

Module E

PRINCIPLES AND PRACTICES OF ASEPSIS

Role of hands and the environment in
disease transmission

OBJECTIVES

- Describe the principles and practice of asepsis.
- Understand hand hygiene.

DEFINING ASEPSIS

| | Medical Asepsis | Surgical Asepsis |
|------------|--|--|
| Definition | Clean Technique | Sterile Technique |
| Emphasis | Freedom from most pathogenic organisms | Freedom from all pathogenic organisms |
| Purpose | Reduce transmission of pathogenic organisms from one patient-to -another | Prevent introduction of any organism into an open wound or sterile body cavity |

MEDICAL ASEPSIS

Measures aimed at controlling the number of microorganisms and/or preventing or reducing the transmission of microbes from one person-to-another:

Clean Technique

- Know what is dirty.
- Know what is clean.
- Know what is sterile.
- Keep the first three conditions separate.
- Remedy contamination immediately.

PRINCIPLES OF MEDICAL ASEPSIS

When the body is penetrated, natural barriers such as skin and mucous membranes are bypassed, making the patient susceptible to microbes that might enter.

- Perform hand hygiene and put on gloves
- When invading sterile areas of the body, maintain the sterility of the body system
- When placing an item into a sterile area of the body, make sure the item is sterile

PRINCIPLES OF MEDICAL ASEPSIS

Even though skin is an effective barrier against microbial invasion, a patient can become colonized with other microbes if precautions are not taken.

- Perform hand hygiene between patient contacts
- When handling items that only touch patient's intact skin, or do not ordinarily touch the patient, make sure item is clean and disinfected (between patients).

PRINCIPLES OF MEDICAL ASEPSIS

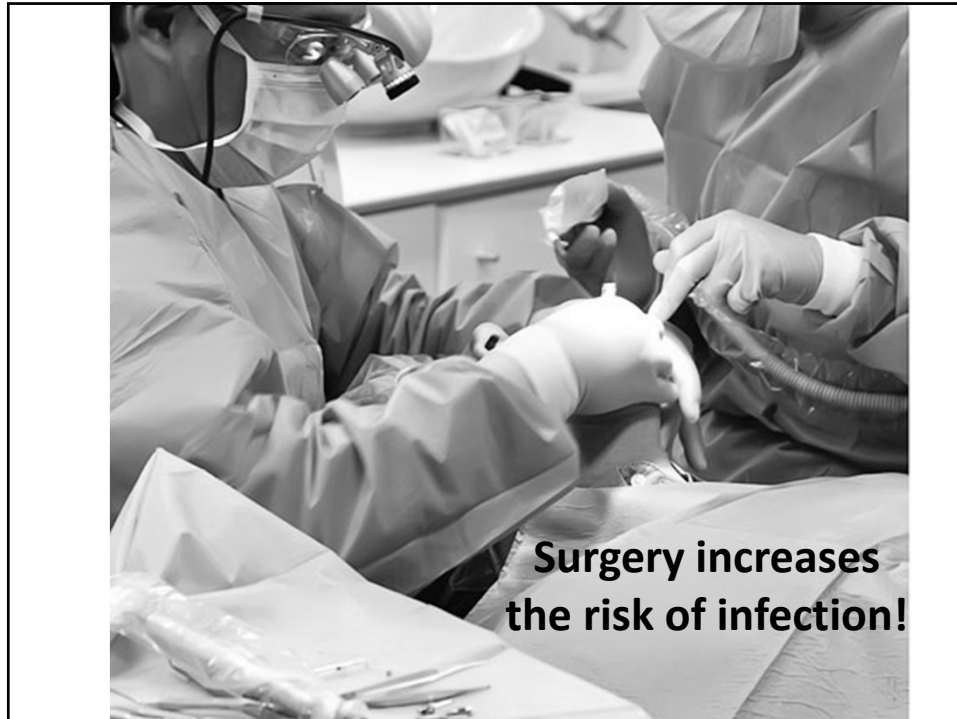
All body fluids from any patient should be considered contaminated

- Body fluids can be the source of infection for the patient and you
- Utilize appropriate personal protective equipment (PPE)

PRINCIPLES OF MEDICAL ASEPSIS

The healthcare team and the environment can be a source of contamination for the patient

