

# Go with the flow



This newsletter is designed to connect respiratory specialists from around the world, sharing their stories and experiences on Optiflow, a new superior way of providing oxygen to patients to deliver **better patient outcomes** and efficiencies in their hospitals. To learn more about this exciting way of delivering oxygen please visit [www.myoptiflow.com](http://www.myoptiflow.com) today.

## WELCOME

Advancements in the world of Optiflow have continued since our last edition of Go with the flow. Further research now suggests that Optiflow is more effective than traditional oxygen therapy and may in fact sanction an extended role in respiratory care.

In this issue we have more user experiences that we want to share with the respiratory community. Here are the highlights:

### Standardising Oxygen delivery with Optiflow

Nigel Fealy explains how the Austin hospital in Australia made a major change in the way they extubate their patients. Standardisation to Optiflow has brought a range of benefits and delivered efficiency gains.

### Helping to reduce ICU admissions

Adoption and use of a new device has helped Barnsley Hospital in the UK. From beginnings within the ICU, Optiflow has now spread to the wards and it is helping to reduce the need for intensive care referrals.

### Clinical practice and research programs

Shay McGuinness and Rachael Parke from Auckland hospital, NZ, explain how from humble beginnings Optiflow has been utilized and grown in clinical practice and as a pillar for their research program.

### A first taste of Optiflow

Carol Columbus from Bluewater Health Sarnia, Canada explains how Optiflow was first used at her hospital on a difficult patient where options were running out.

*Our thanks to our talented contributors.*

*Kind regards,*

*Your Optiflow Team*

## A new standard of oxygen therapy

In December 2011, the Intensive Care Department at Austin Hospital in Melbourne, Australia implemented a policy of always extubating patients onto an Optiflow humidified nasal cannula. The policy was designed to further improve oxygen therapy while reducing waste and minimizing the investment in unproductive inventory. Within six months the use of Optiflow had spread to wards throughout the hospital.



WRITTEN BY: **NIGEL FEALY, RN, MN, ACCCN, Clinical Nurse Educator**, Department of Intensive Care, Austin Hospital Melbourne, Australia.

### Background

Austin Hospital has 400 acute beds and a 20 bed intensive care unit (ICU). Optiflow was initially used within the ICU to provide comfortable and effective high flow oxygen therapy up to 60L/min. The wider benefits and versatile flow rates of Optiflow soon became apparent, making it an ideal solution for the medical staff's desire to improve respiratory care. The majority of ICU patients at Austin Hospital are post-surgical, so extubation was the logical point at which to begin standardizing.

### Versatile flow rates bring economic simplicity

Historically the ICU nurses selected the most appropriate piece of oxygen equipment from what was available at the time.

"Often we were extubating patients from a ventilated circuit to a whole new air entrainer kit. When their oxygen was OK they'd go to

a simple mask and then maybe basic nasal prongs," explains Nigel. "So they'd often have four or five versions of oxygen therapy while in the ICU."

While Optiflow was first introduced to provide comfortable and effective high flow oxygen delivery, the ICU staff realized it was just as effective at low flows. Standardizing with Optiflow would provide continuity of high quality care and eliminate the hidden costs associated with supporting a diverse range of equipment.

"Now, we simply extubate onto Optiflow and as the patient gets better we can decrease the flows right down to levels close to that of basic nasal prongs. But if they get sicker we can escalate up the tree and we don't have to change the device," says Nigel. "In short, we can use Optiflow until they're discharged from the ICU."

### Adoption in just one week

Each bay in the ICU was equipped with two 30L/min flow meters (one for air and the other for oxygen) and dual-flow adaptors. Humidifiers, chambers and heated delivery tubes were standardized (in this case with the F&P MR850 system) allowing a straightforward transition to an Optiflow nasal cannula on extubation.

Austin Hospital ICU has about 230 nurses on staff. Some work only one day a week, while

Article continued from cover:

“In nearly every other facet of medicine we have embraced technology, yet as a profession we’re still putting masks on people”

Nigel Fealy.

others are full time. With the equipment in place, ICU educators and F&P representatives were on site at the beginning of every shift for a week. Staff were shown how to assemble the equipment and provided with a guide that included set up flows. The ICU educators also developed policies and protocols for using Optiflow.

“We just went for one full week, Monday through to Sunday, every shift and captured 80 to 90 per cent of the staff,” explains Nigel. “It also meant that if anyone said ‘hang on, I thought I had it but now that I’m using it I’ve got a couple of questions’, one of us was immediately available to provide the answers.”

