MISH

HealthCare Acquired Infections

HEALTHCARE ACQUIRED INFECTIONS (HCAI)

A significant number of infections can be prevented, such as:

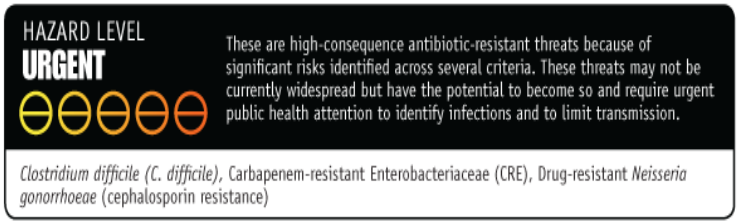
- UTI's
- Surgical Wound infections
- Venous-arterial access line infections
- Multi drug resistant organism infections

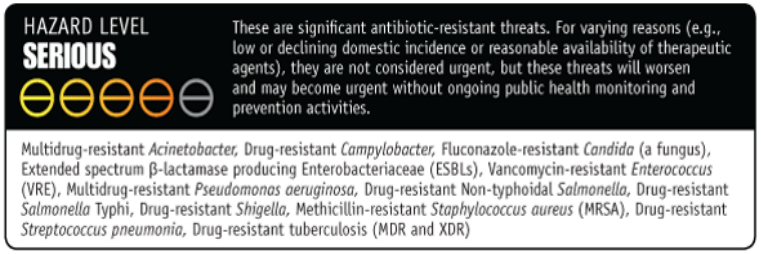
HCAI

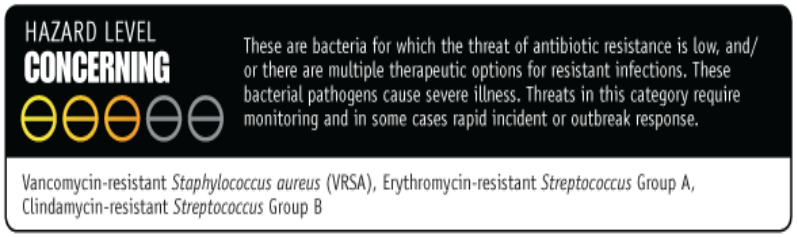
- HCAI's are infections transmitted to patients by healthcare workers after standard precautions have not been adequately carried out

A GROWING LIST OF HAZARDOUS ORGANISMS

CDC GRADING OF THREAT LEVEL

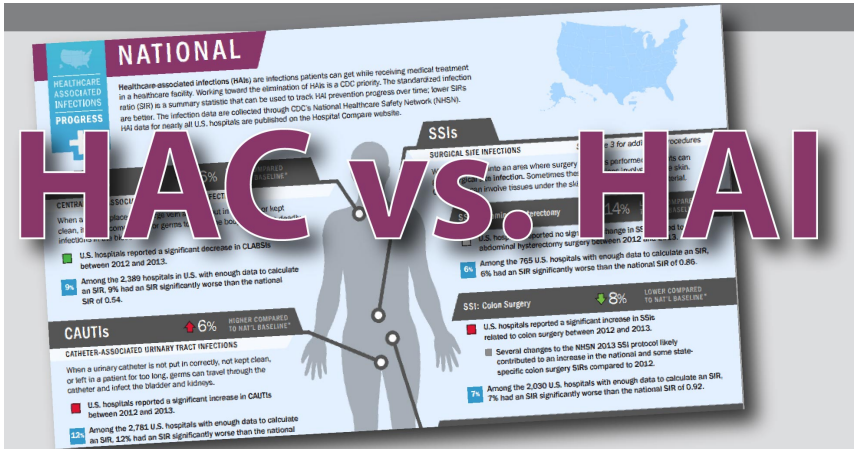






IMPACT OF HCAI's

- Increasing Drug-resistant organisms
- Prolonged hospital stays
- Increased morbidity-complications
- Increased cost
- Spread of infections to others



PREVENTION OF HCAI's

- Prevention of the infection form occurring in the first place is the key to reducing all types of hospital or HCAI 's.

HCAI PREVENTION STRATEGIES

- Hand Hygiene
- Respiratory hygiene
- Contact, Droplet, and Airborne precautions
- Universal Precautions
- Sterile technique
- Aseptic technique
- Maximal barrier use
- Standardizing protocols and procedures

#1 PREVENTION STRATEGY

STOP HAND transmission!!!

Principles of Hand Awareness.

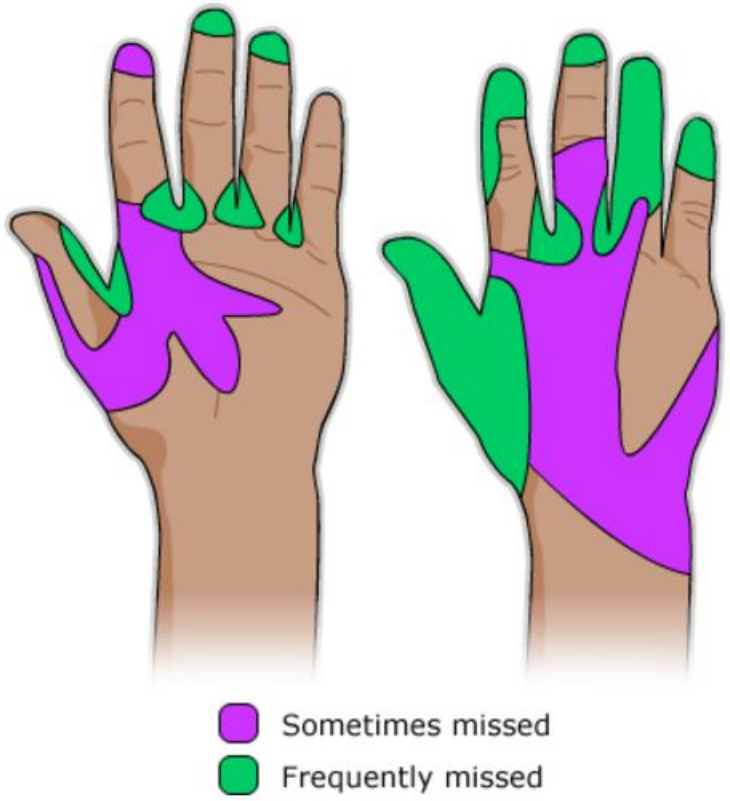
Spreading infection occurs when we do not wash hands and we proceed to use:

- Our cellphones
- Hospital phones
- Keyboards
- Share medical devices/equipment
- Touch door knobs, hand rails, light switches…..
- Go from one patient to the next
- Use the patient chart

HAND AWARENESS

- **Know what your hands are doing AT ALL TIMES.**

- Hand Transmission is the integration of
  - **Hand Hygiene,**
  - **Respiratory Etiquette and**
  - **Cross-contamination awareness**



HAND AWARENESS

TO REDUCE INFECTION AND MDRO SPREAD

Based on WHO poster 'Your 5 Moments for Hand Hygiene' and reproduced with their kind permission

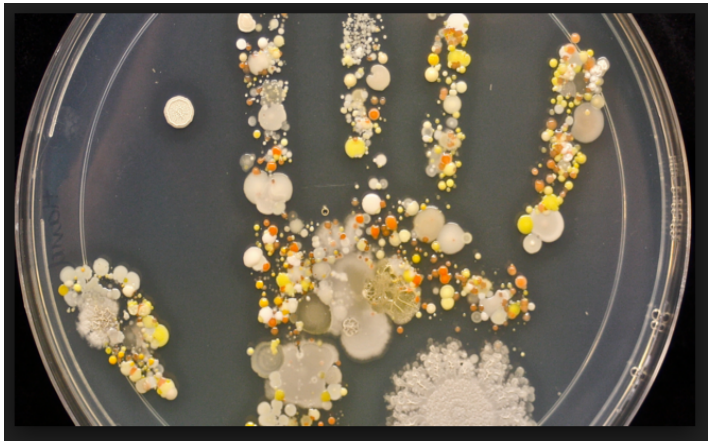
HEALTH CARE WORKERS ARE A PETRI DISH OF MANY DISEASES IN THE HOSPITAL, AND THE #1 SOURCE PF SPREAD

BEHAVIORS WE HAVE TO WORK ON

- Hand hygiene
- Nose picking and rubbing your eye, nail biting, finger licking, etc… while in the hospital
- Not washing hands before and after patient contact and then touching the chart, phone, keyboard..
- Not disinfecting equipment before and after use allowing others to touch and spread organisms to other patients

THE TEN DEADLIEST WEAPONS

Our fingers and thumbs



HAND AWARENESS IMPACT

- People who are **"Hand Aware"** are much less likely to contaminate themselves, another person, patient, device or surface.
- Why would anyone **knowingly** give themselves E.Coli 0157:H7, MRSA,VRE, Shigella, Pertussis, Croup, Meningitis,TB, Flu, Strep, Impetigo, Pink Eye, hepatitis A and many other infections?

