

# Infection control and waste management



# Outline

- What is infection control?
- Why Infection control is important?
- What is the organizational structure of infection control in hospitals?
- What are infection control measures?
  - Standard precautions
  - Additional precautions
  - Disinfection and sterilization
  - Waste management
  - Infection control in HCW



It may seem a strange principle  
to enunciate as the very first requirement  
of a hospital  
that it do the sick no harm



**Florence Nightingale, Notes on Hospitals, 1863**



# History: Ignaz Semmelweis

- At the Vienna Lying-in Hospital
  - Women who delivered on the street had less risk of developing puerperal fever
  - Much higher risk of puerperal fever in women delivered by physicians or medical students as opposed to those delivered by midwives
- Required that hands be washed with chlorinated lime after autopsies & between exams of pregnant women
  - Maternal mortality decreased from 18% to 3%



# Infection Control?



- Infection control is a series of procedures and guidelines to
  - **prevent health care associated infections (HAI)**
- **Provide a safe working environment**
  - **For patients**
  - **For HCW**



# Organization structure of infection prevention and control in hospital

- 3 tiered structure
  - Infection Control Committee (ICC)
  - Infection Control Team (ICT)
  - Infection control Practitioners



# Infection control committee

- Administration (Director, AO)
- Finance (accountant)
- ICT
- clinical staff (consultants from each discipline)
- senior nursing staff (matron and senior nurses)
- health education staff
- occupational health staff
- PHI and Overseer



# Infection control team

- Microbiologist (if available)
- Infection Control Medical Officer (if available)
- Infection Control Nurses
- Liaison nurses





# Infection control measures

- Standard Precautions
- Additional Precautions
- Aseptic technique
- Surveillance of HAI
- Reporting and notification
- Education and training
- Policies and guidelines
- Audits and feedback



# Standard precautions

- A set of guidelines to reduce the transmission of HAI through blood and body fluids
- Used by ALL health care workers at ALL times when attending to ALL patients
  - Designed to reduce the risk of transmission of microorganisms from both recognized and unrecognized sources of infection in hospitals
  - For practical purposes, standard precautions mean assuming that every person's blood and body fluids are infectious for HIV, HBV, and other blood borne pathogens.
  - Apply to all patients at all times by all HCW regardless of diagnosis or infectious status



# To which body fluids do Standard Precautions apply?

- Blood - very important source for HIV, HBV, HCV
- Body fluids
  - Cerebrospinal fluid
  - Peritoneal fluid
  - Synovial fluid
  - Pleural fluid
- Mucous membranes – oral cavity, eyes etc..
- Secretions - saliva, sputum, tears, nasal, genital secretions
- Excretions- vomitus, faeces, sweat, urine
- Non-intact skin



# What are included in Standard precautions?

1. Hand hygiene
2. Personal protection
  - Use of barriers / PPE (Gloves, gown, cap, mask)
  - Proper handling and discarding of sharps
3. Instrument sterilization and disinfection
4. Environmental infection control
  - Disinfection of environmental surfaces
  - Linen
  - Waste handling and disposal
5. Respiratory hygiene and cough etiquette



# Hand washing

- Hands are the most common vehicle for microbial transmission
  - Reduces number of potential infectious agents on the hands
  - Reduce the incidence of infectious agents in healthcare facilities
- Most important preventive measure
- Hand washing facilities
  - Use separate sinks for washing and rinsing purposes
  - Place towels next to the wash basin (single use towels)
  - Display a poster showing the steps of hand washing



# Alcohol hand rub

- can be used to disinfect the hands
- should not be used if hands are visibly soiled.
- Hand rubbing (20–30 sec): apply enough product to cover all areas of the hands; rub hands until dry.