- Health care providers (HCP) should be free from disease
- Single use items can be a source of contamination
- Patients environment should be as clean as possible



SURGICAL ASEPSIS

Practices designed to render and maintain objects and areas maximally free from microorganisms:

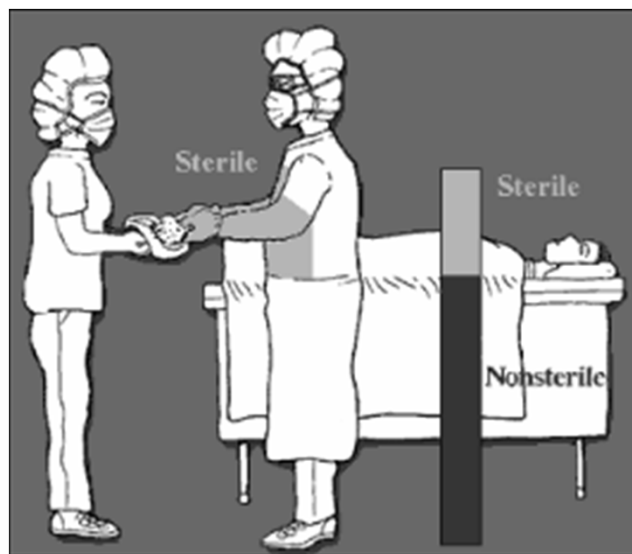
Sterile Technique

- Know what is sterile
- Know what is not sterile
- Keep sterile and not sterile items apart
- Remedy contamination immediately

PRINCIPLES OF SURGICAL ASEPSIS

- The patient should not be the source of contamination.
- The operating personnel should not be the source of contamination.
- The surgical scrub should be done meticulously.
- The OR technique of the surgeon is very important.
- Recognize potential environmental contamination.

DEFINE STERILITY



REMEDY CONTAMINATION

- Every case is a potential source of contamination and the same infection control precautions are taken for all patients.
- When contamination occurs, address it immediately.
- Breaks in technique are pointed out and action is taken to eliminate them.

ASEPSIS IN DENTAL LABORATORY AND RADIOLOGY



LABORATORY ASEPSIS

- Clean and disinfect or sterilize all items coming from the oral cavity
 - Heat tolerant items (impression trays) should be sterilized
 - Heat labile items (prosthetics, impressions, bite registrations, and occlusal rims) should be disinfected by immersion or spray using an EPA-registered disinfectant
- Wear appropriate PPE (gowns, gloves, safety eyewear, mask) until items have been decontaminated

RADIOLOGY ASEPSIS

- Wear appropriate PPE to reduce personnel exposure
- Use films held within FDA-cleared barrier pouches
 - Use heat-tolerant or disposable intraoral film-holding and positioning devices.
- Digital radiographic sensors should be placed in FDA-cleared barriers.
- All reusable items that contact mucous membranes must be heat sterilized or high-level disinfected

RADIOLOGY ASEPSIS

Asepsis during darkroom activities

- Exposed film paced in paper cup or paper towel
- Gloves removed after all films exposed and hand hygiene performed
- Re-glove for transport to dark room
- Open film packs, drop on to clean surface, discard wrappers
- Remove gloves and hand hygiene
- Process films



WHAT IS HAND HYGIENE

- Handwashing
- Antiseptic Handwash
- Alcohol-based Hand Rub
- Surgical Antisepsis



WHY IS HAND HYGIENE SO IMPORTANT?

- Hands are the most common mode of pathogen transmission.
- Reduces the spread of antimicrobial resistance.
- Prevents healthcare-associated infections.