HAND HYGIENE

- Mucosal membranes (eye, nose, mouth) are the first to get colonized with organisms.
- 30% of the public is colonized with MRSA
- AVOID getting your fingers near your eyes or nose by rubbing. The easiest way to get colonized and become a source for the spread infection, and take it home.

RESPIRATORY ETIQUETTE

- Do not cough or sneeze into your hand. Use a sleeve, Kleenex, crook of your elbow, etc., anything except a bare hand. Very few people are running to the sink to wash their hands after coughing or sneezing.
- keep a safe distance from a person sneezing (> 1m)
- Avoid contact with surfaces in the path of a sneeze spray
- Avoid contact with a person sneezing
- Common organisms spread when the etiquette is not observed:
  - *Pertussis, viral illness, pneumococcus, meningococcus, sars, mumps, measles, rubella, and many similar diseases would be prevented by diligent practice of respiratory etiqutte*

WASH HANDS WHEN ENTERING AND LEAVING THE HOSPITAL

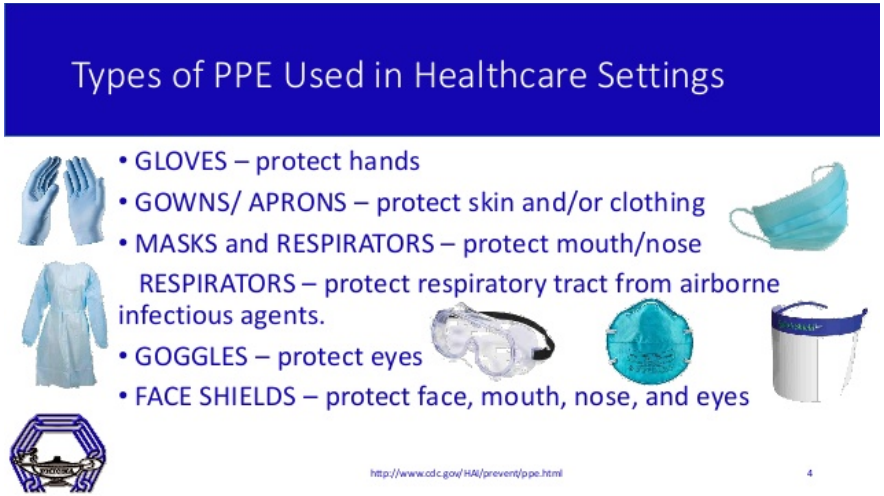
UNIVERSAL PRECAUTIONS

#1 Assume all blood and body fluids are contaminated

#2 Wash Hands

#3 Wear protective barriers (PPE)

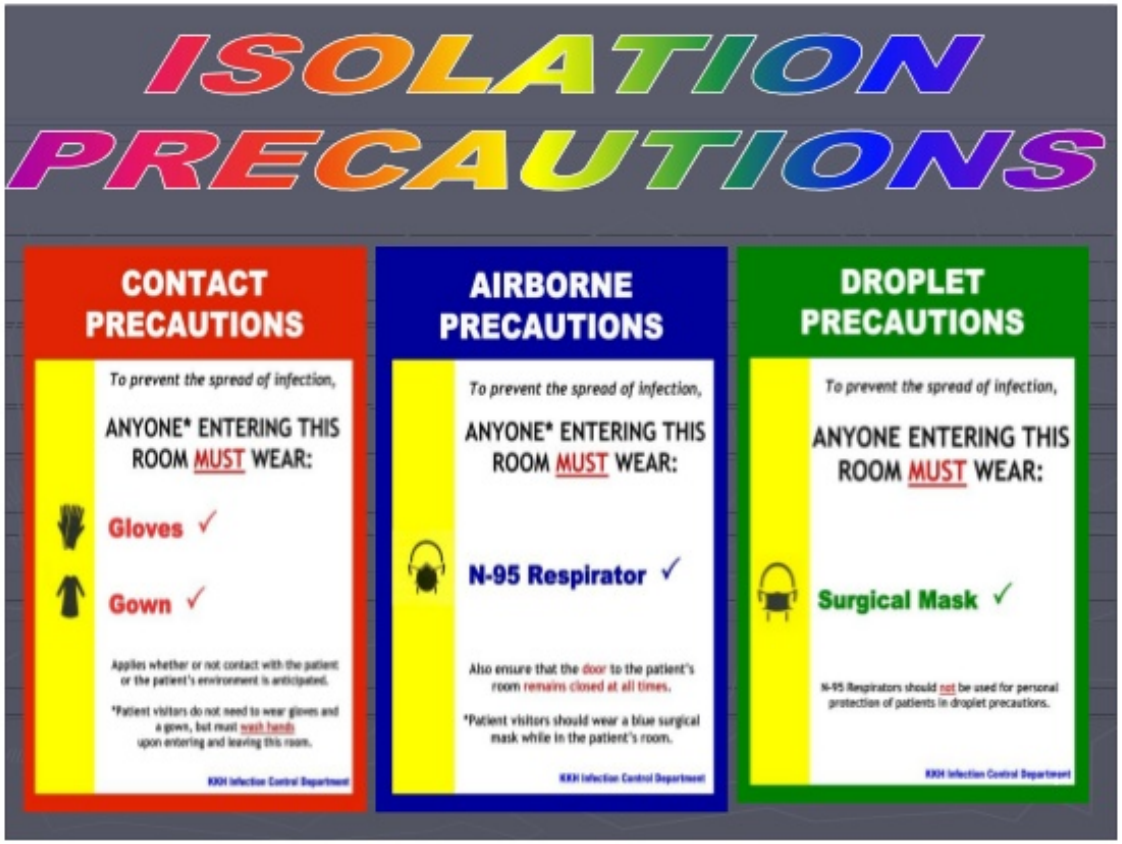
#4 Safely handle contaminated items and sharps



ISOLATION PRECAUTIONS

- Contact precautions
  - This applies to diseases spread by direct patient contact, contact with infectious material, or by contact with contaminated items in the patient's environment.
- Droplet precautions
  - This is intended to prevent transmission of pathogens spread through close respiratory or mucous membrane contact.
- Airborne precautions
  - This applies to infectious agents that remain infectious over long distances when suspended in the air

ISOLATION PRECAUTIONS



BASIC ISOLATION PRECAUTIONS:

- Isolate patient ASAP
- Provide a Private patient room when possible
- Control Visitor traffic and educate visitors
- Control Patient traffic and educate patient
- Educate Staff at shift change and patient transfers
- Use Protective barriers
- Post Instruction Signs
- Use Patient transportation precautions
- Use Hand washing as the #1 method to prevent spread
- Use PPE as indicated by the type of precautions required
- Dedicate patient care equipment/supplies to the patient room whenever possible

MULTI-DRUG RESISTANT ORGANISMS

MDRO DEFINITION

In general, bacteria (excluding *M. tuberculosis)* that are resistant to one or more classes of antimicrobial agents and usually are resistant to all but one or two commercially available antimicrobial agents (e.g., MRSA, VRE..)

MDRO TRANSMISSION

MDROs are mainly spread through physical contact.

They can spread from patient to patient on the:

- hands of hospital staff or from
- equipment that was used to care for a patient.

HOW TO PREVENT THE SPREAD OF A MDRO?

#1 - STOP HAND transmission!!!

#2 – Disinfect patient care equipment between patient care

HAND AWARENESS

THE 5 MOST IMPORTANT MOMENTS TO REDUCE MDRO SPREAD

Based on WHO poster 'Your 5 Moments for Hand Hygiene' and reproduced with their kind permission

MDRO SIGNIFICANCE

- These are Infections for which treatment may not be available
- Associated with Increased lengths of stay, costs, and mortality
- ICUs have a higher prevalence than non-ICU settings

The distinction between the multidrug resistant organism infections and regular infections is that they can be much harder to treat.

