Paediatric Tracheostomy and Tracheostomy Long-Term Ventilated Care during the COVID Pandemic. UPDATED Guidance from the NTSP, January 2021

1. Introduction

The National Tracheostomy Safety Project (Paediatric Working Group) is a group of health care professionals who have been working to improve the safety of tracheostomy care in the UK and Ireland. The Group is particularly concerned that an overly cautious approach to the management of tracheostomised children during the COVID-19 pandemic could disadvantage children by excluding them from their usual social or educational activities. This updated guidance has been revised in light of emerging evidence and considers the balance of risks for children with tracheostomies accessing and fulfilling their usual social and educational needs during the pandemic.

The key message is that care of the tracheostomy (including suctioning) can usually be carried out using simple protection for carers. This document explains the rationale for this recommendation and some situations in which it may not apply. We hope this revised guidance will enable more children to access education.

2. COVID-19 and the paediatric population with a tracheostomy

The global pandemic with coronavirus SARS-CoV-2 and associated COVID-19 disease has led to a significant health care crisis. The disease profile is recognised to predominantly cause severe illness in the adult population and the focus of evidence and treatment guidance reflects this adult predominance.

The paediatric population, whilst known to be at risk of COVID-19, are typically asymptomatic or mildly symptomatic carriers of the SARS-CoV-2 infection. **There is no evidence to suggest that children with a tracheostomy are at any increased risk of contracting or transmitting SARS-CoV-2**. Having a tracheostomy alone does not mean that a child is considered "*extremely clinically vulnerable*." Tracheostomy does not feature on the Public Health England (PHE) "*extremely clinically vulnerable*" list. There are children with other co-morbidities and conditions other than their tracheostomy which mean that they are considered vulnerable, but this number is small.

When looking at Critical Care admissions for children during the pandemic, it has been noted that there have been far fewer admissions overall, extremely low numbers children admitted with SARS-CoV-2, and very few admissions for tracheostomy or tracheostomy long-term ventilated (LTV) children.

2.1. What do we mean by extremely vulnerable?

People falling into this extremely vulnerable group include:

1. Solid organ transplant recipients.
2. People with specific cancers:
    - people with cancer who are undergoing active chemotherapy
    - people with lung cancer who are undergoing radical radiotherapy
    - people with cancers of the blood or bone marrow such as leukaemia, lymphoma or myeloma who are at any stage of treatment

- people having immunotherapy or other continuing antibody treatments for cancer
- people having other targeted cancer treatments which can affect the immune system, such as protein kinase inhibitors or PARP inhibitors
- people who have had bone marrow or stem cell transplants in the last 6 months, or who are still taking immunosuppression drugs

3. People with severe respiratory conditions including all cystic fibrosis, severe asthma and severe COPD.
4. People with rare diseases and inborn errors of metabolism that significantly increase the risk of infections (such as SCID, homozygous sickle cell).
5. People on immunosuppression therapies sufficient to significantly increase risk of infection.
6. Women who are pregnant with significant heart disease, congenital or acquired.

The link to the government guidance is below (correct as of Jan 8th 2021).
https://www.gov.uk/government/publications/guidance-on-shielding-and-protecting-extremely-vulnerable-persons-from-covid-19/guidance-on-shielding-and-protecting-extremely-vulnerable-persons-from-covid-19#cev

2.2.How can we protect children with tracheostomies from COVID-19?

SARS-CoV-2 coronavirus can be transmitted via the following routes:

- Droplet transmission refers to spray with relatively large, short-range droplets (typically >5 μm in diameter) produced by sneezing, coughing, or even talking.

- Contact transmission refers to transmission either through direct contact with an infected individual, or indirect contact with their inanimate environment or objects that they have touched.

- Airborne transmission refers to transmission via aerosols (also known as droplet nuclei) that are typically <5 μm and can travel for long distances

The latest PHE guidance is relevant for those involved in delivering care to patients with tracheostomy or long-term ventilation by tracheostomy. The guidance can be accessed via the link below (correct as of Jan 8th 2021).

