

Environmental sustainability guidance: Flexible nasoendoscopy

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- We recommend only using reusable flexible nasoendoscopes
- We do not recommend routine use of local anaesthetic spray
- We do not recommend routine use of anti-fog
- We do not recommend routine use of lubricant gels
- Nasoendoscopy can be safely performed without gloves
- Ultraviolet-C light is the preferred method for decontamination of flexible nasoendoscopes

The importance of environmentally sustainable practice in healthcare is increasingly recognised, with the UK General Medical Council advising doctors to “Choose sustainable solutions when you’re able to, provided these don’t compromise care standards”¹

Flexible nasoendoscopy is a frequently used diagnostic tool in outpatient and emergency settings, with the average ENT consultant performing 700-1000 nasoendoscopies per year². Nasoendoscopy has potential to generate waste from use of disposable devices, personal protective equipment, supplementary items and from the decontamination process. In a survey at the 2024 ENT UK Spring Meeting, 36% of ENT UK members stated they use single-use nasoendoscopes as part of their practice.

Here we review evidence and provide recommendations on safety and environmental impact of practice (focused on carbon dioxide emissions and waste generation).

Reusable versus single-use flexible nasendoscopes

Compared to single use, reusable nasoendoscopes are more environmentally friendly and cost effective in the long term.^{3,4} A study of cystoscopes (of similar size and composition to nasoendoscopes) found that manufacture of a single use scope generates 1.37kg of CO₂, whilst for a reusable scope this is 6.55kg of CO₂. The use of an Endoscope Washer Disinfector for decontamination generates at least 0.18 kg of CO₂ per cycle.⁵ Assuming similar packaging and transport, and using these figures, a reusable nasoendoscope outperforms single use nasoendoscopes for carbon footprint after 6 uses. Single use nasoendoscopes are typically disposed of in clinical waste, and if incinerated would result in further CO₂ generation of 1.1kg per 1kg of waste.⁶

On the basis of a typical ENT consultant performing 700-1000 endoscope procedures per year, the estimated overall CO₂ reduction for an ENT surgeon from using reusable rather than single use nasoendoscopes is 1082-1576kg of CO₂ (manufacture and disposal combined).

Arguments for using a single-use nasoendoscope often revolve around ease of use, particularly for transportation to emergencies and remote locations, such as a hospital without on-site ENT equipment. However, the Tristel method of decontamination is small and lightweight, enabling portable decontamination of reusable endoscopes, and should be preferred wherever possible (ensuring manufacturer instructions for the Tristel system are followed). Use of disposable nasoendoscopes in elective settings is difficult to justify.

Use of co-phenylcaine spray, lubricants and anti-fog

Use of local anaesthetic spray is often advised to those learning to undertake nasoendoscopy and also recommended in some textbooks⁷. However, evidence suggests that it has no effect on discomfort from such a procedure, whether used alone or in combination with a vasoconstrictor^{8,9,10,11}. Local anaesthetic sprays also create stinging¹² and an unpleasant taste, and generate waste from the spray bottle and its packaging¹⁰.

For extended examinations with a nasoendoscope, such as a Functional Endoscopic Evaluation of Swallow (FEES) there is some evidence that pain and discomfort are reduced by local anaesthetic^{13,14}, and so may be a consideration, whilst acknowledging the potential of the anaesthetic to affect the swallowing mechanism being observed.

Use of local anaesthesia has also been evaluated in children undergoing nasoendoscopy, with one study showing no difference in pain and anxiety scores between those given nasal decongestant with and without lidocaine¹⁵. A randomized trial investigating co-phenylcaine spray vs placebo prior to nasogastric tube insertion in young children showed no difference in distress scores¹⁶. As nasendoscopes of finer diameter have become engineered, the argument for local anaesthesia or decongestant has become less compelling. Clinicians should make their own judgment on a case-by-case basis.

In the 2024 survey, 79% of ENT surgeons used lubricant gel when performing nasoendoscopy. Lubricating gel does not reduce discomfort or pain and gives an inferior image quality compared to using water as a lubricant.^{9,10,17,18} We recommend the use of tap water (in a cup) instead of lubricant gel.

There is no evidence to support requirement for anti-fog or alcohol prior to performing nasoendoscopy, and if needed, in our experience the patients' own saliva is a good anti-fog agent.

Personal Protective Equipment

Hand hygiene during nasoendoscopy is important as an estimated 20% of hospital acquired infections are due to healthcare professional contact with mucosal surfaces (direct or indirect)¹⁹. In the 2024 survey, 67% of ENT UK members report using gloves when they perform nasoendoscopy.

