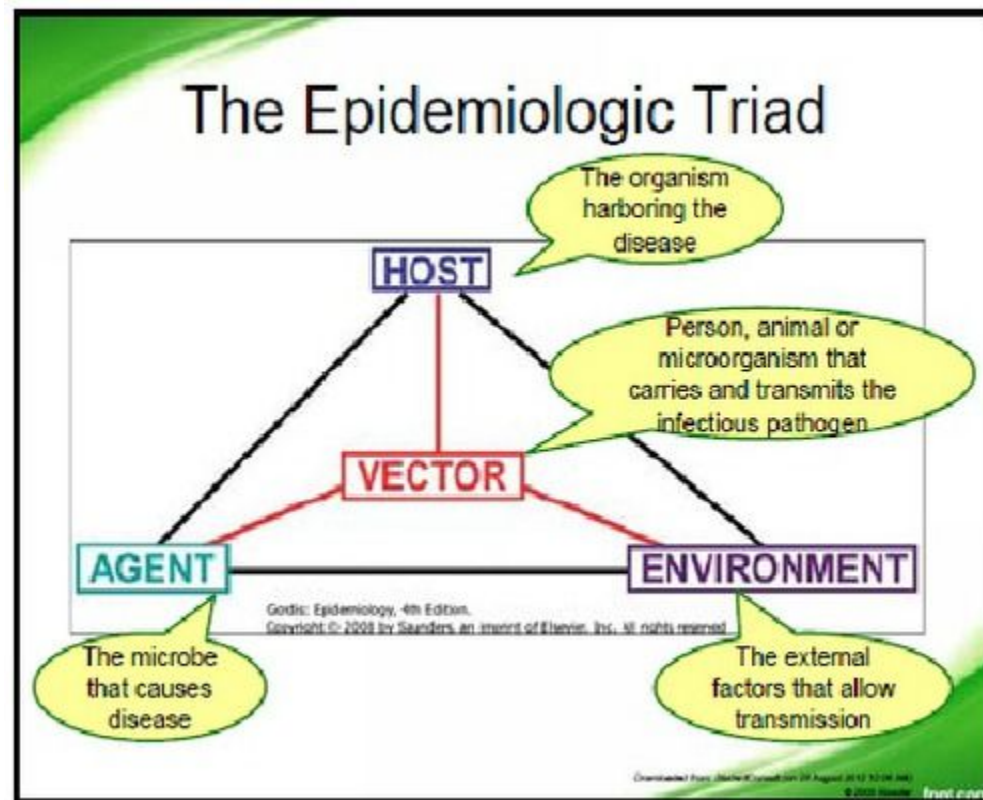




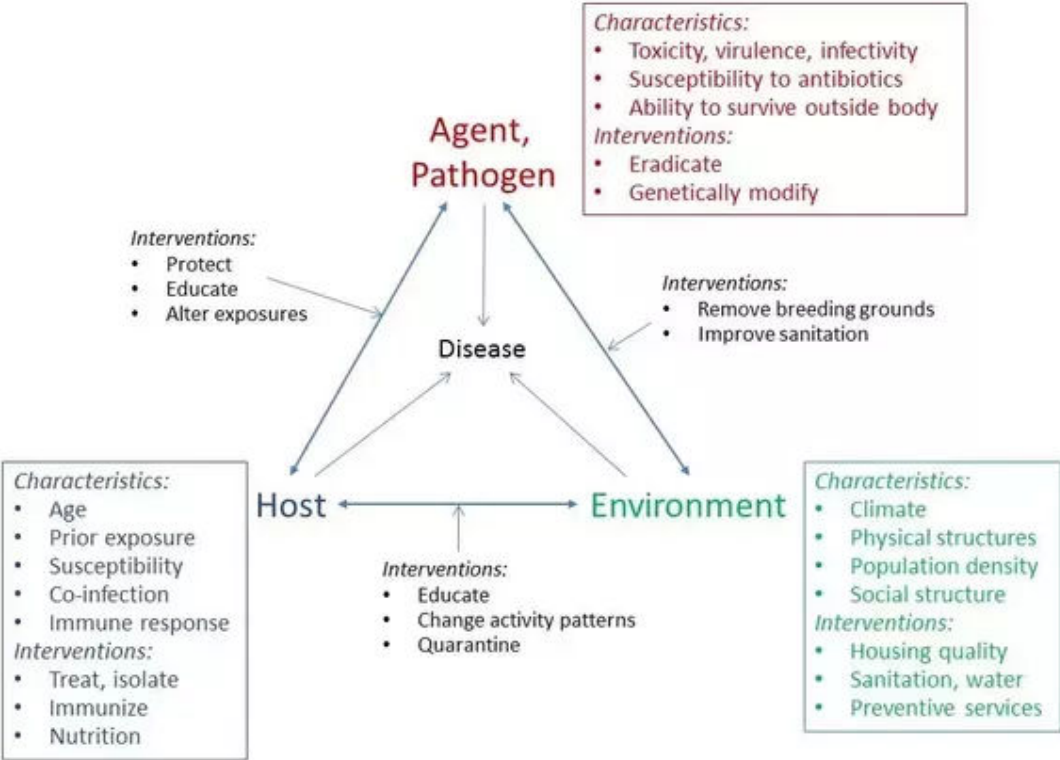
# INFECTION CONTROL

## DISEASE CAUSATION TRIAD MODEL



# INFECTION CONTROL

## DISEASE CAUSATION TRIAD MODEL





- Factor that must be present for disease to occur:
  - Bacteria
  - Fungi
  - Virus
  - Parasite
  - Prion
  - Heat
  - Light
  - Radiation
  - Dangerous/Sharp object

# INFECTION CONTROL HOST

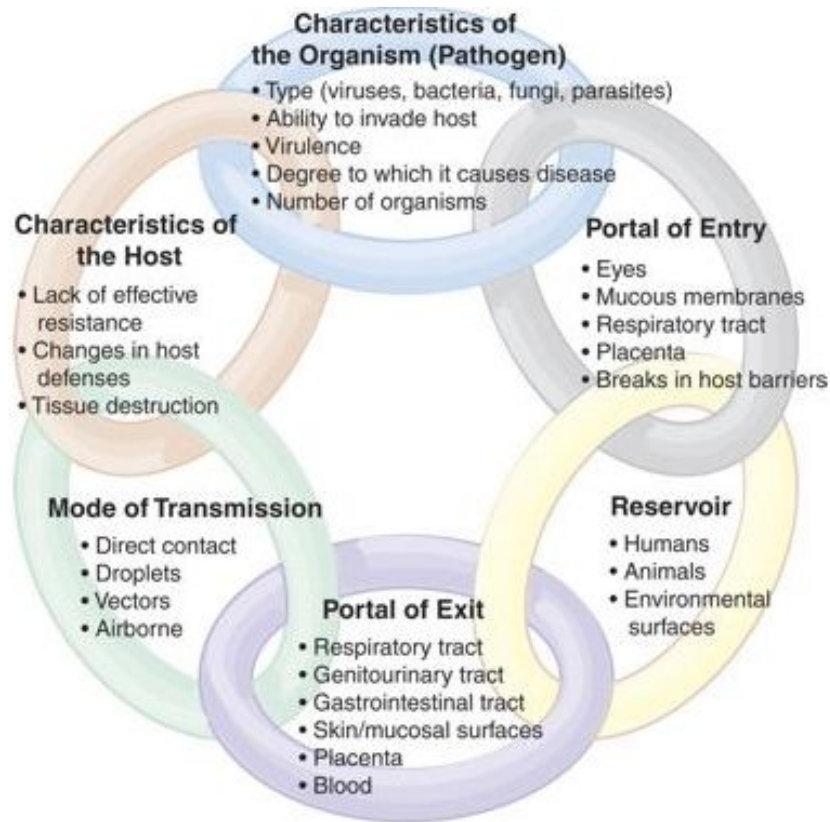
- Host factors promoting infection::
  - Sex
  - Age
  - Health status
  - Immune status
  - Lifestyle/travel
  - Socioeconomic status
  - Nutrition status



# **INFECTION CONTROL ENVIRONMENT**

- **External factors surrounding the host:**
  - Food and water
  - Physical living space: hospital, prison, school...
  - Social interactions
  - Natural disasters
  - Man made disasters





# INFECTION CONTROL CHAIN OF INFECTION



# INFECTION CONTROL

- **CHAIN OF INFECTION** Example – Influenza
  - **Pathogenic Microorganism:** Influenza virus
  - **Reservoir:** Pt infected with the flu
  - **Means of Escape:** Cough, sneeze and respiratory secretions
  - **Mode of Transmission:** Droplets, contaminated hands/surfaces
  - **Means of Entry:** Inhalation, touching mucous membranes
  - **Host Susceptibility:** No immunity to Influenza virus (did not receive annual Influenza vaccine), decreased immune system, elderly or very young





**INFECTION CONTROL**  
**HOW TO PREVENT**  
**INFECTION**



# HEALTHCARE ASSOCIATED INFECTION (HAI)

- Occur when a patient comes to a healthcare facility and acquires a new infection during his/her care, for example:
  - Surgical Site Infection (SSI)
  - Central Line Associated Bloodstream Infection (CLABSI)
  - Ventilator Associated Pneumonia (VAP)
  - Catheter Associated Urinary Tract Infection (CAUTI)

