WHO Guidelines on Hand Hygiene in Health Care: a Summary

First Global Patient Safety Challenge
Clean Care is Safer Care
PART II.

CONSENSUS RECOMMENDATIONS
Consensus recommendations and ranking system

Recommendations were formulated based on evidence described in the various sections of the Guidelines and expert consensus. Evidence and recommendations were graded using a system adapted from the one developed by the Healthcare Infection Control Practices Advisory Committee (HICPAC) of the Centers for Disease Control and Prevention (CDC), Atlanta, Georgia, USA (Table II.1).

Table II.1

<table>
<thead>
<tr>
<th>Category</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>IA</td>
<td>Strongly recommended for implementation and strongly supported by well-designed experimental, clinical or epidemiological studies</td>
</tr>
<tr>
<td>IB</td>
<td>Strongly recommended for implementation and supported by some experimental, clinical or epidemiological studies and a strong theoretical rationale</td>
</tr>
<tr>
<td>IC</td>
<td>Required for implementation as mandated by federal and/or state regulation or standard</td>
</tr>
<tr>
<td>II</td>
<td>Suggested for implementation and supported by suggestive clinical or epidemiological studies or a theoretical rationale or the consensus of a panel of experts</td>
</tr>
</tbody>
</table>

1. Indications for hand hygiene

- A. Wash hands with soap and water when visibly dirty or visibly soiled with blood or other body fluids (IB) or after using the toilet (II).130-140

- B. If exposure to potential spore-forming pathogens is strongly suspected or proven, including outbreaks of *C. difficile*, hand washing with soap and water is the preferred means (IB).141-144

- C. Use an alcohol-based handrub as the preferred means for routine hand antisepsis in all other clinical situations described in items D(a) to D(f) listed below if hands are not visibly soiled (IA).75, 82, 94, 95, 145-149 If alcohol-based handrub is not obtainable, wash hands with soap and water (IB).75, 150, 151

- D. Perform hand hygiene:
  - a) before and after touching the patient (IB).35, 47, 51, 53-55, 66, 152-154
  - b) before handling an invasive device for patient care, regardless of whether or not gloves are used (IB).155
  - c) after contact with body fluids or excretions, mucous membranes, non-intact skin, or wound dressings (IA);54, 130, 153, 156
  - d) if moving from a contaminated body site to another body site during care of the same patient (IB);35, 53-55, 156
  - e) after contact with inanimate surfaces and objects (including medical equipment) in the immediate vicinity of the patient (IB);48, 49, 51, 53-55, 156-158
  - f) after removing sterile (II) or non-sterile gloves (IB).53, 159-162

- E. Before handling medication or preparing food perform hand hygiene using an alcohol-based handrub or wash hands with either plain or antimicrobial soap and water (IB).133-136

- F. Soap and alcohol-based handrub should not be used concomitantly (II).163, 164
**Hand Hygiene Technique with Alcohol-Based Formulation**

**Duration of the entire procedure:** 20-30 seconds

1a. **Apply a palmful of the product in a cupped hand, covering all surfaces;**

1b. **Rub hands palm to palm;**

2. **Right palm over left dorsum with interlaced fingers and vice versa;**

3. **Palm to palm with fingers interlaced;**

4. **Backs of fingers to opposing palms with fingers interlocked;**

5. **Rotational rubbing of left thumb clasped in right palm and vice versa;**

6. **Rotational rubbing, backwards and forwards with clasped fingers of right hand in left palm and vice versa;**

7. **Once dry, your hands are safe.**
How to handwash

**Hand Hygiene Technique with Soap and Water**

**Duration of the entire procedure:** 40-60 seconds

0. Wet hands with water;

1. Apply enough soap to cover all hand surfaces;

2. Rub hands palm to palm;

3. Right palm over left dorsum with interlaced fingers and vice versa;

4. Palm to palm with fingers interlaced;

5. Backs of fingers to opposing palms with fingers interlocked;

6. Rotational rubbing of left thumb clasped in right palm and vice versa;

7. Rotational rubbing, backwards and forwards with clasped fingers of right hand in left palm and vice versa;

8. Rinse hands with water;

9. Dry hands thoroughly with a single use towel;

10. Use towel to turn off faucet;

11. Your hands are now safe.
2. Hand hygiene technique

A. Apply a palmful of alcohol-based handrub and cover all surfaces of the hands. Rub hands until dry (IB). The technique for handrubbing is illustrated in Figure II.1.

