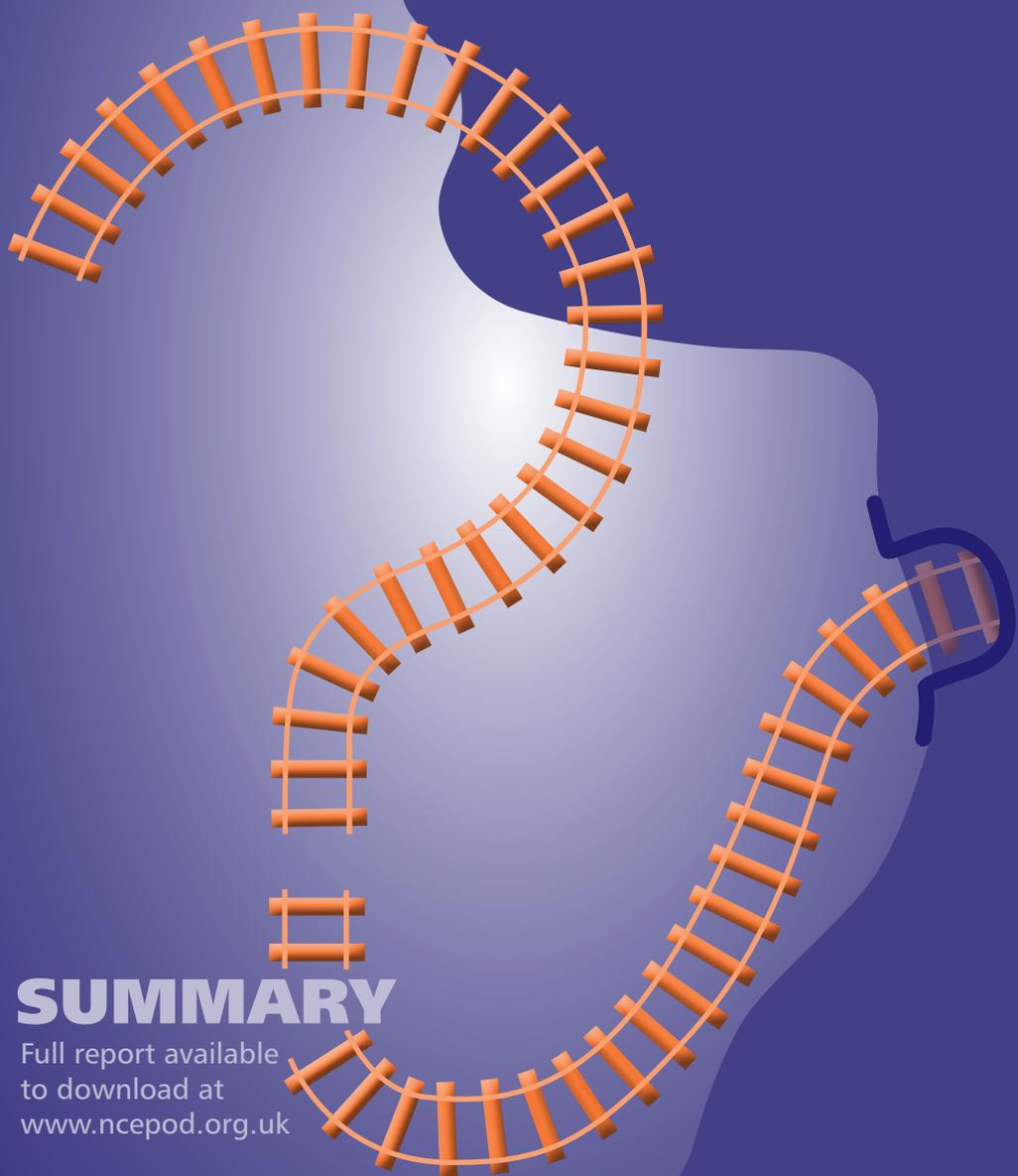


# On the Right Trach?

A review of the care received  
by patients who underwent a  
tracheostomy



## SUMMARY

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## On the Right Trach?

A review of the care received by patients who underwent a tracheostomy

A report by the National Confidential Enquiry into Patient Outcome and Death (2014)

Compiled by:

K A Wilkinson FRCA FRCPC  
NCEPOD Clinical Co-ordinator (Anaesthetics)  
Norfolk and Norwich University Hospitals NHS Foundation Trust

I C Martin LLM FRCS FDSRCS  
Former NCEPOD Clinical Co-ordinator (Surgery)  
City Hospitals Sunderland NHS Foundation Trust

H Freeth BSc (Hons) MSc RGN MSc – Clinical Researcher

K Kelly BA (Hons), PGC Health Research – Researcher

M Mason PhD – Chief Executive

Study proposed by:

The Association of Anaesthetists of Great Britain and Ireland

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## Principal recommendations

Tracheostomy insertion should be recorded and coded as an operative procedure. Data collection in all locations should be as robust as that for a theatre environment. This will facilitate better care planning and allow for national and local review and audit. *(Medical Directors and National Coding Systems)*

The diameter and length of the tube used should be appropriate for the size and anatomy of the individual patient, therefore an adequate range of tracheostomy tubes needs to be stocked by units. Operators should be aware of the types of tube available and in particular recognize that adjustable flanged tubes are available with inner tubes. Professionals need to continue to work closely with manufacturers to optimise design and tube options for a non standard population. *(Consultant Operators, Theatre and Critical Care Managers and Professional Health Care Bodies)*

All Trusts should have a protocol and mandatory training for tracheostomy care including guidance on humidification, cuff pressure, monitoring and cleaning of the inner cannula and resuscitation. The clinical practices around tracheostomy care should be the subject of local quality improvement initiatives. Tube data should be more clearly recorded and made available for review at bedside and thereafter facilitated by a 'passport' for each patient, with all data included. *(Medical Directors, Directors of Nursing and Health Care Commissioners)*

In order to facilitate decannulation and discharge planning multidisciplinary care needs to be established as part of routine pathway for ALL tracheostomy patients. Whilst on the critical care unit there should be at least daily review, key additional team members should be involved at an early stage. The team composition should be flexible to properly reflect the patient's needs and provide excellent continuity of care. There are several key team members who one would expect should always participate, e.g. physiotherapy, speech and language therapy, outreach nurses and dietitians. Hospitals need to provide adequate staff to ensure this happens routinely and in a timely manner. *(Clinical Directors and Critical Care Managers)*

