https://www.flickr.com/photos/kokopinto/1745524662

https://commons.wikimedia.org/wiki/File:Students_assisting_surgery.JPG

Infection Control

University of South Florida
College of Public Health

our practice is our passion.

PHC 6517, Module 7:
"Asepsis and Hand Hygiene, Part I"

USF HEALTH

Asepsis

- Absence of pathogenic *(disease-producing)* microorganisms
- Refers to "aseptic technique"
- Often interchanged with "sterile technique"
- *Gold standard* of infection control patient care practices

https://commons.wikimedia.org/wiki/File:USMC-080803-M-1855J-001.jpg

Aseptic & Clean Techniques

https://en.wikipedia.org/wiki/Surgery

https://en.wikipedia.org/wiki/Adhesive_bandage

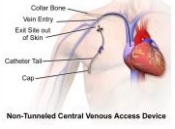
Sterile (Aseptic) Technique

- **Goal:** render & maintain objects & areas *maximally free of microorganisms*
- Maintain area of *sterile field* with sterile gowns, gloves, & drapes
- *Wear appropriate attire* as indicated by procedure risk & area where procedure performed

Sterile Technique Examples

- **Surgery**

- **Insertion of central lines**



https://upload.wikimedia.org/wikipedia/commons/6/60/Blausen_0181_CatheterCentralVenousAccessDevice_NonTunneled.png

- **Insertion of urinary catheters**

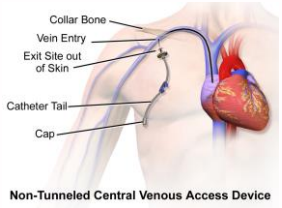
https://en.wikipedia.org/wiki/Urinary_catheterization

Sterile Technique: *Surgery*

https://commons.wikimedia.org/wiki/File:Ear_surgery_on_a_patient.jpg

https://en.wikipedia.org/wiki/Surgical_technologist

Sterile Technique: *Inserting a Central Line*



Non-Tunneled Central Venous Access Device

https://upload.wikimedia.org/wikipedia/commons/6/60/Blausen_0181_Catheter_CentralVenousAccessDevice_NonTunneled.png

http://cdn.c.photoshelter.com/img-get/I0000LFQAu86WXl8/t/170/I0000LFQAu86WXl8.jpg

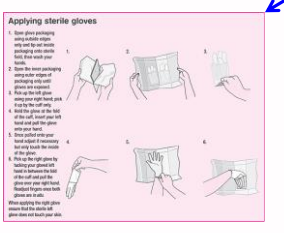
Sterile Technique: *Inserting a Urinary Catheter*

https://en.m.wikipedia.org/wiki/History_of_anesthesia

Sterile Technique: *Setting up a Sterile Field*

https://commons.wikimedia.org/wiki/File:US_Navy_060426-N-5174T-068_Hospital_Corpsman_1st_Class_Cynthia_Donaldson_prepares_surgical_tools_before_an_inguinal_hernia_repair_in_the_operating_room.jpg

Donning (*putting on*) Sterile Gloves



https://www.flickr.com/photos/madeincrediblyeasyuk/6053172236

Removing Gloves

http://www.freestockphotos.biz/stockphoto/15279

Clean Technique

- Use barrier techniques to ↓ microbial transmission from patient to HCW
- Use meticulous hand hygiene
- Use "no-touch" dressing technique to avoid contamination of sterile supplies (or use sterile gloves for dressing application)
- Wear gown or gloves to ↓ contamination of clothing
- Wear clean gloves to avoid direct contact with infectious materials

Clean Technique Examples

- **Changing dressings**
- **Wound care**
- **Drawing blood**

https://en.wikipedia.org/wiki/Negative-pressure_wound_therapy

https://commons.wikimedia.org/wiki/File:Blooddrawgenetics.jpg

Clean Technique: Changing Dressing or Wound Care

https://commons.wikimedia.org/wiki/File:BandAid.jpg

Placement or replacement of bandage using "no touch" technique

Clean Technique: *Drawing Blood*

Sterile vs. Nonsterile Gloves

The use of nonsterile vs. sterile gloves for routine changing of surgical site dressings remains an unresolved issue as wounds may be colonized &, therefore not sterile

Sterile gloves

https://commons.wikimedia.org/wiki/File:Joint_Readiness_Training_Center_140117-F-XL333-797.jpg

Exam (non-sterile) gloves

https://c1.staticflickr.com/1/258/19115798089_d47f47aa9d_b.jpg

http://whqlibdoc.who.int/publications/2009/9789241597906_eng.pdf

Putting on & removing exam gloves: *Clean technique*

Source: RR#4

Why Do You Need to Know This?