B. When washing hands with soap and water, wet hands with water and apply the amount of product necessary to cover all surfaces. Rinse hands with water and dry thoroughly with a single-use towel. Use clean, running water whenever possible. Avoid using hot water, as repeated exposure to hot water may increase the risk of dermatitis (IB). Use a towel to turn off tap/faucet (IB). Dry hands thoroughly using a method that does not recontaminate hands. Make sure towels are not used multiple times or by multiple people (IB). The technique for handwashing is illustrated in Figure II.2.

C. Liquid, bar, leaf or powdered forms of soap are acceptable. When bar soap is used, small bars of soap in racks that facilitate drainage should be used to allow the bars to dry (II).

3. Recommendations for surgical hand preparation

A. Remove rings, wrist-watch, and bracelets before beginning surgical hand preparation (II). Artificial nails are prohibited (IB).

B. Sinks should be designed to reduce the risk of splashes (II).

C. If hands are visibly soiled, wash hands with plain soap before surgical hand preparation (II). Remove debris from underneath fingernails using a nail cleaner, preferably under running water (II).

D. Brushes are not recommended for surgical hand preparation (IB).

E. Surgical hand antisepsis should be performed using either a suitable antimicrobial soap or suitable alcohol-based handrub, preferably with a product ensuring sustained activity, before donning sterile gloves (IB).

F. If quality of water is not assured in the operating theatre, surgical hand antisepsis using an alcohol-based handrub is recommended before donning sterile gloves when performing surgical procedures (II).

G. When performing surgical hand antisepsis using an antimicrobial soap, scrub hands and forearms for the length of time recommended by the manufacturer, typically 2–5 minutes. Long scrub times (e.g. 10 minutes) are not necessary (IB).

H. When using an alcohol-based surgical handrub product with sustained activity, follow the manufacturer’s instructions for application times. Apply the product to dry hands only (IB). Do not combine surgical hand scrub and surgical handrub with alcohol-based products sequentially (II).

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

J. After application of the alcohol-based handrub as recommended, allow hands and forearms to dry thoroughly before donning sterile gloves (IB).
4. Selection and handling of hand hygiene agents

A. Provide HCWs with efficacious hand hygiene products that have low irritancy potential (IB).\textsuperscript{146, 171, 225-231}

B. To maximize acceptance of hand hygiene products by HCWs, solicit their input regarding the skin tolerance, feel, and fragrance of any products under consideration (IB).\textsuperscript{79, 145, 146, 228, 232-236} Comparative evaluations may greatly help in this process.\textsuperscript{227, 232, 233, 237}

C. When selecting hand hygiene products:
   a. determine any known interaction between products used to clean hands, skin care products and the types of glove used in the institution (II);\textsuperscript{238, 239}
   b. solicit information from manufacturers about the risk of product contamination (IB);\textsuperscript{57, 240, 241}
   c. ensure that dispensers are accessible at the point of care (IB);\textsuperscript{95, 242}
   d. ensure that dispensers function adequately and reliably and deliver an appropriate volume of the product (II);\textsuperscript{75, 243}
   e. ensure that the dispenser system for alcohol-based handrubs is approved for flammable materials (IC);
   f. solicit and evaluate information from manufacturers regarding any effect that hand lotions, creams or alcohol-based handrubs may have on the effects of antimicrobial soaps being used in the institution (IB);\textsuperscript{238, 244, 245}
   g. cost comparisons should only be made for products that meet requirements for efficacy, skin tolerance, and acceptability (II).\textsuperscript{236, 246}

D. Do not add soap (IA) or alcohol-based formulations (II) to a partially empty soap dispenser. If soap dispensers are reused, follow recommended procedures for cleansing.\textsuperscript{247, 248}

5. Skin care

A. Include information regarding hand-care practices designed to reduce the risk of irritant contact dermatitis and other skin damage in education programmes for HCWs (IB).\textsuperscript{249, 250}

B. Provide alternative hand hygiene products for HCWs with confirmed allergies or adverse reactions to standard products used in the health-care setting (II).