HOW TO PREVENT ANTIMICROBIAL RESISTANCE

- Diligent use of universal precautions
- Good antiseptic technique
- Good sterile technique
- Clean environment
- Antibiotic stewardship program
- Optimal management of vascular and urinary catheters
- Ventilator management
- Accurate diagnosis of infectious etiologies
- Judicious antimicrobial selection and utilization.

MDRO PREVENTION

- The best way to combat the MDRO crisis is to treat each patient as if he has an MDRO until proven otherwise, not allowing vigilance to lapse and adhering to Universal Precautions routine practice.
- That means following standard practices such as hand-washing, gowning and gloving as well as isolating patients with suspected infections.
- The appropriate use of antibiotics without overuse is critical.

MDRO PREVENTION

- Physicians are instrumental in assisting in the management of MDRO transmission:
  - Accurate/prompt diagnosis and treatment
  - Judicious antimicrobial usage by working with and contributing to the antibiotic stewardship program. Please reference MISH prophylactic antibiotic list based on surgical procedure type. LIP's are asked to adhere to these recommendations, if not they will be required to justify another antibiotic choice.
  - Initiate/order transmission prevention measures as soon as possible (standard precautions, PPE use, contact isolation/duration, barriers). Assist in compliance and education of transmission prevention measures
  - Be aware of Environmental measures necessary to stop MDRO transmission (hand hygiene, enhanced environmental cleaning of high frequency contact services, dedicated non-critical med equipment, staff/patient/family education).
  - The *Environment is a potential reservoir for infectious organisms.* Be aware that organisms may survive (even thrive) on environmental surfaces for months if surfaces not cleaned & disinfected correctly:
    - E. coli & Pseudomonas aeruginosa – up to 16 months
    - MRSA – up to 9 - 10 months
    - TB & C. diff – up to 5 months
    - VRE – up to 4 months
    - Norovirus – up to 1 month

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MRSA FOCUS

- Staphylococcus aureus is a gram positive bacterium which lives harmlessly on the skin and in the nose of 30% of the population
- If resistant to methicillin (an antibiotic) it is termed Methicillin resistant Staphylococcus aureus (MRSA)
- Skin or wound colonization may not cause harm. However, in the sick and vulnerable, it can cause problems as severe as life threatening septicemia

MRSA - CHALLENGE

- Once MRSA is established in an environment it is difficult to stop its spread and treat those affected
- MRSA spreads by the transiently colonized hands of health care workers.
- Hand hygiene and protective clothing are vital!
- MRSA persists in dust – a clean environment is important.

MRSA - TREATMENT

Screen, identify, isolate if necessary

If treatment is required –

- Nasal mupirocin can be used to treat colonization
- Systemic antibiotics such as tetracyclines, teicoplanin and vancomycin may be used with care. Some strains of MRSA are already resistant

MISH RISK FOR MDRO

- IS Low (elective, short stays, surgical ..)
- Education/training is key to keep it low
- Screening and vigilance
- To keep it low screen it is screened for on admission (prompts added to forms):
    - chronic infections,
    - wounds,
    - healing lesions
    - Colonization
    - Hx of MRSA

C. DIFF

Clostridium difficile

Prevention:

Contact Precautions

Hand Hygiene with Soap & Water after patient care

Clean Environment and equipment using Oxivir

Antimicrobial stewardship

STERILE, ASEPTIC AND CLEAN TECHNIQUE

STERILE TECHNIQUE

- Prepare patient and area
- Have an assistant
- Have all supplies needed in the room prior to starting
- Hand hygiene before / after procedure
- Body Surface sterile prep
- Maximal sterile barrier patient and proceduralist
- Sterile PPE
- Maintain sterile technique
- Enforce break in sterile technique procedure
- Apply dressing sterily

STERILE TECHNIQUE

- Is used for surgery, and when performing invasive procedures:
  - Pacemaker placement
  - Gallbladder removal
  - Line placement
  - Liver biopsy

STERILE TECHNIQUE

- Sterile technique involves:
  - Mask and cap
  - Surgical hand scrub with a long acting antiseptic
  - Hands dried with sterile towels
  - Sterile field
  - Sterile gown
  - Sterile gloves
  - Sterile supplies
  - Skin prep with long acting antisepsis
  - A dedicated room

STERILE TECHNIQUE

- All articles used in a sterile procedure are sterilized
- Persons who are sterile touch only sterile articles;
- persons who are not sterile touch only unsterile articles.
- Sterile persons avoid leaning over an unsterile area;
- non-sterile persons avoid reaching over a sterile field. Unsterile persons do not get closer than 12 inches from a sterile field.
- If in doubt about the sterility of anything consider it not sterile.
- If a non-sterile person brushes close consider yourself contaminated.
- Gowns are considered sterile only from the waist to shoulder level in front and the sleeves to 2 inches above the elbows.
  - Keep hands in sight or above waist level away from the face.
  - Arms should never be folded.
  - Articles dropped below waist level are discarded.

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STERILE TECHNIQUE

- Sterile persons keep well within the sterile area and follow these rules when passing each other:
  - Face to face or back to back.
  - Turn back to a non-sterile person or when passing.
  - Face a sterile area when passing the area.
  - Ask a non-sterile person to step aside rather than trying to crowd past him.
  - Step back away from the sterile field to sneeze or cough.
  - Turn head away from sterile field to have perspiration mopped from brow.
  - Stand back at a safe distance from the operating table when draping the patient.
  - Members of the sterile team remain in the operating room if waiting for the case.
  - Do not wander around the room or go out in the corridors.

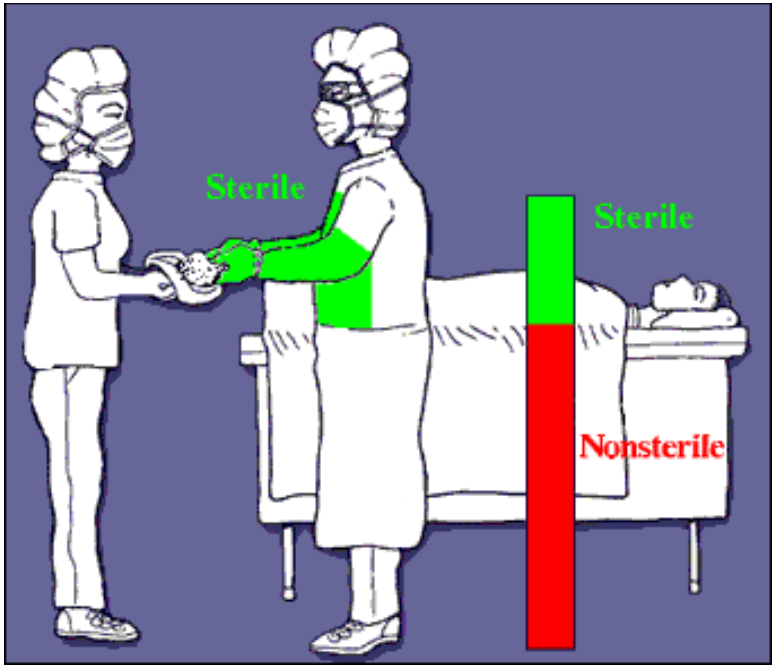
- Sterile persons keep contact with sterile areas to a minimum.
  - Do not lean on the sterile tables or on the draped patient.
  - Do not lean on the nurse's mayo tray.

STERILE TECHNIQUE

- Non-sterile persons — when you are observing a case, please stay in the room until the case is completed. Do not wander from room to room as traffic in the operating room should be kept at a minimum to reduce infection and patient privacy needs to be respected.
- Keep non-essential conversation to a minimum.
- The circulating nurse is in charge of the room — if you have any questions, please refer them to her, the supervisor or your instructor. Ask circulating nurse when it is an appropriate time to ask questions so that explanations/rationale can be given.