Non-sterile gloves carry a similar microbial load to appropriately washed hands, and do not reduce risk of transmission of infection, with one study showing contamination of hands in ungloved encounters to be lower (15%) than in gloved encounters (20%),^{20,21}. Use of non-sterile gloves is also associated with poor hand hygiene (increasing risk of cross-contamination) and contact dermatitis^{22,23}. During nasoendoscopy, the clinician's hand is in contact with the decontaminated scope and not the inside of the patient's nose, and so handwashing or hand sanitiser prior to and after undertaking nasoendoscopy is sufficient to prevent infection transmission. Gloves are only required when there will be direct contact with blood, other body fluids, non-intact skin, or mucous membranes. There is

no indication to wear an apron, as aprons are only designed to protect against contact with body fluids.

For staff responsible for handling and cleaning nasoendoscopes, a clean (decontaminated) nasendoscope can be handled with clean hands, and gloves are not required. For handling the distal end of a used (contaminated) nasoendoscope, or handling any chemicals used for cleaning, gloves are an appropriate form of protection.

Decontamination of (non-lumen) flexible nasendoscopes

A flexible nasoendoscope is classed as a 'semi critical' device in contact with mucous membranes, and therefore requires, as a minimum, high level disinfection²⁴. Current methods for decontamination include the endoscope washer disinfector (also used for gastrointestinal and other channeled endoscopes), the Tristel wipe system, and Ultraviolet-C (UV-C) light.

The Endoscope Washer Disinfector (EWD) is the traditional approach to decontamination, but consumes time (minimum of 22 mins, up to 45minutes²⁵), large amounts of water (100-136 litres per cycle²⁶), chemicals, and energy (0.62-6.13 kWh per cycle, generating 0.18-0.59 kg CO₂ per endoscope)^{27,25}. This would result in 126-590kg of CO₂ release for each consultant using EWD's as their decontamination method for nasoendoscopy.

In our 2024 survey, 50% of ENT UK members used Tristel wipes for decontamination, which is as effective as an Endoscope Washer Disinfector if performed in accordance with manufacturer's instructions.²⁸ The wipes are not biodegradable and must be disposed of in clinical waste, and the sachets that contain them are a laminate containing plastic making these unsuitable for recycling²⁹. The total weight of wipes and their packaging is 45g, which translates to 35-45kg of clinical waste per year for an ENT consultant using Tristel wipes as their preferred method of decontamination. If incinerated this would represent 34.65-49.5kg of CO₂ generation.

UV-C light disinfection is a modern approach, which incorporates a manual pre-clean using water and a microfibre cloth to remove debris, followed by a 60 second decontamination cycle with UV-C light. UV-C light decontamination is as effective as the Endoscope Washer Disinfector,^{30,31} with no statistical difference in the number of colony forming units (CFUs) on nasoendoscopes.³⁰ UV-C light appears to be the most cost-effective method for high volume reprocessing compared to the Tristel wipes system³² or other chemical disinfection protocols,³³ and generates less waste, and uses only 0.01kWh of electricity per cycle³⁴ (0.0029 kg CO₂³⁵): 60-600 times lower than an endoscope washer disinfector. The manual pre-cleaning uses a microfibre wipe which weighs approximately 4g, and is disposed into clinical waste. Therefore, each ENT consultant using UV-C light decontamination generates 2.8-4kg of clinical waste per year, which if incinerated generates 3.1-4.4kg of CO₂.

Endoscope sheaths

Endoscope sheaths are a disposable cover for the distal part of a nasoendoscope, but do not cover the hand controls, and so risk cross contamination. If used, additional full decontamination of the nasoendoscope is recommended³⁶. Sheaths can also reduce image quality, or damage endoscopes during application and removal. For these reasons, we do not recommend use of endoscope sheaths.

Image recording

Most modern nasoendoscopes allow for image recording, which may be particularly helpful when procedures are undertaken by less experienced doctors or allied health care practitioners. This enables images or videos to be reviewed by more senior members of the team, avoiding need for a second nasoendoscopy procedure, which would consume further resources as well as causing potential patient discomfort. Images should therefore be recorded where clinically indicated.

Summary

From the data available, the most environmentally sustainable way to perform nasoendoscopy is with a reusable nasoendoscope decontaminated with UV-C light. The second choice is to use Tristel wipes, and the third the endoscope washer disinfectant. Single use nasoendoscopes are the least environmentally friendly option, with little argument to support their use. Supplementary items such as local anaesthetic spray, lubricant gel, “anti-fog” preparations, gloves and aprons are unnecessary, and their use should be restricted to only exceptional circumstances.

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