protocol. If it is used, hospitals must have a specific step-by-step instructional protocol in print that is well understood. Decontamination should occur in a specific designated area, away from patients and other healthcare workers. Frequent in-service training of anaesthesia nurses on HLD must be conducted. The decontamination of RLBs should be monitored and audited for compliance.

- No other method of disinfection, e.g. chlorhexidine and alcohol, should be used to decontaminate RLBs.

Laryngoscope handles

The laryngoscope handle should be decontaminated after each patient. To minimise laryngoscope handle contamination:

- Remove the blade from the handle immediately after use and place the contaminated blade in a receptacle.
- Do not close the contaminated blade on the handle after intubation.
- Consider covering the handle with a new disposable plastic bag for each patient, as described in the rationale.
- Decontaminate by sterilisation, or HLD or ILD.

Sterilisation

Sterilisation steps are as follows:

- Send the laryngoscope handle to the central sterile supplies department for sterilisation.
- Batteries must be removed in the operating theatre (OT).
- Adequate numbers of handles per OT should be acquired to allow for this.
- The manufacturer should be consulted to determine compatibility with the type of sterilisation. Steam sterilisation is recommended. If the handle is not sterilisation friendly, it should be replaced.

High-level disinfection

HLD steps are as follows:

- HLD should take place after each patient.
- Batteries should be removed in the OT prior to HLD.
- There should be a specific step-by-step instructional protocol in print, that can be easily understood.
- HLD must be monitored and audited for compliance.
- Adequate numbers of laryngoscope handles per OT must be acquired to allow for this.

Intermediate-level disinfection

ILD steps are as follows:

- ILD should take place after each patient.
- Chlorhexidine 2% with alcohol 70% should be used.
- HLD or sterilisation must be employed if there is visible blood or organic material contamination.
- Several articles prefer HLD over ILD, so ILD is not the preferred choice.

Laryngoscopes

Laryngoscope blades

Contaminated anaesthetic equipment has been implicated in the nosocomial transmission of infectious diseases. Options for the reprocessing of laryngoscope blades include:

- Use of disposable (single-use) laryngoscope blades (DLBs) (preferred): The metal type only must be used. They should be discarded after single use. DLBs should not be reused, even after sterilisation.
- The sterilisation of reusable laryngoscope blades (RLBs): The light intensity of all RLBs that are steam sterilised should be monitored. Handling and storage are important.
- HLD: There are significant concerns about the use of HLD in a South African setting when decontaminating RLBs. Evidence of poor compliance with HLD protocol has been documented, and there is a significant margin for human error in the HLD

- After sterilisation or disinfection, the laryngoscope handle and blade should be checked for function and then packaged into a sealed plastic bag to prevent recontamination.

Magill forceps

Magill forceps must be steam sterilised after each use. Adequate numbers of Magill forceps per OT should be acquired to allow for this.

Nasopharyngeal and rectal temperature probes

Nasopharyngeal and rectal temperature probes require sterilisation after each use according to manufacturers' recommendations. Adequate numbers of nasopharyngeal temperature probes per OT should be acquired to accommodate this.

Suction bowl

The suction bowl is the container that is filled with water that is used to clear anaesthetic suction catheters or Yankauers™. It should be changed to a plastic or metal receptacle that can be replaced after each patient (one suction bowl per patient). The contaminated receiver should be sent for sterilisation.

Suction tubing

Disposable plastic tubing is recommended for suction tubing. The tubing should be replaced after each patient.

Oropharyngeal airways

Single-patient use only is applicable to oropharyngeal airway equipment, which must be discarded after each use.

Bougies, and intubation guides and stylets

A gum-elastic bougie may be disinfected up to five times between patients according to the manufacturer's recommendations. It should be stored in a sealed packet.

Alternative single-use intubation aids are preferable to bougie use. Intubation aids and stylets are single-use items. Rigid stylets for use with video laryngoscopes e.g. GlideRite with the Glidescope, should be sterilised as per manufacturer's guidelines.