C. Provide HCWs with hand lotions or creams to minimize the occurrence of irritant contact dermatitis associated with hand antisepsis or handwashing (IA).\textsuperscript{228, 229, 250-253}

D. When alcohol-based handrub is available in the health-care facility for hygienic hand antisepsis, the use of antimicrobial soap is not recommended (II).

E. Soap and alcohol-based handrub should not be used concomitantly (II).\textsuperscript{163}
6. Use of gloves

A. The use of gloves does not replace the need for hand hygiene by either handrubbing or handwashing (IB). 53, 159-161, 254-256

B. Wear gloves when it can be reasonably anticipated that contact with blood or other potentially infectious materials, mucus membranes or non-intact skin will occur (IC). 257-259

C. Remove gloves after caring for a patient. Do not wear the same pair of gloves for the care of more than one patient (IB). 51, 53, 159-161, 260, 261

D. When wearing gloves, change or remove gloves during patient care if moving from a contaminated body site to either another body site (including non-intact skin, mucus membrane or medical device) within the same patient or the environment (II). 52, 159, 160

E. The reuse of gloves is not recommended (IB). 262 In the case of glove reuse, implement the safest reprocessing method (II). 263

The techniques for donning and removing non-sterile and sterile gloves are illustrated in Figures II.4 and II.5

7. Other aspects of hand hygiene

A. Do not wear artificial fingernails or extenders when having direct contact with patients (IA). 56, 191, 195, 264-266

B. Keep natural nails short (tips less than 0.5 cm long or approximately ¼ inch) (II). 264

8. Educational and motivational programmes for HCWs

A. In hand hygiene promotion programmes for HCWs, focus specifically on factors currently found to have a significant influence on behaviour and not solely on the type of hand hygiene products. The strategy should be multifaceted and multimodal and include education and senior executive support for implementation (IA). 64, 75, 89, 100, 111, 113, 119, 166, 267-277

B. Educate HCWs about the type of patient-care activities that can result in hand contamination and about the advantages and disadvantages of various methods used to clean their hands (II). 75, 81, 83, 85, 111, 125, 126, 166, 270-278

C. Monitor HCWs’ adherence to recommended hand hygiene practices and provide them with performance feedback (IA). 62, 75, 79, 81, 83, 85, 89, 99, 100, 111, 125, 276

D. Encourage partnerships between patients, their families and HCWs to promote hand hygiene in health-care settings (II). 279-281
9. Governmental and institutional responsibilities

9.1 For health-care administrators

A. It is essential that administrators ensure that conditions are conducive to the promotion of a multifaceted, multimodal hand hygiene strategy and an approach that promotes a patient safety culture by implementation of points B–I below.

B. Provide HCWs with access to a safe, continuous water supply at all outlets and access to the necessary facilities to perform handwashing (IB). 276, 282, 283

C. Provide HCWs with a readily accessible alcohol-based handrub at the point of patient care (IA). 75, 82, 94, 95, 284-288

D. Make improved hand hygiene adherence (compliance) an institutional priority and provide appropriate leadership, administrative support, financial resources and support for hand hygiene and other infection prevention and control activities (IB). 75, 111, 113, 119, 289

E. Ensure that HCWs have dedicated time for infection control training, including sessions on hand hygiene (II). 270, 290

F. Implement a multidisciplinary, multifaceted and multimodal programme designed to improve adherence of HCWs to recommended hand hygiene practices (IB). 75, 119, 129

G. With regard to hand hygiene, ensure that the water supply is physically separated from drainage and sewerage within the health-care setting and provide routine system monitoring and management (IB). 291

H. Provide strong leadership and support for hand hygiene and other infection prevention and control activities (II). 119

I. Alcohol-based handrub production and storage must adhere to the national safety guidelines and local legal requirements (II).

9.2 For national governments

A. Make improved hand hygiene adherence a national priority and consider provision of a funded, coordinated implementation programme while ensuring monitoring and long-term sustainability (II). 292-295

B. Support strengthening of infection control capacities within health-care settings (II). 290, 296, 297

C. Promote hand hygiene at the community level to strengthen both self-protection and the protection of others (II). 71, 138-140, 298-300

D. Encourage health-care settings to use hand hygiene as a quality indicator (Australia, Belgium, France, Scotland, USA) (II). 278, 301
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 II.3
Surgical hand preparation technique with an alcohol-based hand rub 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 dosas) 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 represented in Images 12-17 are followed (20-30 seconds).