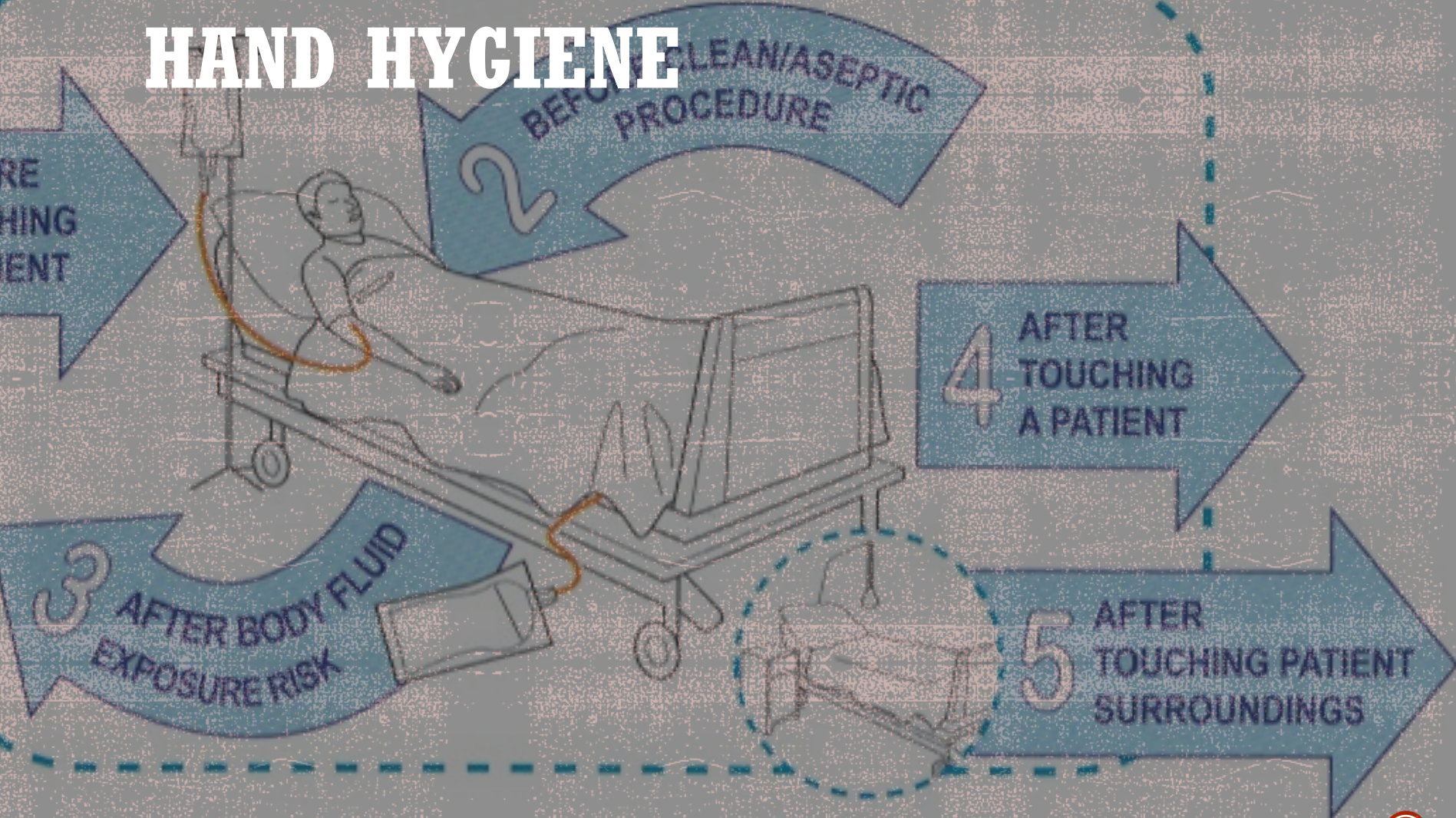


- Hand hygiene
- Personal hygiene
- PPE usage
- Good practices in disinfection
- Management of medical waste
- High level Disinfection and sterilization
- Hospital environment cleaning
- Good antibiotic practices
- Surveillance of hospital infections
- Isolation precautions
- Prevention of catheter / line / SSI infections

