衞生防護中心
Centre for Health Protection

Recommendations on Prevention of Surgical Site Infection

3rd Edition

Scientific Committee on Infection Control, and
Infection Control Branch, Centre for Health Protection,
Department of Health

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Background

The Scientific Committee on Infection Control (SCIC) endeavours to prevent surgical site infection. In this connection, the SCIC has developed the Recommendations on Prevention of Surgical Site Infection. The recommendations serve as guidance for the formulation of strategies, programmes and plans for the prevention of surgical site infection.

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Contents

I. Introduction

Surgical site infection (SSI) is common, accounting for 16.1% to 20% of healthcare-associated infections with reported rates ranging from 0.6% to 9.5% of surgical procedures, depending on the type of surgery and patient characteristics (1-5).

2. Applying evidenced-based strategies for the prevention of surgical site infection can significantly reduce SSI rates (4, 6-9). Successful prevention of SSI helps to reduce surgical patients' morbidity, mortality and length of stay, and save cost for the healthcare institutions (6). In general, SSI prevention measures deemed effective in adults are also indicated in the paediatric surgical population (7).

3. A multidisciplinary team work approach is necessary to successfully implement the preventive measures and improvement in surgical site infection. The team may include anyone who has a role in the surgical care process, e.g. surgical staff, anaesthesiologists, operating room assistants, infection control personnel, pharmacists, supporting staff, quality control officers, engineers, etc. All direct care healthcare workers should be educated about the risks of surgical site infection and preventive measures (4).

II. Recommendations on Prevention of Surgical Site Infection

A. Preoperative Preparation of Surgical Patients

(a) Eradicate or treat all infections remote to the surgical site before surgery whenever possible (8-11).

(b) For patients with diabetes mellitus, assess preoperative glycemic control and optimise as appropriate (12-18). The HbA_{1C} goal for elective surgeries should be less than 8% whenever feasible (12, 14, 16, 17).

(c) Minimize the preoperative length of stay of patients in the hospital, such as by completing preoperative assessments and optimising patients' conditions before admission to hospital and performing elective surgery in ambulatory day centres, where possible (1, 6, 12, 19).

(d) Educate patients about the increased risk of smoking on postoperative surgical site infection and encourage patients to stop smoking or taking any tobacco consumption at least 30 days before the operation (4, 6, 12, 20, 21).

(e) Avoid removing hair from the operating site unless it interferes with the operation. If hair is to be removed, perform hair removal shortly before surgery and preferably with clippers. Razors are not recommended as they increase the risk for surgical site infection (1, 4, 5, 12, 22).

(f) Advise patients to shower or bathe the night before or on the day of operation. Either plain soap or antimicrobial soap can be used. Preoperative showers reduce the skin's microbial colony counts but studies did not show reduction in SSI rates (1, 5, 6, 12, 23-28).

(g) Wash and clean gross contamination of skin at and around the incision site before performing preoperative antiseptic skin preparation in the operating theatre (4, 6).

(h) Use a combination of mechanical bowel preparation and oral antimicrobial prophylaxis, in addition to intravenous antimicrobial prophylaxis, to reduce the risk of SSI in elective colorectal surgery (1, 4, 12, 29, 30).

B. Reprocessing of Surgical Instruments

(a) All surgical instruments, especially those with long and narrow lumens, hinges must be cleaned and decontaminated adequately before sterilization process (31-33).

(b) Heat resistant surgical instruments should receive steam sterilization. Heat sensitive instruments can use low temperature sterilization technology, such as hydrogen peroxide gas plasma (32-34).

(c) Laparoscopes, arthroscopes and other scopes that enter normally sterile tissue should be sterilized. When it is not feasible, they should at least be treated with high level disinfection after thorough cleansing (32, 35-37).

(d) All endoscopes and accessories used in endoscopy should be reprocessed following every endoscopic procedure, using a uniform, standardized reprocessing protocol (36, 38, 39).