#### Discharging to the ward on Optiflow

With the ICU’s inventory simplified to one device for noninvasive oxygen delivery, patients are now discharged to the ward on Optiflow. ICU nurses simply wean patients down to flow rates that are within the wards’ capabilities. The ward staff can then decide whether to continue delivering humidified gas through the Optiflow nasal cannula or switch the patient to another device.

“We believe there is good evidence that effective humidification is important even if

the patient is only needing a couple of liters per minute,” says Nigel.

The ICU liaison nurses also did an immense job in assisting with the transition to build confidence with Optiflow on the wards. Once ward staff realized that you can use Optiflow at low flows, they understood that the device was not just for high acuity patients; it was about providing effective and comfortable humidification. As a result, they’ve taken to Optiflow quite quickly and developed their own specific policies for Optiflow use.

“Our cardiothoracic and liver transplant wards were the first two that really took it up easily. That translated to most wards in the hospital within just six months,” explains Nigel. “We were pleased to find that the device was quickly adopted due to support from the wards and ward educators.”

## Proven performance in a smaller district hospital

Barnsley Hospital in South Yorkshire, Great Britain began using Optiflow in 2008 with the aim of providing a ward based high flow humidified device. They started the process by incorporating the device within their critical care directorate. Today Optiflow is in use throughout the hospital providing improved respiratory care and helping to save money by reducing ICU admissions.



WRITTEN BY: DR KEN INWEREGBU, Consultant Anesthetist/Intensivist and RACHEL ROBINSON, Senior Physiotherapist, Barnsley Hospital NHS Foundation Trust, Great Britain

“The benefits are quite clear. Humidified oxygen and high flow reduce the need for intensive care,” explains Ken. “Our original guidance was that anyone who required 50% oxygen needed level 2 critical care. Now we can treat patients with well above 50% oxygen on the ward. An ICU bed costs around £1,400 a day compared to £250 for a ward bed. So from that point of view, the cost benefit is huge.”

#### Background

With 500 beds including a seven bed ICU, Barnsley Hospital serves a local population of around 250,000 people. The hospital is part of the Great Britain’s National Health Service and as such provides ‘free care based on need, not the ability to pay’. Located in a former coal mining area, the hospital sees a high prevalence of patients with occupational lung disease.

In 2008, aware of the benefits of providing warm humidified oxygen at high flows the hospital set about finding a suitable delivery device. “We were looking for a robust ward based high flow humidification device because the existing device was limited to providing 50% oxygen and poor humidification capability,” explains Ken.

Barnsley Hospital began with two Optiflow systems for use in their intensive care (ICU), high dependency (HDU) and respiratory care (RCU) units. An early audit of Optiflow use at the hospital revealed clear benefits and now there are seven more systems in the hospital.

#### Initial training

The hospital began by educating key trainers and relied on cascading information to around 100 staff in the ICU, HDU and RCU. The training was delivered over four to eight weeks, but with only two Optiflow systems it took around four months for all staff to accumulate experience and become fully competent with the device.

“With any new equipment there is some hesitancy, but Optiflow is very simple to use,” explains Ken. “We were well supported by Fisher & Paykel’s training package, so once the trainers knew how to use it was very easy to cascade it on to other staff.”

#### Bringing Optiflow to patients in the wards

Barnsley Hospital operates an outreach service that provides a bridge between intensive care units and patients on the wards. Rachel Robinson is a senior physiotherapist within this vital service.

“We only had low-flow bubble through systems on the wards. They just run at room temperature and on such poor flow rates they don’t even match the rate that dry gas is delivered through a venturi-style mask,” explains Rachel. “So for some

patients we had to compromise the flow and percentage oxygen to provide the humidification they required.”

#### A quiet revolution for patients

“We’ve had some really positive feedback from patients on repetitive admissions. From a physiotherapist point of view we know it will help with secretion clearance. While most patients talk about the comfort, we have had patients come in and say ‘May I have that Optiflow machine? It really does help get my phlegm off my chest!’”

“It’s also very quiet and if you’re poorly, you need to sleep. One of the biggest things patients have said is they can sleep while they’re on Optiflow because it’s so quiet,” says Rachel.

“We’ve made a very positive start,” explains Ken. “We established Optiflow in the critical care area first then continued with a rolling program. Education is the key, along with auditing your results. Our results proved to others that Optiflow was benefitting patients and that they were happy with it. Even in the early days, staff from other areas of the hospital would say ‘This patient doesn’t need intensive care yet, but if we don’t do something now it’s possible they will. Can we use your Optiflow machine?’ It certainly seems cost effective in terms of reducing referrals to ICU beds.”

