Environmental considerations in infection control and prevention

Please refer to the relevant IUSS guidelines that can be found at www.iussonline.co.za as well as the SASA website.

Operating theatre ventilation

- Every operating theatre complex requires effective central humidity ventilation and air-conditioning system (HVAC).
- Maintain at least 15–20 air changes per hour of which at least three such air changes should be with fresh air.
- Maintain positive pressure within the operating theatre compared to the corridors and adjacent areas. This is to facilitate the movement of air from the operating theatre along a pressure gradient towards adjacent areas. Air thus moves away from the sterile operating site and reduces the risk of contaminated air getting in contact with the operating field and sterile instruments.
- Ideally, air should come from the ceiling and move towards at least two air exhaust vents located close to the floor.
- Make sure that air exhaust vents are not obstructed or covered.
- All air (re-circulating and fresh air) should pass through filters before entering the operating theatre.
- Keep the doors to the operating theatres closed at all times.
- The air-conditioner system should operate continuously independent of whether there is a case on the table or not.

Forced-air warmers

- Consider using conductive fabric warmers over forced-air warmers for preventing intraoperative hypothermia, especially in high-risk surgery such as joint replacements.
- Where conductive fabric warmers are not available, forced-air warmers should be used as the risk of hypothermia outweighs the possible risk of contamination of the surgical wound.

Operating theatre temperature and humidity

Keep ambient theatre temperature between 18–24 ºC. The ambient temperature should be uniform throughout the space. Keep humidity levels between 30–60%.

Environmental cleaning of the operating theatre

Table IV: Definitions

Cleaning	The physical removal of foreign material, e.g., dust, soil, and organic material such as: blood, secretions, excretions, and microorganisms. Cleaning physically removes rather than kills microorganisms. It is accomplished with water, detergents and mechanical action.
Contact time/ Dwell time	The defined time for which surfaces are exposed to a chemical or thermal disinfection process to achieve the appropriate level of disinfection. Inadequate contact time may lead to incomplete disinfection.
Disinfectant	Product used on inanimate objects to reduce the number of microorganisms to an acceptable level. Hospital-grade disinfectants require a drug identification number (DIN). High-level disinfectants should not be used to clean environmental or inanimate objects.
Disinfection	The inactivation of disease-producing microorganisms with the exception of bacterial spores. Hospital-grade disinfectants are used on inanimate objects. Medical equipment must be cleaned properly before effective disinfection can take place.
Preliminary cleaning	Damp-dust horizontal surfaces prior to first case. Do not clean with dry materials as that causes dust to become airborne. Use a clean, lint-free cloth moistened with low-level disinfectant. Avoid spraying or misting methods. Start at higher surfaces and work down in a clockwise manner. Damp-dust equipment before it is brought into or out of the operating theatre. Inspect operating theatre lights for cleanliness before the first case of the day. Floors should always be considered contaminated even after proper cleaning.
Intraoperative cleaning	The responsibility for verifying disinfection of a contaminated surface rests with the perioperative team member who is first aware of the contamination. All contaminated (blood, body fluids, or other potentially infectious material) items or surfaces occurring intraoperatively are to be promptly cleaned/disinfected as required using facility-approved disinfectant. Equipment leaving the operating theatre is cleaned and disinfected with hospital-approved disinfectant. Chemical spills occurring intraoperatively are to be managed as per site/regional policy/procedure.
Between procedures	Each operating theatre must be cleaned and disinfected immediately after each case. Do not start the process before the patient has left the area. Prior to cleaning, remove all trash, linen, and recycling from the room, including soiled anaesthesia equipment and supplies. All surfaces that have been in direct or indirect contact with the patient or body fluids are considered to be contaminated and therefore are to be cleaned/disinfected with a hospital-approved disinfectant. Contaminated linen should be handled as little as possible.
Terminal cleaning	Cleaning staff should adhere to standard precautions with regards to personal protective equipment (PPE). Staff performing cleaning may be required to wear additional PPE during terminal cleaning after procedures with additional precautions such as the highly infectious patient. Operating theatres are to be terminally cleaned at minimum once every 24 hours during a regular workweek regardless of whether the theatre has been used. All floors should be cleaned using a wet vacuum or single-use mop and a disinfectant (follow dwell time indicated on manufacturer's instructions). Floor cleaning should progress from cleanest area to dirtiest, from perimeter of the room to the centre. Care must be taken to ensure the floor under the theatre bed and trolleys are also cleaned.

- Cleaning of surfaces and instruments with detergents is needed before disinfection and decontamination can take place. The presence of organic matter, salts and obvious contamination can compromise the efficacy of the terminal reprocessing procedures.
- Use Environmental Protection Agency (EPA)-approved disinfectants such as a quaternary ammonium compound to clean all areas that could have been contaminated during the procedure.
- Avoid methods that can lead to mist, aerosols or dispersion of dust.

Surgical attire

Scrubs

- Scrubs should be made from material that is tightly woven, low-linting, stain-resistant and non-flammable.
- It should not be 100% fleece but rather a mixture of cotton with 10–20% polyester.
- Change scrubs that are visibly soiled or contaminated with potential infectious material.
- Reusable scrubs should be washed at a healthcare-accredited laundry.
- For procedures at high risk of contamination from blood or bodily fluids, a waterproof apron should be worn under the surgical gown.
- Surgical scrubs should not be worn outside the operating theatre complex due to the risk of spreading microorganisms.
- Home laundering of scrubs is not recommended as it does not meet specified criteria to reduce microbial load.
- Maintaining good personal hygiene is as important as wearing appropriate theatre attire.

Other theatre attire

- Wear a surgical mask when packs are open and for the duration of the procedure.
- Surgical mask must cover all facial hair, the mouth and the nose.
- Wear a theatre cap that covers all hair on the head and sideburns.
- Shoe covers do not protect against SSIs.
- Shoe covers can be replaced with dedicated theatre shoes that are easily washable and washed at the end of the day.
- Outside shoes should not be worn inside the operating theatre.
- PPE use should be based on the most likely mode of transmission of organisms.