(e) Immediate-use steam sterilization (IUSS, formerly known as flash sterilization) of surgical instruments should only be used for emergency with no alternatives. IUSS should never be used for implant devices, prosthesis and power instruments or simply to save time (7, 32, 33, 40, 41).

(f) IUSS record (i.e. load identification, patient/ hospital's identifier, mechanical, chemical +/- biological indicator result) should be maintained and updated for epidemiological tracking and for an assessment of the reliability of the sterilization process (32, 41, 42).

(g) Standard procedures and staff proficiency to carry out reprocessing procedures should be monitored (42).

(h) To assure sterility and proper handling of instruments, a quality control programme should be established and documented (6, 32, 41).

(i) For more details on sterilization and disinfection of surgical instrument in hospital setting, please refer to "Recommendations on Disinfection and Sterilisation of Surgical Instruments for Hospital Setting".

C. Ventilation and Environment in the Operating Theatre

(a) Exert traffic control of operating room by restricting the number of people allowed in the operating room. Keep doors closed to prevent in and out traffic, and limiting unnecessary movement and talking once in the operating room (6, 43, 44).

(b) Maintain positive-pressure ventilation in operating rooms with respect to corridors and adjacent areas (6, 7, 43). A programme for periodic checking and system maintenance assessment is important to ensure that the target pressure gradient is maintained and that out of range performance can be detected (43-46). A device or a simple visual method which requires a minimum differential pressure to indicate airflow direction is desirable.

(c) Maintain the ventilation at a minimum of 20 air changes per hour (ACH) of which at least 4 ACH should be fresh air (47). Airflow monitoring device(s) with alerting feature for out of range performance should be in place. A program for periodic checking and system maintenance assessment is important to ensure that the target airflow is maintained (43, 47).

(d) Filter for all incoming air through MERV 16 filters (or equivalent) at a

minimum (47).

(e) Recirculating room units shall not be used. For recirculating devices with high-efficiency particulate air (HEPA) filters, refer to the relevant requirements applicable to each specific setting (47-49).

(f) Introduce air at the ceiling and exhaust air near the floor (6, 43, 44).

(g) Laminar airflow ventilation systems (ultraclean air) and ultraviolet irradiation are not necessary to decrease overall surgical site infection risk, even for orthopaedic implant operations, if appropriate antiseptic precautions and prophylactic antibiotic policy are implemented (1, 6, 43, 50-54).

(h) Maintain relative humidity at 20-60% and temperature at 20-24°C (47).

(i) Do not shut down the heating, ventilation and air conditioning systems (HVAC) for purposes other than required maintenance, filter changes and construction (43).

(j) The design of sinks should reduce risk of splashes (55). If strainers are used in water taps, they should be inspected, cleaned, descaled and disinfected regularly or on a frequency defined by the proper risk evaluation, taking account of the manufacturer's recommendations (56).

(k) Do not use tacky mats at the entrance to the operating room suite or individual operating rooms for infection control (6, 43).

(l) Microbiologic air sampling

(i) Allow adequate time for commissioning including microbiological assessments by the hospital infection prevention and control team before an operating theatre is first used and after any substantial modifications that may affect airflow patterns in

pre-existing theatres (57, 58). As microbiological sampling results take days to become available, particle counters may be of value, but air particle counts do not reliably correlate with microbiological sampling results and therefore cannot replace them (59, 60).

(ii) Do not perform microbiological air sampling routinely, provided that engineering parameters such as air distribution, air change rates, pressure differentials and airflow, etc. are satisfactory and regularly monitored. Such sampling should be done as part of an epidemiological investigation, validation of changes in products e.g. HEPA filters, maintenance of operating theatres or as advised by the hospital infection control team (6, 46, 57, 58, 61).