Breathing filters and breathing circuits

Use of a breathing filter must include the following:

- Use a new, high-quality heat-and-moisture-exchange filter (HMEF) for every patient. The HMEF must be changed between patients.
- The filter should be placed on the Y-piece between the endotracheal or tracheostomy tube and the elbow connector or breathing circuit.
- The high-quality HMEF should be above the level of the lungs, with the filter in a vertical position to decrease the risk of contamination from secretions from the patient or condensate from the breathing circuit.
- The anaesthetist must actively search for complications associated with the use of breathing filters, such as obstruction of the filter with blood or secretions, an increase in airway resistance and possible disconnection.
- The filter should not be placed between the circuit and the absorber as this practice can lead to the desiccation of soda lime, with the resultant risk of carbon monoxide poisoning.
- The filter has to be changed when it becomes visibly contaminated with blood or secretions, or with condensate within the breathing system.

Type of breathing filter

- The HMEF must have been tested using the saline test as prescribed in ISO 9360-1:2000 or the European standard norm EN13328-1. The HMEF should have a 99.97% efficiency at a flow rate of 30 l/minute.
- The HMEF should be able to withstand a pressure of 60 hectopascals (≈ 60 cmH_2O) without allowing liquid to pass through, or 20 hectopascals above the set pressure limit of the breathing circuit.
- The HMEF must have a minimum humidity output of 20 g/m^3 in patients ventilated < 10 hours or 33 g/m^3 in ICU patients ventilated > 10 hours.
- When using low flows, the dead space in the filter should be appropriate for the patient's tidal volume.
- Ideally, the HMEF should be a hydrophobic pleated filter.
- Electrostatic filters should not be used in cases where there is a high risk of cross-infection as they do not prevent the passage of liquid through the filter. Electrostatic filters do not prevent transmission because liquid (carrying viruses and bacteria along) can pass through these filters.
- The increase in dead space, increased airway resistance and possible delayed inhalational induction of anaesthesia when using breathing filters/HMEFs, should be considered in children. The lower-weight limit should be a heat-and-moisture exchanger (HME) of 5 kg and filter of 3 kg.

Breathing circuits

The breathing system consists of the elbow connector or catheter mount, the breathing circuit, the reservoir bag and CO_2 absorber. The components of the breathing circuit can be reused between cases for up to seven days, provided that:

- A high-efficiency filter has been used.
- There are no defects in the system.
- It has been disinfected daily according to the manufacturer's instructions.
- It has been cleared by the manufacturer to be used as such.
- The breathing system components are seen as semi-critical items and should be disinfected according to the manufacturer's instructions.
- The CO_2-absorber canister should be cleaned every time the absorber material is changed. Disinfection must take place according to manufacturer's guidelines.

The components of the breathing circuit should be changed immediately in any of the following circumstances:

- When it is visibly soiled with blood or secretions.
- When used on a patient with a confirmed or potential notifiable infectious disease that involves the risk of transmission via the breathing circuit and reservoir bag, e.g. tuberculosis, acute viral hepatitis, measles, influenza virus, infection and/or colonisation with a multidrug-resistant pathogen and upper or lower respiratory tract infection.

Oxygen tubing, oxygen masks and nasal prongs

- These are single-use items and should be discarded after use on a single patient.
- An area of at least 0.4 m from the mask should be considered to be a potential hazard for aerosolised pathogens.
- Patients with high-risk respiratory infections should only be nebulised when necessary and should be isolated during nebulisation in a room with good ventilation.

Bag valve mask resuscitators

- All resuscitators should be fitted with a high-efficiency breathing filter between the valve and the mask before being used on a patient.
- Resuscitators used on the same patient should be capped at the patient connection port when not in use.
- Resuscitators should be cleaned and disinfected according to the manufacturers' instructions.
- The resuscitator should be disassembled, and all the parts washed thoroughly, using clean water and mild detergent. It is necessary to ensure that the detergent is suitable for the material.
- Do not disassemble the pressure release valve and the positive end-expiratory pressure valve.
- All of the parts should be rinsed in clean water to remove the detergent.
- All of the parts should be allowed to dry in a clean, controlled environment, where the risk for recontamination is low.