Bedside staff who care for tracheostomy patients must be competent in recognizing and managing common airway complications including tube obstruction or displacements and as described by the National Tracheostomy Safety Project algorithms. *(Medical Directors and Directors of Nursing)*

Unplanned and night time critical care discharge is not recommended, particularly in patients with a newly formed tracheostomy and/or patients recently weaned from respiratory support. This reinforces the Intensive Care Society's general recommendation about night time discharges. *(Clinical Directors and Risk Managers)*

## Introduction

Historically tracheostomy has been used to remedy upper airway obstruction, to avoid the laryngeal complications of prolonged tracheal intubation and the continued need for the protection and maintenance of the airway in patients with severe neurological injury. It is also now often planned relatively early in the stay of patients on critical care to improve patient comfort, and facilitate weaning of sedation when there is a need for a longer period of ventilation, and the number of temporary tracheostomies has greatly increased in recent years. The development and refinement of the percutaneous technique, improved equipment and the increasing number of critical care physicians trained to perform the procedure have all enabled a temporary tracheostomy to be placed as a bedside procedure. Alongside these developments there has been initiatives such as the National Tracheostomy Safety Project (NTSP)<sup>1</sup> and guidance on best practice<sup>2</sup> which have provided clearer standards of care for the patient.

From 2005 to 2007 the National Patient Safety Agency (NPSA) collected data submitted from 150 Trusts which showed that 53/1085 (5%) of airway incidents reported related to tracheostomies.<sup>3</sup> Fourteen of the 53 incidents were classed as major or life threatening, and it was recognised by the authors that it was likely that only around 10% of all incidents were reported. The fourth National Anaesthesia Audit Project<sup>4</sup> was specifically set up to examine the frequency and characterise the importance of serious airway related complications, and reported from all age groups and in all hospital locations across the UK over a 12 month period. Many different airway devices were implicated in these events, but in critical care the most serious incidents frequently related to tracheostomy. In half of all airway-related deaths and cases of brain damage in critical care the airway problems were attributed to tracheostomy complications.

UK data published after the NCEPOD study had commenced has shown that there is no improvement in long term outcomes in patients who have a tracheostomy placed at an early or late stage on critical care.<sup>5</sup> Therefore whilst performing a tracheostomy is generally considered a safe procedure with a low complication rate with important benefits such as greater patient comfort, there is still some controversy over the timing and risks of insertion in the critically ill patient. It is important to acknowledge that the alternative (longer term endotracheal intubation) is not itself without complications.

Whilst the basis for national competences for tracheostomy care exist, it is clear that they are not yet fully integrated into mandatory training programmes for all health professionals. The emergence of the Global Tracheostomy Collaborative<sup>6</sup> acknowledges that tracheostomy care is an important priority for many modern health care systems, with a membership which ranges from medical students to Harvard professors. Both this initiative and the NTSP also recognise the very important needs of children as well as the very much larger adult population with tracheostomies, and the importance of professionals working collaboratively to share knowledge and expertise.

In parallel the multidisciplinary team in the hospital caring for any patient with a tracheostomy remains large. Part of the challenge of this report has been to carefully consider all the levels of expertise and to provide a useful summary of what is a very large data set and prioritising the recommendations which have emerged (many of which have been already made by other organisations). Ultimately we have provided six key recommendations which we hope will resonate with all those involved in the care of tracheostomy patients, as well as patients themselves, and on which

action is most likely to result in significant improvements in care.

This study was undertaken to help identify the difficulties in the pathway of care for patients with a tracheostomy and in various hospital settings. The NCEPOD report has also highlighted many of the

broader issues which impact upon the care of sick and complex patients. These are not unexpected and include the greater numbers of overweight and obese patients that require critical care, as well as revealing the pressure to admit and discharge relatively complex patients at all times of the day and night.

## 1 – Method and Data returns

### Expert Group

A multidisciplinary group of experts comprising health care professionals from intensive care medicine, anaesthesia, respiratory medicine, critical care nursing, ear, nose and throat surgery, maxillofacial surgery, physiotherapy, speech and language therapy, and a lay representative contributed to the design of the study and reviewed the findings.

### Aim

The primary aim of this study was to explore factors surrounding the insertion and subsequent management of tracheostomies in both the critical care unit and ward environments by:

- Exploring (percutaneous and surgical) tracheostomy-related complications following insertion in the operating theatre or the critical care unit
- Exploring remediable factors in the care of adult patients (aged 16 and over) undergoing the insertion of a surgical or percutaneous tracheostomy tube
- Assessing the number and variability of percutaneous tracheostomies performed annually in the critical care unit
- Making recommendations to improve future practice.

### Objectives

The expert group identified a number of areas of tracheostomy care to be explored in more detail. These included:

- Insertion of the tracheostomy
  - Indications for the tracheostomy
  - Cautions and contraindications

- Consent
- Delays
- Equipment and monitoring
- Staffing
- Anaesthesia
- Environment in which the tracheostomy tube was inserted and cared for
- Routine care
  - Essential equipment
  - Cuff management
  - Humidification
  - Suctioning
  - Inner cannulae
  - Dressings
  - Swallowing
  - Oral care
  - Communication needs
- Changing tracheostomy tubes
- Emergencies, common complications and their management
- Decannulation and long term (30 day) follow up
- Facilities
  - Staff capacity
  - Staff competency
  - Number of patients cared for
  - Training
  - Facilities available
  - Policies and procedures

### Hospital participation

Data were collected from all hospitals where the insertion of a tracheostomy tube was undertaken in England, Wales, Northern Ireland, the Channel Islands and the Isle of Man. Data were collected from both the National Health Service (NHS) and the Independent sector where applicable.

Within each hospital, a named contact, referred to as the NCEPOD Local Reporter, acted as a link between NCEPOD and hospital staff, facilitating case identification, dissemination of questionnaires and data collection.

## Study population

Patients who underwent a new tracheostomy insertion or a laryngectomy between 25th February – 12th May 2013, were included in the study. Patients were identified at the time of tracheostomy insertion or laryngectomy on the critical care unit or in theatre. Data were collected on both surgical and percutaneous tracheostomies. Where available, the following OPCS codes were used to identify patients.