(iii) For conventional operating rooms, aerobic cultures on nonselective media should not exceed ten bacterial and/or fungal colony forming units per cubic metre (CFU/m^3) (46, 58). Initiate an appropriate course of action e.g., re-cleaning of the environment and re-testing if results are outside the limits. If repeat testing produces results above acceptable levels, the HVAC systems should be reviewed by the appropriate personnel.

(m) For infection control measures in the operating theatre for patients with suspected or confirmed pulmonary tuberculosis (TB) or other airborne infections, please refer to **Appendix 1**.

D. Antimicrobial Prophylaxis

(a) Surgical prophylaxis refers to the administration of antibiotics before surgery to prevent SSIs. It is recommended for most clean-contaminated and specific clean procedures in which the consequence of infection is severe, such as those involving placement of prostheses or implants (62).

(b) Moreover, patient-specific factors may justify the use of antimicrobial

prophylaxis in certain procedures where it might not typically be recommended. Risk factors that may warrant prophylaxis include extremes of age, obesity, diabetes mellitus, and immunosuppression (63).

(c) The causative organisms of SSI are usually skin commensals or flora that are present at the bodily site of operation (for example, Gram-negative and anaerobic bowel flora for surgeries traversing the colon) (64).

(d) In cases of contaminated or infected wounds, such as traumatic or bite injuries, ruptured or suppurative viscus, postoperative antibiotic treatment is recommended instead of prophylaxis (64).

(e) The choice, dosing and timing of antimicrobial agent are crucial for the effectiveness of surgical prophylaxis. Narrow-spectrum agents are preferred because they pose a lower risk of causing *Clostridioides difficile* infection and antimicrobial resistance (65). Other important considerations include local resistance patterns, prior antibiotic use history, and instances of antibiotic-resistant infections (64).

(f) For many prophylactic antimicrobial agents, the initial dose should be administered within 30 minutes before incision, coinciding with the induction of anaesthesia, to achieve bactericidal serum and tissue concentrations at the time of the initial incision. This process can be facilitated by having the anaesthesiologist administer the drug in the operating room during induction. The antimicrobial agents should be infused completely prior to the incision (66, 67).

(g) Redose prophylactic antimicrobial agent(s) in cases with excessive blood loss during the procedure (i.e. >1500 mL). For antimicrobials with a short half-life (e.g. cefazolin) used before long procedures, redosing in the operating room is recommended at an interval of approximately two times the half-life of the agent in patients with normal renal function. For example, redose cefazolin after 4 hours in procedures >4 hours long (62, 64, 68-70).

(h) Screening and decolonisation of methicillin-resistant S*taphylococcus aureus* (MRSA) is recommended for high-risk surgery such as cardiac, orthopaedic and neurosurgery involving implant. In general, mupirocin without proper screening is not advised as indiscriminate use can contribute to the development of resistance (71, 72). Patients with a history of MRSA colonisation or a recent MRSA infection should receive surgical prophylaxis with MRSA coverage for high-risk surgeries (62).

(i) Colonisation of multi-drug resistant organisms (MDRO) other than MRSA and consequent SSI caused by these pathogens are controversial issues. Whether prophylaxis should be expanded to cover for these pathogens depends on many factors, including the host, the MDRO and its antimicrobial susceptibility profile, the procedure and the proximity of the pathogen reservoir to the operative site. Please consult a clinical microbiologist or infectious disease physician for the use of surgical prophylaxis (62, 73, 74).

(j) There is no evidence to suggest that administering prophylactic antimicrobial agents after incisional closure reduces SSIs, even when drains are inserted during the procedure (1, 4, 5, 7, 75-78). On the contrary, antibiotics given after closure can lead to increased antimicrobial resistance, superinfections by fungi and *Clostridioides difficile*, as well as side effects such as rash and acute kidney injury (1, 79).