STERILE TECHNIQUE

EXTENT OF THE STERILE FIELD



STERILE VS. ASEPTIC VS. CLEAN

	Clean	Aseptic	Sterile
Procedure space	On ward or at beside	Dedicated area	Dedicated room
Gloves	Clean or none	Sterile	Sterile surgical
Hand hygiene before the procedures	Routine	Aseptic, e.g. alcohol	Surgical scrub Iodophors, chlorheximide
Skin antisepsis	No	Alcohol	Long acting agent
Sterile field	No	No*	Yes
Sterile gown, mask, head covering	No	No	Yes

STERILE VS. ASEPTIC VS. CLEAN

Techniques: definitions

Aseptic	Clean	No touch
• Necessary infection control measures to prevent pathogenic micro-organisms on hands, surfaces or equipment from being introduced into susceptible sites during clinical practice	• A method involving hand decontamination, maintaining a clean environment, clean non-sterile gloves, sterile instruments and prevention of direct contamination of materials and supplies	• A method of manipulation of invasive devices or wounds without directly touching the wound, device, or any surfaces that may come into contact with those sites

Dougherty et al (2010)

Association for Professionals in Infection Control and Epidemiology (2001)

STERILE VS. ASEPTIC VS. CLEAN

THINGS THAT NEED TO BE CONSIDERED

S.C.R.I.P.T Procedures

- **S**pace and work flow?
- **C**lean, aseptic, or sterile technique?
- **R**outine, aseptic or surgical hand hygiene?
- **I**nstruments and supplies?
- **P**ersonal protective equipment?
- **T**rash: sharps, infectious waste, radioactive waste, pathology or routine waste?

ASEPTIC TECHNIQUE

- Is used for short moderate invasive procedures, such as:
  - Foley placement
  - Line dressing change
  - IV placement

ASEPTIC TECHNIQUE

- Requires:
  - Hand hygiene with shorter acting antiseptic
  - Usually Sterile gloves
  - Surface skin prep
  - Clean dedicated immediate area

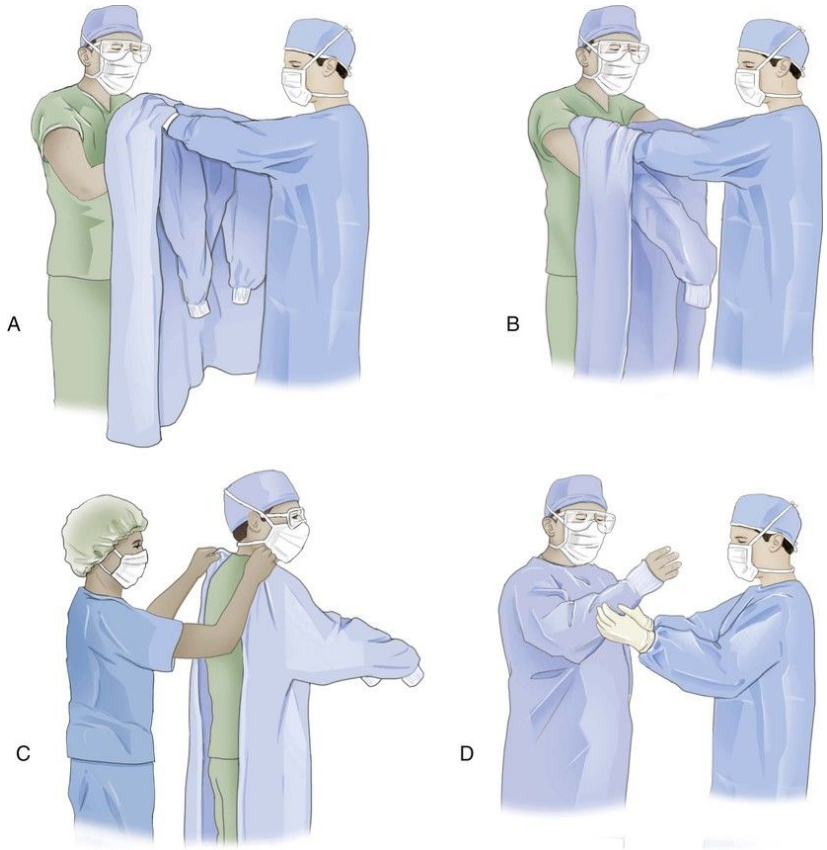
CLEAN TECHNIQUE

- Examples are:
  - Emptying a foley bag
  - Emptying a JP drain

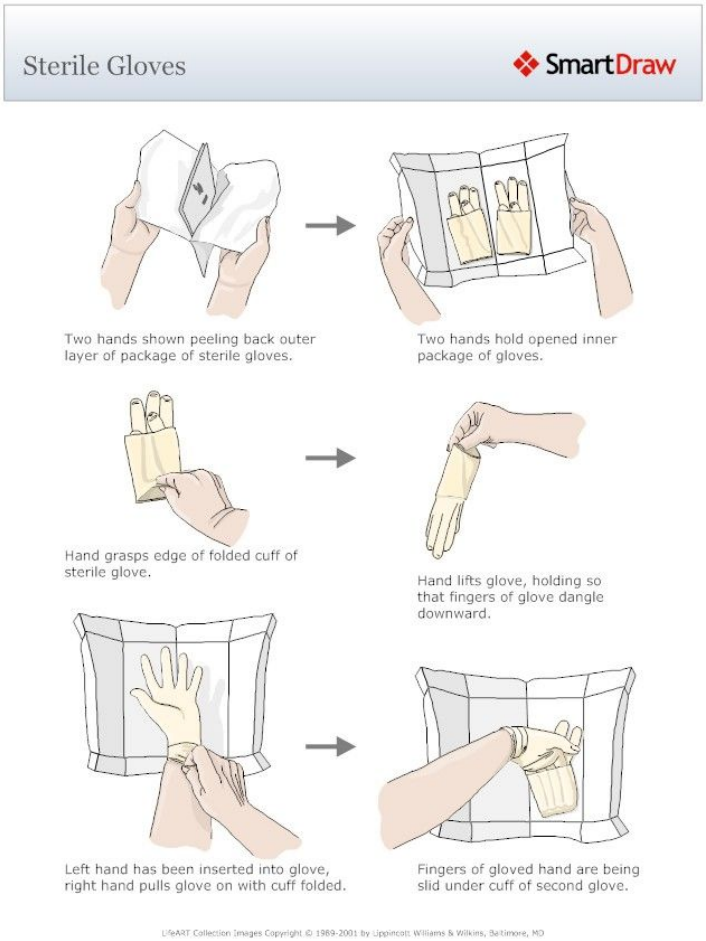
CLEAN TECHNIQUE

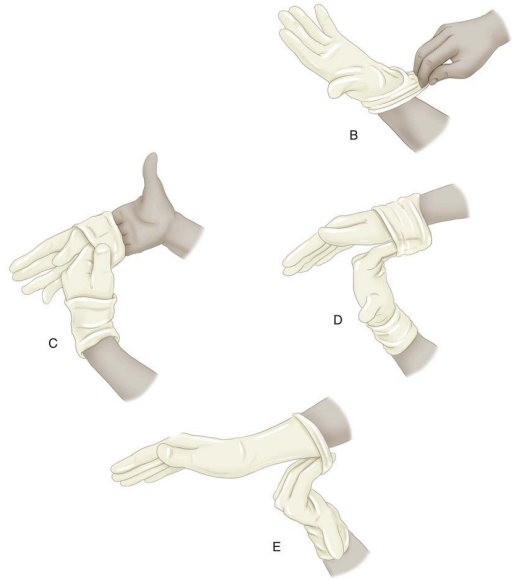
- Refers to the use of:
  - Routine hand hygiene
  - Routine hand drying
  - Non-sterile glove use