12 Cover the whole surface of the hands up to the wrist with alcohol-based handrub, 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 rotating 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.
Figure II.4
How to don and remove non-sterile gloves

I. HOW TO DON GLOVES:

1. Take out a glove from its original box
2. Touch only a restricted surface of the glove corresponding to the wrist (at the top edge of the cuff)
3. Don the first glove

4. Take the second glove with the bare hand and touch only a restricted surface of glove corresponding to the wrist
5. To avoid touching the skin of the forearm with the gloved hand, turn the external surface of the glove to be donned on the folded fingers of the gloved hand, thus permitting to glove the second hand
6. Once gloved, hands should not touch anything else that is not defined by indications and conditions for glove use

II. HOW TO REMOVE GLOVES:

1. Pinch one glove at the wrist level to remove it, without touching the skin of the forearm, and peel away from the hand, thus allowing the glove to turn inside out
2. Hold the removed glove in the gloved hand and slide the fingers of the un gloved hand inside between the glove and the wrist. Remove the second glove by rolling it down the hand and fold into the first glove
3. Discard the removed gloves

4. Then, perform hand hygiene by rubbing with an alcohol-based handrub or by washing with soap and water
The purpose of this technique is to ensure maximum asepsis for the patient and to protect the health-care worker from the patient’s body fluid(s). To achieve this goal, the skin of the health-care worker remains exclusively in contact with the inner surface of the glove and has no contact with the outer surface. Any error in the performance of this technique leads to a lack of asepsis requiring a change of gloves.

I. HOW TO DON STERILE GLOVES

1. Perform hand hygiene before an "aseptic procedure" by handrubbing or hand washing.
2. Check the package for integrity. Open the first non-sterile packaging by peeling it completely off the heat seal to expose the second sterile wrapper, but without touching it.
3. Place the second sterile package on a clean, dry surface without touching the surface. Open the package and fold it towards the bottom so as to unfold the paper and keep it open.
4. Using the thumb and index finger of one hand, carefully grasp the folded cuff edge of the glove.
5. Slip the other hand into the glove in a single movement, keeping the folded cuff at the wrist level.
6-7. Pick up the second glove by sliding the fingers of the gloved hand underneath the cuff of the glove.
8-10. In a single movement, slip the second glove on to the ungloved hand while avoiding any contact/resting of the gloved hand on surfaces other than the glove to be donned (contact/resting constitutes a lack of asepsis and requires a change of glove).
11. If necessary, after donning both gloves, adjust the fingers and interdigital spaces until the gloves fit comfortably.
12-13. Unfold the cuff of the first gloved hand by gently slipping the fingers of the other hand inside the fold, making sure to avoid any contact with a surface other than the outer surface of the glove (lack of asepsis requiring a change of gloves).
14. The hands are gloved and must touch exclusively sterile devices or the previously-disinfected patient's body area.
II. HOW TO REMOVE STERILE GLOVES

15. Remove the first glove by peeling it back with the fingers of the opposite hand. Remove the glove by rolling it inside out to the second finger joints (do not remove completely).

16. Remove the other glove by turning its outer edge on the fingers of the partially ungloved hand.

17. Remove the glove by turning it inside out entirely to ensure that the skin of the health-care worker is always and exclusively in contact with the inner surface of the glove.

18. Discard gloves.

19. Perform hand hygiene after glove removal according to the recommended indication.

NB: Donning surgical sterile gloves at the time of a surgical intervention follows the same sequences except that:

- it is preceded by a surgical hand preparation;
- donning gloves is performed after putting on the sterile surgical gown;
- the opening of the first packaging (non-sterile) is done by an assistant;
- the second packaging (sterile) is placed on a sterile surface other than that used for the intervention;
- gloves should cover the wrists of the sterile gown.
This often calls for the use of an alcohol-based product.

Hand hygiene can be performed by using either plain soap or products including antiseptic agents. The latter have the property of inactivating microorganisms or inhibiting their growth with different action spectra; examples include alcohols, chlorhexidine gluconate, chlorine derivatives, iodine, chloroxylenol, quaternary ammonium compounds, and triclosan (Table III.1).

