

Safety Action Notice

Reference **SAN(SC)21/03**Issued **29 January 2021**Review Date **29 January 2022**

Oxygen Supply (COVID-19)

Source: This notice is based on the English Estates and Facilities Alert NHSE/I – 2020/003 issued by NHS Improvement

Summary

In relation to oxygen supplies within NHS Scotland hospitals and specialist services, health boards are reminded to be aware of:

- **Low supply pressure risk:** If the demand through multiple wall outlets exceeds the maximum capacity of the vacuum insulated evaporator (VIE) delivery system (pipe network), there is a risk of an increased pressure drop in oxygen supply pipes. This could lead to difficulties with oxygen delivery systems throughout the hospital, including to patients on face masks, high flow nasal oxygen (HFNO₂), Continuous Positive Airway Pressure (CPAP) or other non-invasive ventilation (NIV), ventilators and operating theatres. There is also a risk of an accelerated depletion of the VIE. Both of these situations present a potentially significant risk to multiple patients simultaneously if no action is taken.

Action

Establish leadership teams including key clinical leaders and hospital oxygen engineering teams (including expertise from medical gases committees) to ensure oxygen demand does not outstrip supply by:

1. Identifying the current maximum flow rate from your VIE.
2. Clarifying the safest physical location to treat multiple patients on high flow O₂ or high flow support devices such as wall CPAP (i.e. critical care vs. ward), taking into account room ventilation and the ability of the gas pipe network to deliver the desired flow and pressure to any selected location.
3. Identifying any improvements that could be made to pipework architecture or other potential modifications which enable more patients to be managed on oxygen. The starting point must be the establishment of a detailed record of the existing network and obtaining/developing tools to check that the desired flow rates can be delivered, to any chosen location, without excessive pressure reduction.
4. Establishing at least daily checking systems for good oxygen housekeeping on every ward and department (**see Annex 1**)
5. Instituting a system to monitor average hourly oxygen usage and ensuring an escalation plan has been developed for if this exceeds 75% of maximum VIE outflow. Ensure that existing arrangements with the supplier, to top up the VIE, are still appropriate.

6. Risk assessing the local controls to manage provision of oxygen supply, including maintenance of the VIE plant, to ensure unintended effects that create unnecessary delay in providing oxygen to patients who need it are minimised
7. Risk assessing the local controls to avoid wastage of oxygen supply to ensure unintended effects are minimised (e.g. risk of failing to restart flow of oxygen after turning off when not in use)
8. Ensure that all staff are trained to read the flow rate from the centre of the ball in the O2 flow meter. *A popular misconception is that it is read from the bottom of the ball, which could add 0.5 lpm to the flow, given the number of hours patients may be on O2, this, when multiplied up by the number of patients is potentially significant and wasteful. Not to mention contributing to O2 enrichment. See figure 1.*
9. Ensure that all staff are trained to recognise that flow meters are calibrated up to 15 lpm, if the valve is fully opened the flow rate will flush at up to 60 lpm. *(If you go above the 15 lpm marker the accuracy drops off and the actual flow rate may be anywhere between 15 and 60. This would be potentially wasteful and could add to O2 enrichment).*
10. Establishing effective systems for ensuring used and emptied cylinders are identified and promptly collected and returned for refilling

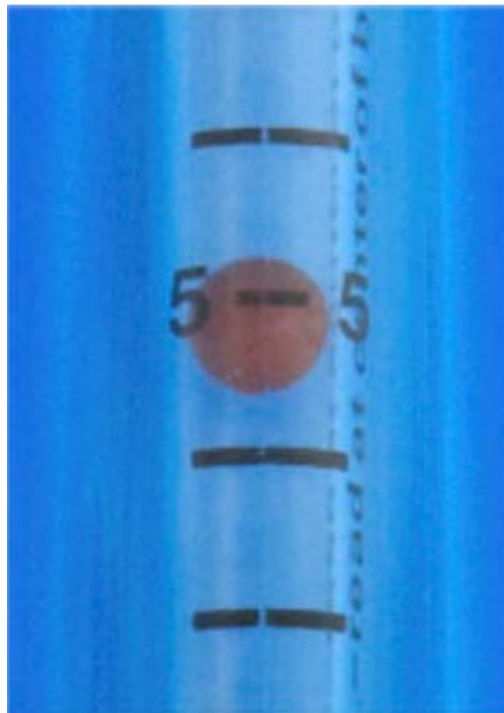


Figure 1 – oxygen flow rate must be read at the middle of the ball's diameter

Note many of the actions to reduce oxygen wastage will also have a positive effect on reducing fire risk