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/910885/COVID-19_Infection_prevention_and_control_guidance_FINAL_PDF_20082020.pdf

The main aims of this updated NTSP guidance are to interpret the current PHE guidance based on a risk assessment, specifically for children with tracheostomies. We anticipate that the NTSP guidance will support the aims of the PHE in:

1. **Protecting** the NHS workforce
2. **Reducing transmission** of SARS-CoV-2 to patients, public and staff
3. **Reducing preventable admission** to hospital or HDU/ICU to maximise available resources

The National Tracheostomy Safety Project (Paediatric Working Group) is a group of health care professionals who have been working to improve the safety of tracheostomy care in the UK and Ireland. The group includes representatives from specialist areas of ENT surgery, Paediatric Intensive Care, Respiratory Care, Speech and Language therapy, Physiotherapy, Anaesthetics and Paediatric specialist nurses.

The Paediatric Working Group has listened to the concerns of healthcare workers, patients, carers and families around implementation of the PHE guidance. The Group is particularly concerned that an overly cautious approach to the management of tracheostomised children during the COVID-19 pandemic could disadvantage children by excluding them from their usual social or educational activities.

3. The principles of Personal Protective Equipment

Personal Protective Equipment (PPE) is designed to protect the wearer from the risks of infection from the patients which they are caring for. PPE is used in addition to good hand hygiene and infection control and prevention measures. PPE during the pandemic can be considered in two categories:

- **Droplet PPE** for general contact protects against splashes of potentially infectious material
- **Aerosol PPE** offers a higher level of protection against inhalation of any potentially airborne virus, known as aerosols

The choice of PPE depends on the risks posed to the carer by the child they are looking after. The risk depends on the child, the procedure and also the community prevalence of COVID-19 (how many people are estimated to have the virus).

4. Modifications to care during the pandemic

Care should be modified in the pandemic to:

- Protect staff
- Protect patients
- Reduce the frequency of airway, tracheostomy and ventilator interventions which may have viral aerosol-generating potential

4.1 Protecting staff

In order to minimise the risk of healthcare staff bringing SARS-CoV-2 into the patient environment, the use of appropriate PPE by staff is recommended alongside good handwashing practices.

4.2 General contact (with a patient confirmed or suspected to have COVID-19) or entry into a designated cohort area should involve the PPE demonstrated in the orange figure to the right. Eye protection is based on risk assessment, but we recommend that due to the nature of the patient group this guidance is aimed at, that eye protection is worn at all times.

Note that this 'general contact 'PPE should also be used when cleaning equipment. This type of PPE is usually referred to as **'droplet PPE'** because it protects against potentially infectious larger droplets.

Droplet PPE precautions are appropriate when performing contact caring or Aerosol generating procedures (AGPs) for self-ventilating Tracheostomy or Tracheostomy-LTV children who:

- are well (asymptomatic), or
- have a recent negative COVID-19 test, or
- are managed in "green" clinical areas, or
- are managed in the community

The most common way that the virus is spread is from contaminated surface or hand contact, which is then transferred to the mucus membranes (eyes, nose or mouth). Hand washing is therefore essential.

'Sessional 'PPE is permitted. This means you don't have to change all of your equipment after every contact if you are in an area with more than one patient.

Doffing (removal) of PPE is important. Rehearse and ask a colleague ('buddy') to watch you.