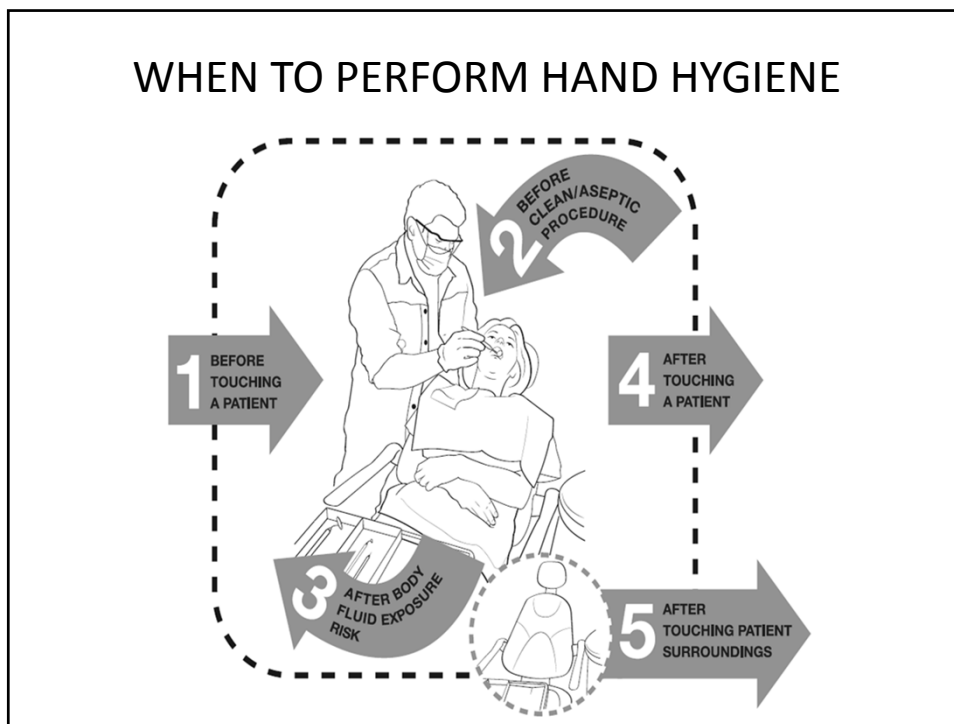
HAND-BORNE MICROORGANISMS

Healthcare providers contaminate their hands with 100-1000 colony-forming units (CFU) of bacteria during “clean” activities (lifting patients, taking vital signs).

Pittet D et al. *The Lancet Infect Dis* 2006

TRANSMISSION OF PATHOGENS ON HANDS FIVE ELEMENTS

- Germs are present on patients and surfaces near patients
- By direct and indirect contact, patient germs contaminate healthcare provider hands
- Germs survive and multiply on healthcare provider hands
- Defective hand hygiene results in hands remaining contaminated
- Healthcare providers touch/contaminate another patient or surface that will have contact with the patient.



RUB HANDS FOR HAND HYGIENE! WASH HANDS ONLY WHEN VISIBLY SOILED!

⌚ Duration of the entire procedure: 20-30 sec.

1a Apply a palmful of the product in a cupped hand and cover all surfaces.

1b Rub hands palm to palm

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 ...once dry, your hands are safe.

HOW TO HAND RUB

To effectively reduce the growth of germs on hands, **hand rubbing** must be performed by following all of the illustrated steps. **This takes only 20–30 seconds!**

http://www.who.int/gpsc/tools/HAND_RUBBING.pdf

credit: WHO

WASH HANDS ONLY WHEN VISIBLY SOILED! OTHERWISE, USE HANDRUB!

Duration of the entire procedure: 40-60 sec.