(k) A review by the World Health Organization indicates that there is low to very low-quality evidence suggesting that a brief postoperative prophylaxis duration may offer some benefits in reducing SSIs in cardiac and jaw (orthognathic) surgery. However, randomized controlled trials (RCTs) in these procedures have not shown any advantage in extending prophylaxis beyond 24 hours. In vascular surgery, evidence from a single RCT suggests that extending prophylaxis until the removal of intravenous lines and tubes may be beneficial in reducing SSI (1, 64).

(l) For suggestions on indications and choice of prophylactic antimicrobial agents please refer to **Appendix 2**.

E. Surgical Hand Preparation

(a) Nails should be kept short. Artificial nails, nail polish, rings, wrist-watches and bracelets should be removed before surgical hand preparation (5, 55).

(b) After donning theatre clothing and on arrival in the operating theatre, or if hands are visibly soiled, wash hands with plain soap and water. This step should be done before surgical hand preparation. Remove debris from underneath fingernails using a nail cleaner, preferably under running water. Brushes are not recommended for surgical hand preparation (55).

(c) Surgical hand preparation should be performed either by scrubbing with an appropriate antimicrobial soap (e.g. 4% chlorhexidine or 7.5% povidone-iodine) and water, or rubbing with an alcohol-based handrub product indicated for surgical hand preparation (1, 5, 12, 55, 80).

(d) When performing surgical hand preparation with an antimicrobial soap and water, scrub hands and forearms for the length of time recommended by the manufacturer, typically 2 to 5 minutes. Long scrub times (e.g. 10 minutes) are not necessary (55, 81).

(e) When performing surgical hand preparation with an alcohol-based surgical handrub product, follow the manufacturer's instructions for application times and observe the following guidance (55):

(i) Apply the product on dry hands only.

(ii) Do not combine surgical hand scrub and surgical handrub with alcohol-based products sequentially.

(iii) When using an alcohol-based handrub, use sufficient product to keep hands and forearms wet with the handrub throughout the surgical hand preparation procedure.

(iv) After application of alcohol-based handrub as recommended, allow hands and forearms to dry thoroughly before donning sterile gloves.

The proper techniques for surgical hand preparation with a medicated soap and water, as well as surgical hand preparation with an alcohol-based handrub formulation, are included in **Appendix 3**.

F. Surgical Attire and Drapes

(a) Scrubbed surgical team members should wear masks, caps, sterile gowns and gloves (6, 7).

(b) Wear a surgical mask that fully covers the mouth and nose when entering the operating room if an operation is about to begin or already under way, or if sterile instruments are exposed. Wear the mask throughout the operation (6, 7).

(c) Wear a new disposable or hospital-laundered head covering when entering the operating room. Ensure it fully covers all hair on the head and all facial hair not covered by the surgical mask (6, 7, 12).

(d) Consider wearing two pairs of sterile gloves or orthopaedic gloves when there is a high risk of glove perforation and the consequences of contamination may be serious (5, 82, 83). However, there was no direct evidence that additional glove protection worn by the surgical team reduces SSI in patients (1, 12). Glove(s) should be changed when perforation is noted (4).

(e) Use sterile surgical drapes to create a barrier between the surgical field and the environment or potential source of bacteria (1, 6).

(f) Surgical gowns and drapes should be sterile and resistant to liquid penetration and remain effective barriers when wet (6, 7).

(g) Change surgical gowns and scrub suit if visibly soiled or penetrated by blood or body fluids (6, 7).

G. Intraoperative Management

(a) For surgical site skin preparation (1, 4, 5, 7, 12, 84-86):

(i) Use an alcohol-based antiseptic solution containing chlorhexidine, unless contraindicated.

(ii) If chlorhexidine is contraindicated, use an alcohol-based antiseptic solution containing povidone-iodine, unless contraindicated.

(iii) If alcohol is contraindicated, use an aqueous antiseptic solution containing chlorhexidine, unless contraindicated.