# Research and clinical practice evolve as one

Auckland City Hospital in New Zealand began using Optiflow in 2006. Since then a carefully structured research program has continuously evolved in harmony with the use of Optiflow in the cardiothoracic and vascular intensive care unit, and more recently the wider hospital.



WRITTEN BY: SHAY MCGUINNESS, Specialist Intensivist, and RACHAEL PARKE, Research Coordinator, Cardiothoracic and Vascular Intensive Care Unit Auckland City Hospital, Auckland, New Zealand.

## Background

Auckland City Hospital is a 710-bed public hospital and New Zealand's largest. The cardiothoracic and vascular intensive care unit (CVICU) and high dependency unit (HCU) see around 2,000 patients per year. Specialist intensivist Shay McGuinness leads the unit's numerous research programs and the Optiflow program is run by nurse researcher Rachael Parke.

## Overcoming the challenges of oxygen therapy

In 2006, the CVICU at Auckland City Hospital was facing the typical challenges with oxygen therapy - the range of interfaces required, limited control over  $\text{FiO}_2$ , poor patient compliance with face masks and the difficulty of comfortably providing good levels of humidity.

The unit introduced Optiflow as an alternative to humidified facemask oxygen therapy. It turned out to be more effective than expected and as their use of Optiflow increased the rate of non-invasive ventilation steadily decreased. From only being used on the occasional patient, Optiflow quickly became the default oxygen therapy device for patients experiencing hypoxemia in CVICU.

"Most of our patients are post-cardiac surgery and the difficulties of respiratory function after cardiac surgery are well known," explains Shay. "Before Optiflow we were limited to low-dose oxygen and if the patient needed more, we had to use CPAP or BiPAP with the associated discomfort of tight-fitting masks. With the introduction of Optiflow many of those patients no longer have to go on to CPAP."

"Optiflow came into practice because we could see that patients tolerated it very well and they were benefitting from it," explains Shay. "Because of the clinical benefits we were seeing, we decided to start doing some research into the device."

## Research informs protocols and guidelines

In 2007, the CVICU began a program of clinical research to investigate and describe the mechanisms of action and clinical outcomes associated with Optiflow.

"There was a lot of anecdotal evidence at the time that Optiflow was brilliant, but we wanted to be able to describe how it worked," explains Rachael.

Four studies have since been published and a fifth was in review at the time of this newsletter.

"The initial study compared Optiflow with a high-flow face mask. It involved a flow rate of 35L/min and measured airway pressure over one minute," explains Rachael. "We were able to show that Optiflow generates a positive airway pressure when averaged over the whole respiratory cycle."

The second study described the relationship between flow and pressure.

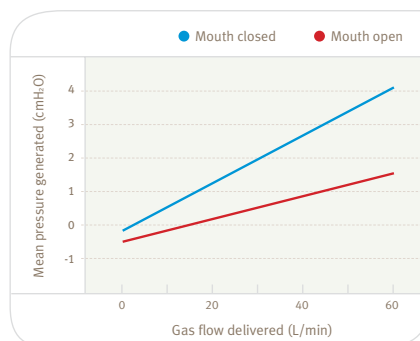
"We wanted to find out what happens to the airway pressure as you vary the flow rate," explains Rachael. "We were able to show there was a linear relationship and that the airway pressure was greater when the patient's mouth was closed, which is what they tend to do instinctively"

"We were able to use this to write our protocol for nasal high flow therapy within the CVICU," explains Rachael.

The next study compared nasal high flow with CPAP in terms of their effects on airway pressure.

"This study showed that as far as the mean airway pressure is concerned, nasal high flow is never going to deliver the same levels as CPAP,"

## Study Two - The Relationship Between Flow and Pressure



Parke et al, Respiratory Care 2011

explains Rachael. "But Optiflow does provide a pressure effect that gives you a step before escalating to CPAP or when weaning down. It also lets you maintain some pressure while giving patients a break from CPAP to eat or talk with relatives."

In the fourth study, 60 patients with moderate hypoxemia were randomized to receive either nasal high flow with Optiflow, or humidified high flow face mask oxygen therapy.

The results showed the Optiflow group had:

- Improved therapy success.
- Fewer episodes of desaturation - 42% Optiflow group vs 71% face mask group.
- Fewer patients who went on to require non-invasive ventilation - 10% Optiflow group vs 30% face mask group.

"Basically there were less patients who required an escalation of therapy, so less patients required CPAP or noninvasive ventilation in the Optiflow group than in the standard group" explains Rachael.

