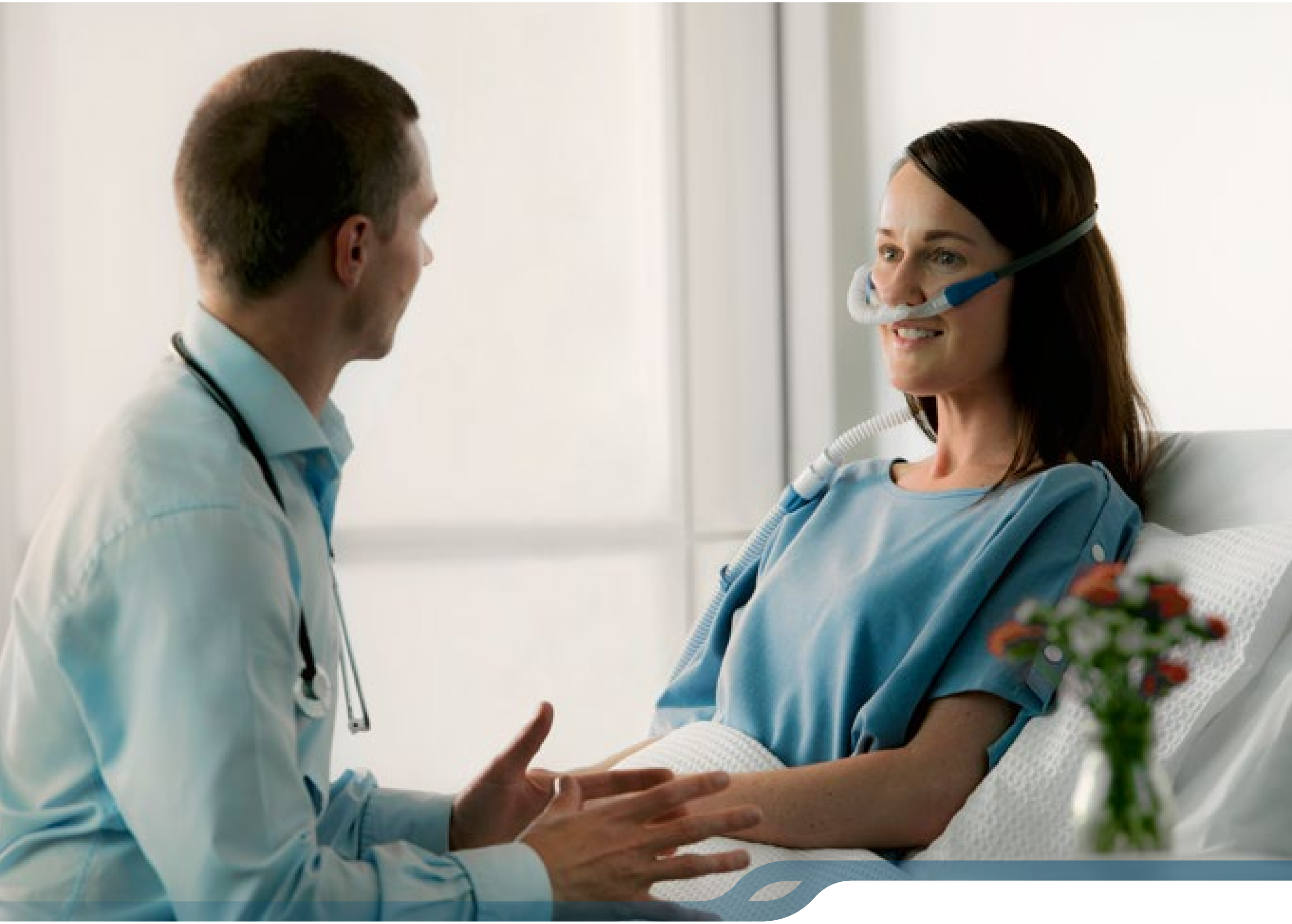
F&P Optiflow Nasal High Flow



Fisher & Paykel HEALTHCARE

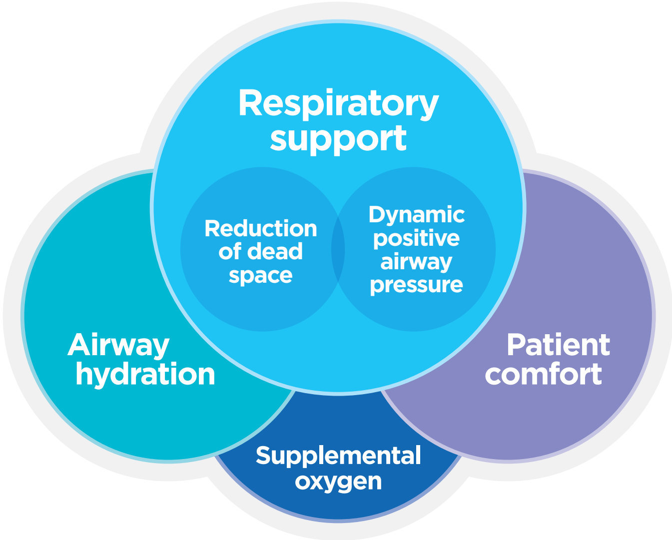
Understand
Optiflow™
Nasal High Flow

Optiflow Nasal High Flow (NHF) delivers respiratory support to your spontaneously breathing patients, by providing heated, humidified air and oxygen at flow rates up to 60 L/min through the unique Optiflow nasal cannula.

Read on to discover more about:

- mechanisms
- physiological effects
- clinical outcomes and how using Optiflow NHF can reduce escalation, thereby avoiding its associated costs.

MECHANISMS OF ACTION



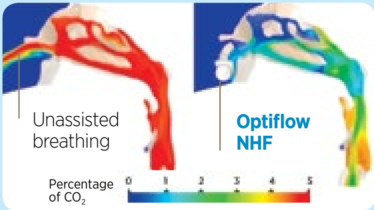
With Optiflow NHF, you can independently titrate flow and oxygen concentration (FiO_2 21 - 100%) according to your patient's needs.

The mechanisms of action differ from those of conventional therapies, as do the resulting physiological effects and clinical outcomes.

Read more about mechanisms at:
fphcare.com/opti/mechanisms

Respiratory support

Reduction of dead space