4.3 Aerosol generating procedures (AGPs) in community settings or in COVID-negative children in healthcare facilities

AGPs that are commonly performed in education and children's social care settings include:

- Non-invasive ventilation (NIV)
- Bi-level positive airway pressure ventilation (BiPAP)
- Continuous positive airway pressure ventilation (CPAP)
- Respiratory tract suctioning beyond the oro-pharynx

For well, asymptomatic children either LTV or non-LTV in the community, the current PHE guidance regarding the recommended choice of PPE is based on the estimated community prevalence of COVID-19. **If the community prevalence is estimated to be below 2%, then we recommend that all asymptomatic (well) children can be managed with the simpler droplet PPE precautions for any aerosol-generating procedures.**

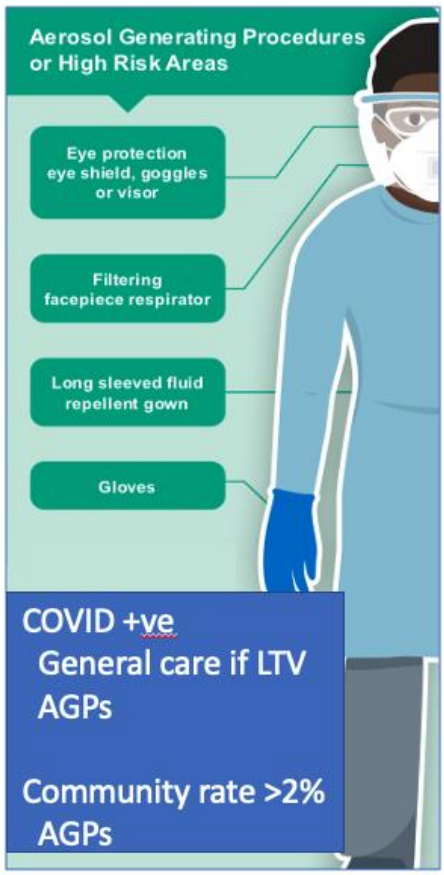
If the community prevalence increases above 2%, then the chance of *any* asymptomatic child being infected with the coronavirus SARS-CoV-2 is increased. The PHE guidance reflects this and recommends that well/asymptomatic children who require potentially aerosol generating procedures to manage their tracheostomy are then managed with the increased protection offered by '**Aerosol PPE'** described below.

4.4 Aerosol Generating Procedures (AGPs) for a patient confirmed or suspected to have COVID-19

Note: The following guidance for aerosol PPE also applies for well/asymptomatic children when the community prevalence of SARS-CoV-2 infection is estimated at >2%.

These situations pose additional risks for staff. If you work in a high-risk area where AGPs are occurring (in an ICU/HDU where there is ventilation with a positive pressure gas flow

occurring) then the risks of exposure to virus-containing aerosols are increased. This is particularly the case if you are providing care specifically related to the tracheostomy tube. Some procedures can cause coughing, and some involve circuit disconnection.



Relevant tracheostomy procedures include:

- Open suction
- Tube care (cleaning, dressings, ties/tapes)
- Cuff care
- Tube changes
- Changes of ventilator circuits

Sessional PPE can be used in a cohort area. This includes a 'filtering facepiece respirator (FFP3/N95 masks recommended by NHS England), long sleeved gown and visor and single use apron with either a double glove layer or change of gloves and apron after an AGP.

Closed suction systems should be used where possible. Tracheostomy tubes with inflated cuffs are ideal to reduce the aerosol risks to staff, but an individual assessment must be made for each patient. Cuffed tubes stop laryngeal airflow, prevent vocalisation and increase the risks of the tube becomes blocked as the patient cannot breathe around the tube.

Patients should be cohorted into designated areas where possible. This allows the delivery of care to be clear and consistent and may conserve the supply of PPE by allowing sessional use (the PPE may be worn between different patients, with appropriate cleaning/changing of outer gloves/gown or apron between patients).

For AGPs in "green" patients (swab negative or asymptomatic) when regional prevalence is < 2%, droplet PPE as seen in section 4.2 is recommended.

