



Shared Learning Briefing

Safe Management of Breathing Circuits and Maintenance of a Patent Exhalation Route



Purpose

The safe management of breathing circuits depends on maintaining a patent expiratory route. A missing, obstructed or incorrectly configured expiratory route can rapidly compromise ventilation and result in serious harm.

This briefing highlights key learning from the NHS England National Patient Safety Alert: Risk Associated with Adult Breathing Circuits Lacking a Patent Exhalation Route and reinforces safe respiratory care practice.

What is a patent exhalation route?

A patent exhalation route is the pathway that allows a patient to exhale effectively whilst connected to a breathing circuit. Depending on the respiratory support being used, this may be provided by an exhalation valve, an expiratory port, or an exhalation port incorporated within an NIV mask.

Without a patent expiratory route, exhaled gas cannot leave the system effectively, resulting in ineffective ventilation, carbon dioxide retention and rapid patient deterioration.

What is the risk?

Failure to maintain a patent expiratory route can rapidly compromise ventilation and result in serious patient harm. Nationally reported incidents have included peri-arrest, seizures, raised carbon dioxide levels and patient distress.

Safe Practice

Before connecting or reconnecting a breathing circuit, confirm that a patent expiratory route is present, all valves, ports and vents are unobstructed, and that circuit configuration and alarm settings are appropriate for the patient.

Many patient safety incidents occur during routine tasks. Plan equipment changes carefully, minimise interruptions and, where practicable, seek an independent check from a second appropriately trained clinician.

Following any circuit change, remain with the patient and confirm effective ventilation through both equipment checks and direct clinical assessment.

Special considerations – NIV and one-way speaking valves

Full-face NIV masks (covering the nose and mouth) require a patent expiratory route. Only NIV masks with an integrated exhalation port are approved for use. Staff should ensure that these ports are present and unobstructed.

One-way speaking valves, including Passy Muir Speaking Valves, redirect exhaled air through the upper airway, restoring a more normal airflow pattern and supporting communication, airway sensation and secretion management where appropriate. These devices must never be used with an inflated tracheostomy cuff, as the inflated cuff blocks the intended expiratory route.

Always understand how the patient is expected to exhale and ensure that the expiratory route is present and remains patent.

Key message

Always confirm that a patent expiratory route is present before connecting or reconnecting a patient. Plan equipment changes carefully, avoid assumptions and, where practicable, seek an independent check.

Following any circuit change, remain with the patient and confirm effective ventilation through both equipment checks and direct clinical assessment

Reflective team activity

Use one question below to guide discussion during supervision, team meetings or Putney Board sessions:

1. What conditions, circumstances or system factors could increase the risk of a patient losing their expiratory route, and what barriers or safeguards are in place to prevent harm?
2. If you were asked to care for a patient using respiratory equipment outside your usual area of practice, what factors would help you recognise the limits of your competence and access the support needed to provide safe care?
3. What human factors are most likely to influence the safe assembly, modification or checking of breathing circuits in our clinical area, and how can we design our practice to reduce the risk of error?