- E29 – Excision of larynx
  - E29.1 - Total laryngectomy
  - E29.6 - Laryngectomy not elsewhere classified
  - E29.8 - Other specified
  - E29.9 - Unspecified
  
- E42 – Exteriorisation of trachea
  - E42.1 - Permanent tracheostomy
  - E42.3 - Temporary tracheostomy
  - E42.8 - Other specified
  - E42.9 - Unspecified

## Exclusions

Only patients who underwent the creation of a new tracheostomy were included in the study. Therefore patients who were coded with the following OPCS codes were excluded:

- E42.2 - Cricothyroidostomy
- E42.4 - Revision of tracheostomy
- E42.6 - Replacement of tracheostomy
- E42.5 - Closure of tracheostomy
- E42.7 - Removal of tracheostomy tube

Patients aged 15 and younger were not included in the study.

## Case identification

Patients were identified at the point of tracheostomy insertion either on the critical care unit or in theatre.

A study contact was set up in the critical care unit and in theatre, and one of their main roles was to identify cases and notify the details of the cases to NCEPOD (either directly or via the Local Reporter).

Once a patient was identified as having undergone a tracheostomy insertion, data were collected up to the point of decannulation on, or discharge from, critical care (with a tracheostomy still in place); decannulation, discharge from or day 30 on a general ward; or death. To assist with this, a study contact was also set up to help collate data from the general wards.

Data were subsequently collected in two ways. Questionnaires were either returned directly to NCEPOD and the case details recorded on the database, or case details were notified to NCEPOD using a data collection spreadsheet, and then these details were uploaded to the study database.

Where data were submitted to NCEPOD via a spreadsheet, this was maintained by the Local Reporter (or other nominated study contact) and was sent to NCEPOD on a regular basis in order to track case load (new insertions and discharge from the critical care unit and the ward). This was followed by a request for the prompt return of questionnaires.

Where the data (spreadsheets and/or questionnaires) were not returned reminders were sent.

## Questionnaires

Five questionnaires were developed to collect data for this study:

### Organisational questionnaire by hospital

This was sent out at the start of the study to all hospitals to identify wards where patients with tracheostomy tubes could be cared for, and to gather data about the approximate number of tracheostomy insertions undertaken; this was to help determine the sampling period required. This questionnaire collected data around staffing capacity and competency, training and hospital policies and procedures.

### Organisation of ward care questionnaire

This questionnaire collected organisational data at a ward level rather than at a hospital level. Questions were asked about the number of tracheostomy patients cared for on a monthly basis, and the equipment and facilities available. Data collection for this questionnaire was undertaken on-line.

### Tracheostomy insertion questionnaire

A questionnaire was completed at the time of tracheostomy insertion (Figure 1.1) by the consultant/clinician responsible for the procedure or by the most appropriate person. The same questionnaire was used to gather data for both surgical and percutaneous tracheostomy insertions.

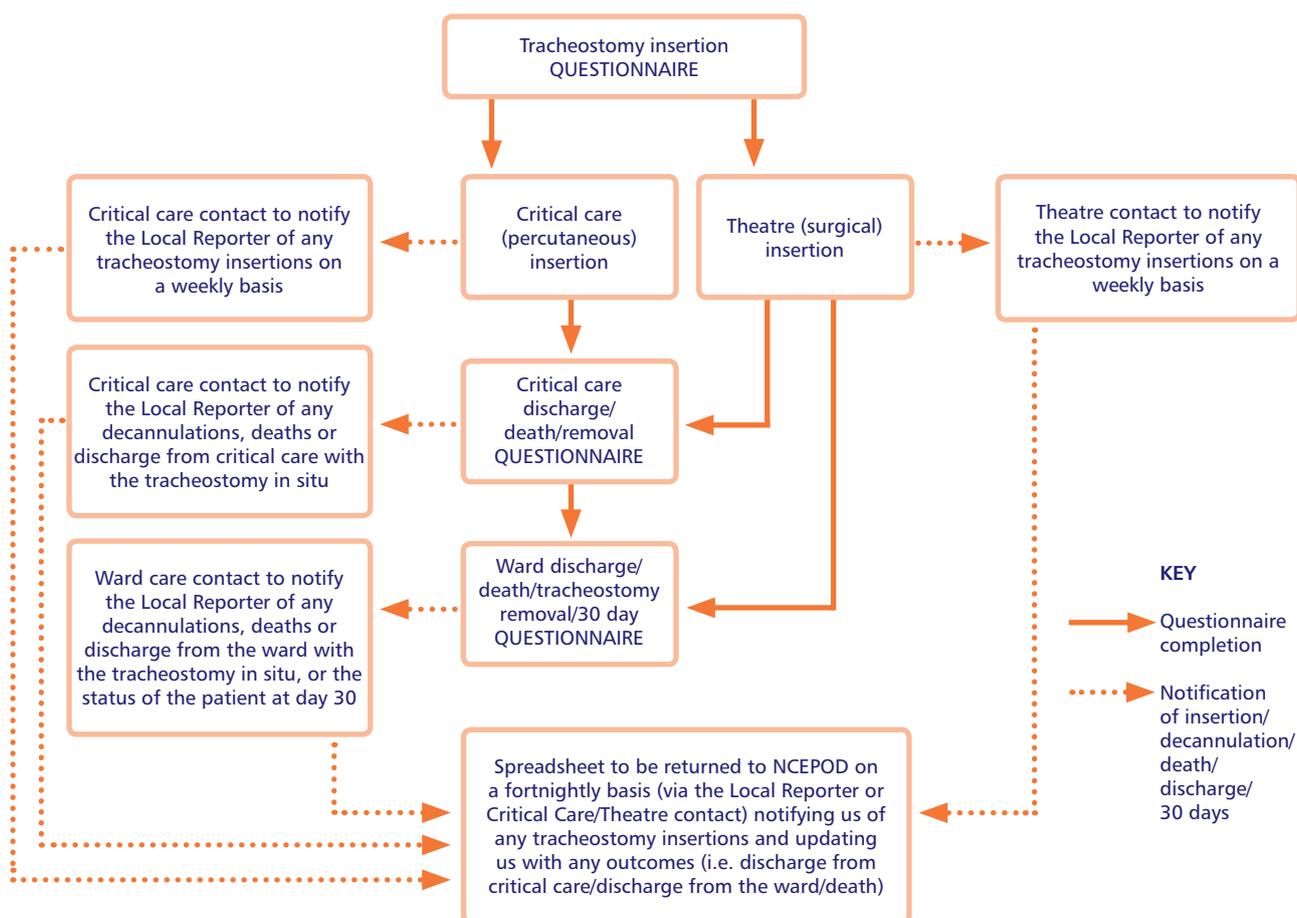


Figure 1.1 Patient pathway for questionnaire completion

### **Critical care questionnaire**

This questionnaire was completed at the time of discharge from the critical care unit to the ward, tracheostomy removal or death, for all patients who were admitted to (or remained on) the critical care unit following their tracheostomy insertion (Figure 1.1). This included patients who had a tracheostomy inserted whilst in the critical care unit and patients who went to the critical care unit following the insertion of a tracheostomy in theatre. As well as collecting clinical data and information about complications, this questionnaire also collected data about the facilities for tracheostomy care in the critical care unit.

