



True partnerships in action

A landmark rapid innovation project between the NSW Government, local universities and industry to rapidly develop back-up ventilator solutions has been a major success story during the unprecedented COVID-19 pandemic.

The challenge

As the world entered March 2020 battling the pandemic, it became clear that global shortages of vital medical equipment could impact NSW's ability to respond to the escalating crisis.

Following a call to industry and its university partners, NSW Health embarked on a rapid innovation project to explore how new ideas could provide back-up ventilator solutions to support frontline workers.

Peter Lawless, Director, Health Infrastructure who led the initiative for Health Infrastructure, said that at the time the project commenced, Australia was heading up a similar COVID-19 curve to Italy.

"If we got to the point that the need for ventilators exceeded the number available, then each additional ventilator had the potential to save a life every 7-10 days," Peter said.

"This really helped keep the team focussed on identifying multiple ways to deliver the first additional ventilator and then scale-up rapidly, rather than worrying too much about how to deliver the perfect solution for the 1000th+ ventilator".

Rapid innovation

THE FIVE KEY INGREDIENTS TO SUCCESS



1. Leverage existing relationships:

Leveraging strong, established relationships across the public and private sector enabled the team to get the right people to have the right conversations. Senior clinicians and academics from two universities helped get the team's head around the problem and quickly identify potential solutions.



2. Multi-pronged approach:

Stream and explore multiple ideas in parallel but also be prepared to quickly pull the handbrake and put workstreams on hold. A good example was the equipment recovery stream – this identified around 50 ICU-grade ventilators that could be fleet-matched with existing hospital ventilators and then quickly recovered, serviced and deployed – a pilot was run with 6 machines before this workstream was put on hold.



3. Resource-up:

Quickly mobilise a project team by leveraging existing industry partners. This allowed the team to divide the work across four project management streams, match workstreams to the expertise of each person, share best practice and not put too much pressure or reliance on any one organisation.



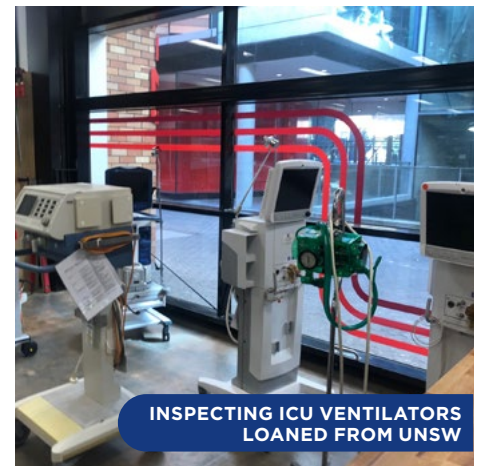
4. Keep everyone calm and informed:

A key risk was that the team could have become overwhelmed and progress paralysed by the scale and uncertainty of the problem. This was countered by ensuring there was progress every day in every workstream, meeting daily and openly sharing information between organisations. There was no 'need to know', everyone was kept in the loop.



5. Strong but simple governance:

Quickly establishing an Executive Steering Committee – meeting regularly and comprising the key decision-makers, supported by expert advisors and an independent Clinical Governance Group.



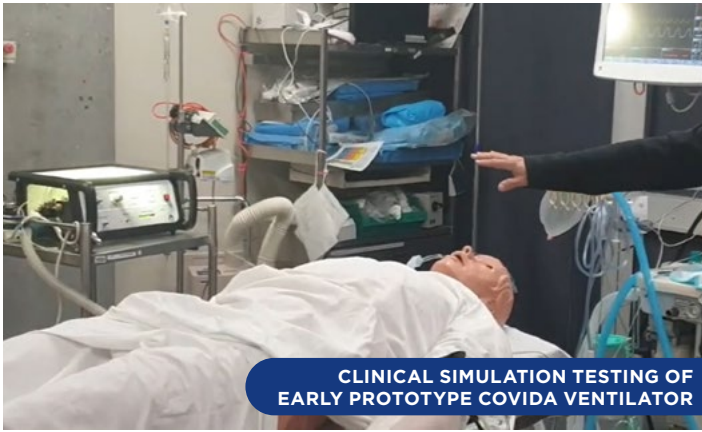
The approach

Three different strategies were developed to source additional back-up ventilators. Two of these focussed on repurposing existing ventilators from different sources – and carried the shortest turnaround to meet demand if required.

The third strategy included developing new products that complied with emergency regulatory requirements and could be manufactured locally at scale.

Five groups came forward to develop prototype ventilators after a callout to industry and university partners, with two solutions selected for further development and testing to meet regulatory requirements in a pre-production stage.





CLINICAL SIMULATION TESTING OF EARLY PROTOTYPE COVIDA VENTILATOR



COVIDA VENTILATOR (MARK 2)

CoVida

A simple, low cost design that uses tried and tested ventilator technology with an updated control system

The CoVida solution may also provide a valuable solution for developing countries, as it provides a low-cost solution using simple, proven and robust technology.

Lead innovation partners



R&D Partners



Other contributors to prototyping



“This wasn’t about getting the best product out there on the market but focussing on what was important right here right now, using tried and tested bullet-proof technology. We took a step back to ensure we could manufacture a basic product that could be replicated elsewhere. We focussed on making it fast and useable through a rapid innovation approach that was driven by the pandemic.”

Prof Gregg Suaning,
Head of School – Biomedical Engineering,
the University of Sydney



Fast Facts

VENTILATOR LOCAL MANUFACTURING SOLUTIONS

- Five prototype ventilators developed over a 4-week period
- Two solutions were selected for further R&D investment:

CoVida ventilator – a simple, low cost design that uses tried and tested ventilator technology with an updated control system – team led by the University of Sydney

Ventasys ventilator – a new design of a relatively sophisticated ventilator led by Ampcontrol, a Hunter-based engineering company in partnership with John Hunter Hospital

- 10 of each solution are being manufactured and tested through a pre-production stage during June and July
- R&D investment will help boost jobs and innovation in NSW and support enduring partnerships between health, education and industry.

Ventasy

A new design of a relatively sophisticated ventilator

The Ventasys solution is targeting the upper end of the Therapeutic Goods Administration specification and, once further R&D has been completed during the pre-production stage, it will be able to support and synchronise with the patient's own breathing cycle which is important for weaning patients off mandatory ventilation as they recover.

Lead innovation partners



R&D Partners



Other contributors to prototyping



The project

Both ventilator solutions use components that can be either manufactured locally or that are used in other high-specification industries and are available without competing with the supply chain for current model ventilators.

The CoVida and Ventasys prototypes have been selected for progression through the pre-production stage, involving the manufacture of 10 fully functioning units of each ventilator for further clinical assessment and satisfaction of TGA requirements for COVID-19 use in Australia.

Pre-production is being undertaken in June and July and will deliver two 'shelf-ready' back-up solutions, which can be mobilised quickly to full production if required.

Comprehensive contingency plan

In addition to local manufacturing of new ventilators, other innovations have been investigated to provide additional back-up ventilator capacity, including training and software upgrades required to enable anaesthetic machines to be used by a broader cohort of staff, as well as sourcing, servicing and repurposing ventilators that meet current TGA requirements for use but are being used in research and education settings.

“We now have a multi-pronged contingency plan in place, which if needed, would be the most important thing we've ever done in our careers.”

Prof John Watson AM,
Senior Vice Dean, University of New South Wales - Clinical Affairs.