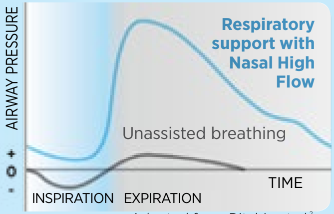


Clearance of expired air in the upper airways[1]

Reduces rebreathing of gas with high CO_2 and depleted O_2[1]

Increases alveolar ventilation[1]

Dynamic positive airway pressure



Adapted from Ritchie et al.[2]

Breath- and flow-dependent airway pressure[3,4]

Promotes slow and deep breathing[3]

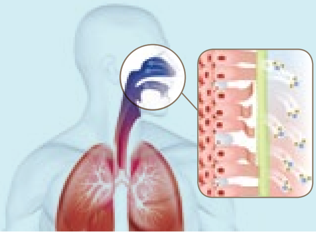
Increases alveolar ventilation[1,5]

Airway hydration

Optimal Humidity

Prevents desiccation of the airway epithelium[6]

Improves mucus clearance[6,7]



Patient comfort

Optimal Humidity

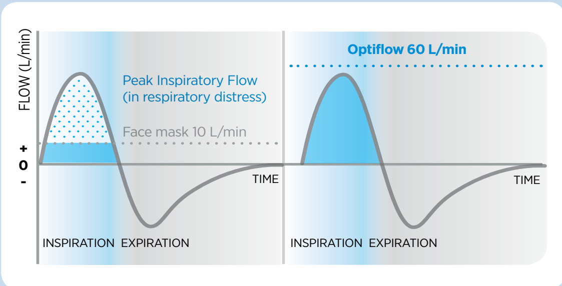
Open system
No seal required

Comfortable[8,9] and easy to use

Patient tolerance[8,10]

Supplemental oxygen when required

Confidence in the delivery of blended, humidified oxygen[2,11], from 21% to 100%



Adapted from Masclans et al.[12]

PHYSIOLOGICAL EFFECTS & CLINICAL OUTCOMES

The mechanisms of respiratory support, airway hydration, patient comfort and supplemental oxygen contribute to distinct physiological effects...