### **Ward questionnaire**

This questionnaire was completed for all patients admitted to a ward either from the critical care unit (both surgical and percutaneous) or directly from theatre (Figure 1.1). This was completed at the time of tracheostomy removal, death, discharge from the ward with the tracheostomy in situ, or 30 days post transfer to ward. Again, as well as collecting clinical data and information about complications, this questionnaire collected data about the ward facilities available.

The clinical questionnaires were sent out in packs; each pack contained an insertion, critical care and ward care questionnaire, and also the instructions for completion. Because not all patients had a critical care stay or a general ward stay with a tracheostomy in situ, the completion of all three questionnaires was not required for each patient (Figure 1.1). These study packs were sent out at the beginning of the study based on the number of insertions undertaken annually at each hospital, so they could be completed at the time of tracheostomy insertion.

### **Case notes**

Photocopied case note extracts were requested for two cases per hospital and these were randomly selected by NCEPOD. The requested extracts included:

- Inpatient annotations (main case notes)
- Nursing/speech and language therapy/physiotherapy notes
- Intensive Care (Level 3)/High Dependency (Level 2) Unit notes
- Anaesthetic records
- Surgical/operation notes
- Observation charts
- Tracheostomy care records
- Ward discharge summaries

Case notes were requested for the time period up to:

- Successful decannulation (either on the critical care unit or a general ward); or
- Death (on the critical care unit or a general ward); or
- Discharge with the tracheostomy in situ from the hospital; or
- Day 30 following admission to a general ward, whichever occurred first.

### **Advisor group**

A multidisciplinary group of Advisors was recruited to undertake peer review of the case notes and associated questionnaires. This group of Advisors comprised clinicians from a number of specialties including critical care medicine, anaesthetics, general medicine, respiratory medicine, oral and maxillofacial surgery, ear, nose and throat (ENT) surgery, plastic surgery, nursing (critical care, critical care outreach, tracheostomy and ENT), physiotherapy and speech and language therapy (SLT). This group also peer reviewed the findings of the larger questionnaire dataset.

Case notes were checked on receipt for completeness. In a majority of cases all of the relevant data were returned, however there were a small number of cases where some of the case notes were missing.

All patient identifiers were removed from the case notes and questionnaires prior to review. Neither the coordinators at NCEPOD, nor the Advisors, had access to patient identifiable information.

After being anonymised, each case was reviewed by at least one Advisor and at regular intervals throughout the meeting the Chair allowed a period of discussion for each Advisor to summarise their case and ask for opinions from other specialties or raise aspects of care for discussion.

Advisors completed a semi-structured electronic assessment, and were encouraged to enter free text commentary at various points. Where the Advisor felt that there was insufficient information available in the case note extracts present in order to make a decision, there was the option to select 'insufficient data'.

The grading system shown in Figure 1.2 was used by the Advisors to grade the overall care each patient received at the time of tracheostomy insertion, during a critical care stay (where applicable), and during a ward stay (where applicable).

**Good practice:** a standard of care you would expect from yourself, your trainees, and your institution.  
**Room for improvement:** aspects of CLINICAL care that could have been better.  
**Room for improvement:** aspects of ORGANISATIONAL care that could have been better.  
**Room for improvement:** aspects of CLINICAL AND ORGANISATIONAL care that could have been better.  
**Less than satisfactory:** SEVERAL ASPECTS OF CLINICAL AND/OR ORGANISATIONAL care that were well below a standard you would expect from yourself, your trainees and institution.

Figure 1.2 Grading of quality of care

## Quality and confidentiality

Each case was given a unique NCEPOD number. The data from all questionnaires received were electronically scanned into a preset database. Prior to any analysis taking place, the data were cleaned to ensure that there were no duplicate records, and that erroneous data had not been entered during scanning. Any fields that contained data that could not be validated were removed.

## Data analysis

Following cleaning of the quantitative data, descriptive data summaries were produced.

The qualitative data collected from the Advisors' opinions and free text answers in the clinician questionnaires were coded, where applicable, according to content to allow quantitative analysis. The data were reviewed by NCEPOD Clinical Co-ordinators, a Clinical Researcher, and a Researcher, to identify the nature and frequency of recurring themes.

All data were analysed using Microsoft Access and Excel by the research staff at NCEPOD.

The findings of the report were reviewed by the Expert Group, Advisors, and the NCEPOD Steering Group prior to publication.

Case studies have been used throughout this report to illustrate particular themes.