4.5 At all times Standard Infection Prevention Control precautions (SICP's) should be adhered to.

The elements of SICPs are:

- Patient placement and assessment for infection risk (screening/triaging)
- Hand hygiene
- Respiratory and cough hygiene
- Personal protective equipment (see later)
- Safe management of the care environment (see later)
- Safe management of care equipment (see later)
- Safe management of healthcare linen

- Safe management of blood and body fluids
- Safe disposal of waste (including sharps)
- Occupational safety: prevention and exposure management
- Maintaining social/physical distancing (new sicp due to covid-19)

4.6 Protecting patients

Staff should ensure that they maintain the highest possible standards of infection control, especially when entering and leaving a cohort area, or when working between patients. With appropriate PPE and practices, the risks to staff of healthcare-associated COVID-19 infection are low. However, due to the nature of transmission of this virus, healthcare workers can transmit it between patients.

Hand washing, alcohol gel and outer glove/gown or apron changes between patient contacts remain important.

5. Delivery of established care

For children who require Tracheostomy or Tracheostomy Long-Term Ventilation (Tracheostomy-LTV) care, the NTSP consider the best approach is **to leave care unchanged as much as possible**. This will hopefully mean a continued stability in the child's health, and that the parent or community-led care can continue with social distancing techniques providing an appropriate and proportionate degree of protection.

Emergency Healthcare Plans should be reviewed by the responsible hospital specialists for children receiving Tracheostomy-LTV. The plans should provide information about what to do and who to contact in an emergency situation. They should form part of hand-held records that are fully accessible to the child receiving LTV, parent carers and the health and social care teams. These plans should include reference to any agreed ceilings of care for these children.

6. Modifications to care regimes during the COVID-19 pandemic

The principles are that established care should continue, but that airway and tracheostomy interventions should be reduced to a minimum. This minimum frequency of interventions will change from patient to patient and over time, depending on the patient's condition.

It is not considered appropriate in the asymptomatic patient to make changes to their ventilation, equipment or tracheostomy care regime at this time, but rather for those healthcare staff involved in delivering care to take additional PPE precautions as outlined for AGP above.

Where possible, at the next planned tube change, consider changing all children to an equivalent tracheostomy tube which may allow less frequent changes (e.g. Bivona®, dependent on local availability and patient-suitability).

For those Tracheostomy or Tracheostomy Long-Term Ventilation patients **who become suspected or confirmed to have COVID-19** it is important to then consider additional actions to minimise the risk of transmission by reducing AGPs. It is recognised that for these patients it is not possible to remove the need for AGPs entirely and appropriate PPE is essential.

Modifications to reduce the exposure of staff to AGPs could include:

- All children with tracheostomies could wear a *trachphone* Heat and Moisture Exchange (HME) if possible.
    - This type of HME allows a suction catheter to be inserted without having to remove the filter. It also reduces aerosols significantly.
- Reduce the frequency of suction as indicated by the clinical condition of the patient
    - For example, patients may not need suction every 4 hours regardless of secretion load
    - Suction frequency should be reviewed regularly
- Reduce the frequency of inner cannula cleaning/changing (if used)
- Consider the use of a 'dry' ventilator circuit. This means using a n HME filter rather than an active heated/water-based system
    - 'Anti-viral' HME filters are available
- Reduce the frequency and use of nebulised therapies
    - For example, review the need for regular nebulisers and move to an 'as indicated' regime

If open suction is utilized, a modified closed suction system can be used. One example is the Kelley circuit. See http://www.tracheostomy.org.uk/storage/files/The Kelley Circuit For Tracheostomy.pdf.pdf