- **IMPROVES** ventilation and gas exchange
  - **REDUCES** respiratory rate[5,8,11,13-16]
  - **REDUCES** carbon dioxide[1,3,17]
  - **INCREASES** tidal volume[5]
  - **INCREASES** end-expiratory lung volume[5]
- **IMPROVES** mucus clearance[7]
- **IMPROVES** oxygenation[2,5,8-10,12,13,16,18]

... and clinical outcomes:

Read clinical studies and other evidence at:
fphcare.com/opti/evidence-library

REDUCES escalation of care when used:

- as a first-line respiratory support[10]
- post-extubation[9,19-22]

REDUCES mortality rate[10]

IMPROVES symptomatic relief[8,10,11]

IMPROVES comfort and patient compliance[8,9,11,19,22]

Frat 2015

The New England Journal of Medicine

STUDY

A 23-center study[10] compared NHF to use of a non-rebreather mask (standard oxygen) and NIV as a primary treatment. The primary outcome was the number of patients intubated at day 28 (not attained).

METHOD

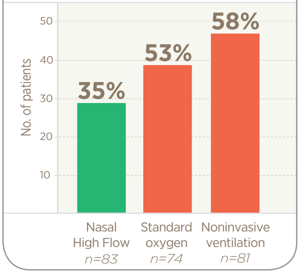
310 pre-intubation patients in acute hypoxemic respiratory failure ($PaO_2:FiO_2 \leq 300$ mmHg) were randomized to receive NHF, non-rebreather mask or NIV.

RESULTS

- **NHF significantly reduced ICU** (p=0.047) **and 90-day mortality** (p=0.02)
- The primary outcome was not met for all patients (p=0.18), however, **NHF significantly reduced the need for intubation in more acute patients ($PaO_2:FiO_2 \leq 200$ mmHg)** (p=0.009)
- Significant increase in ventilator-free days on NHF (p=0.02)
- NHF significantly reduced intensity of respiratory discomfort (p<0.01) and dyspnea (p<0.001)

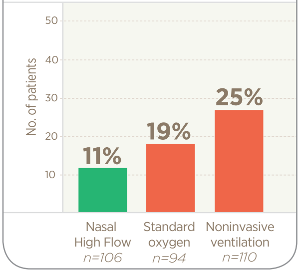
Reduced intubation rate (%)*

P=0.009 *Patients with $PaO_2:FiO_2 \leq 200$ mmHg*



Reduced ICU mortality (%)

P=0.047



Ischaki 2017

European Respiratory Review

Acute hypoxaemic respiratory failure*

Criteria for immediate or imminent intubation are present.

NO → **NHF initiation**
- FiO_2 100%
- Flow rate 60 L·min^{-1}
- Temperature 37°C

YES → **Intubation and invasive MV**

NHF for improving pre-oxygenation and peri-laryngoscopy oxygenation
- FiO_2 100%
- Flow rate 60 L·min^{-1}

Within 1-2 h

Monitoring

Presence of prognostic factors

NO → **Titration**
- FiO_2 based on target SpO_2 [>88- 90%]
- Flow rate based on < 25-30 breaths·min^{-1} and patient comfort
- Temperature based on patient comfort.

YES → **Noninvasive MV**

Short trial [1-2 h]

Monitoring

Presence of prognostic factors within hours [maximum 48 h]

NO → **Weaning from NHF**

Firstly decrease FiO_2. When FiO_2 <0.4% decrease flow rate by 5 L·min^{-1}.

YES → **Intubation and invasive MV**

NHF for improving pre-oxygenation and peri-laryngoscopy oxygenation
- FiO_2 100%
- Flow rate 60 L·min^{-1}

Adapted from original paper[21]; used under Creative Commons licence 4.0.

MV = mechanical ventilation; SOT = standard oxygen treatment.

Please note that this material is intended exclusively for healthcare practitioners and the information conveyed constitutes neither medical advice nor instructions for use. This material should not be used for training purposes or to replace individual hospital policies or practices. Before any product use, consult the appropriate user instructions.

Hernández (Apr) 2016

Journal of the American Medical Association

STUDY

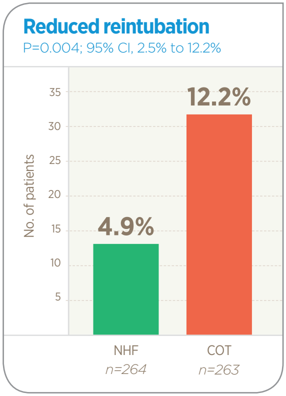
A 7-center study[20] compared the efficacy of NHF to use of conventional oxygen therapy (COT) post-extubation. The primary outcome was reintubation within 72 hours.