- They are ***essential*** infectious disease prevention strategies
- They are important part of ***infection prevention & control***
- ***Patient care practices*** involve both techniques in varying situations

Hand Hygiene

- **One of the most important procedures** for preventing transmission of disease-producing organisms or infections http://www.freestockphotos.biz/stockphoto/15286
- Many hospital outbreaks of infections related to inadequate hand hygiene

https://en.wikipedia.org/wiki/Hand_washing

Definition of Terms 1

- ***Hand hygiene:*** handwashing, antiseptic handwash, antiseptic hand rub, or surgical hand antisepsis
- ***Handwashing:*** washing hands with plain (non-antimicrobial) soap & water
- ***Hand antisepsis:*** refers to either antiseptic handwash or antiseptic hand rub
- ***Antiseptic handwash:*** washing hands with water & soap or other detergents containing an antiseptic agent

Definition of Terms 2

- ***Antiseptic hand rub***: applying an antiseptic hand-rub product to all surfaces of hands to ↓ # microorganisms present (no water used)

- ***Alcohol-based hand rub:*** alcohol-containing preparation designed for application to hands to ↓ #'s viable microorganisms. In U.S., such preparations usually contain 60%-95% ethanol or isopropanol.
- ***Surgical hand antisepsis:*** Hand antisepsis performed preoperatively by surgical personnel to eliminate transient & ↓ resident hand flora

Resident & Transient Skin Flora

https://commons.wikimedia.org/wiki/File:Stethoscope_and_Laptop_Computer_-_Nci-vol-9713-300.jpg

https://www.flickr.com/photos/82066314@N06/9223190460

Transient Flora

- Colonize superficial layers of skin
- Often acquired by HCWs during contact with patients or environmental surfaces
- *More amenable to removal* by routine handwashing with plain soap & water
- *Are organisms most frequently associated with HAI*

Resident Flora

- Attached to deeper skin layers
- *More resistant* to removal
- *Less likely* to be associated with HAI
- *Examples:* coagulase (-) *Staph* & diptheroids

Hand Hygiene Agents

https://www.flickr.com/photos/usdagov/7008312299

- **Plain (non-antimicrobial) soap**
- **Alcohols**
- **Chlorhexidine**
- **Iodine & iodophors**
- **PCMX (Chloroxylenol)**
- **Hexachlorophene**
- **Triclosan**
- **Quaternary ammonium compounds**

See RR#1: Appendix "Antimicrobial Spectrum & Characteristics of Hand-Hygiene Antiseptic Agents"

Special Situations

- None of the these agents are reliably sporicidal (*Bacillus* or *Clostridium*)
- Hands contaminated with *B. anthracis* or *C. difficile*-contaminated items should be washed with a *non-antimicrobial or antimicrobial soap & water*

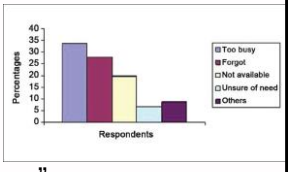
https://en.wikipedia.org/wiki/Agar_plate

Complicated Issue

- New terms **RR#1**
- Old practices may no longer be sound
- Need to change how people do things
- Need to substantiate claims with studies
- Involves patient, staff, & visitor safety

Excuses for Not Washing Hands

- Not enough time
- Emergency
- No soap
- No water
- "I was wearing gloves"
- "I'm not going to touch anything"



http://www.ijccm.org/articles/2011/15/1/images/IJCCM_2011_15_1_6_78215_f12.jpg

Using Water Vs. Waterless

https://www.google.com/url?sa=i&rct=j&q=&esrc=s&source=images&cd=&cad=rja&uact=8&ved=0ahUKEwjc5f38-MLKAhULzGMKHVtQCg8QjRwIBw&url=https%3A%2F%2Fwww.flickr.com%2Fphotos%2Fcolalife%2F9362442935&psig=AFQjCNGpVWdki6Z6U3i2Er6YhFwAx28R9A&ust=1453741955454222

