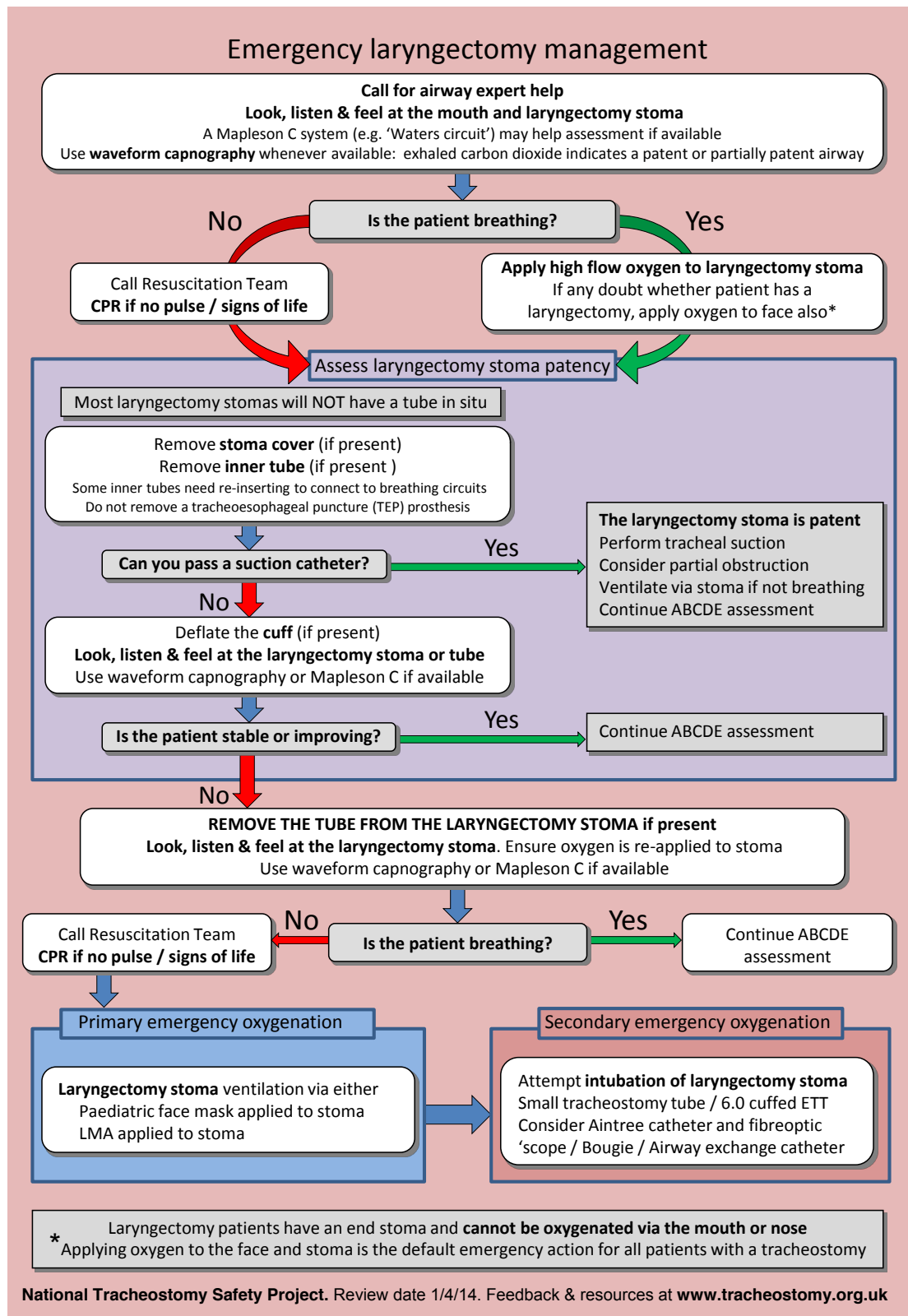**Laryngectomy: the 'Red algorithm'**

This algorithm is paired with the red bedhead sign and indicates that the patient does not have an upper airway which is connected the lungs. The principles of the algorithm are the same, without the conventional upper airway management steps described above. Patients with laryngectomies usually do not have a tracheostomy tube in situ, but may have other devices inserted into their airways, such as humidifiers or tracheo-oesophageal puncture 'TEP' valves. These devices should not be removed (see relevant section) The exclusion of the upper airway means laryngectomy patients will not obstruct their airway when laying flat on their back and aspiration of gastric contents is not a concern. In the context of cardio-pulmonary resuscitation, chest compressions will generate more significant tidal volumes owing to a reduction in dead space. Oxygen insufflation alone without ventilation may be effective if ventilation proves difficult.