(iv) If both alcohol and chlorhexidine are contraindicated, use an aqueous antiseptic solution containing povidone-iodine, unless contraindicated.

(b) Perform antiseptic skin preparation in the operating room before incision; allow the antiseptic solution to dry before incision (1, 5, 6, 87).

(c) Antiseptic skin preparation should include surgical incision and drain sites (6).

(d) Adhere to standard principles of operating room asepsis from the start of preparation of surgical instruments on the sterile field through wound closure and dressing (4, 6, 7, 12, 88, 89).

(e) Sterile surgical instruments, medications and solutions should be assembled as close as possible to the time of use (6, 89).

(f) Maintain good surgical techniques, such as gentle tissue handling to minimize trauma, careful haemostasis, adequate debridement and removal of dead, devitalized tissues and foreign bodies (4, 6).

(g) Consider the use of impervious plastic wound protectors for gastrointestinal and biliary tract surgery (1, 4, 90, 91).

(h) Maintain normothermia (above 36°C) in the perioperative period for procedures not requiring hypothermia. Active warming methods include forced-air warming devices and fluid warming devices, whereas passive warming methods include warmed blankets and increased ambient temperature in the operating room. These methods may be used in combination. Consistent and proper site, method and equipment should be used for monitoring the patient's core temperature by direct measurement or estimate (1, 4, 12, 92-96).

(i) Optimize tissue oxygenation during surgery and in the immediate postoperative period (1, 4, 5).

(j) Maintain adequate perfusion during surgery (5, 12, 97).

(k) Blood transfusions increase the risk of SSI by decreasing macrophage function. Do not withhold transfusion of necessary blood products for surgical patients as a means to prevent SSI (4, 7, 12, 98-100).

(l) The intraoperative blood glucose target should generally be below 10 mmol/L (7, 13, 14, 16, 17).

(m) Antibiotic irrigation of the incisional wounds for the purpose of SSI prevention is not recommended (1, 12, 101, 102).

(n) Consider irrigation of the incisional wound with an aqueous iodophor solution before closure to decrease the risk of SSI (1, 4, 7, 102-104).

(o) If the surgical site is heavily contaminated, leave the incision open to close later when it is clean (6, 105, 106).

(p) Use closed suction drain and insert through a separate incision if surgical drainage is necessary. Remove the drain as soon as possible (6,

107).

H. Postoperative Management

(a) Cover the primarily closed clean surgical wound with sterile dressing and keep it intact for 24-48 hours postoperatively unless leakage occurs (1, 6, 7, 12).

(b) Use normal saline to cleanse and remove surface bacteria and discharge from wound (108, 109).

(c) Perform hand hygiene before and after touching the surgical site or changing dressing (6, 55).

(d) Teach the patients and their carers how to care and monitor the surgical site, signs and symptoms of surgical site infection and to report if any problems occur (5, 6).

(e) The postoperative blood glucose target should generally be below 10 mmol/L (4, 7, 12-14, 16, 17).

I. Surgical Site Infection Surveillance

5. Surgical site infection surveillance with feedback of surgical infection rates to surgeons is one of the successful strategies to help reduce surgical site infection (110, 111). All hospitals with surgical services are recommended to undertake ongoing and active surveillance of surgical site infection with a written plan/protocol to measure the incidence using trained infection prevention personnel (4).

The main components include:

(a) Select certain categories of operations in the scope of the surgical site

infection surveillance based on risk and volume of procedures in local hospitals (4, 112).

(b) Use standardized and consistent methods and definitions, such as National Healthcare Safety Network (NHSN) for data collection and analysis (2, 4).

(c) Trained infection prevention personnel with knowledge and understanding of epidemiology, surveillance and plan of the programme should be responsible for case-finding and applying definitions (4).

(d) Perform consistent post discharge surveillance of surgical site infection to capture the infection incidence that occurs outside the hospitals, which was essential to make the surveillance data more accurate and complete (4, 112-114).