Handwashing

- *Suboptimal compliance* by HCWs
- *Location* of sink may be a barrier
- *Time* factor
- *Effects on skin-* PH, lipid across skin water loss, microbial shedding

https://en.wikipedia.org/wiki/Hand_washing

Hygienic Handrub with Alcohol Base

- Used only in program with sustained improvement in hand hygiene compliance & ↓ infection rates
- More convenient from excellent spreading & evaporation
- No water necessary
- Optimal action: bacteria, fungi, viruses, yeasts
- Rapid acting

https://commons.wikimedia.org/wiki/File:Wall-mounted_hand_sanitizer_dispenser.JPG

- *Preferred method to decontaminate hands*****

How to Clean without Water (*hygienic hand rub*)

- Spread recommended amount into palm of one hand
- Rub thoroughly over all surfaces until hands dry
- Not recommended when hands soiled with organic material
- Wash with soap & water after 5-10 times

How to Wash with Soap & Water

- **wet hands**
- **soap up**
- **wash for 15 seconds**
- **vigorously rub all surfaces**
- **rinse**
- **dry**

Category IB Recommendation

https://www.flickr.com/photos/arlingtonva/4314530838

Category Recommendations

- **IA =** *strongly recommended for implementation & strongly supported by well-designed studies*
- **IB =** *strongly recommended for implementation & supported by some studies & strong theoretical rationale*
- **1C, II & No Recommendation:** Unresolved Issue

Category IA

- If hands NOT visibly soiled, use alcohol-based hand rub for *routinely decontaminating* hands in all clinical situations***
- Decontaminate hands after contact with body fluids, excretions, mucous membranes, non-intact skin, & wound dressings
- *Exceptions: spore-contamination, visibly soiled*

***= very important**

Category 1A

https://www.flickr.com/photos/colalife/9362442935

- To improve hand hygiene adherence among personnel, *make alcohol-based hand rub available* at the entrance to the patient's room or at the bedside, other convenient locations, & in individual pocket-sized containers to be carried by HCWs.

Category 1A

As part of multi-disciplinary program to improve hand hygiene adherence, *provide HCWs with a readily-accessible* alcohol-based hand-rub product

Should NOT be placed near sink

Category 1A

- If hands *visibly dirty or contaminated with proteinaceous material or visibly soiled with blood or other body fluid*, wash hands with either a non-antimicrobial soap and water or an antimicrobial soap & water

DJH©2016

Category 1A

- Do NOT add soap to a partially empty soap dispenser
- *"topping off"* can lead to bacterial contamination of soap

DO NOT "top off"

https://pixabay.com/static/uploads/photo/2014/04/02/16/16/liquid-soap-306747_960_720.png

DJH©2016

Lotions

https://www.flickr.com/photos/gezellig-girl/6261193918

- Lotions protect hands from cracking
- When hands are cracked, don't get washed as often
- Some protective qualities with lotions
- *Some petroleum-based ingredients in lotions can damage integrity of latex gloves*

DJH©2016

Category IA

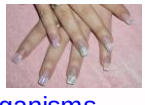
- Provide HCWs with hand lotions or creams to minimize the occurrence of irritant contact dermatitis associated with hand antisepsis or handwashing

https://en.wikipedia.org/wiki/Lotion

DJH©2016

Artificial Nails

https://commons.wikimedia.org/wiki/File:Tipsy.jpg



- More likely to harbor gram (-) organisms
- Traced to outbreaks of infection in neonatal intensive care units & others
- Chipped nail polish may support growth of ↑ #'s of organisms on fingernails

https://www.flickr.com/photos/soaringbird/7341346614

DJH©2016

Category IA

Do NOT wear artificial fingernails or extenders when having direct contact with patients at high risk (e.g., intensive care units, operating rooms)

DJH©2016

Surgical Hand Antisepsis

- Bacteria on hands can cause wound infections
- Bacteria multiply rapidly on hands with plain soap
- 5 minutes as effective as 10
- 2-stage scrubs as effective as 5 minute antiseptic scrub
- Brushes can damage skin & increase shedding of bacteria from hands

Category IB

- Scrub hands & forearms for length of time recommended by manufacturer (2-6 minutes)
- *Long scrub times* (10 minutes) are NOT necessary

Why Wash After Removing Gloves?

- Temperature warm on gloved hands
- Moisture on gloved hands
- Bacteria rapidly grow in such conditions
- Gloves may tear

Monitoring Compliance

Category 1A

Monitor HCWs' adherence with recommended hand-hygiene practices & *provide personnel with information* regarding their performance

https://en.wikipedia.org/wiki/Doctor%E2%80%93patient_relationship