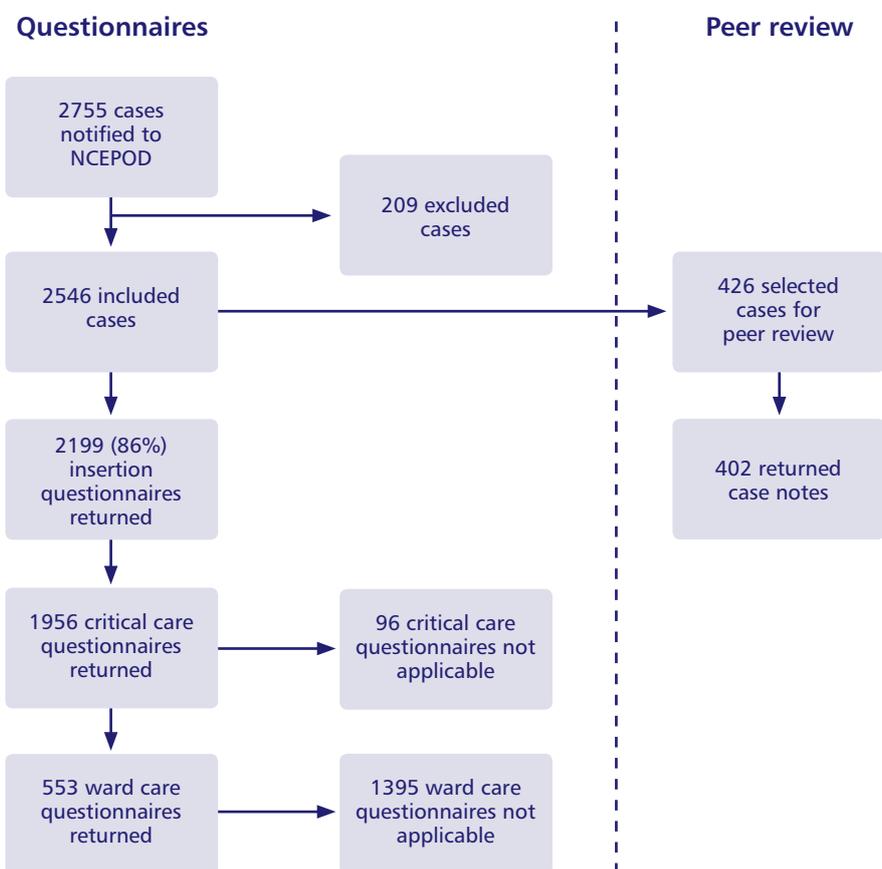


Figure 1.3 Data returns

### Data returns

Over the 11 week study period, NCEPOD was notified of 2755 cases of which 209 were subsequently excluded. This gave an overall sample of 2546 included cases. Within this group, 2199 insertion questionnaires were returned (86.4%). Critical care questionnaires were returned for 1956 patients, and NCEPOD were notified in a further 96 cases that the critical care unit questionnaire was not applicable (the patient did not have a critical

care stay). Ward care questionnaires were returned for 553 cases, and NCEPOD were notified in a further 1395 cases that the patient did not have a general ward stay with the tracheostomy in situ and so did not need a questionnaire to be completed (Figure 1.3).

A random sample of case notes was selected for Advisor review. Case notes were limited to two per hospital, giving an overall sample of 426 cases. Of these, 402/426 (94%) sets of case notes were returned.

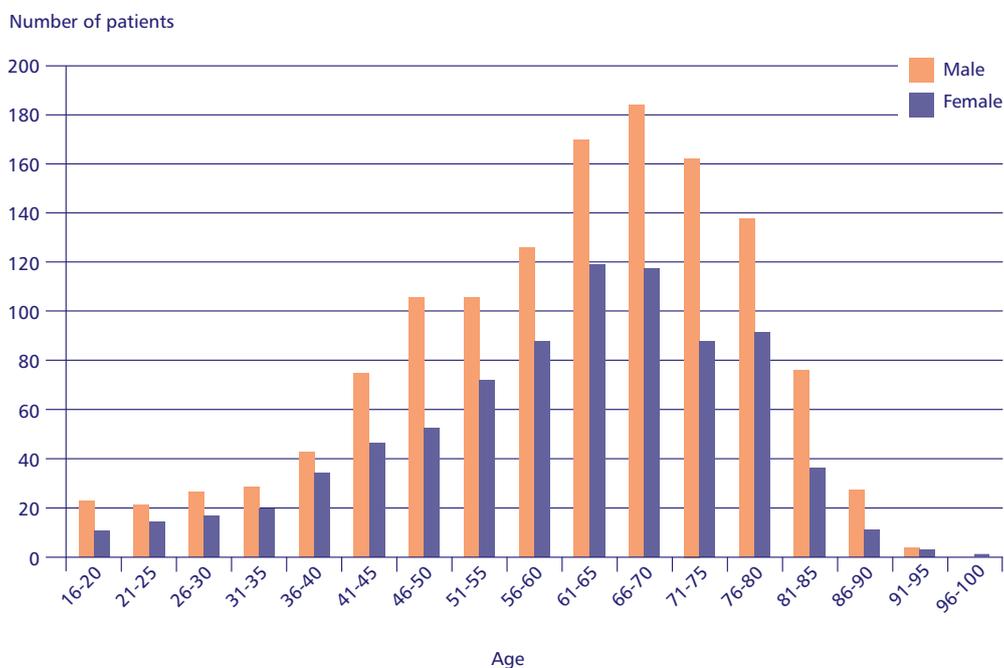


Figure 1.4 Age of patients included in the study

## Demographics

Over two thirds of the patients included had their tracheostomy inserted percutaneously and one third surgically (Table 1.1).

Table 1.1 Mode of insertion

	n	%
Percutaneous	1530	69.6
Surgical	669	30.4
<b>Total</b>	<b>2199</b>	

Table 1.2 Gender

	n	%
Male	1358	61.9
Female	835	38.1
<b>Subtotal</b>	<b>2193</b>	
Not answered	6	
<b>Total</b>	<b>2199</b>	

Ages ranged from 16 – 93 and the average age for both male and female patients was 61 years (Figure 1.4) regardless of procedure type.

Of the 2199 cases reported over the study period, 1358 (61.9%) of the sample were male and 835 (38.1%) of the sample were female (Table 1.2). There was very little difference in terms of gender and the mode of tracheostomy insertion with 68% of females and 71% of males undergoing a percutaneous insertion.

## 2 – Summary and overall quality of care

This study looked at the pathway of tracheostomy care for patients beginning with a surgical or percutaneous insertion, followed in most by a stay on critical care and/or up to 30 days on a hospital ward. Patients with a new tracheostomy are a high risk population, not just because of potential airway complications but because most have associated major co-morbidity.

At the outset NCEPOD was unable to use existing OPCS codes to provide an accurate estimate of numbers of all new tracheostomies, as only those inserted surgically tend to be coded. An estimate of between 5,000 to 15,000 was made which provided a challenge to our existing method and to everyone taking part in this study. An important lesson for the future is that in order to facilitate care planning and ongoing review of tracheostomy care, both locally and nationally, there is a need for routine coding and data collection to occur for all tracheostomy insertions.

There are many recommended improvements in care at all steps of the patient pathway in this report, some of which do not involve additional expenditure. This includes the use of checklists for tracheostomy insertion which should be performed for patients in intensive care. These checks ensure that preparation for the tracheostomy is equivalent to those performed as a surgical procedure.