Action by

- Chief Executives, Medical Directors, Directors of Nursing, Critical Care Managers, Respiratory Care Managers, Medical Physics Manager, Pharmacy Managers, Directors of Estates and Facilities and Fire Managers

Deadlines for action

Actions underway: Immediately

Actions complete: 04 March 2021

Problem / background

As hospitals come under increased pressure from acute respiratory admissions due to COVID-19 and winter viruses, oxygen estates may also come under pressure due to:

- Admitting large numbers of COVID-19 patients in addition to their usual workload of elective, urgent and emergency care;
- Creating new bays or wards to care for patients with COVID-19 or other respiratory illnesses;
- Having older estates, or;
- Using Continuous Positive Airway Pressure CPAP, non-invasive ventilation (NIV) and/or High Flow Nasal Oxygen (HFNO₂) as part of the care pathway for acute respiratory patients (COVID-19 or non-COVID-19);

Demand for oxygen this winter is also likely to be higher than in spring because:

- There are more general and acute patients in hospital than in the spring, many of whom require some oxygen; and
- There is proportionately greater use of HFNO₂ and CPAP in patients with COVID-19 and in general, these devices, in total, use more oxygen than critical care ventilators (due to the proportionally higher quantity of them compared to the number of ventilators)
- Operating theatres and recovery wards are largely continuing to run as normal rather than acting as COVID-19 surge capacity.

It is therefore particularly important that Boards continue to follow previously issued guidance and good practice in relation to oxygen supplies

Distribution

Ambulance Services, Capital Planning & Design, Critical care, Emergency Department, Estates and Facilities, Fire Safety Advisors, Health & Safety, Hospices, Infection Control Staff, Intensive Therapy Units, Medical, Medical Physics, Nursing, Operating Departments, Pharmacy, Respiratory Medicine, Risk Management, Supplies/Procurement

References

- SAN(SC)20/05 Protection of hospital oxygen pipeline systems through managed distribution of oxygen-dependant patients (COVID-19), April 2020 <https://www.nss.nhs.scot/media/1309/san-sc-2005.pdf>
- IM/2020/005 Use of high flow Oxygen therapy devices (including CPAP and high flow face mask or nasal oxygen) during the Coronavirus epidemic – urgent patient safety notice, April 2020 <https://www.nss.nhs.scot/media/1277/im-2020-005.pdf>

Enquiries

Enquiries (and adverse incident reports) in Scotland should be addressed to:

Incident Reporting & Investigation Centre (IRIC)

NHS National Services Scotland

Gyle Square, 1 South Gyle Crescent, Edinburgh EH12 9EB

Tel: 0131 275 7575 Email: nss.irc@nhs.scot

Report options are available on the HFS website: [How to report an Adverse Incident](#)
Further information about reporting incidents can be found in [CEL 43 \(2009\)](#) or by contacting IRIC at the above address.

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ANNEX 1

Good Oxygen Housekeeping **For use on ALL WARDS AND DEPARTMENTS**

Ward and Department checklist

Complete before shift handover and during pharmacy rounds

- Advise all staff working of the location of the oxygen outlet alarm panel
- Check stock of oxygen cylinders is readily available in case of emergency
- Replace empty or near empty oxygen cylinders
- Turn off oxygen flowmeters which are not in use
- Remove medical air flowmeters when not in active use

Have staff been trained in the correct setup and reading of O2 flow meters

Patient checklist

- Titrate patient's oxygen to targeted SpO2 consistent with local clinical guidance.
- Turn off oxygen flowmeter if not in use
- Ensure no more than 15L/Min are given by a standard ward oxygen flowmeter

High flow nasal oxygen (HFNO₂) and CPAP/NIV devices patient checklist

- Turn off devices when not in use
- Limit large mask leaks with CPAP / NIV devices: call for help to review / refit mask if required
- Where possible avoid the use of oxygen cylinders to support CPAP / NIV devices (both risk of oxygen failure and potential fire risk)

**If an oxygen alarm sounds, this must be taken seriously and not ignored
Please contact [Insert local point of contact] as a matter of urgency.**