# **INFECTION CONTROL HOW TO PREVENT INFECTION**

# Your 5 moments for HAND HYGIENE

## INFECTION CONTROL HAND HYGIENE



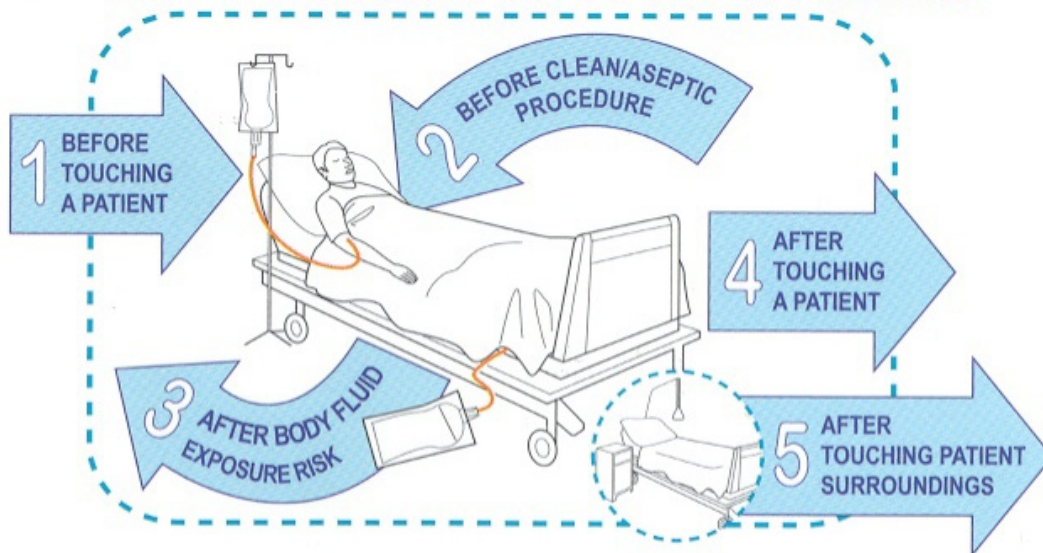
Based on WHO poster 'Your 5 Moments for Hand Hygiene' and reproduced with their kind permission



# INFECTION CONTROL

## HAND HYGIENE

### Your 5 moments for HAND HYGIENE



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

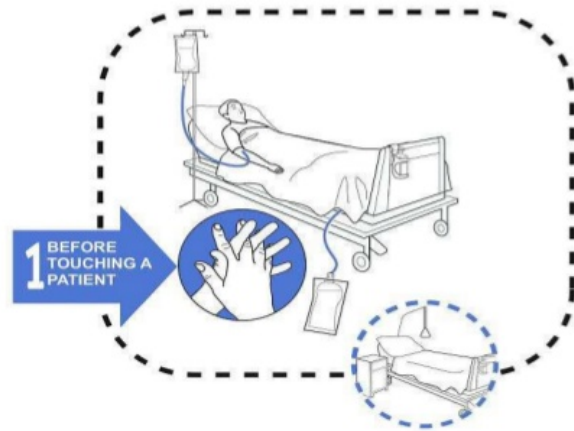
- **#1 method**
- **To**
- **Reduce**
- **The**
- **Spread**
- **Of**
- **infection**