There are other opportunities to improve quality of care and reduce complications if hospitals ensure that adequate equipment is available to care for patients with tracheostomies in intensive care and ward areas, including fiberoptic scopes, difficult intubation kit, and capnography. Whilst this recommendation has been made by other authors, NCEPOD has found that in many centres such equipment is still not readily available or in use.

Before insertion and at every tube change tracheostomy tubes need to be selected according to patient anatomy and the position checked to provide as good a “fit” as possible, whilst selecting equipment with essential safety features such as inner cannulae which help prevent unnecessary serious complications. More serious complications arise during the after care of tracheostomies than at insertion, and attending staff must be able to deal with blocked and displaced tubes. When a patient with a tracheostomy requires resuscitation, there is also a need for staff to be able to use correct airway management techniques in patients with both a simple tracheostomy and post laryngectomy.

The involvement of a large multidisciplinary team of nurses, physiotherapists, physicians and surgeons, speech and language therapists and dietitians is essential for the good aftercare of patients with a tracheostomy, and they should be present in a timely fashion. Adequate numbers of these support staff are required to ensure this happens for each and every patient. Discharge arrangements when transferring patients from critical care, and from wards to the community need to include concise but adequate documentation, with good handover in daylight hours to suitably trained staff in the receiving area.

### Advisor opinion on care

Of the 396 cases assessed by the Advisors, 372 cases had a critical care stay. These data should be seen in context and looked at alongside the (larger) amount of ward and critical care data from questionnaires, including information about complications.

In 40% of cases Advisors felt that practice in relation to tracheostomy care was good (Figure 7.8). The

reasons stated for room for improvement in all areas and the cases where less than satisfactory care was most commonly issues with clinical care (39/108), cuff management (36/108), monitoring and/or the frequency of observations (21/108), tube selection (18/108) and weaning process unclear and/or inappropriate (28/108).

The most common non clinical/organisational reasons for sub optimal care were documentation (116/124).

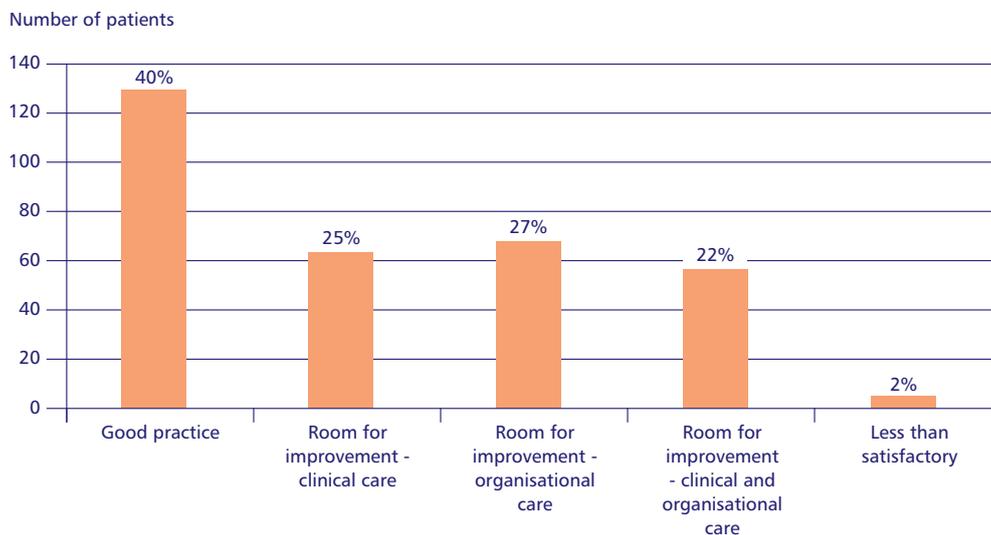


Figure 7.8 Overall assessment of care - critical care unit

### Overall assessment of care on the ward

Figure 7.9 represents the overall assessment of care in a small subset of ward based patients with a tracheostomy in whom questionnaires and case notes were reviewed by Advisors and an assessment was made (88/103). There were 103 cases in which at least part of the patient journey involved a stay in a ward area. Whilst numbers are relatively small, decisions about the quality

of care are strikingly similar to those made about care in the critical care unit. In ward areas the most common problem in relation to clinical care was felt to be around cuff management (10/32), the monitoring and/or frequency of observation inadequate (11/32) and the weaning process (10/32). In terms of the organisation of care the most common problems related to documentation (30/36).

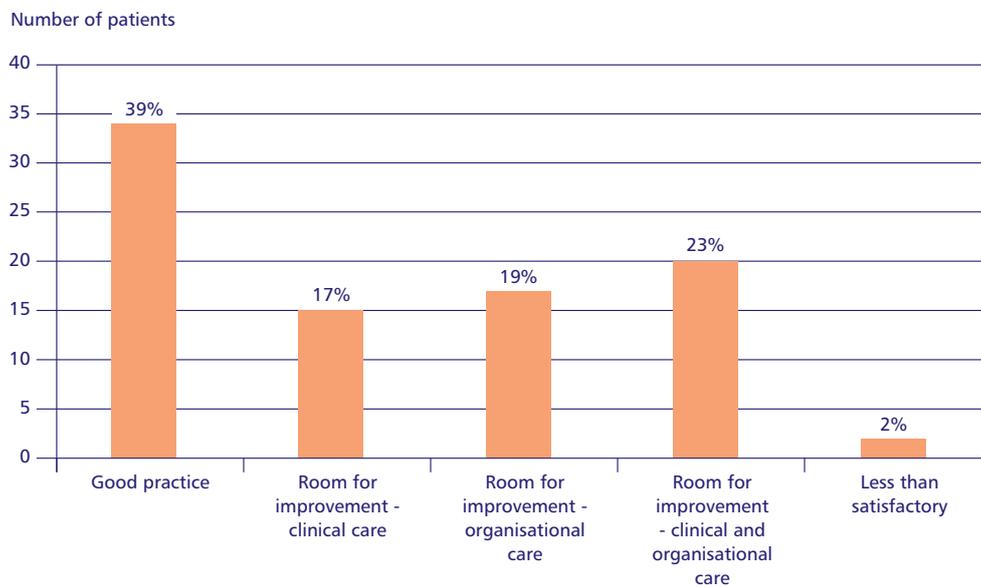


Figure 7.9 Overall assessment of care ward tracheostomy patients

## Key findings and recommendations

### Key findings - The organisation of care

2546 tracheostomies were reported as being inserted across England, Wales, Northern Ireland and the Offshore Islands, during the study period.