## Next steps

The latest study, in review at the time of this article, is a 340-patient randomized trial looking at whether using nasal high flow prophylactically in patients after cardiac surgery can improve oxygenation.

## Optiflow on the wards

While the research program continued to provide insights into how Optiflow works, use of the device spread to the post-cardiac surgery ward. Here they use the Airvo™ flow generator from Fisher & Paykel Healthcare to provide the necessary flows.

"Airvo has made things much easier on the wards," explains Shay. "It only requires electricity and oxygen, and it can give you up to 45L/min. We anticipate it being used more widely in our other post-surgery wards."

## Valuable cost savings

"Optiflow has dramatically reduced our face mask non-invasive ventilation rates," explains Shay. "In addition, we can wean patients down to 35L/min and our rules now allow us to send those patients to the ward, which we couldn't do while they were on non-invasive ventilation."

"Non-invasive ventilation face masks are considerably more expensive than Optiflow and the capital cost of a noninvasive ventilator is much more than an Airvo flow generator," explains Shay. "And let's not forget that an intensive care bed costs eight to ten times more than a ward bed."

## Conflict of interest statement:

Fisher & Paykel Healthcare provide an un-restricted research grant to support a research nurse at Auckland CVICU.

## Opening doors on dead-end streets



WRITTEN BY: **CAROL COLUMBUS, Manager**  
**Respiratory Therapy, Bluewater Health Sarnia,**  
Ontario, Canada.

Respiratory therapists at Bluewater Health in Ontario, Canada were struggling with a patient transferred from another hospital. After several hours trying all known options they turned to a recently demonstrated humidified nasal cannula called Optiflow. Within 90 minutes the patient was sitting up, smiling and solving a crossword puzzle.

### Background

Bluewater Health in Sarnia, Ontario, Canada is a 250-bed hospital with a 16-bed critical care unit using Dräger v500 ventilators. Armed with budget approval for a high flow device, respiratory therapy manager Carol Columbus requested an in-house Optiflow demonstration. She was impressed by the high flow nasal cannula's straightforward connection to their existing ventilators and how easy it was to use. The local Fisher & Paykel Healthcare representative left a sample cannula and heater circuit with Carol along with instructions for use.

### The challenge that opened the door

A respiratory patient, who had spent a full day at a rural hospital with no success, was transferred to Bluewater Health in Sarnia. After trying a variety of devices over two hours Bluewater respiratory therapists were running out of options and sought advice from respiratory therapy manager, Carol Columbus. The decision was made, with the patient's consent, to try Optiflow for the first time.

"With other devices, the patient had been on 100%, sating at about 89% to 90% and even lower in many instances. After an hour and a half on Optiflow, we had the patient down to a FiO<sub>2</sub> of about 70%," explains Carol.

"The patient said he loved it," explains Carol. It was just so weird because he was very ill and then in no time he was doing a crossword puzzle and answering the phone. He was free to eat, drink and do all that stuff."

### Early success leads to further applications

Encouraged by further successes with similar patients and when weaning a tracheotomy patient, the focus soon moved to extending the use of Optiflow.

"We have three intensivists on rotation in our unit and they're quite happy with the results," explains Carol. "The ICU nurses are very positive because they're seeing results; they're seeing that patients are enjoying it and it's doing what it's supposed to do."

"BiPAP masks are really labor intensive. When patients have a mask on and they feel claustrophobic or they're air hungry, they'll rip their masks off. They're certainly more receptive to a nasal prong," says Carol.

"Optiflow has given us another option before intubation and because it fits our existing equipment, it hasn't required a big investment," explains Carol. "When we don't have to ventilate patients, we're probably decreasing length of stay and decreasing vap rates as well."

### Beyond the critical care unit

Carol is now talking with local homecare providers about using Optiflow with Airvo (Fisher & Paykel Healthcare's compact integrated flow generator) when patients could be discharged to home if higher flows were available.

"There might be some expense involved, but there is a considerable expense involved in keeping them here in the critical care unit to provide that effective oxygen therapy," explains Carol.

In addition, Carol can see benefits in a standalone unit in the Emergency Department that could be moved to other areas as required. She is also exploring the potential for pediatric applications.

As is often the case, necessity has opened the door to a new path. For Bluewater Health it is leading to a new world of oxygen delivery with Optiflow.

## And finally...

Optiflow makes a statement at the American Thoracic Society. At this year's ATS Optiflow was spotlighted at an Industry Theater where an International Faculty shared their experiences with Optiflow to a large group of attendees. You can view the presentations on line by visiting the F&P website at [www.fphcare.co.nz](http://www.fphcare.co.nz).