

HYGIENE AND HEALTHCARE ASSOCIATED INFECTIONS

III

HAND HYGIENE

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Microflora of the hand skin



Resident flora (resident microbiota) - under the superficial cells of the stratum corneum and also found on the surface of the skin (*Staphylococcus epidermidis*, Streptococci, *S. hominis* and other coagulase-negative staphylococci, followed by coryneform bacteria - *propionibacteria*, *corynebacteria*, dermobacteria, and micrococci).

- **!!! Persistent colonization by pathogenic flora - *S. aureus*, Gram-negative bacilli, or yeast.**

Transient flora (transient microbiota) - colonize the superficial layers of the skin and are more amenable to removal by routine handwashing (*Staphylococcus aureus*, *Proteus mirabilis*, *Klebsiella spp.*,.....).

- **!!! Often acquired during direct contact with patients or contaminated environmental surfaces adjacent to the patient.**



Definitions



Hygienic handrub

- Treatment of hands with an alcohol-based **handrub** to reduce the transient flora without necessarily affecting the resident skin flora.

Hygienic handwash

- Treatment of hands with **a detergent and water** to reduce the transient flora without necessarily affecting the resident skin flora.

Surgical hand preparation

History

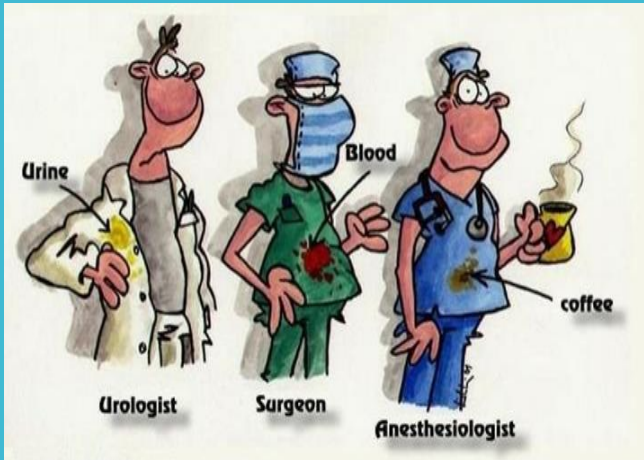


Studies by Ignaz Semmelweis in Vienna in the mid-1800s:



- maternal mortality rates, mostly attributable to puerperal fever, were substantially higher in one clinic compared with the other (**16%** versus 7%),
- doctors and medical students often went directly to the delivery suite after performing autopsies and had a disagreeable odour on their hands despite handwashing with soap and water before entering the clinic.
- His hypothesis: “cadaverous particles” were transmitted via the hands of doctors and students from the autopsy room to the delivery theatre and caused the puerperal fever.
- Semmelweis recommended that hands be scrubbed in a chlorinated lime solution before every patient contact and particularly after leaving the autopsy room.
- Following the implementation of this measure, the mortality rate **fell dramatically to 3%!!!**

Transmission of pathogenes by hands



- **diabetics, patients undergoing** dialysis for chronic renal failure, and those **with chronic dermatitis** – high *S. aureus* skin areas colonization,
- patient gowns, bed linen, bedside furniture and other objects in **the immediate environment of the patient** become contaminated with patient flora.
- certain microorganisms can also play an important role in environmental contamination due to their **long-time survival capacities** (*G+* - *Acinetobacte baumanii*,....)

NO jewellery!!!



- Several studies have shown that skin underneath rings is more heavily colonized than comparable areas of skin on fingers without rings.
- WHO: *„The consensus recommendation is to strongly discourage the wearing of rings or other jewellery during health care. If religious or cultural influences strongly condition the HCW’s attitude, the wearing of a simple wedding ring (band) during routine care may be acceptable, but in high-risk settings, such as the operating theatre, all rings or other jewellery should be removed.“*

Fingernails???



Artificial fingernails

- WHO: „*Consensus recommendations are that HCWs do not wear artificial fingernails or extenders when having direct contact with patients and natural nails should be kept short (0.5 cm long or approximately 1/4 inch long)*“

Nail polish

- WHO: „*Freshly applied nail polish does not increase the number of bacteria recovered from periungual skin, but chipped nail polish may support the growth of larger numbers of organisms on fingernails*“.