The number of tracheostomy insertions undertaken annually could not be provided retrospectively in 32/219 (14.6%) hospitals, and where it could be provided it was estimated in 101/186 (54.3%) cases.

20/217 (9.2%) hospitals did not have immediate access to a difficult airway trolley in the critical care unit.

47/209 (22.5%) of hospitals did not have the equipment to perform bronchoscopy/fibreoptic laryngoscopy IMMEDIATELY available within the critical care unit.

181/212 (85.4%) of hospitals delivered training programmes in accordance with clinical consensus guidelines on the management of tracheostomy insertion.

In 152/175 hospitals (86.9%) training included the re-establishment of a blocked airway.

91/175 (52.0%) hospitals included training on the practice of difficult tube changes.

A protocol to help patients communicate was present in 138/216 (63.9%) hospitals.

116/215 (54%) hospitals had a resuscitation policy covering the patient with a tracheostomy but whose upper airway may still be patent.

97/214 (45.3%) hospitals had a resuscitation policy covering the patient who is totally reliant on breathing through the stoma in the neck.

77/212 (36.3%) hospitals had a protocol for the management of neck breathers who present as an emergency.

Capnography was available in a majority of critical care areas where data were available (286/312; 91.7%), it was used continuously in only 218/305 (71.5%) hospitals.

Regular audit of tracheostomy care was only undertaken in 46/217 (21.2%) hospitals.

Only 63.7% (135/212) of hospitals reported a stated level of competency expected for staff caring for a tracheostomy.

203/295 (68.8%) of hospitals had wards where < 2 patients with either surgical or percutaneous tracheostomy were cared for per month.

## Recommendations - The organisation of care

1. Tracheostomy insertion should be recorded and coded as an operative procedure. Data collection in all locations should be as robust as that for a theatre environment. This will facilitate better care planning and allow for national and local review and audit. *(Medical Directors and National Coding Systems)*
2. Critical care units need a rapidly available difficult airway trolley/fibreoptic laryngoscopy. This recommendation reinforces the Intensive Care Society and Royal College of Anaesthetists' recommendations. *(Clinical Directors)*
3. Training programmes in blocked/displaced tubes/airways and difficult tube changes should be delivered in accordance with clinical consensus guidelines as stated by the National Tracheostomy Safety Project and the Intensive Care Society. *(Medical Directors and Directors of Nursing)*
4. Capnography must be available at each bed space in critical care and should be continuously used when patients are ventilator dependent. This reinforces the recommendation from NAP4 and others. *(Clinical Directors)*
5. Core competences for the care of tracheostomy patients, including resuscitation, should be set out by all Trusts using existing national resources available. *(Medical Directors and Directors of Nursing)*

### Key findings - Tracheostomy insertion

728/1491 (48.8%) patients had consent taken for a percutaneous tracheostomy, compared with 611/638 (95.8%) undergoing a surgical insertion.

239/1490 (16%) patients undergoing a percutaneous tracheostomy had a WHO type (surgical) checklist used.

Adjustable length tracheostomy tubes were used in only 185/1825 (10.1%) of patients. Inner tubes were used in 1661/1931 (86%) of patients.

566/1910 (29.6%) patients included in the study were obese or morbidly obese, but adjustable flanged tubes were only used in 96/510 (18.8%) of patients.

Capnography to assess tube placement documented in 144/266 (54.1%) of patients.

Post-insertion endoscopy was used in 137/266 (51.5%) of patients.

### Recommendations - Tracheostomy insertion

6. Consent and WHO type (surgical) checklists should be adopted and used prior to tracheostomy insertion, wherever it is performed. (*Medical Directors and Clinical Directors*)
7. The diameter and length of the tube used should be appropriate for the size and anatomy of the individual patient, therefore an adequate range of tracheostomy tubes needs to be stocked by units. Operators should be aware of the types of tube available and in particular recognize that adjustable flanged tubes are available with inner tubes. Professionals need to continue to work closely with manufacturers to optimise design and tube options for a non standard population. (*Consultant Operators, Theatre and Critical Care Managers and Professional Health Care Bodies*)
8. Confirmation of tube placement must be obtained using capnography. This should be readily available and the events documented. (*All Health Care Professionals*)
9. Appropriate positioning of the tube should be made using airway endoscopy. This should be readily available and the events documented. (*All Consultants*)

### Key findings - Tube care in the patient with a tracheostomy

27% (113/419) of tubes were changed for the first time in the critical care unit at a point less than 7 days from insertion and 11.7% (49/419) more than 30 days.

21/41 patients with an unplanned tube change before day 7, had a BMI of  $\geq 30$ .

57/113 (50.4%) patients in the critical care unit who had unplanned tube changes had them in the first 7 days, before a clear tract from skin to trachea had had time to form.

30/379 (7.9%) patients did not have tubes with an inner cannula present as part of the replacement tube at first tube change on critical care.

41.3% (128/310) of patients reviewed by Advisors and where data were available had problems with secretion clearance.

88.3% (302/342) of tubes were replaced with one of a standard length despite many of this population being overweight or obese (a total of 63%).

95% (551/580) of patients were discharged from the critical care unit with a cuffed tracheostomy tube still in place and in 72.6% (360/496) the cuff was still inflated at discharge.

28% (130/464) of tubes on the ward were left continuously inflated and cuff pressure was not measured in 25.4% (105/414) of ward patients.

In just 211/396 (53.3%) of the peer reviewed cases was there information available on cuff pressure available in the case notes.

### Recommendations - Tube care in the patient with a tracheostomy

10. When changing a tracheostomy tube factors that increase the risk of obstruction or loss of airway should be considered. These include tube size/configuration and length. This is particularly important in the obese/high BMI patient. *(All Consultants)*
11. Unplanned tube changes pose additional risks. All unplanned tube changes should be reported locally as critical incidents and investigated to ensure that lessons are learned and reduce the risk of future events. *(All Health Care Professionals and Risk Managers)*
12. Particularly careful consideration should be made at discharge from the critical care unit as to whether a cuffed tube is still indicated, and reasons must be documented. If it is, then there must be equipment and competences available on the ward for cuff pressure measurement. *(Critical Care Consultants and Tracheostomy Leads)*
13. All Trusts should have a protocol and mandatory training for tracheostomy care including guidance on humidification, cuff pressure, monitoring and cleaning of the inner cannula and resuscitation. The clinical practices around tracheostomy care should be the subject of local quality improvement initiatives. Tube data should be more clearly recorded and made available for review at the bedside and thereafter facilitated by a 'passport' for each patient, with all data included. *(Medical Directors, Directors of Nursing and Health Care Commissioners)*
14. All hospitals should adhere to recommendations already made by the National Tracheostomy Safety Project to maintain an essential box of equipment which is sufficiently portable to be moved around with the patient. *(Clinical Directors and Tracheostomy Leads)*

### Key findings - The multidisciplinary care of tracheostomy

67.1% (318/474) of ward patients with a tracheostomy were discussed at an MDT meeting.