STERILE GOWN DONNING TECHNIQUE

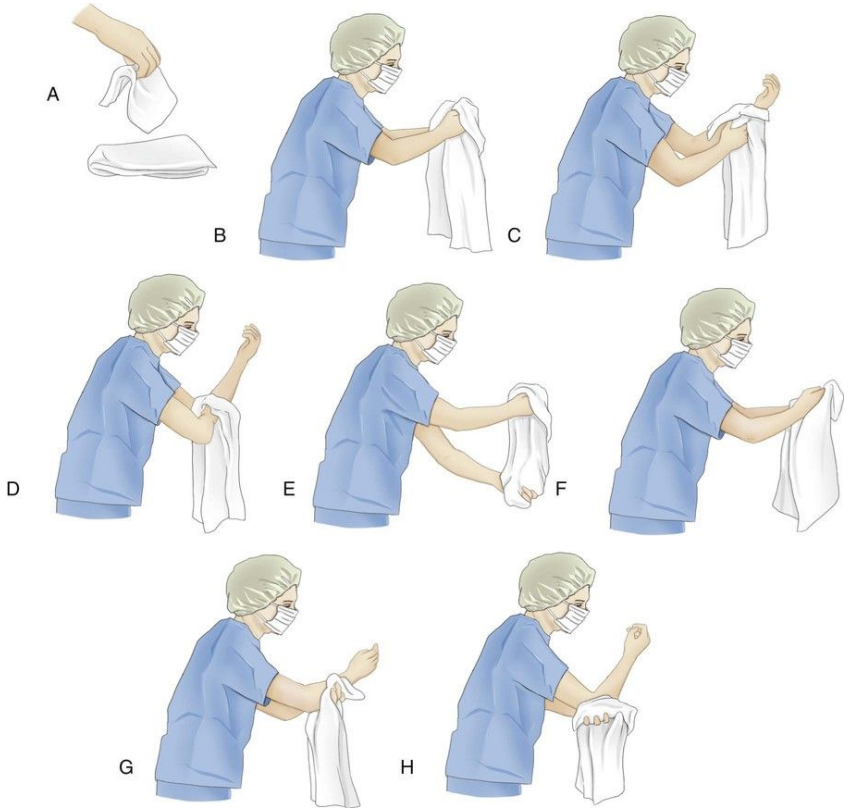


STERILE GLOVE DONNING TECHNIQUE

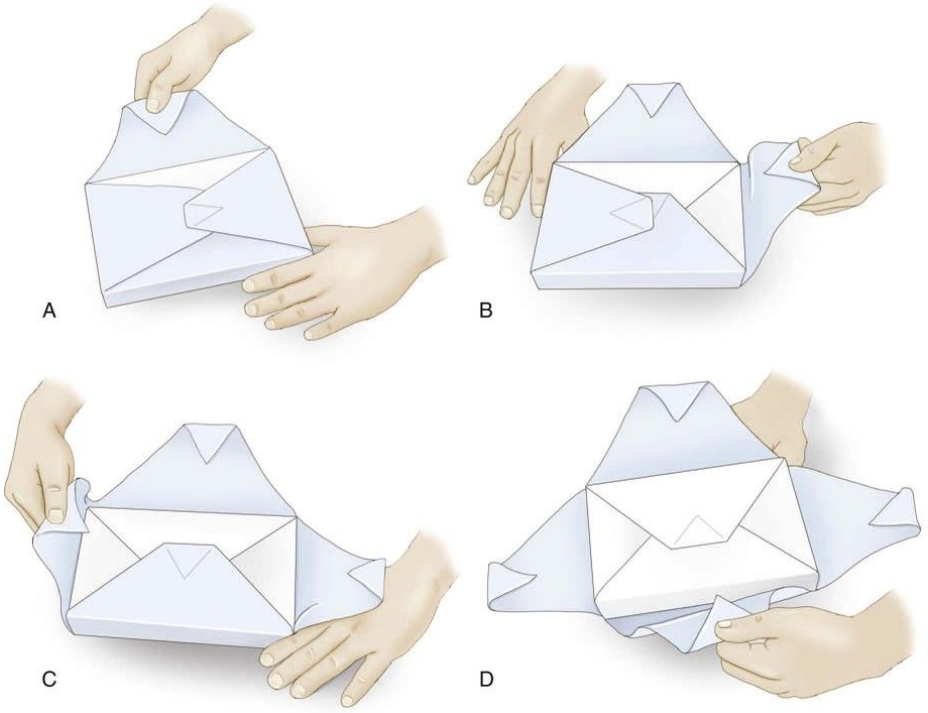


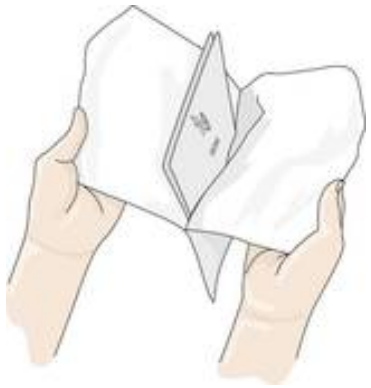


STERILE DRYING TECHNIQUE



STERILE PACKAGE OPENING TECHNIQUE





Can't touch the inside of packages

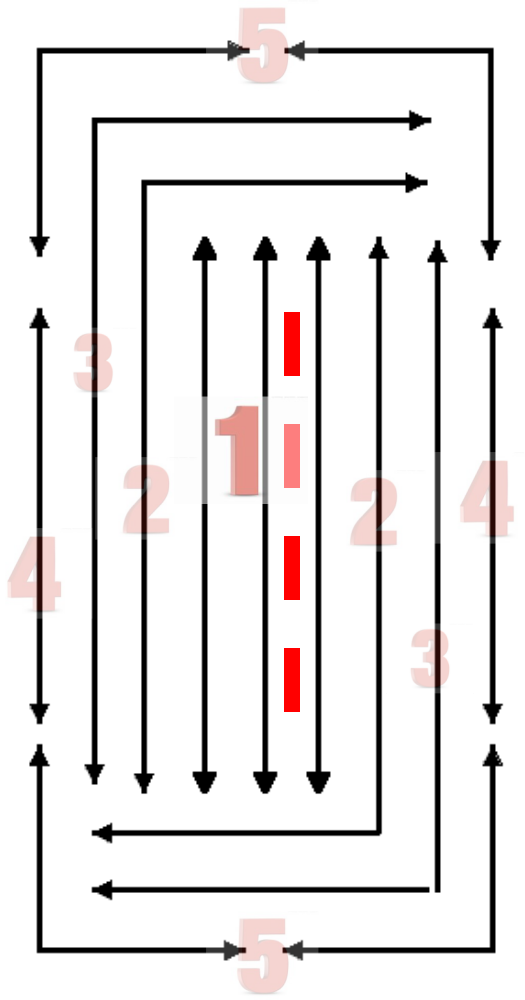
STERILE PREPPING TECHNIQUE

WHAT TO PREP WHEN OPERATING ON DIFFERENT AREAS OF THE BODY.

STERILE PREPPING TECHNIQUE

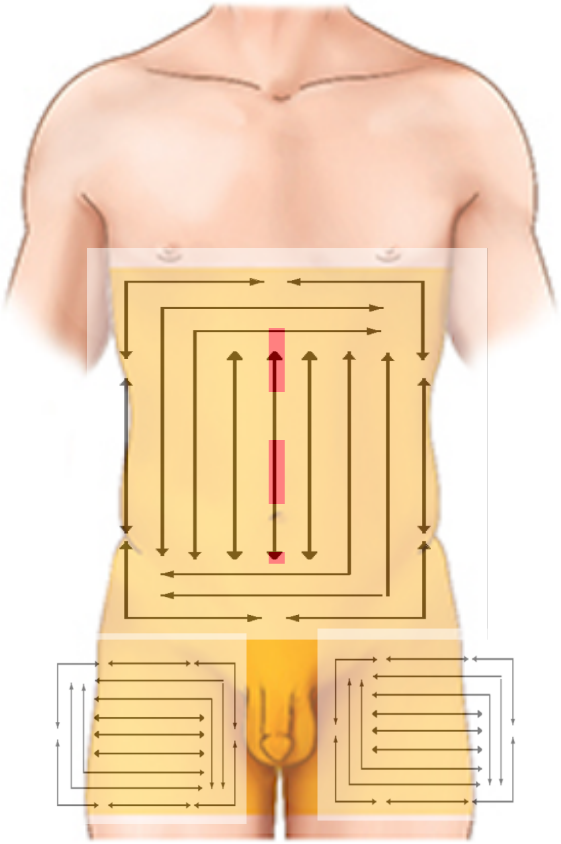
HOW TO PREP A BODY PART.

- Always start where the incision will be made (the center - 1)
- Slowly move further away from the center without coming back to center – 2 & 3.
- Never go from the outer edge back toward the center (incision site) with the same sponge stick - considered dirty
- When you grab a new sponge stick start again at ONE - 3 times.
- The further from the center, or the closer the skin is to the bed, or parts of the body that are considered contaminated you do last. These would be 4 and 5



STERILE PREPPING TECHNIQUE

HOW TO PREP A BODY PART.



1. The abdomen is prepped first separate from the legs and groin
2. Legs are prepped next avoiding the groin
3. Groin is prepped last with its own sponge stick

SURGICAL SITE INFECTIONS

WHAT IS AN SSI?

