



Patient Safety Alert

Stage One: Warning

Risk of severe harm and death from unintentional interruption of non-invasive ventilation

13 February 2015

Alert reference number: NHS/PSA/W/2015/003

Alert stage: One - Warning

Non-invasive ventilation (NIV) is increasingly being used in acute hospitals and a recent audit¹ has highlighted the importance of giving NIV in an appropriate environment by appropriately trained staff.

A particular risk relating to the delivery of NIV has been identified. A serious incident reported to the National Reporting and Learning System (NRLS) described that a mask for non-invasive ventilation (NIV) was attached to a patient's face but the ventilation machine had not been switched on. The patient became severely hypoxic and died. A similar case has also been reported to MHRA.

A review of NRLS data since 2012 identified three additional fatal incidents in which the oxygen supply was found to be disconnected when patients were receiving NIV. In these cases, the length of time that the oxygen tubing was detached was unknown as no regular checking of oxygen tubing was completed, and no patient observations were recorded.

Unlike ventilators that provide life-sustaining ventilation, non-invasive ventilators may lack features to warn staff of delivery problems, such as disconnection and loss of gas supply. Where devices delivering NIV have an alarm facility, this function has sometimes been disabled by staff. Devices also differ in their modes of operation; for example, following a pause in NIV therapy, some machines automatically revert to ventilation support when the mask is re-fitted; others need to be manually reactivated.

Review of incidents reported to the NRLS suggest that risks are increased when:

- patients, especially those with limited ability to summon help, are not closely monitored;
- staff are not familiar with the equipment and its correct use (e.g. unclear about when to use vented or non-vented masks, or patients bringing devices from home); and
- a new make and model of device is implemented; staff, even when they have been trained on the new device, may instinctively expect the device to work in the same way as the previous make and model in use.

NHS England and MHRA will continue to review risks relating to NIV and will provide further advice if required.

Actions

Who: All providers of NHS funded care

When: To commence immediately and be completed by no later than 27 March 2015

- 1** Identify if unintentional interruption of NIV has occurred, or could occur, in your organisation.
- 2** Consider if immediate action needs to be taken locally, and ensure that an action plan is underway if required, to reduce the risk of further incidents occurring.
- 3** Distribute this Alert to all relevant staff who are involved in the setup of NIV devices and/or care for NIV patients.
- 4** Share any learning from local investigations or locally developed good practice resources by emailing patientsafety.enquiries@nhs.net.

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Technical notes

NRLS search dates and terms

The National Reporting and Learning System (NRLS) was searched on 12 January 2015 for incidents, which were reported since 1 January 2012 as resulting in severe harm or death and which contain the keywords [NIV, non_invasive_ventilation, BIPAP or CPAP]. In total, 206 incidents were found and all were reviewed. In addition to the trigger incident, four reports were identified describing oxygen disconnections during non-invasive ventilation. Three of the patients involved have died.

Stakeholder engagement

The Patient Safety Alert was developed with advice from MHRA, the British Thoracic Society (BTS) and the NHS England Medical Specialties Patient Safety Expert Group (see www.england.nhs.uk/patientsafety/patient-safety-groups/ for membership details) who fully supported the publication of this alert.

Useful resources

¹COPD: Who cares? National Chronic Obstructive Pulmonary Disease (COPD) Audit Programme: Resources and organisation of care in acute NHS units in England and Wales 2014. National COPD Audit Programme, November 2014. Available at <https://www.rcplondon.ac.uk/projects/national-copd-audit-programme-starting-2013>

The use of NIV in the management of patients with COPD admitted to hospital with acute type II respiratory failure (2008). Joint British Thoracic Society/ Royal College of Physicians/ Intensive Care Society publication. Available at [https://www.brit-thoracic.org.uk/guidelines-and-quality-standards/non-invasive-ventilation-\(niv/](https://www.brit-thoracic.org.uk/guidelines-and-quality-standards/non-invasive-ventilation-(niv/)

NIV in COPD: Management of acute type 2 respiratory failure: National guidelines. (Royal College of Physicians, 2008). Available at <https://www.rcplondon.ac.uk/resources/concise-guidelines-non-invasive-ventilation-chronic-obstructive-pulmonary-disease>