Solutions for handrubbing

Aqueous solution

- the need of immersion of hands
- dilution, stability
- the need of drying
- irritating
- colouring
- frequent use causes damage of hand skin

Alcohol-based disinfectant

- comfortable use
- application on dry hands
- quick drying
- content of protecting substances
- perfumed
- availability at the point of care (within arm's reach)
- Risk: flammable



Alcohol antiseptics and their efficacy

|

- contain either ethanol, isopropanol or n-propanol, or a combination of two of these products,
- solutions containing **60–80% alcohol** are most effective, with higher concentrations being less potent,
- **no activity against bacterial spores**, and very poor activity against some non-enveloped (non-lipophilic) viruses.

Alcohol antiseptics and their efficacy

II

- non-enveloped viruses (hepatitis A and enteroviruses -poliovirus) may require 70–80% alcohol to be reliably inactivated.

Activity against viruses (German Association for the Control of Virus Diseases [DVV])	Virucidal against enveloped viruses (incl. HBV, HIV, HCV)	15 sec
Tested for activity against enveloped viruses (following the DVV)	Influenza A virus (avian)	15 sec
	Influenza A virus (human)	15 sec
Tested for activity against non-enveloped viruses (DVV)	Adenovirus	1 min
	Poliovirus	3 min
Tested for activity against non-enveloped viruses (following the DVV)	MNV	15 sec
	Rotavirus	15 sec

Centres for
disease
control and
prevention
CDC


- <https://www.youtube.com/watch?v=BaHTZdJWYVw>




5th May


International
Hand Hygiene
Day

#HandHygiene #AntibioticResistance



FIGHT
ANTIBIOTIC
RESISTANCE
IT'S IN YOUR HANDS

 World Health Organization



SAVE LIVES
CLEAN YOUR HANDS

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Handwashing

WHEN?



- Hands visibly dirty, contaminated with proteinaceous material, or visibly soiled with blood or body fluids (also before eating or after using the toilet!)
- The only method of decontamination of hands in exposure of spore-forming pathogens (e.g., *Clostridium difficile*).



- Use an alcohol-based handrub as the preferred means for routine hand antisepsis in all other clinical situations

How to handwash

by WHO

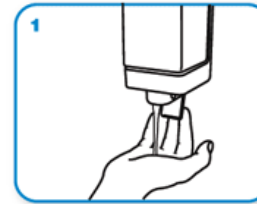


- Wet hands with water and apply the amount of product necessary to cover all surfaces.
- Rinse hands with water and dry thoroughly with **a single-use towel**.
- Use clean, running water whenever possible.
- **Avoid using hot water**, as repeated exposure to hot water may increase the risk of dermatitis.

The technique for handwashing



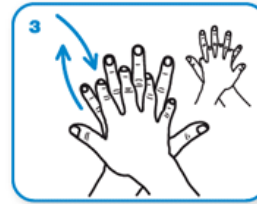
Wet hands with water



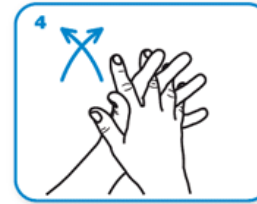
apply enough soap to cover all hand surfaces.



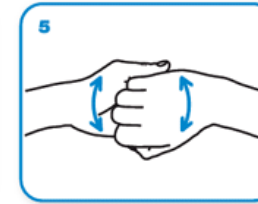
Rub hands palm to palm



right palm over left dorsum with interlaced fingers and vice versa



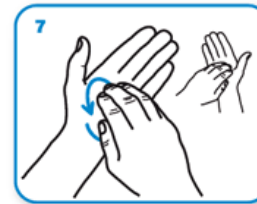
palm to palm with fingers interlaced



backs of fingers to opposing palms with fingers interlocked



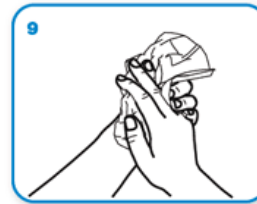
rotational rubbing of left thumb clasped in right palm and vice versa



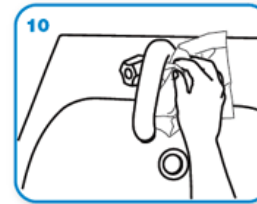
rotational rubbing, backwards and forwards with clasped fingers of right hand in left palm and vice versa.