- The CDC defines SSIs in three standardized categories:
  - Superficial incisional
  - Deep incisional
  - Infection of the organ or space

HOW ARE SSIS CLASSIFIED?

- Class I, or clean wounds – plastic surgery, lap-band
- Class II, or clean-contaminated wounds - bypass
- Class III, or contaminated wounds – elective colon surgery
- Class IV, or dirty-infected wounds – perforated colon

CAUSES OF SSIS

- Most SSIs are caused by the patient's own normal flora entering the body via an incision
- Other risks include perioperative blood transfusions, steroid use, malnutrition, preoperative nasal colonization with *Staphylococcus aureus*

EVIDENCE-BASED RECOMMENDATIONS

- Institute for Healthcare Improvement (IHI) recommends:
  - 1. Antibiotics peri-operatively
  - 2. Appropriate hair removal, or no hair removal
  - 3. Blood glucose control
  - 4. Maintaining normathermia

- Administer peri-operative antimicrobial prophylaxis according to evidence-based standards and guidelines.
  - a. Begin administration within 1 hour before incision to maximize tissue concentration. Two hours are allowed for the administration of vancomycin and fluoroquinolones.
  - b. Select appropriate agents on the basis of the surgical procedure, the most common pathogens causing SSIs for a specific procedure, and published recommendations.
  - c. Discontinue agent within 24 hours after surgery. Adjust dosing on the basis of patient weight; for example: Vancomycin should be dosed at 15 mg/k. Gentamicin should be dosed at 5 mg/kg for adult patients. Re-dose prophylactic antimicrobial agents for long procedures and in cases with excessive blood loss during the procedure.
  - d. Prophylactic antimicrobials should be redosed at intervals of 2 half-lives (measured from time the preoperative dose was administered) in cases that exceed this time.
  - e. Use a combination of parenteral antimicrobial agents and oral antimicrobials to reduce the risk of SSI following colorectal procedures. The additional SSI reduction achieved with mechanical bowel preparation has not been studied, but the data supporting use of oral antimicrobials have all been generated in combination with mechanical bowel preparation.
  - f. Mechanical bowel preparation without oral antimicrobials does not decrease the risk of SSI

- Do not remove hair at the operative site unless the presence of hair will interfere with the operation. Do not use razors. If hair removal is necessary, remove hair outside the operating room using clippers or a depilatory agent.
- Use alcohol-containing preoperative skin preparatory agents if no contraindication exists
  - Alcohol is highly bactericidal and effective for preoperative skin antisepsis but does not have persistent activity when used alone. Rapid, persistent, and cumulative antisepsis can be achieved by combining alcohol with chlorhexidine gluconate or an iodophor
  - Alcohol is contraindicated for certain procedures, including procedures in which the preparatory agent may pool or not dry (eg, involving hair) due to fire risk. Alcohol may also be contraindicated for procedures involving mucosa, cornea, or ear.
  - The most effective disinfectant to combine with alcohol is unclear.
  - These disinfectants are not interchangeable. Follow the manufacturers' instructions to ensure correct application.

SSI PREVENTION

- Surgical Site Infection (SSI) Prevention
- Intra-operative Interventions
  - Avoid hair removal
  - Never shave; use clippers if necessary
  - Proper skin antiseptic; allow to DRY
  - Maintain normothermia (>36.0C)
  - Control serum glucose (<200)
  - Antimicrobial prophylaxis
  - Right agent, right dose, right timing (within 1 hour before incision)
  - Redose every 3-4 hours and for 1500cc blood loss
  - PROPER ATTIRE WITH MASKS TIED
  - HAIR COVERED
  - NO JEWELRY
  - PROPER SURGICAL SCRUB OF HANDS AND NAILS
  - PROPER ASEPTIC AND STERILE TECHNIQUE

SSI PREVENTION

Surgical Site Infection (SSI) Prevention

Post-operative Interventions

- Place a sterile dressing for 24-48 hours
- Thorough hand hygiene and sterile supplies for wound dressing change
- Control blood glucose (<200)
- Discontinue antimicrobial prophylaxis within 24 hours after surgery (within 48 hours for cardiac surgery)

1. ANTIBIOTICS

- Antibiotic prophylaxis recommended within 1 hour before surgical incision
- Antibiotic prophylaxis consistent with CDC's guidelines
- Recommend narrow-spectrum antibiotics, such as cefazolin, cefuroxime
- Antibiotics be discontinued within 24 hours

2. HAIR REMOVAL

- CDC recommends not removing hair unless it interferes with surgery
- If removal necessary, should be done with clippers immediately before surgery not in the operating room
- Razors are not allowed
- Use tape to collect all free shaved hairs

3. NORMOTHERMIA

- Patients whose body temperature is less than 96.8° F (36° C) during surgery are prone to SSIs
- Impairs patient's immune system and causes vasoconstriction at incision site
- IHI recommends warm I.V. fluids, increased temperature in the OR, forced-warm-air blankets; patient may wear hat and booties

OTHER PROMISING INTERVENTIONS

- CDC recommends patients shower or bathe with antiseptic soap prior to surgery
- CDC guidelines also address OR ventilation, cleaning and disinfecting environmental surfaces, sterilizing instruments, surgical drapes, apparel, adherence to aseptic and sterile techniques.

HIBICLENS (4% CHLORHEXADINE (CHG))

PATIENT INSTRUCTIONS

- Remove all jewelry and body piercings.
- Do not shave the area of your body where your surgery will be performed.
- With each shower or bath, wash your hair as usual with your normal shampoo.
- Rinse your hair and body thoroughly after you shampoo your hair.
- Turn water off and apply the CHG soap to your entire body from the neck down, paying special attention to the area where your surgery will be performed.
- Use a wet freshly laundered wash cloth to apply the CHG to your body
- Apply and rub CHG to your body gently for (5) minutes, paying special attention to the area where your surgery will be performed.
- Re-soak the washcloth with the CHG soap frequently till you have scrubbed your whole body Do not scrub your skin too hard.

- you should use 1 bottle per shower.
- allow extra 2 minutes for the chg to work.
- do not wash your body with your regular soap after chg is used.
- do not use chg on your face near your mouth, eyes or ears or in the genital area.
- turn the water back on and rinse your body thoroughly.
- pat yourself dry with a freshly laundered towel.
- do not apply any lotion, powder, deodorant, perfume, make up or hair products.
- go to bed in freshly laundered pajamas, on freshly laundered bed sheets.

POSTOPERATIVE MEASURES TO PREVENT SSIS

- Cover the incision with a sterile dressing for 24-48 hours; interventions after this depend on wound type and health care provider's orders.
- Perform hand hygiene before and after dressing changes and with any type of contact with incisional site.
- Use sterile gloves and technique when changing dressing.

POSTOPERATIVE MEASURES (CON'T)

- Individualize patient education before discharge
  - how to care for the incision
  - how to spot signs and symptoms of infection

CENTRAL LINE ASSOCIATED BLOODSTREAM INFECTIONS

GOALS - ELIMINATE CL RELATED BSI'S

- Staff education
- Standardize protocols and procedures
- Central line cart
- Hand hygiene
- Dressing cart
- Barriers, aseptic-sterile technique
- Sterile technique
- Monitoring for infections
- Treating a CL related BSI as an event, with full investigation
- CDC guidelines
- Avoid femoral lines
- Early removal when not needed

CDC GUIDELINES:

- Line protocol checklist - standardized
- Line protocol quality check monitoring
- Line cart
- Dressing cart
- Line-wound care record
- Deviation from protocol requires correct intervention

BASIC MEASURES IN THE PREVENTION OF LINE RELATED INFECTIONS

- Promptly remove unnecessary central lines - perform daily audits to assess whether each central line is still needed F
- Follow proper insertion practices
  - Perform hand hygiene before insertion
  - Adhere to aseptic technique
  - Use maximal sterile barrier precautions (i.e., mask, cap, gown, sterile gloves, and sterile full body drape)
  - Perform skin antisepsis with >0.5% chlorhexidine with alcohol
  - Choose the best site to minimize infections and mechanical complications. Avoid femoral site in adult patients
  - Cover the site with sterile gauze or sterile, transparent, semipermeable dressings