Although comparing the results of laboratory studies dealing with the in vivo efficacy of plain soap, antimicrobial soaps, and alcohol-based handrubs may be problematic for various reasons, it has been shown that alcohol-based rubs are more efficacious than antiseptic detergents and that the latter are usually more efficacious than plain soap. However, various studies conducted in the community setting indicate that medicated and plain soaps are roughly equal in preventing the spread of microorganisms and reducing childhood gastrointestinal and upper respiratory tract infections or impetigo. In health-care settings where alcohol-based handrubs are available, plain soap should be provided to perform hand washing when indicated.

Alcohol solutions containing 60–80% alcohol are usually considered to have efficacious microbicidal activity, with concentrations higher than 90% being less potent. Alcohol-based handrubs with optimal antimicrobial efficacy usually contain 75 to 85% ethanol, isopropanol, or n-propanol, or a combination of these products. The WHO-recommended formulations contain either 75% v/v isopropanol, or 80% v/v ethanol.

These were identified, tested and validated for local production at facility level. According to the available data, local production

---

**Table III.1**

<table>
<thead>
<tr>
<th>Antiseptics</th>
<th>Gram-positive bacteria</th>
<th>Gram-negative bacteria</th>
<th>Viruses enveloped</th>
<th>Viruses non-enveloped</th>
<th>Myco-bacteria</th>
<th>Fungi</th>
<th>Spores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcohols</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td>+</td>
<td>+++</td>
<td>+++</td>
<td>-</td>
</tr>
<tr>
<td>Chloroxylenol</td>
<td>+++</td>
<td>+</td>
<td>+</td>
<td>±</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Chlorhexidine</td>
<td>+++</td>
<td>++</td>
<td>++</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Hexachlorophene*</td>
<td>+++</td>
<td>+</td>
<td>?</td>
<td>?</td>
<td>+</td>
<td>+</td>
<td>±</td>
</tr>
<tr>
<td>Iodophors</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td>++</td>
<td>+</td>
<td>++</td>
<td>±*</td>
</tr>
<tr>
<td>Triclosand</td>
<td>+++</td>
<td>++</td>
<td>?</td>
<td>?</td>
<td>±</td>
<td>±*</td>
<td>-</td>
</tr>
<tr>
<td>Quaternary ammonium compounds*</td>
<td>++</td>
<td>+</td>
<td>+</td>
<td>±</td>
<td>±</td>
<td>±</td>
<td>-</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Antiseptics</th>
<th>Typical conc. in %</th>
<th>Speed of action</th>
<th>Residual activity</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcohols</td>
<td>60-80 %</td>
<td>Fast</td>
<td>No</td>
<td>HR</td>
</tr>
<tr>
<td>Chloroxylenol</td>
<td>0.5-4 %</td>
<td>Slow</td>
<td>Contradictory</td>
<td>HW</td>
</tr>
<tr>
<td>Chlorhexidine</td>
<td>0.5-4%</td>
<td>Intermediate</td>
<td>Yes</td>
<td>HR,HW</td>
</tr>
<tr>
<td>Hexachlorophene*</td>
<td>3%</td>
<td>Slow</td>
<td>Yes</td>
<td>HW, but not recommended</td>
</tr>
<tr>
<td>Iodophors</td>
<td>0.5-10 %</td>
<td>Intermediate</td>
<td>Contradictory</td>
<td>HW</td>
</tr>
<tr>
<td>Triclosand</td>
<td>(0.1-2%)</td>
<td>Intermediate</td>
<td>Yes</td>
<td>HW; seldom</td>
</tr>
<tr>
<td>Quaternary ammonium compounds*</td>
<td>(slow)</td>
<td>No</td>
<td>HR,HW; Seldom; +alcohols</td>
<td></td>
</tr>
</tbody>
</table>

Good = +++; moderate = ++; poor = +; variable = ±; none = –
HR: handrubbing; HW: handwashing
*Activity varies with concentration.
* Bacteriostatic.
* In concentrations used in antiseptics, iodophors are not sporicidal.
* Bacteriostatic, fungistatic, microbicidal at high concentrations.
* Mostly bacteriostatic.
* Activity against Candida spp., but little activity against filamentous fungi.
Source: adapted with permission from Pittet, Allegranzi & Sax, 2007.