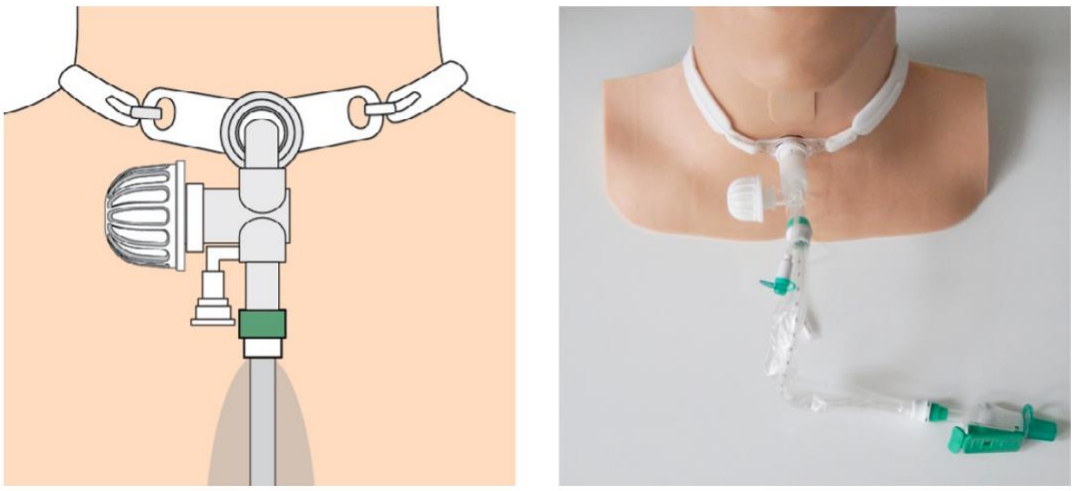


Figure above. The Kelley circuit with a closed-circuit suction system attached to the ISO 15 hub of the tracheostomy tube and the ProTrach XtraCare attached to the ventilator hub on the side.

6. Suspected or Confirmed COVID-19

When patients with Tracheostomy or Tracheostomy-LTV develop symptoms or signs consistent with COVID-19 the need for patient isolation and appropriate PPE is essential and should be guided by local Infection Prevention & Control teams. Some children will be able to remain in the community during these times, others may require hospital admission.

Modifications to usual care may be necessary, although not all of these actions will be appropriate for all patients or in every patient setting. Some of the risks/side-effects are outlined below. Changes made in order to prevent viral spread may lead to worsening of

patient respiratory status, escalation of care requirements, prolonged admission to hospital and additional AGPs. The changes should therefore be made in balance of these risks to the patient, staff and resources.

Some patients will have rising carbon dioxide levels and falling pulse oximetry saturations due to their respiratory infection, and should the patient require additional respiratory support (ventilation pressures or oxygen delivery) this may require admission to the hospital specialist area, high-dependency or intensive care unit in order to optimise care.

Tracheostomy patients (without ventilator support) are also at risk of generating aerosols when are suctioned. These children may need an emergency tracheostomy tube change or suction at any time.

Those delivering care to a child with a tracheostomy should be wearing appropriate PPE. It would be appropriate within the hospital setting to therefore have these children cohorted and for staff to wear 'sessional 'PPE. Droplet PPE is appropriate for general care of the non-ventilated child (with hand hygiene, glove and apron changes between patients) and aerosol PPE for any potential aerosol generating procedures.

For children ventilated via their tracheostomy who have confirmed COVID-19, general care should be undertaken with aerosol PPE. Sessional PPE can be worn as a base layer with disposable aprons/gloves over base layers for direct patient contact. Gloves must be changed, and apron removed and disposed of when completing the episode of direct patient contact. Hand wash after the patient episode. New gloves and apron may then be placed for the next care episode.

Appendix 1

The actions to **consider** in order to potentially reduce aerosol generation and viral spread in the Tracheostomy-LTV patient group include:

Action	**Risk or potential side-effect**
• Viral filter with heat-moisture exchange attached to the patient tracheostomy in place of simple heat-moisture exchange filter	• None identified
• Conversion from heated humidified system to inline viral heat-moisture exchange filter ('dry circuit' rather than 'wet circuit')	• Increased secretion viscosity and mucus plugging which may lead to deterioration and requirement for increased nebulisation/suction or change in ventilation
• Closed in-line suction catheter to avoid disconnections	• Dead-space with CO_2 retention and requirement for increased ventilation
• Conversion to a dual limb ventilator circuit to avoid environmental expiration	• Lack of care team familiarity with these circuits; not compatible with all portable ventilators
• Viral filter to protect the ventilator on expiratory limb	• None identified; not always applicable
• Cuffed tracheostomy tube	• Traumatic tracheostomy change; impaired management of oro-pharyngeal secretions/swallowing; loss of vocalisation; smaller internal diameter tube may be required; lack of care team familiarity and care requirements for cuffed tracheostomy; may require hospital admission in some patients; cuff pressure related tracheal injury; a blocked or displaced cuffed tube is a more dangerous situation than a blocked or displaced uncuffed tube.

Appendix 2: <u>Emergency Management of Tracheostomy Emergency COVID positive or Suspected Patient</u>

Safety checks

1	PPE available outside cubicle
2	Emergency Paediatric Tracheostomy Algorithm' available INSIDE and OUTSIDE ROOM
3	End Tidal CO_2 monitoring (in all critical care areas)
4	Closed in-line suction system (if Tracheostomy-LTV)
5	Viral HME filter attached to the rescue breathing circuit: BVM or T-piece

Hot Zone/Dirty = cubicle or patient bed side

Warm Zone 'Anteroom'/Clean = outside cubicle door

1. Care should follow the NTSP Guidelines using the bed head and algorithm at the bedside. A second algorithm will be on the COVID airway trolley which will be brought to the anteroom/clean zone in an emergency.

2. Plan ahead! E.g. elective tracheostomy tube changes or airway interventions with appropriate support whenever possible to avoid emergencies

3. In the event of an Emergency –

Nurse in the cohorted area or at the patient's bedside should be in FFP3 PPE at the time of an emergency.

Call for help – pull emergency buzzer in hot zone

4. Tell responder:
- What the problem is
- Help required
- Who to contact (2222 COVID Cardiac arrest team)

5. **First Responder (in PPE) Follows Emergency Tracheostomy Algorithm**

Changes below:
- Closed in-line suction system for Tracheostomy-LTV patients
- Viral HME filter between tracheostomy/stoma/face mask and the BVM or breathing circuit
- **DO NOT** listen and feel at the mouth and tracheostomy/ stoma

6. **Runner** outside cubicle:
- Collect Covid-19 Intubation Trolley and Arrest Trolley
- Read-out Tracheostomy emergency algorithm
- Ensure arriving team wear **PPE appropriate for AGP**

7. **Expert** help:

- if **Airway Intervention** is needed to use COVID Airway intubation local guidance which should be available on the COVID airway trolley.

Appendix 3: References and definitions:

***Sessional PPE**: A single session refers to a period of time where a health and social care worker is undertaking duties in a specific clinical care setting or exposure environment. For example, a session might comprise a ward round, or taking observations of several patients in a cohort bay or ward. A session ends when the health and social care worker leaves the clinical care setting or exposure environment. Once the PPE has been removed it should be disposed of safely. The duration of a single session will vary depending on the clinical activity being undertaken.* PHE 05/04/2020

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/910885/COVID-19_Infection_prevention_and_control_guidance_FINAL_PDF_20082020.pdf

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https://www.bprs.co.uk/wp-content/uploads/2020/11/BPRS-Guidance-for-management-of-children-with-tracheostomies-and-those-on-LTV_Nov10th2020.pdf.

https://www.gov.uk/government/publications/safe-working-in-education-childcare-and-childrens-social-care/safe-working-in-education-childcare-and-childrens-social-care-settings-including-the-use-of-personal-protective-equipment-ppe#aerosol-generating-procedures-agps.

https://www.gov.uk/government/publications/guidance-on-shielding-and-protecting-extremely-vulnerable-persons-from-covid-19/guidance-on-shielding-and-protecting-extremely-vulnerable-persons-from-covid-19#cev.

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