(e) Relevant patient's background information, risk factors which were shown to be associated with increased SSI risk (e.g. risk index components) and information about surgical antibiotic prophylaxis should be recorded (4, 112, 115, 116).

(f) Stratify operations according to the SSI risk (e.g. risk index determined by wound class, ASA score and duration of operation) (115).

(g) Report the stratified, operation-specific surgical site infection rates periodically to the surgical team members and other stakeholders (4).

(h) Benchmark the surveillance data with local or international benchmark data (2, 112, 117, 118).

(i) Periodically evaluate and validate the application of definition, data and process of the surgical site infection surveillance to ensure high quality and accuracy (4, 112).

(j) Investigate outbreak or abnormal clustering of surgical site infection ascribing to, such as clustering of organisms, healthcare personnel or airborne source and make recommendations to frontline staff (4).

J. Quality Measures

6. Quality measures should be established to assess the effectiveness of implementing the recommendations. The following parameters can be used as performance indicators:

(a) Surgical site infection rate (stratified by risk and use benchmark) (3, 4, 115, 116).

(b) Process measures as appropriate e.g. percentage of surgical cases with appropriate timing, selection, dosage and duration of prophylactic antibiotic in accordance with section D above (4).

(c) Ventilation and environmental parameters of the operating theatres as listed in section C above.

Centre for Health Protection

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Appendix 1: Infection control measures in the operating theatre for patients with suspected or confirmed pulmonary tuberculosis (TB) or other airborne infections

(a) A system of detection and communication should be established to evaluate surgical patients prior to surgery and communicate to relevant departments to facilitate arrangement of necessary infection control measures (119, 120).

(b) There is no recommendation for changing pressure in operating room from positive to negative or setting it to neutral (43, 120).

(c) Perform only emergency operations or diagnostic procedures as indicated. Postpone elective surgery until after the infectious period or after effective therapy if delaying the operation does not cause increased risk to the patients (120).

(d) Schedule patient as the last case of the day to provide maximum time for adequate air changes if the delay of operations does not cause increased risk to the patients (43, 120).

(e) Install high-efficiency filters between the anaesthesia breathing circuit and the patients (43, 120). The entire breathing circuit should be changed and safely discarded after used (121, 122). Closed suctioning system is preferred.

(f) N95 respirators without exhalation valves should be worn for respiratory protection of surgical personnel in the operating theatre (43, 120).

(g) Perform aerosol generating procedures, such as intubation and extubation in an airborne infection isolation room if feasible (43).

Appendix 2: Suggested guidelines for surgical antimicrobial prophylaxis

IMPACT (6th Edition) Part VI: Guidelines for surgical prophylaxis

https://impact.chp.gov.hk/chapters_6_1.php

IMPACT mobile applications for download:

Appendix 3: Protocol for surgical scrub with a medicated soap and surgical hand preparation technique with an alcohol-based handrub formulation

(Source: WHO guidelines on hand hygiene in healthcare facilities 2009)

Table I.13.2
Protocol for surgical scrub with a medicated soap

Procedural steps
• Start timing. Scrub each side of each finger, between the fingers, and the back and front of the hand for 2 minutes.
• Proceed to scrub the arms, keeping the hand higher than the arm at all times. This helps to avoid recontamination of the hands by water from the elbows and prevents bacteria-laden soap and water from contaminating the hands.
• Wash each side of the arm from wrist to the elbow for 1 minute.
• Repeat the process on the other hand and arm, keeping hands above elbows at all times. If the hand touches anything at any time, the scrub must be lengthened by 1 minute for the area that has been contaminated.
• Rinse hands and arms by passing them through the water in one direction only, from fingertips to elbow. Do not move the arm back and forth through the water.
• Proceed to the operating theatre holding hands above elbows.
• At all times during the scrub procedure, care should be taken not to splash water onto surgical attire.
• Once in the operating theatre, hands and arms should be dried using a sterile towel and aseptic technique before donning gown and gloves.