# INFECTION CONTROL

## HAND HYGIENE

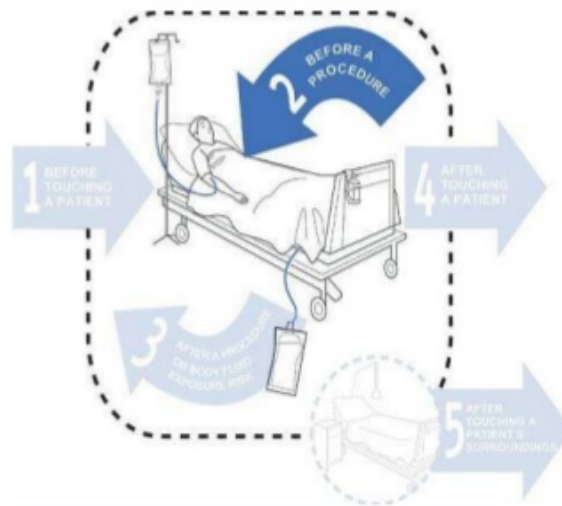
### Moment 1 Before touching a Patient



# INFECTION CONTROL

## HAND HYGIENE

### Moment 2 – Before A Procedure



Prevented negative outcome:  
Patient infection,  
endogenous/exogenous

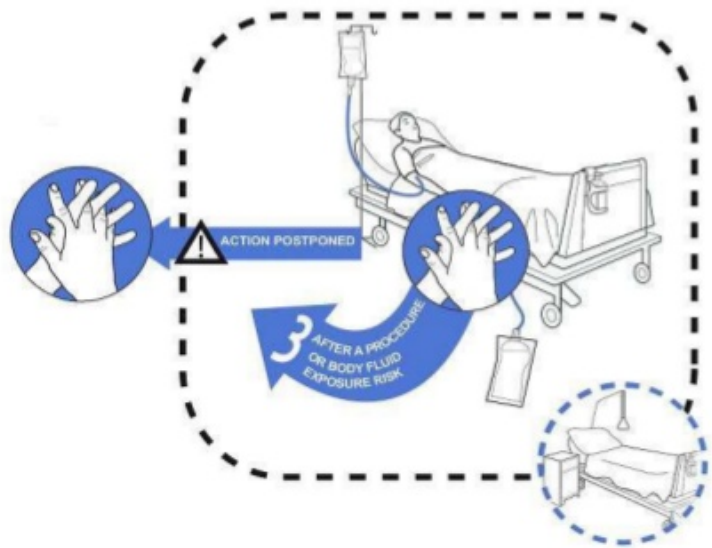
HCWs generally touch  
another surface within  
the patient zone before  
contact with a clean site



# INFECTION CONTROL

## HAND HYGIENE

### Moment 3 After a Procedure or Body Fluid Exposure Risk

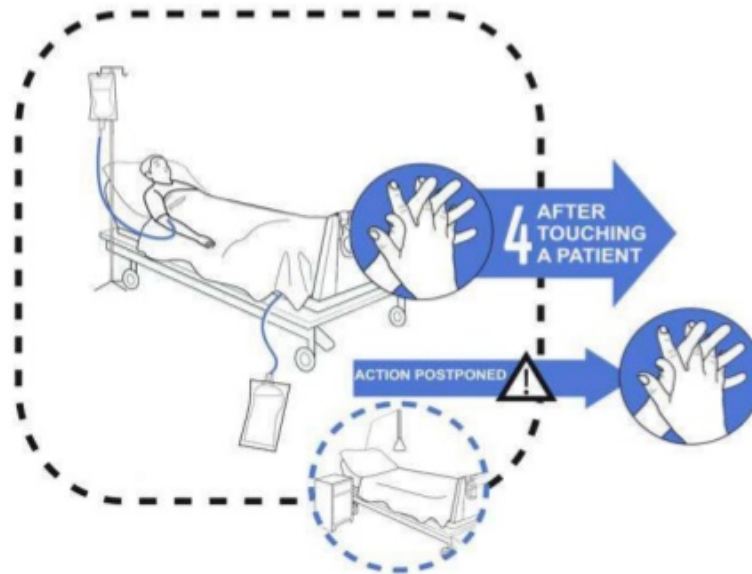




# INFECTION CONTROL

## HAND HYGIENE

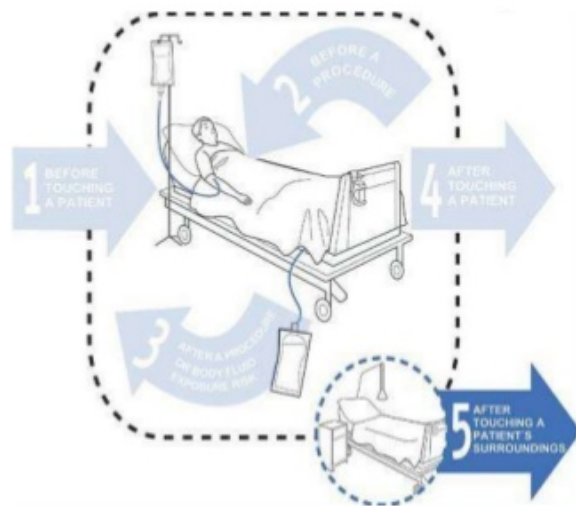
### Moment 4 After Touching a Patient



# INFECTION CONTROL

## HAND HYGIENE

### Moment 5 – After Touching A Patient's Surroundings



Prevented negative outcome:

Healthcare worker colonisation, environmental contamination

Minimises dissemination to healthcare environment



Hand Hygiene Australia

[www.hha.org.au](http://www.hha.org.au)

AUSTRALIAN COMMISSION ON  
SAFETY AND QUALITY IN HEALTHCARE



# HAND HYGIENE

## *WHEN TO USE SOAP & WATER VS. SANITIZER*



### Hand Hygiene with Soap & Water is Required:

- Before eating
- After using the restroom
- Anytime hands are visibly soiled
- After caring for patients with spore producing organisms (For example: *Clostridium difficile*)
- When there is significant build-up of waterless hand sanitizer



## **HAND HYGIENE**

### ***WHEN TO USE SOAP & WATER VS. SANITIZER***

#### **Hand Hygiene with sanitizer:**

When hands are clean but  
need disinfection

After glove removal


In between patient care

When hands are clean some  
has past since last  
disinfection



# How to Handwash?

WASH HANDS WHEN VISIBLY SOILED! OTHERWISE, USE HANDRUB

 Duration of the entire procedure: 40-60 seconds



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 hands thoroughly with a single use towel;



Use towel to turn off faucet;



Your hands are now safe.