Rinse hands with water



dry thoroughly with a single use towel



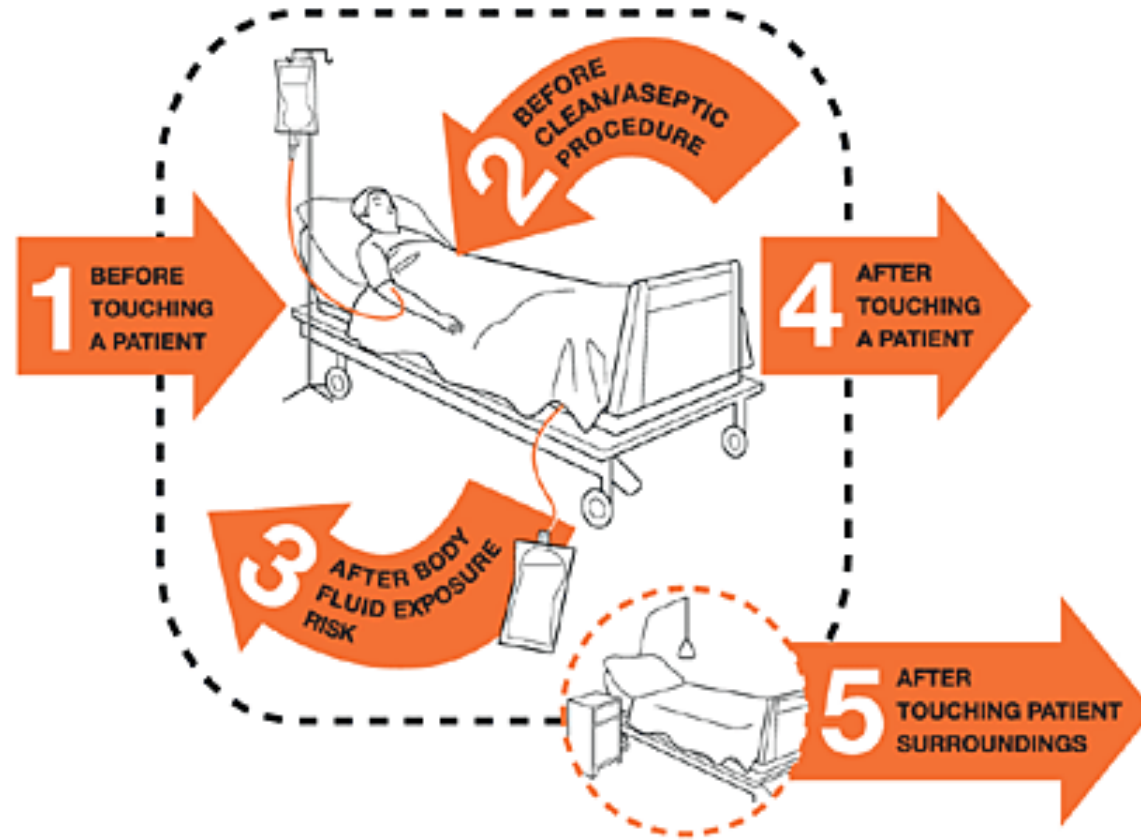
use towel to turn off faucet



...and your hands are safe.

Handrubbing

WHEN?



How to handrub by WHO

- Apply a palmful of alcohol-based handrub and cover all surfaces of the hands. Rub hands until dry.



The technique for handrubbing

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



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 finger to opposing palms with finger interlocked;