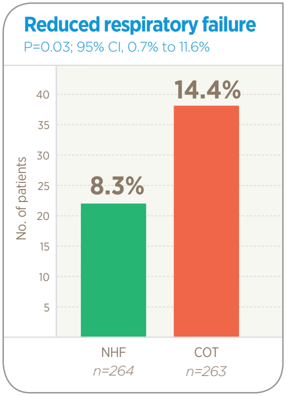
METHOD

527 patients at low risk of reintubation (age < 65; APACHE score < 12; BMI < 30 etc.) were randomized to receive NHF or COT (via nasal prongs or a non-rebreather).

RESULTS

- **NHF significantly reduced reintubation** (p=0.004) and post-extubation respiratory failure (p=0.03)
- Successfully extubated patients (in both groups) had a shorter duration of mechanical ventilation (p<0.001), ICU stay (p<0.001) and hospital stay (p=0.005)





Hernández (Oct) 2016

Journal of the American Medical Association

STUDY

A 3-center non-inferiority study[21] compared use of NHF to bi-level positive airway pressure (BPAP) post-extubation. The primary outcomes were reintubation and post-extubation respiratory failure within 72 hours.

METHOD

604 patients at high risk of reintubation (age > 65; APACHE score > 12; BMI > 30 etc.) were randomized to receive NHF or BPAP. The non-inferiority margin was 10%.

RESULTS

- NHF was non-inferior to BPAP for **preventing reintubation:** 22.8% (66/290) NHF group vs. 19.1% (60/314) BPAP group reintubated
- NHF was non-inferior to BPAP for **preventing post-extubation respiratory failure:** 26.9% (78/290) NHF group vs. 39.8% (125/314) BPAP group had post-extubation respiratory failure
- No patients in the NHF group suffered adverse effects requiring withdrawal of the therapy, compared to 42.9% of patients in the BPAP group (p<0.001)
- Median ICU length of stay was lower in the NHF group: 3 days (NHF) vs. 4 days (BPAP) (p=0.048)

Read clinical studies and other evidence at:
fphcare.com/opti/evidence-library

USAGE

There is an ever-increasing body of clinical literature which may provide guidance on the day-to-day application of Optiflow NHF

When are the effects of Optiflow NHF seen?

Sztrymf[13] associated Optiflow NHF with sustained beneficial effects on oxygenation and physiological parameters for patients with acute respiratory failure.

Similarly Rittayamai[14] showed significant improvement in post-extubation patients.

These studies may provide guidance on patient responses to the therapy.

↓ Dyspnea
5 minutes[24] – 10 minutes[14]

↓ Respiratory rate
5 minutes[14] – 15 minutes[13]

↑ Oxygenation
15 minutes[11]

↓ Supraclavicular retraction
30 minutes[13]

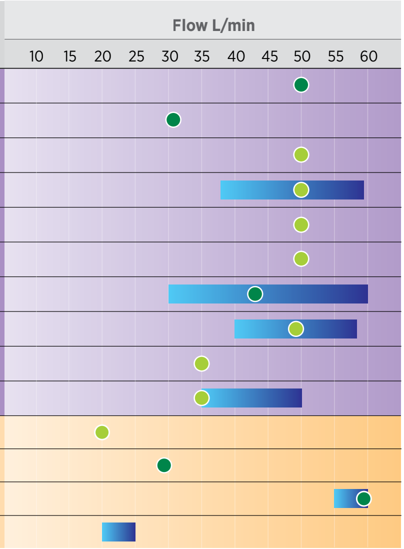
↓ Thoracoabdominal asynchrony
30 minutes[13]

View more frequently asked usage questions at:
fphcare.com/opti/usage

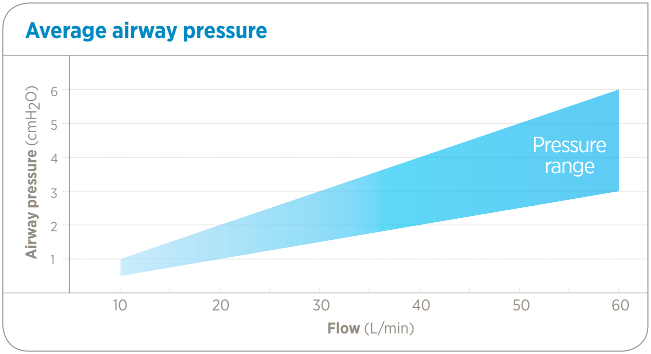
What flow rates and ranges are used?

