

COVID-19: Very Rapid Updates and Safety (ViRUS)

What will happen if your oxygen pipeline pressure drops?

What happened?

Huge demands on oxygen infrastructure may lead to a drop in pipeline gas pressure, or maybe even failure. Units need to know what will happen to their ventilators in their unit if the pipeline pressures fall. Some ventilators reduce their FIO₂ and some will shut off the oxygen flow if it drops below a threshold, delivering 21%.

Therefore, we used a pressure regulating test device (from our medical engineers) placed between the pipeline gas wall outlet and the various ventilators to assess the impact of a fall in pipeline pressure. This adjusts the pipeline pressure from 4 bar down to zero and you can see how the ventilator responds. We ran the ventilator on 100% oxygen into a test lung.

Why might this be more likely than usual to happen during the COVID-19 pandemic?

The COVID pandemic has increased the potential numbers of patients in a hospital requiring oxygen therapy. Some of this requires very high flows of oxygen (and in some cases air). This particularly affects CPAP and HiFlo provision. However, in the event that flows fall, this will impact all systems including ventilators. Not all ventilators handle this problem equally, and we are using lots of different types of ventilators at the moment.

How could this have been identified early in its course/how it could have been prevented or mitigated if recognised earlier?

Prior knowledge of which ventilators are most at risk of failure is useful for units, who might want to consider where these devices are used, and perhaps the worst devices kept 'in reserve' if possible. Our newer ventilators worked until the pipeline gas pressure dropped below 0.8bar, whilst older ventilators shut off the oxygen supply when the pipeline pressure dropped below 2.5bar.

How have you managed to resolve this issue or create a work around?

We will circulate guidance to staff as to what to do if the 'pipeline pressure low' alarm comes up, so there is hopefully less panic. Simple things like shutting off any additional oxygen supplies, ensuring that nebulisers are used with low flows and knowing where the oxygen cylinders are located are useful. This is especially important as we use non-ICU locations to care for our patients.