Estates and Facilities Alert

NHSE/I – 2020/001 Issued: 31 March 2020

Use of high flow Oxygen therapy devices (including wall CPAP and high flow face mask or nasal oxygen) during the Coronavirus epidemic – urgent patient safety notice; immediate attention required

Summary

Letter to CEOs, Medical Directors, Critical Care Directors and Respiratory and acute medicine directors

Dear Colleague,

Revised guidelines around the use of non-invasive ventilation (NIV), and particularly continuous positive airway pressure ventilation (CPAP) were issued by NHS England / NHS Improvement on 26 March 2020. When considering how to implement these guidelines, please ensure that your estates team and clinical teams consider the following important safety issues about oxygen (O_2) flow and demand:

- CPAP delivery systems may have very different oxygen flow requirements – wall CPAP devices generally have much higher oxygen flow requirements than bedside machines
- The safe delivery of oxygen through wall outlets depends on:
    - the physical location of the outlet (critical care units, operating theatres and recovery areas usually have higher average potential flow rates – around 40 l/min – than normal wards – around 10 l/min);
    - the total piped oxygen demand within the hospital; and
    - the maximum outflow from the hospital's liquid oxygen storage tank, the Vacuum Insulated Evaporator (VIE). Modern VIEs with modern pipe systems can often produce around 3000L/min O_2, but older systems can produce as little as 1500 l/min O_2.
- **If the demand through multiple wall outlets exceeds the maximum capacity of the VIE delivery system, there is a risk of a rapid pressure drop in oxygen supply pipes. This could lead to a failure of oxygen delivery systems throughout the hospital, including to patients on face masks, CPAP, ventilators and operating theatres. There is also a risk of rapid and unpredictable depletion of the VIE. Both of these situations present a potentially significant risk to multiple patients simultaneously.**

As a result of this, some hospitals are using cylinders to increase O_2 supply on normal wards – there are significant patient and staff risks associated with this.

These issues are not normally a consideration for hospitals, as the majority of patients are on no oxygen or low-flow. However, during the Coronavirus epidemic, a far greater proportion of

patients will require O_2 therapy and ventilation, and this presents a clear and significant risk to oxygen delivery systems within hospital estates.

In order to mitigate this risk, please ensure that you take the following urgent actions:

- ensure liaison between clinical leadership and hospital oxygen engineering teams to ascertain:
  - the maximum flow rate from your VIE
  - the safest physical location to treat multiple patients on high flow O_2 or high flow support devices such as wall CPAP (i.e. critical care/theatres vs. ward)
  - any additional limitations to O_2 delivery owing to pipework architecture or potential modifications which could be made to improve O_2 delivery
- undertake a daily count of the number of high flow ventilatory systems where the potential O_2 flow rate exceeds 10 l/min (this would include most wall CPAP systems, High Flow Nasal Oxygen (HFNO) and many ventilators used in critical care units or operating theatres). This is particularly important as your hospital starts to receive additional invasive and non-invasive ventilators from the NHS supply chain or any other route
- calculate the maximum number of patients who can be treated with high flow devices such as wall CPAP and communication of this to the relevant clinical teams
- implement safety measures to prevent accidental O_2 system failure (such as limiting the number of these devices available for clinical use).
- work with your local medical oxygen engineering team to evaluate the potential for improving supply / flow dynamics of local O2 delivery to enable more patients to be managed on higher flow O2
- reduce / avoid reliance on cylinder O_2 to drive ventilators or to provide O_2 at permanent patient bedspaces. There are physical hazards associated with this, including trip hazards for staff and patients, and the risk of O2 supply running out without clinical staff being alerted.
- when cylinders are used and emptied, please ensure that they are promptly returned for refilling.
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Thank you in anticipation of your attention to this critical safety concern.

Yours faithfully,

Professor Ramani Moonesinghe, National Clinical Director, Critical Care

Professor Andrew Menzies-Gow, National Clinical Director, Respiratory Medicine

Mr Adrian Eggleton, National Estates Operational Lead and Covid-19 NHS Estates Lead

Action

Action by
CEOs,
Medical Directors,
Critical Care Directors and
Respiratory and acute medicine directors
Estates and Facilities Directors

Deadlines for action
Actions underway: ASAP

Enquiries

This alert has been compiled under a partnership arrangement by the organisations below and it has been distributed across the UK. Enquiries should be directed to the appropriate Regional Office quoting the alert reference number.

England

Enquires should be addressed to: yasmin.whyte1@nhs.net please DO NOT SUBMIT QUERIES through the Central Alerting System as we are unable to manage this flow at the moment.

For queries about clinical use of NIV, CPAP and HFNO in COVID-19 see https://www.england.nhs.uk/coronavirus/

Reporting adverse incidents in England
Defects or failures should be reported on this system: http://efm.hscic.gov.uk/

The web-based D&F reporting system is managed by the NHS Digital on behalf of NHS Improvement. For further information on this system, including obtaining login details, please contact the efm-information Helpdesk. Tel 0300 123 2106.

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