A patient with a tracheostomy is more likely to come to harm by not having oxygen applied to the face if confusion surrounds the nature of the stoma. The default emergency action is to apply oxygen to the face and the stoma for all neck breathers when there is any doubt as to the nature of a stoma. Any oxygen applied to the upper airway can be removed in the case of a laryngectomy once this has been confirmed to be the case. Ventilation via laryngectomy stomas can be achieved directly using paediatric face masks or laryngeal masks applied to the anterior neck.

An interactive laryngectomy algorithm with videos highlighting key steps can be viewed at our website www.tracheostomy.org.uk.

Emergency laryngectomy management

Call for airway expert help
Look, listen & feel at the mouth and laryngectomy stoma
A Mapleson C system (e.g. 'Waters circuit') may help assessment if available
Use **waveform capnography** whenever available: exhaled carbon dioxide indicates a patent or partially patent airway

Is the patient breathing?

No →
Call Resuscitation Team
CPR if no pulse / signs of life

Yes →
Apply high flow oxygen to laryngectomy stoma
If any doubt whether patient has a laryngectomy, apply oxygen to face also*

Assess laryngectomy stoma patency

Most laryngectomy stomas will NOT have a tube in situ

Remove **stoma cover** (if present)
Remove **inner tube** (if present)
Some inner tubes need re-inserting to connect to breathing circuits
Do not remove a tracheoesophageal puncture (TEP) prosthesis

Can you pass a suction catheter?

Yes →
The laryngectomy stoma is patent
Perform tracheal suction
Consider partial obstruction
Ventilate via stoma if not breathing
Continue ABCDE assessment

No ↓
Deflate the **cuff** (if present)
Look, listen & feel at the laryngectomy stoma or tube
Use waveform capnography or Mapleson C if available

Is the patient stable or improving?

Yes →
Continue ABCDE assessment

No ↓
REMOVE THE TUBE FROM THE LARYNGECTOMY STOMA if present
Look, listen & feel at the laryngectomy stoma. Ensure oxygen is re-applied to stoma
Use waveform capnography or Mapleson C if available

Is the patient breathing?

No →
Call Resuscitation Team
CPR if no pulse / signs of life

Yes →
Continue ABCDE assessment

Primary emergency oxygenation

Laryngectomy stoma ventilation via either
Paediatric face mask applied to stoma
LMA applied to stoma

Secondary emergency oxygenation

Attempt **intubation of laryngectomy stoma**
Small tracheostomy tube / 6.0 cuffed ETT
Consider Aintree catheter and fibreoptic 'scope / Bougie / Airway exchange catheter

* Laryngectomy patients have an end stoma and **cannot be oxygenated via the mouth or nose**
Applying oxygen to the face and stoma is the default emergency action for all patients with a tracheostomy

National Tracheostomy Safety Project. Review date 1/4/14. Feedback & resources at **www.tracheostomy.org.uk**

NTSP
www.tracheostomy.org.uk

Comparison with previously published guidelines

The way in which the NTSP guidelines have been developed is unique. As a result, specific differences with other previous guidelines are evident. In the NTSP algorithms:

1. Waveform capnography has a prominent role at an early stage in emergency management.
2. Oxygenation of the patient is prioritised.
3. Trials of ventilation via a potentially displaced tracheostomy tube to assess patency are avoided.
4. Suction is only attempted after removing a potentially blocked inner tube.
5. Oxygen is applied to both potential airways.
6. Simple methods to oxygenate and ventilate via the stoma are described.
7. A blocked or displaced tracheostomy tube is removed as soon as this is established, not as a 'last resort'.

In addition, previous guidance for tracheostomy emergencies has generally not been published as an algorithm, making them difficult to follow in emergency situation. Where algorithms have been used, they are often complex and not easily followed when tested in simulated emergencies. No other algorithms are colour coded and none are presented paired with bedhead signs. No emergency guidance was applicable to all situations (critical care, ventilated patients, surgical vs percutaneous tracheostomy, community patients) and many offered no 'Plan B' if the initial measures failed to resolve the situation.