- Handle and maintain central lines appropriately
  - Comply with hand hygiene requirements
  - Scrub the access port or hub immediately prior to each use with an appropriate antiseptic (e.g., chlorhexidine, povidone iodine, an iodophor, or 70% alcohol)
  - Access catheters only with sterile devices
  - Replace dressings that are wet, soiled, or dislodged
  - Perform dressing changes under aseptic technique using clean or sterile gloves

- Selection of Catheters and Sites: Central Venous Catheters
  - Weigh the risks and benefits of placing a central venous device at a recommended site to reduce infectious complications against the risk for mechanical complications (e.g., pneumothorax, subclavian artery puncture, subclavian vein laceration, subclavian vein stenosis, hemothorax, thrombosis, air embolism, and catheter misplacement)
  - Avoid using the femoral vein for central venous access in adult patients
  - Use a subclavian site, rather than a jugular or a femoral site, in adult patients to minimize infection risk for non-tunneled CVC placement
  - Avoid the subclavian site in hemodialysis patients and patients with advanced kidney disease, to avoid subclavian vein stenosis
  - Use ultrasound guidance to place central venous catheters (if this technology is available) to reduce the number of cannulation attempts and mechanical complications. Ultrasound guidance should only be used by those fully trained in its technique.
  - Use a CVC with the minimum number of ports or lumens essential for the management of the patient
  - Promptly remove any intravascular catheter that is no longer essential
  - When adherence to aseptic technique cannot be ensured (i.e catheters inserted during a medical emergency), replace the catheter as soon as possible, i.e, within 48 hours

- Hand Hygiene and Aseptic Technique
  - Perform hand hygiene procedures, either by washing hands with conventional soap and water or with alcohol-based hand rubs (ABHR). Hand hygiene should be performed before and after palpating catheter insertion sites as well as before and after inserting, replacing, accessing, repairing, or dressing an intravascular catheter. Palpation of the insertion site should not be performed after the application of antiseptic, unless aseptic technique is maintained
  - Maintain aseptic technique for the insertion and care of intravascular catheters
  - Sterile gloves should be worn
  - Use new sterile gloves before handling the new catheter when guidewire exchanges are performed.
  - Wear either clean or sterile gloves when changing the dressing on intravascular catheters

- Maximal Sterile Barrier Precautions
  - Use maximal sterile barrier precautions, including the use of a cap, mask, sterile gown, sterile gloves, and a sterile full body drape, for the insertion of CVCs, or guidewire exchange

- Skin Preparation
  - Prepare clean skin with a >0.5% chlorhexidine preparation with alcohol before central venous catheter and peripheral arterial catheter insertion and during dressing changes. If there is a contraindication to chlorhexidine, tincture of iodine, an iodophor, or 70% alcohol can be used as alternatives
  - Antiseptics should be allowed to dry according to the manufacturer's recommendation prior to placing the catheter

- Catheter Site Dressing Regimens
  - Use either sterile gauze or sterile, transparent, semipermeable dressing to cover the catheter site
  - Replace catheter site dressing if the dressing becomes damp, loosened, or visibly soiled
  - Do not use topical antibiotic ointment or creams on insertion sites, except for dialysis catheters, because of their potential to promote fungal infections and antimicrobial resistance
  - Replace dressings used on short-term CVC sites every 2 days for gauze dressings.
  - Replace dressings used on short-term CVC sites at least every 7 days for transparent dressings
  - Replace transparent dressings used on tunneled or implanted CVC sites no more than once per week (unless the dressing is soiled or loose), until the insertion site has healed. Category II
  - Monitor the catheter sites visually when changing the dressing or by palpation through an intact dressing on a regular basis, depending on the clinical situation of the individual patient. If patients have tenderness at the insertion site, fever without obvious source, or other manifestations suggesting local or bloodstream infection, the dressing should be removed to allow thorough examination of the site

- Catheter Securement Devices. Use a sutureless securement device to reduce the risk of infection for intravascular catheters.

- Systemic Antibiotic Prophylaxis. Do not administer systemic antimicrobial prophylaxis routinely before insertion or during use of an intravascular catheter to prevent catheter colonization or CRBSI

- Antibiotic/Antiseptic Ointments. Use povidone iodine antiseptic ointment or bacitracin/gramicidin/ polymyxin B ointment at the hemodialysis catheter exit site after catheter insertion and at the end of each dialysis session only if this ointment does not interact with the material of the hemodialysis catheter per manufacturer's recommendation

- Anticoagulants. Do not routinely use anticoagulant therapy to reduce the risk of catheter-related infection in general patient populations.

- Replacement of CVCs, Including PICCs and Hemodialysis Catheters
  - Do not routinely replace CVCs, PICCs, hemodialysis catheters to prevent catheter-related infections.
  - Do not remove CVCs or PICCs on the basis of fever alone. Use clinical judgment regarding the appropriateness of removing the catheter if infection is evidenced elsewhere or if a noninfectious cause of fever is suspected.
  - Do not use guidewire exchanges routinely for non-tunneled catheters to prevent infection.
  - Do not use guidewire exchanges to replace a non-tunneled catheter suspected of infection.
  - Use a guidewire exchange to replace a malfunctioning non-tunneled catheter if no evidence of infection is present.
  - Use new sterile gloves before handling the new catheter when guidewire exchanges are performed.

CLABSI

Prevention of Catheter Associated Blood Stream Infection	**Prior to insertion** • Educate patient/family on CLABSI prevention. Document education • Use the evidence-based, Central Line Insertion Care Checklist • Use the standardized central line bundle kit/cart that contains all necessary supplies for insertions • Perform hand hygiene prior to catheter insertions

CLABSI

Prevention of Catheter Associated Blood Stream Infection	During Insertion
	• Use the Central Line Insertion Checklist—stop the procedure if steps are not followed: • Utilize maximum barrier precautions during insertions and rewires which include cap, mask, sterile gown and gloves for the inserter and supervisor and head to toe drape for patient • Utilize chlorhexidine based antiseptic for cleaning insertion site. Let dry. • Avoid femoral vein unless no other site is available • The Central Line Insertion Checklist is shown on the next page.

Line Insertion Critical Steps Checklist
“Line care Record” Form initiated to document daily line care
Positioned patient in a trendelenburg or head-down tilt position
Central line supplies / equipment pulled
All the necessary equipment/supplies collected prior to starting the procedure
Consent from the patient/family obtained
Patient/family educated about central lines and CLI Infections
Hand Hygiene performed before insertion
Time out – Verification procedure performed
Top surface of work table disinfected prior to use
Mask, Hat, Sterile gown and gloves were worn by provider
Was insertion site prepared with ETOH & 2% chlorhexidine?
Was Site allowed to dry prior to draping?
Were Sterile towels used to prep out the insertion site?
Was patient then covered from head-to-toe with sterile drapes?
During entire procedure – was Sterile field maintained at all times? If not, document corrections
Blood draw confirmed / Ports were flushed with heparin?
Sterile transparent dressing immediately applied to site when done?
Hand Hygiene was performed after insertion
Before accessing a ports or line the skin / hubs were disinfected with alcohol swabs by rubbing 5 to 10 seconds
Hand Hygiene was performed before and after line care by RN
Placement verified / PTX ruled out by x-ray

CLABSI – DRESSING CHANGES / LINE CARE

- Prevention of Catheter Associated Blood Stream Infection
  - Maintenance
    - Perform hand hygiene prior to any central line manipulations.
    - Always "Rub the Hub" with alcohol (disinfect hub) before accessing the ports
    - Adhere to standardized dressing care as outlined in the appropriate VAD Policy(HPO).
    - Replace VAD dressings when the dressing becomes damp, loosened, soiled or when inspection of the site becomes necessary.
    - Minimum is every 7 days for transparent dressings or every 48 hours for gauze dressings.
    - Perform daily assessment of the need for a catheter and remove catheters when no longer indicated.