# INFECTION CONTROL

# HAND HYGIENE



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SAVE LIVES  
Clean Your Hands

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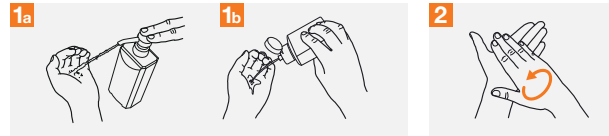
May 2009



# How to Handrub?

RUB HANDS FOR HAND HYGIENE! WASH HANDS WHEN VISIBLY SOILED

🕒 Duration of the entire procedure: 20-30 seconds



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



Rub hands palm to palm;



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



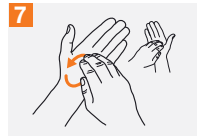
Palm to palm with fingers interlaced;



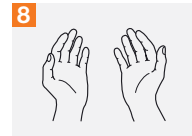
Backs of fingers to opposing palms with fingers interlocked;



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;



Once dry, your hands are safe.

# INFECTION CONTROL HAND HYGIENE



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May 2009



# HAND HYGIENE AND GLOVES

- Gloves should be worn if contact with blood and body fluids is anticipated, but are not a substitute for hand hygiene
  - Hand hygiene Before and After contact
- Gloves must be disposed of after each use
- Dispose of gloves before exiting the room
- Hands should be washed after disposal of gloves



# HOW TO PREVENT HCAI AND MDRO?

## **#1 - STOP HAND transmission!!!**

Principles of Hand Awareness.

We spread infection when we do not wash hands and we use:

- Our cellphones
- Hospital phones
- Keyboard
- Share medical devices/equipment
- Door knobs, hand rails, light switches.....





# HAND AWARENESS

- **Knowing** what your hands are doing **AT ALL TIMES.**
- Hand Transmission is the integration of
  - **Hand Hygiene,**
  - **Respiratory Etiquette and**
  - **cross-contamination awareness**









# WHAT ARE THE TEN DEADLIEST WEAPONS ?

Our fingers and thumbs



# HAND HYGIENE

- Mucosal membranes 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, or touching your mouth.
- This is the Easiest way to get colonized and become a source for the spread infection.



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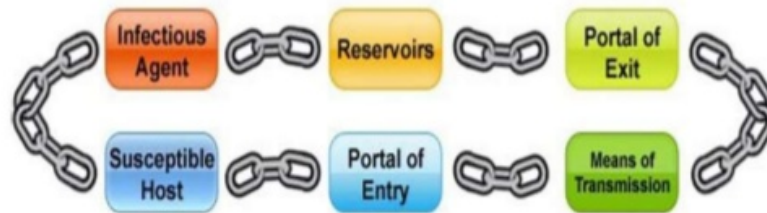
www.hospitalnews.com

**DEVELOP THE HABIT OF**  
***WASHING YOUR HANDS WHEN***  
***ENTERING AND LEAVING***  
***THE HOSPITAL***

# INFECTION CONTROL

## UNIVERSAL PRECAUTIONS - PPE

### Chain of Infection



Standard Precautions breaks the chain of infection thus minimizing transmission of infection within the Healthcare environment.





# INFECTION CONTROL

## UNIVERSAL PRECAUTIONS - PPE

### Types of PPE Used in Healthcare Settings



• GLOVES – protect hands



• GOWNS/ APRONS – protect skin and/or clothing



• MASKS and RESPIRATORS – protect mouth/nose

RESPIRATORS – protect respiratory tract from airborne infectious agents.



• GOGGLES – protect eyes



• FACE SHIELDS – protect face, mouth, nose, and eyes



<http://www.cdc.gov/HAI/prevent/ppe.html>

4

### Standard Precautions

Treat all blood & body fluids as though potentially infectious; Apply to all patients to protect yourself from BBP

Perform hand hygiene before and after patient care.



If touching blood, body fluids, secretions, excretions, and/or contaminated items is likely, wear gloves.



If sprays/splatters are possible, add a gown and fluidshield mask with eye protection.