Figure I.13.1
Surgical hand preparation technique with an alcohol-based handrub formulation

The handrubbing technique for surgical hand preparation must be performed on perfectly clean, dry hands.
On arrival in the operating theatre and after having donned theatre clothing (cap/hat/bonnet and mask), hands must be washed with soap and water.
After the operation when removing gloves, hands must be rubbed with an alcohol-based formulation or washed with soap and water if any residual talc or biological fluids are present (e.g. the glove is punctured).

Surgical procedures may be carried out one after the other without the need for handwashing, provided that the handrubbing technique for surgical hand preparation is followed (Images 1 to 17).

1
Put approximately 5ml (3 doses) of alcohol-based handrub in the palm of your left hand, using the elbow of your other arm to operate the dispenser

2
Dip the fingertips of your right hand in the handrub to decontaminate under the nails (5 seconds)

3
Images 3–7: Smear the handrub on the right forearm up to the elbow. Ensure that the whole skin area is covered by using circular movements around the forearm until the handrub has fully evaporated (10-15 seconds)

4
See legend for Image 3

5
See legend for Image 3

6
See legend for Image 3

7
See legend for Image 3

8
Put approximately 5ml (3 doses) of alcohol-based handrub in the palm of your right hand, using the elbow of your other arm to operate the dispenser

9
Dip the fingertips of your left hand in the handrub to decontaminate under the nails (5 seconds)

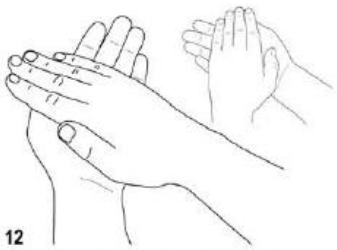
Figure I.13.1
Surgical hand preparation technique with an alcohol-based handrub formulation (Cont.)

10

Smear the handrub on the left forearm up to the elbow. Ensure that the whole skin area is covered by using circular movements around the forearm until the handrub has fully evaporated (10-15 seconds)

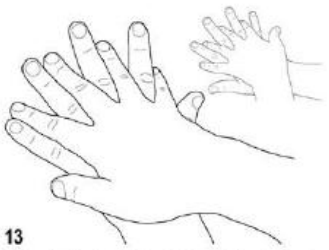
11

Put approximately 5ml (3 doses) of alcohol-based handrub in the palm of your left hand, using the elbow of your other arm to operate the distributor. Rub both hands at the same time up to the wrists, and ensure that all the steps re-presented in Images 12-17 are followed (20-30 seconds)



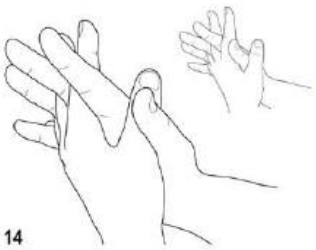
12

Cover the whole surface of the hands up to the wrist with alcohol-based han-drub, rubbing palm against palm with a rotating movement



13

Rub the back of the left hand, including the wrist, moving the right palm back and forth, and vice-versa

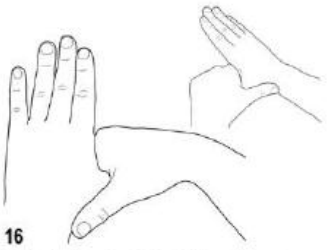


14

Rub palm against palm back and forth with fingers interlinked

15

Rub the back of the fingers by holding them in the palm of the other hand with a sideways back and forth movement



16

Rub the thumb of the left hand by rota-ting it in the clasped palm of the right hand and vice versa

17

When the hands are dry, sterile surgical clothing and gloves can be donned

Repeat the above-illustrated sequence (average duration, 60 sec) according to the number of times corresponding to the total duration recommended by the manufacturer for surgical hand preparation with an alcohol-based handrub.

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