The components should then be subjected to one of the following decontamination techniques:

- Pasteurisation for 30 minutes (not the oxygen reservoir bag).
- Autoclaving not to exceed 132 °C (not the oxygen reservoir bag).
- Ethylene oxide gas (all parts are suitable).
- Liquid sterilisation (all parts are suitable) with Cidex OPA® or sodium hypochlorite. Wash thoroughly to remove any excess disinfectant.

Manual resuscitator should be sterilised:

- For first-time use.
- Between patients.
- When visibly contaminated.
- Every 24 hours of use in the same patient.

Supraglottic devices

Single-use (disposable) supraglottic airway devices (SADs) are preferred to reusable SADs.

If reusable SADs, e.g. LMA Classic™, are used, they should be sterilised in an audited sterile service department and not more often than recommended by the manufacturer, e.g. 40 times for LMA Classic™. Do not decontaminate and reuse single-use SADs.

Storage of semi-critical items

Semi-critical items should be packaged and stored in a way that prevents recontamination. Suggested compliant storage methods include a peel pouch or a closed plastic bag. These items should not be left unwrapped in or on top of anaesthesia workstations and trolleys.

Non-critical medical equipment surfaces

Non-critical medical equipment surfaces extend to blood pressure cuffs, stethoscopes, and frequently used control mechanisms, e.g. pop-off knobs, flow controls and vaporisers.

It is necessary to disinfect with a low- or intermediate-level disinfectant after each patient.

Medical equipment surfaces can become contaminated with blood and infectious agents and contribute to the spread of healthcare-associated infection. Loftus et al. reported that multidrug-resistant bacterial transmission to the anaesthesia work area occurred during the practice of general anaesthesia.

Disposable devices

A single-use medical device is to be used on a single patient during one procedure. The reuse of disposable or single-use devices started in the 1970s and is a growing and common practice worldwide, especially in resource-limited settings. Informed consent should be obtained from the patients if an item is to be reused on them. Certain issues exist, including the decontamination technique and the risk of cross-contamination, material alteration, a clear limit to the number of times that an item can be reused, mechanical failure of the device, exposure risks to healthcare workers and ethical and legal implications. Although the reuse of single-use devices is strongly discouraged, the suggested practice from the International Society for Infectious Diseases (ISID) and the World Health Organization (WHO) are as follows:

- A facility should be committed to the reuse of single-use devices and have an institution-specific policy with clear guidelines.
- The disposable devices should be classified and reprocessed as per their intrinsic risk: critical, semi-critical and non-critical.
- Functionality and integrity of the device should be maintained.
- The package labelling and manufacturer's guidelines should be followed.
- Reprocessing of disposable devices should be cost-justified and performed by a licensed reprocessor.
- Both the physician and the patient should be informed that a device being used is a reprocessed single-use device.
- Any person who reuses a single-use device takes full responsibility for its safety and effectiveness.

A platform for reporting any adverse events from the reuse of single-use devices should be available. The Association of Perioperative Registered Nurses (AORN) has recommended that the sterility, integrity and functionality of a reprocessed single-use device must be documented as safe for patient care and/or equal to the original device specifications.

Trans-oesophageal echocardiogram probes (TEE)

A semi-critical device with increasing usage in anaesthetic practice that has the potential for cross-contamination, especially if the probes are damaged. A sheath should preferentially be used but does not eliminate the risk of contamination and does not exclude the probe from HLD. The recommended basic principles for reprocessing TEE probes are:

- Clean the probe shaft and tip either with immersion or with detergent moistened wipe or enzymatic cleaner to remove gross contamination.
- Use a second wipe to wipe the proximal non-immersible parts such as the handles.
- Ensure that there is no structural damage to the probe.
- Use HLD to disinfect the probe tip and flexible shaft.
- Thoroughly rinse and dry before storage.

The manufacturers' instructions regarding chemical disinfectants should be followed.