# **INFECTION CONTROL**

## **DISINFECTION**

- No disinfectant is a substitute for:
  - Hand washing
  - Use of PPE
  - Appropriate handling of equipment / soiled linens
  - Environment cleaning
  - Waste management

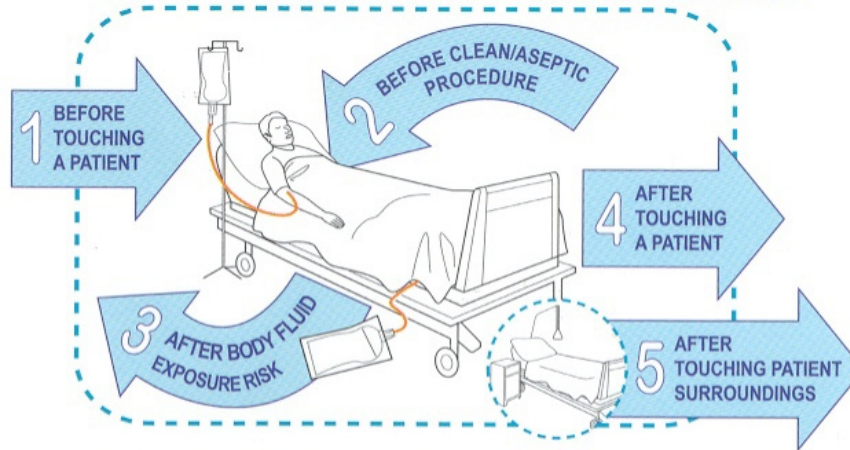


# HAND AWARENESS

## TO REDUCE MDRO SPREAD



### Your 5 moments for HAND HYGIENE



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



# INFECTION CONTROL

## DISINFECTION

- Disinfectants are substances that are:
  - Applied on non-living objects
  - To destroy the living micro-organisms living on it
- Disinfectants often do not kill all micro-organism types
- Disinfect:
  - patient care equipment before and after use
  - High contact surfaces frequently
  - When in doubt



# INFECTION CONTROL

## ISOLATION





- If a contagious infection is identified **ISOLATE** the patient as soon as possible.
- Restrict access / traffic to the patient
- Determine what type of isolation is required:
  - Contact
  - Droplet
  - Airborne
- Label the room with the correct sign and precaution instructions
- Initiate Isolation Precautions – see next slide



# INFECTION CONTROL

## ISOLATION

# ISOLATION PRECAUTIONS




CONTACT PRECAUTIONS	AIRBORNE PRECAUTIONS	DROPLET PRECAUTIONS
<p>To prevent the spread of infection,</p> <p><b>ANYONE* ENTERING THIS ROOM <u>MUST</u> WEAR:</b></p> <ul style="list-style-type: none"><li> <b>Gloves ✓</b></li><li> <b>Gown ✓</b></li></ul> <p><small>Applies whether or not contact with the patient or the patient's environment is anticipated.</small></p> <p><small>*Patient visitors do not need to wear gloves and a gown, but must <u>wash hands</u> upon entering and leaving this room.</small></p> <p><small>IKH Infection Control Department</small></p>	<p>To prevent the spread of infection,</p> <p><b>ANYONE* ENTERING THIS ROOM <u>MUST</u> WEAR:</b></p> <ul style="list-style-type: none"><li> <b>N-95 Respirator ✓</b></li></ul> <p><small>Also ensure that the <u>door</u> to the patient's room <u>remains closed at all times</u>.</small></p> <p><small>*Patient visitors should wear a blue surgical mask while in the patient's room.</small></p> <p><small>IKH Infection Control Department</small></p>	<p>To prevent the spread of infection,</p> <p><b>ANYONE ENTERING THIS ROOM <u>MUST</u> WEAR:</b></p> <ul style="list-style-type: none"><li> <b>Surgical Mask ✓</b></li></ul> <p><small>N-95 Respirators should <u>not</u> be used for personal protection of patients in droplet precautions.</small></p> <p><small>IKH Infection Control Department</small></p>



# TRANSMISSION BASED PRECAUTIONS

## Transmission Based Precautions

Apply to patients who are known/suspected to be colonized/infected with multidrug resistant organisms (MDROs) and other epidemiologically significant organisms **STANDARD PRECAUTIONS STILL APPLY**

<p><b>Contact Precautions</b></p> <p>For organisms spread by contact (MRSA, VRE, or <i>C. difficile</i>)</p>	 <p>Hand hygiene, gloves and gown required</p>
<p><b>Droplet Precautions</b></p> <p>For organisms spread by droplets (Influenza or RSV)</p>	 <p>Hand hygiene, gloves, fluidshield mask with eye shield and gown required</p>
<p><b>Airborne Precautions</b></p> <p>For organisms spread by air (Tuberculosis, Measles or Shingles/Chickenpox)</p>	 <p>Hand hygiene and PAPR or fit-tested N95 required</p>