The adjacent table lists starting flows and flow ranges used in clinical studies.[5,9,10,13,16,19-22,25-29]

	Guidance source	Category description
RESPIRATORY DISTRESS	Hernández et al Oct 2016	extubated patients at high risk of reintubation
	Hernández et al Apr 2016	extubated patients at low risk of reintubation
	Bell et al 2015	acute undifferentiated shortness of breath in the ED
	Frat et al 2015	acute hypoxemic respiratory failure (pre-intubation)
	Stéphan et al 2015	hypoxemic patients post cardiothoracic surgery
	Maggiore et al 2014	post extubation with acute respiratory failure
	Peters et al 2013	do not intubate patient with hypoxemic respiratory distress
	Sztrymf et al 2011	acute respiratory failure
	Parke et al 2011	mild-to-moderate hypoxemic respiratory failure
	Corley et al 2011	post-cardiac surgery
CHRONIC	Storgaard et al 2018	COPD
	Nagata et al. 2018	COPD
	Cirio et al 2016	stable severe COPD patients
	Rea et al 2010	COPD and/or bronchiectasis



Key: Flow range Starting flow Mean flow



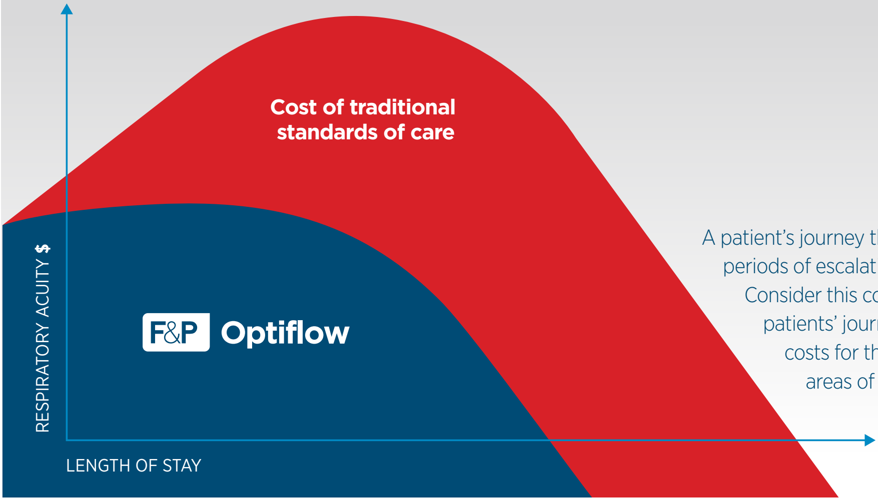
What is the approximate average dynamic pressure generated?

Average pressure increases approximately 0.5 - 1 cmH_2O per 10 L/min.[2,4,30]

Pressure ranges are cannula and patient dependent. For illustrative purposes only.

COST BENEFITS

Use Optiflow NHF to reduce escalation[10,20] thereby avoiding associated costs



A patient's journey through the hospital may include periods of escalation and de-escalation of care. Consider this conceptual model, showing two patients' journeys through the hospital. The costs for these journeys are denoted by the areas of blue and red.

Using Optiflow NHF as a first-line therapy (both pre-intubation and post-extubation) may reduce a patient's escalation 'up the acuity curve', resulting in better patient outcomes and reduced costs of care.

We call this **F&P Optiflow** FIRST

Evaluate Optiflow NHF at:
fphcare.com/opti/eval

Evaluate **F&P Optiflow** FIRST

Publications in the NEJM and JAMA suggest Optiflow NHF may improve patient outcomes[10] and reduce the need for higher level support[20,21] thereby avoiding the associated costs[31].

Fisher & Paykel Healthcare will provide training and equipment during an Optiflow NHF evaluation to help you achieve these goals in your hospital. Let us customize an evaluation to suit you. Visit **fphcare.com/opti/eval**

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