6



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

7



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

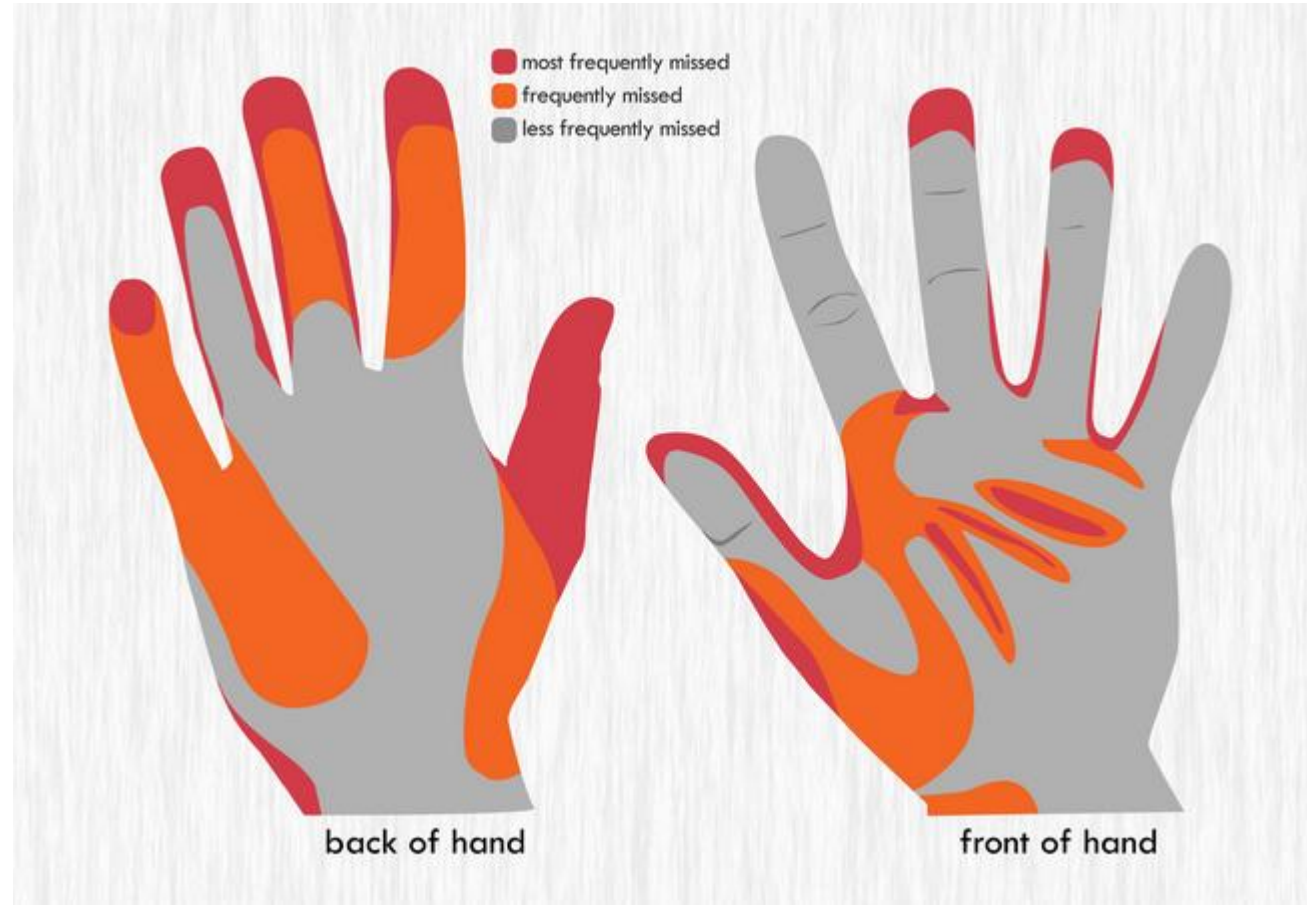
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Once dry, your hands are safe.

Frequently missed areas

(by CDC)



BBE

BBE = Bare Below the Elbows

(Initiative of SHEA, Special Report, Medscape Infectious Diseases, 2014)

- Preventive strategy to improve the effectiveness of hand hygiene.
- Hands and forearms are free of jewellery and sleeves are above the elbow.
- Long sleeves have been found to be contaminated with pathogens (MRSA), and can impede appropriate hand hygiene.



Rules for use of gloves!!!

1. Handwashing or handrubbing must be performed before donning gloves to prevent glove contamination and possible cross-transmission in case of glove damage or improper use/efficacy.
2. Gloves must be removed to perform handwashing or handrubbing to protect a body site from the flora from another body site or skin area previously touched within the same patient.
3. Hand hygiene must be performed immediately after glove removal to prevent HCW contamination and further transmission and dissemination of microorganisms.