# INFECTION CONTROL ISOLATION

## DISEASE-SPECIFIC ISOLATION RECOMMENDATIONS

### Standard Precautions

- CMV
- HIV
- Hepatitis B and C
- Aspergillosis

### Contact Precautions

- MRSA (mask if respiratory infection)
- VRE
- Adenovirus
- Diarrhea
- C. Difficile
- Rotavirus
- E coli 0157
- Enterovirus
- Salmonella
- Shigella
- Hepatitis A
- Herpes Zoster (shingles, localized)
- Herpes simplex
- Parainfluenza (mask if coughing)
- RSV (mask if productive cough)
- Lice
- Scabies
- Chicken pox (symptomatic, until all lesions crusted and dried)

### Droplet Precautions

- Pertussis
- Influenza A or B
- MRSA (respiratory infection)
- Neissera meningitides (suspected or confirmed)
- Coxsackie
- Bacterial meningitis (for 24 hours after effective antibiotic therapy)
- RSV (droplet and contact)
- Mumps
- Rubella

### Airborne Precautions

- Chicken pox
- Disseminated herpes zoster (shingles)
- Measles
- N-95 Mask:**
  - Tuberculosis
  - SARS
  - Avian influenza





# **INFECTION CONTROL**

## **BASIC ACTIONS**

- 1. Cover coughs and sneezes** (everyone, always)
- 2. Maintain Distance / separation** (everyone, always)
- 3. Hand hygiene before and after interaction** (everyone, always)
- 4. Wear Personal protective equipment (PPE)** (staff)



# INFECTION CONTROL

## BASIC ACTIONS

- 1. Cover coughs and sneezes**  
(everyone, always)
- 2. Maintain Distance / separation** (everyone, always)
- 3. Hand hygiene before and after interaction** (everyone, always)
- 4. Wear Personal protective equipment (PPE)** (staff)

### Respiratory Etiquette

- Cough or sneeze into your sleeve
- Stay Home if you have Upper Respiratory Illness (URI) and Fever
- If You Have URI and No Fever, wear a Mask for patient care
- Practice good hand hygiene
- Stay up to date on influenza vaccination



# INFECTION CONTROL

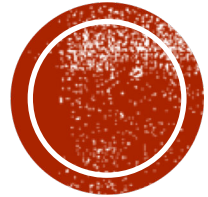
## BASIC ACTIONS

### Control Infection spread at the Source

**Control the source of infection** – the sick person/patient

**Limit the person from spreading the infection** - A person/patient should cover mouth and nose, if possible with a mask or scarf, when in close contact with other people





# 5 BASIC STEPS FOR ALL CAREGIVERS

# 1. Clean your hands (Hand Hygiene).

- Use soap and warm water. Rub your hands really well for at least 15 seconds.
- Or, if hands not dirty, clean them with alcohol-based hand sanitizers – cover all surfaces of hand.
- Clean your hands before touching or eating food.
- Clean them after you use the bathroom, touch a patient, care for a patient.
- Clean your hands before putting gloves on and after removing



## **2. Wear PPE.**

- wear PPE
- always wash hands after glove removal



### **3. Cover your mouth and nose.**

- Many diseases are spread through sneezes and coughs.
- When you sneeze or cough, the germs can travel 3 feet or more!
- Use a tissue!
- If you don't have a tissue, cover your mouth and nose with the bend of your elbow or hands. If you use your hands, clean them right away.



#### **4. If you are sick, avoid close contact with others.**

- If you are sick, stay away from other people or stay home.
- Don't shake hands or touch others.





## 5. Get vaccinated

### Available vaccinations:

- Chicken pox
- Measles
- Tetanus
- Shingles
- Flu (also known as influenza)
- Whooping cough (also known as Pertussis)
- German measles (also known as Rubella)
- Pneumonia (*Streptococcus pneumoniae*)
- Human Papillomaviruses (HPV)
- Mumps
- Diphtheria
- Hepatitis
- Meningitis

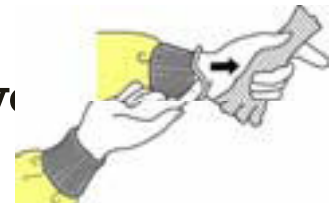


# Removing Gloves

- Grasp outside edge near wrist from inside
- Peel away from hand, turning glove inside-out
- Hold in opposite gloved hand



- Slide ungloved finger under the wrist of the remaining glove
- Peel off from inside, creating a bag for both gloves



- Discard
- Wash hands



# Gloves

- Gloves should be worn if contact with blood and body fluids is anticipated, but are not a substitute for hand hygiene
  - Hand hygiene Before and After contact
- Gloves must be disposed of after each use
- Dispose of gloves before exiting the room
- Hands should be washed after disposal of gloves





Bacterial growth on a RN after glove removal

