National Patient Safety Alert

The Faculty of Intensive Care Medicine

NHS England

Risk associated with adult breathing circuits lacking a patent exhalation route.

Date of issue:	11 December 2025	Reference no:	NatPSA/2025/008/NHSPS

This alert is for action by all organisations that care for patients on invasive and non-invasive breathing circuits.

This is a safety critical and complex National Patient Safety Alert. Implementation should be co-ordinated by an executive lead (or equivalent role in organisations without executive boards) and supported by clinical leaders in intensive care medicine, emergency medicine, long term ventilation services, respiratory medicine and physiotherapy.

Explanation of identified safety issue:

In the UK, many of the around 236,500 adults and children admitted to a critical care unit each year[1] will require breathing support with invasive or non-invasive ventilatory (NIV) support systems. Some patients with respiratory support needs will be cared for in other clinical areas such as emergency departments or base wards as their condition and need for support changes.

The safe set up or adaptation of a breathing circuit is a complex process. Critically, for effective respiratory support, a breathing circuit requires the patient to be able to breathe in and, via an exhalation route, to breathe out.

The National Patient Safety Team are aware of patients who have come to harm or been exposed to potential harm because the breathing circuit to which they were connected was incorrectly assembled.

A review of the national patient safety databases over a 3-year period identified 102 safety incidents describing the absence of an exhalation route because of incorrect assembly or selection of equipment. As a result the patient could not effectively exhale.

Two patients were reported as peri-arrest when exhalation routes were missed from their breathing circuits. In multiple reports describing the physiological deterioration of a patient, the potential for serious harm was mitigated when staff placed the missing exhalation port into the circuit. In addition, numerous accounts of exhalation routes on NIV masks being occluded with tape were also identified. NOTE A

The Faculty of Intensive Care Medicine (FICM) has published a resource to help in the designing of local guidance and visual aids to support the safe set up of invasive and non-invasive breathing circuits.[2]

Actions required:

Actions to be completed by 12 June 2026

Organisations should identify a clinical lead and form a working group to develop local guidance and visual aids for the assembly, connection and reconnection of breathing circuits. NOTE B

The guidance and associated training must include the following recommendations:

1. **Before** connection to the patient, check the breathing circuit includes an exhalation route, and that there are no obstructions within the circuit. NOTE C
2. Perform the following checks when there is **any** change in the configuration of **any** breathing circuit;
   i. observe the patient, checking chest movement (inspiration and expiration), to ensure patient is ventilating normally, and check flow, volume, pressure, saturations and capnography.
   ii. ensure alarm parameters and volume are set appropriately.
   iii. ensure expiratory vents, ports or valves on NIV masks are **not** occluded. NOTE A

Organisations should:

3. Ensure the clinical lead (or deputy) oversees any revision to the local guidance.
4. Establish a clear process to ensure all updates to the guidance, checklists or visual aids are communicated to all relevant team members.
5. Establish a clear process for communicating any urgent changes to local guidance and practice when, for example, a supply chain disruption means standard consumables are unavailable and replacements are provided.

The FICM resource[2] can be used as a template for organisations to produce local guidance.

For further details see: https://www.england.nhs.uk/2025/12/risk-associated-adult-breathing-circuits-lacking-patent-exhalation-route/

Failure to take the actions required under this National Patient Safety Alert may lead to CQC taking regulatory action

Notes

A. NIV masks are available with and without an integral vent. Breathing circuits that use a non-vented mask require an expiratory port in the circuit. Those that use a vented mask do not; the vent is integral to the mask. Care should be taken to ensure the vent on a vented mask is never covered as this is the patient's only expiratory route.
B. This alert does not apply to breathing circuits used in the operating theatre.
C. Checks should include use of speaking valves (Passy Muir). These devices close on expiration so must NEVER be used with the tracheostomy cuff inflated, as the cuff obstructs the patient's only expiratory route.[3,4]

Patient safety incident data:
The National Reporting and Learning System (NRLS) and Learning from Patient Safety Events (LFPSE) were searched on two occasions using a combination of keywords to identify relevant incidents. Incidents were thematically reviewed and together the two searches for a 3-year period identified 102 incidents describing a breathing circuit without a patent expiratory port.

Reports described:

- incorrect assembly or selection of equipment, resulting in circuits without an exhalation route
- ports on vented NIV masks were taped over or otherwise covered
- mis-selection of NIV masks; for example, non-vented mask used without the addition of a suitable expiratory port or valve to the circuit.

Resulting in:

- peri-arrest
- seizures
- raised carbon dioxide and drowsiness
- patient distress and reports of being unable to breathe

References:

1. NHS England. Hospital admitted patient care activity. Summary report: critical care records 2024. 26 September 2024
2. Faculty of Intensive Care Medicine. Breathing circuits: a resource for designing local guidance. February 2025
3. MHRA News Roundup: Passy Muir speaking valve (PMV) – reminder of safe management after incident reports. July 2025
4. National Tracheostomy Safety Project: Swallowing & Communication (Adults) – One-way valves and ventilators.

Stakeholder engagement:

- Faculty of Intensive Care Medicine (FICM)
- National Patient Safety Response Advisory Panel
- NHS England National Clinical Director (Critical & Perioperative Care)
- Consultation on resource via FICM:
  - British Thoracic Society
  - Intensive Care Society
  - Safe Anaesthesia Liaison Group

Advice for Central Alerting System (CAS) officers and risk managers
This is a safety critical and complex National Patient Safety Alert. In response to CHT/2019/001 and CHT/2023/002 your organisation should have developed new processes to ensure appropriate oversight and co-ordination of all National Patient Safety Alerts. CAS officers should send this Alert to the executive lead nominated in their new process to co-ordinate implementation of safety critical and complex National Patient Safety Alerts, copying in the leads identified on page 1.