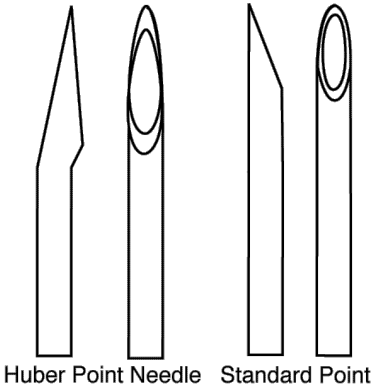
LINE CARE – DRSG CHANGES

Line Dressing Change Checklist
Pull Dressing cart/kit
Hand hygiene before
Explain procedure to patient.
With non-sterile gloves remove old dressing
Inspect catheter, insertion site, and surrounding skin for signs of infection/hematoma.
Prepare sterile field / dressing supplies
Apply sterile gloves
Cleanse insertion site and skin with swabsticks using 2% chlorahexidine. (start at insertion site, cleanse in a circular motion outward for 5" diameter) – let dry
Apply transparent dressing using aseptic technique.
Write date and time on dressing changed and initial.
Remove and discard gloves and old dressings in appropriate receptacle.
Hand hygiene after
Any signs of infection or complication were communicated to the MD
Document line care on "Line care Record" daily
Daily assess if line needed?

ACCESSING SUBCUTANEOUS LINE PORTS

- **Only access port with Non-Coring needle** with integral extension set with clamp / stopcock. Check record for best needle size.
- **The area/skin around the port may become tender and irritated.** This may make accessing a port painful and more difficult. Ask patient what has worked best in the past. Consider topical anesthetic.
- **Use volumetric pump with a filtered giving set when infusing blood products** to avoid blockage
- **If patient undergoes MRI scan**, inform scanning personnel about the port.
- **If patient requires defibrillation** do not place paddles directly over the port.
- **The port should never be used for power-injection of CT/MRI contrast medium** unless the patient has a CT-Rated Port.

ACCESSING SUBCUTANEOUS LINE PORTS



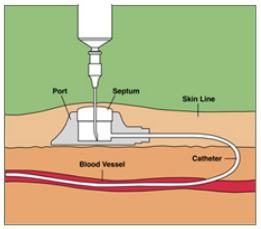
Inserting the needle

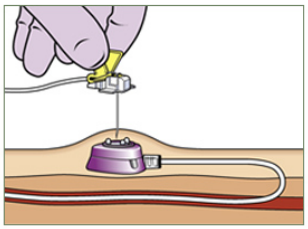
Which needle?

- **Style**: **For infusions**: a 90˚ non-coring needle with extension set should be used. **For boluses, blood-taking and flushing**: a straight non-coring needle with extension set may be used instead if preferred.
- **Gauge**: A 20 or 22-gauge needle will suffice for most uses including blood administration and withdrawal.
- **Length**: When a 90˚ needle is used, the length will depend on the amount of subcutaneous tissue between the skin surface and the port. The external part of the needle should rest on the skin but not exert pressure on the skin. **Hint**: a 1" needle is suitable for most adult patients. Deeper or more superficial ports will require longer or shorter needles.

TECHNIQUE

- **Numb skin over the port** if required using topical anaesthetic (before skin prep) or subcutaneous Lidocaine 1% (after skin prep).
- **Prepare skin over the port using 2%** *Chloraprep* using a 30-second back and forth motion. Allow to dry. Do not touch the proposed needle insertion site again except with totally sterile gloves.
- **Prime needle and/or giving set** with 0.9% saline
- **Put on sterile gloves if you need to palpate the port** to ensure you are confident of its position (otherwise you can wear non-sterile gloves).
- **Hold port firmly (e.g. with thumb and two fingers)** and stretch skin taut during insertion of the needle to prevent the port sliding out of the way of the needle, and to reduce the risk of the port becoming dislodged within the subcutaneous pocket.
- **Insert needle swiftly and firmly** until it is felt to contact the back of the port.
- **Verify correct position** by flushing with 10 mls 0.9% saline and checking for aspiration of blood.
- **If patient complains of discomfort/edema** in the tissues around or over the port this may indicate incorrect position of the needle. In this case needle should be removed (see below for technique) and a fresh attempt made. (You can use the same needle for up to 2 further attempts if it has not become contaminated or damaged.)
- **If the port flushes easily wit** **but there is no flashback of blood**, this suggests that needle posi self is not fully functional. See Maintaining Patency





- Flushing
  - **Recommend** brisk push-pause technique
  - **10 mls 0.9% saline between** incompatible drugs / infusions or after blood sampling
  - **If needle to be removed:** lock with 5 mls Heparinized saline 100 U/ml
  - **If needle to remain in situ**: lock with a further 10mls 0.9% saline
- Removing needle
  - **Lock port** with 5mls heparinized saline 100 U/ml. Ideally, remove needle while injecting last ml to achieve 'positive pressure finish' but use gauze to prevent spray. You will need to ask the patient or a third party to inject because you will need two hands for removing the needle. **NB** If this is not possible, you can achieve a positive pressure finish by clamping the infusion set while injecting the final ml of flush and then remove needle as below.
  - **Stabilize the port** with one hand during needle withdrawal to avoid trauma to tissues. Take care to avoid a needle-stick injury.
  - **Apply gentle pressure** to needle site with sterile gauze until minor bleeding has ceased. A band-aid may be applied.

UTI PREVENTION
FOLEY CARE

UTI PREVENTION

- Best prevention is not to place it in the first place
- Assess true need for a foley
- Assess every 24 hrs if a foley is needed any longer
- Highest risk for UTI is at time of insertion, and with duration of foley

Examples of Appropriate Indications for Indwelling Urethral Catheter Use
Patient has acute urinary retention or bladder outlet obstruction
Need for accurate measurements of urinary output in critically ill patients
Perioperative use for selected surgical procedures: •Patients undergoing urologic surgery or other surgery on contiguous structures of the genitourinary tract •Anticipated prolonged duration of surgery (catheters inserted for this reason should be removed in PACU) •Patients anticipated to receive large-volume infusions or diuretics during surgery •Need for intraoperative monitoring of urinary output
To assist in healing of open sacral or perineal wounds in incontinent patients
Patient requires prolonged immobilization (e.g., potentially unstable thoracic or lumbar spine, multiple traumatic injuries such as pelvic fractures)
To improve comfort for end of life care if needed
Examples of Inappropriate Uses of Indwelling Catheters
As a substitute for nursing care of the patient or resident with incontinence
As a means of obtaining urine for culture or other diagnostic tests when the patient can voluntarily void
For prolonged postoperative duration without appropriate indications (e.g., structural repair of urethra or contiguous structures, prolonged effect of epidural anesthesia, etc.)

- **Appropriate Urinary Catheter Use is key in preventing infection**. Order catheters only for appropriate indications see Table 2 below for guidance, and leave in place only as long as needed:
  - Minimize urinary catheter use and duration of use in all patients, particularly those at higher risk for CAUTI or mortality from catheterization such as women, the elderly, and patients with impaired immunity
  - Avoid use of urinary catheters for management of incontinence.
  - Use urinary catheters in operative patients only as necessary, rather than routinely. Example for cases longer than 2-3hrs.
  - For operative patients who have an indication for an indwelling catheter, remove the catheter as soon as possible postoperatively, preferably within 24 hours, unless there are appropriate indications for continued use.

UTI PREVENTION

FOLEY INSERTION Procedure:

- Perform sterile peri-care, then, re-perform hand hygiene.
- Maintain strict aseptic technique throughout the actual insertion procedure
- Use sterile gloves and equipment and establish/maintain sterile field.
- Do not pre-inflate the balloon to test it (not recommended).
- In females not a lot of lubrication is needed just apply to tip of catheter.
- In males place lubricant tip of syringe at meatus and inject as much into urethra as is easily able to go in.
- Insert to appropriate length and check urine flow before balloon inflation to prevent urethral trauma.
- In males, insert fully to the "y" connection, or in females, advance ~1 inch or 2.5 cm beyond point of urine flow.
- Inflate balloon correctly: Inflate to 10 ml

UTI PREVENTION

FOLEY MAINTENANCE

- Maintain catheter securement and the drainage bag below the level of the bladder at all times (but not on the floor, even when emptying).
- Empty the drainage bag regularly using a separate, clean collecting container for each patient; avoid splashing, and prevent contact of the drainage spout.
- Maintain unobstructed urine flow by keeping the catheter and tube free from kinking.
- Maintain a closed drainage system.
- If breaks in the closed system are noted (e.g., disconnection, cracked tubing), replace the catheter and collecting system following above IUC insertion checklist.
- Perform perineal hygiene at a minimum, daily and PRN.
- Use timely fecal containment device when appropriate for fecal incontinence.
- Teach patient/family Foley maintenance and UTI signs and symptoms