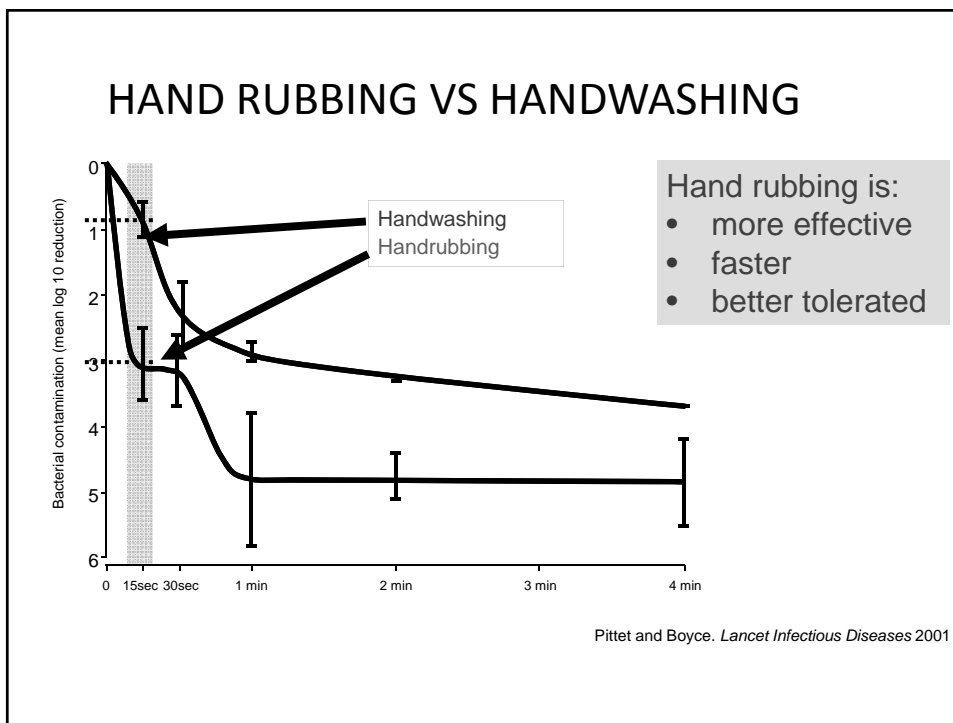
HOW TO HAND WASH

To effectively reduce the growth of germs on hands, **handwashing must last at least 15 seconds** and should be performed by following all of the illustrated steps.

http://www.who.int/gpsc/tools/HAND_WASHING.pdf

credit: WHO

The illustration shows 11 steps: 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 thoroughly with a single use towel; 10. use towel to turn off faucet; 11. ...and your hands are safe.



HAND HYGIENE COMPLIANCE IS LOW

| Author | Year | Sector | Compliance |
|------------|------|----------------|------------|
| Preston | 1981 | General Wards | 16% |
| | | ICU | 30% |
| Albert | 1981 | ICU | 41% |
| | | ICU | 28% |
| Larson | 1983 | Hospital-wide | 45% |
| Donowitz | 1988 | Neonatal ICU | 30 |
| Graham | 1990 | ICU | 32 |
| Dubbert | 1990 | ICU | 81 |
| Pettinger | 1991 | Surgical ICU | 51 |
| Larson | 1992 | Neonatal Unit | 29 |
| Doebbeling | 1992 | ICU | 40 |
| Zimakoff | 1993 | ICU | 40 |
| Meengs | 1994 | Emergency Room | 32 |
| Pittet | 1999 | Hospital-wide | 48 |

Pittet and Boyce. *Lancet Infectious Diseases* 2001

<40%

REASONS FOR NONCOMPLIANCE

- Inaccessible hand hygiene supplies
- Skin irritation
- Too busy
- Glove use
- Didn't think about it
- Lacked knowledge

SUMMARY OF HAND HYGIENE

Hand hygiene must be performed exactly where **you** are delivering healthcare to patients (at the point-of-care).

During healthcare delivery, there are 5 moments (indications) when it is essential that **you** perform hand hygiene.

To clean your hands, **you** should prefer **hand rubbing** with an alcohol-based formulation, if available. Why? Because it makes hand hygiene possible right at the point-of-care, it is faster, more effective, and better tolerated.

You should wash your hands with soap and water when visibly soiled.

You must perform hand hygiene using the appropriate technique and time duration.

LATEX HYPERSENSITIVITY AND CONTACT DERMATITIS

LATEX ALLERGY



- Type I hypersensitivity to natural rubber latex proteins
- Reactions may include nose, eye, and skin reactions
- More serious reactions may include respiratory distress—rarely shock or death

CONTACT DERMATITIS

- Irritant contact dermatitis
 - Not an allergy
 - Dry, itchy, irritated areas
- Allergic contact dermatitis
 - Type IV delayed hypersensitivity
 - May result from allergy to chemicals used in glove manufacturing

GENERAL RECOMMENDATIONS CONTACT DERMATITIS AND LATEX ALLERGY

- Educate DHCP about reactions associated with frequent hand hygiene and glove use
- Get a medical diagnosis
- Screen patients for latex allergy
- Ensure a latex-safe environment
- Have latex-free kits available (dental and emergency)

REFERENCES

- CDC Guidelines for Hand Hygiene in Healthcare Settings – Recommendations of the Healthcare Infection Control Practices Advisory Committee and the HICPAC/SHEA/APIC Hand Hygiene Task Force. MMWR October 25, 2002, 51(RR-16).
- Guidelines for Infection Control in Dental Health-Care Settings, 2003. MMWR, December 19, 2003:52(RR-17).

Thank You