Composition of the MDT varied and dietetics and critical care outreach were relatively poorly represented (included in 42.7% (93/218) and 58.8% (153/260) of MDTs respectively).

Physiotherapy was not included in 12% (33/276) of patient MDTs.

96/168 (57.1%) of patients with a swallowing difficulty had an early referral to Speech and Language Therapy (within 48 hours).

42/168 (25%) patients with a swallowing difficulty waited longer than 48 hours for referral to Speech and Language Therapy.

In cases reviewed by Advisors there were 32/223 patients (14.3%) where it was felt that attention to swallowing difficulty was insufficient, and this related mainly to a lack of Speech and Language Therapy input.

The advice of SLT was sought in only 456/1693 (26.9%) patients with a new tracheostomy on the critical care unit.

### Recommendations - The multidisciplinary care of tracheostomy

15. In order to facilitate decannulation and discharge planning multidisciplinary care needs to be established as part of the routine pathway for ALL tracheostomy patients. Whilst on the critical care unit where there will be at least daily reviews, key additional team members should be involved at an early stage. The team composition should be flexible to properly reflect the patient's needs and provide excellent continuity of care. There are several key team members who one would expect should always participate, e.g. physiotherapy, speech and language therapy, outreach nurses and dietitians. Hospitals need to provide adequate staff to ensure this happens routinely and in a timely manner. *(Clinical Directors and Critical Care Managers)*
16. Involvement of Speech and Language Therapy in critical care needs to be facilitated particularly for more complex patients and to assist clinicians with high quality communication strategies as well as day to day ward care and according to patient needs. *(Clinical Directors and Speech and Language Therapists)*
17. Dysphagia reported in tracheostomy patients warrants ongoing and further study in terms of risk factors, identification and natural history. *(All Professional Health Care Bodies involved with tracheostomy care)*
18. There needs to be improved recognition of the incidence of swallowing difficulty in tracheostomy patients at all points in the care pathway. Early referrals to Speech and Language Therapy with specific competences are recommended. *(All Consultants and Speech and Language Therapists)*

### Key findings - Complications and adverse events

23.6% (461/1956) of patients had complications whilst in the critical care unit.

31.3% (173/553) of patients had complications whilst on the ward.

The most serious complications in patients during and after tracheostomy insertion in both critical care and the ward, were accidental tube displacement, obstruction, pneumothorax and haemorrhage. Consultant involvement in the management of these complications was high.

Accidental tube decannulation/displacement occurred in 35/553 (6.3%) of patients in the ward and in 80/1956 (4.1%) patients in critical care.

174/216 hospitals (80.6%) had a policy for the management of blocked or displaced tubes.

27.9% (48/172) of hospital sites did not provide staff training in the management of blocked and displaced tubes.

### Recommendations - Complications and adverse events

19. Bedside staff who care for tracheostomy patients must be competent in recognizing and managing common airway complications including tube obstruction or displacements and as described by the National Tracheostomy Safety Project algorithms. (*Medical Directors and Directors of Nursing*)
20. Emergency action plans must clearly reflect the escalation policy in order to summon senior staff in the event of a difficult airway event. Equipment including capnography must be always available, checked and utilised in patient care and in training scenarios. This reinforces the recommendation in the NAP4 guidance. (*Clinical Directors*)

### Key findings - Outcomes of care in tracheostomy patients

18% (161/910) of patients underwent decannulation in under 7 days in the critical care unit.

85/141 patients who had an early decannulation did not undergo a trial of extubation before tracheostomy insertion. 68 of these were percutaneous insertions.

157/503 discharges of patients from the critical care unit occurred after 18.00 in the evening and before 08.00 in the morning. 165/348 (47.4%) ward admissions occurred after 18.00 and before 08.00.

46 patients were discharged from a critical care unit to a ward or different critical care unit area after 21.00 at night and before 06.00 in the morning.

5/156 patients were discharged out of hours from the critical care unit to locations which were not designated to provide routine tracheostomy care.

341/466 (73.2%) of patients had a comprehensive risk assessment carried out prior to ward admission.

90.9% (541/595) of patients had a discharge summary provided when they left the critical care unit, but 460/541 (85%) summaries did not contain several important elements such as weaning plans for the tracheostomy and who had responsibility for decisions about the tracheostomy.

27 patients were discharged home from a ward area and 5 to community care facilities.

Discharge from ward areas to other hospital locations and to community care occurred outside the normal working day in 11 cases.

### Recommendations - Outcomes of care in tracheostomy patients

21. In patients undergoing a tracheostomy without a trial of extubation the reason should be clearly documented. *(All Health Care Professionals)*
22. Unplanned and night time critical care discharge is not recommended, particularly in patients with a newly formed tracheostomy and/or patients recently weaned from respiratory support. This reinforces the Intensive Care Society's general recommendation about night time discharges. *(Clinical Directors and Risk Managers)*
23. Wards accepting tracheostomy patients should be in a state of readiness in terms of equipment and competences. *(Clinical Directors and Directors of Nursing)*
24. Multidisciplinary agreement about minimum airway assessments prior to decannulation needs to be established including availability of equipment and competences. *(Professional Health Care Bodies)*
25. Quality of discharge documentation should be improved. A structured and detailed summary must be provided between wards and between hospitals and the community at the point of transfer. *(All Health Care Professionals and Tracheostomy Leads)*

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Ground Floor  
Abbey House  
74-76 St John Street  
London EC1M 4DZ

T 0207 251 9060  
F 0207 250 0020  
E [info@ncepod.org.uk](mailto:info@ncepod.org.uk)  
w [www.ncepod.org.uk](http://www.ncepod.org.uk)

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