## How to Handrub?

RUB HANDS FOR HAND HYGIENE! WASH HANDS WHEN VISIBLY SOILED

Duration of the entire procedure: 20-30 seconds



# Key points in hand hygiene

- Indications for glove use do not modify any indication for hand hygiene
  - Glove use **should not replace** any hand hygiene action



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# Personal protective equipment (PPE)

- These are gadgets/equipment designed to protect the skin and the mucous membranes of the eyes, nose, and mouth of oral health worker from exposure to blood or other potential infectious material
- Include
  - Gloves
  - Masks
  - Gowns/ coat/ apron
  - Eye shield/ goggles





# Gloves

- Always wear gloves
  - when touching mucous membrane, blood, saliva or other potentially infectious material
  - before touching non-contaminated items and surfaces
  - before going to another patient
- Should be changed between patients or when they are torn or punctured and after contact with potentially infectious material.
- Gloves are not a substitute for hand washing
- Perform hand hygiene before wearing the gloves, after removing the gloves, between patients and before leaving the surgery



# Don'ts

- ✗ Don't touch your face or adjust PPE with contaminated gloves
- ✗ Don't touch environmental surfaces except as necessary during patient care
- ✗ Never wash or reuse disposable gloves



# Gown/ Apron

- Wear a gown to protect the skin and to prevent soiling of clothing during dental procedures to protect from splashes or sprays of blood, body fluids, secretions or excretions.
- change protective clothing when it becomes visibly soiled



# Masks

- The mask should be a standard surgical splash proof mask and not a gauze mask.
- The mask's outer surface can become contaminated with infectious droplets from spray of oral fluids or from touching the mask with contaminated hands



# Goggles/ Eye sheild

- Should be worn when there is risk of splash or spilling of blood or body fluids.



# Sequence for Donning PPE

- ✓ Gown first
- ✓ Mask
- ✓ Goggles or face shield
- ✓ Gloves



# Sequence for Removing PPE

- ✓ Gloves
  - ✓ Hand hygiene
  - ✓ Face shield or goggles
  - ✓ Gown/ apron
  - ✓ Mask or respirator
  - ✓ Cap if worn
  - ✓ Hand hygiene
- 
- All protective clothing should be removed before leaving the work area



# Respiratory Hygiene

## Cough & Sneeze Etiquette



- Covering mouth and nose when sneezing or coughing
- Use tissues, use once and dispose into a rubbish bin
- Perform hand hygiene



# Other IC measures

- Additional / transmission based precautions
- Occupational health
  - Vaccination
  - Post-exposure prophylaxis
- Aseptic technique
- Surveillance , Reporting and notification
- Education and training



# Transmission-based precautions

Measures practiced in addition to standard precautions that are based on the confirmed or suspected presence of a specific communicable disease, and the mode(s) of transmission of that disease

- contact
- droplet
- airborne



# Contact transmission

- Direct: person to person by physical contact
- Indirect: person to intermediary object to person
  - hands
  - contaminated items, equipment, surfaces
- MDROs (Ex. MRSA)
- Diarrhoea
- SSTIs
- Chicken pox



# Contact precautions

- Physical separation of infectious persons (exclusion from work, school, daycare, social settings, crowded areas)
- Individual room for the patient, if available
- When single room is not available cohorting with spatial separation of equal or more than 3 feet with a curtain between two patients
- hand hygiene
- Use of PPE
  - Gown, gloves
- Cleaning/disinfection of environment/contaminated equipment and surfaces/patient care items



# Droplet transmission

- large particle droplets (5microns or greater) come in contact with mucous membranes (eyes, nose, mouth)
- occurs during coughing, sneezing, talking, performing suctioning or bronchoscopy
- droplets travel approx. 3 feet, then fall
- Diseases spread by droplet transmission
  - pertussis
  - influenza
  - mumps



# Droplet precautions

- Physical separation of infectious persons (exclusion from work, school, daycare, social settings, crowded areas)
- Individual room for the patient, if available
- When single room is not available cohorting with spatial separation of equal or more than 3 feet with a curtain between two patients
- Use of PPE
  - Splash proof surgical mask



# Airborne transmission

- Droplets evaporate into droplet nuclei (less than 5 microns) that can spread via air currents for up to 25 feet
- Requires special air handling

- Diseases spread by airborne transmission
  - TB
  - measles
  - Chicken pox



# Airborne precautions

- No shared air
  - negative pressure rooms: 6-12 air exchanges/hour, exhaust directly to outside or filtered first, or use of portable HEPA filtration units/ or rooms with 2 exhaust fans
- Donning PPE upon room entry and discarding them into yellow bin before leaving
- Staff should wear high-efficiency masks (eg. N95) before entering the room
- Patient should be confined to the room:-





# Infection control in HCW

- Vaccination
- Post exposure prophylaxis
- Training and education



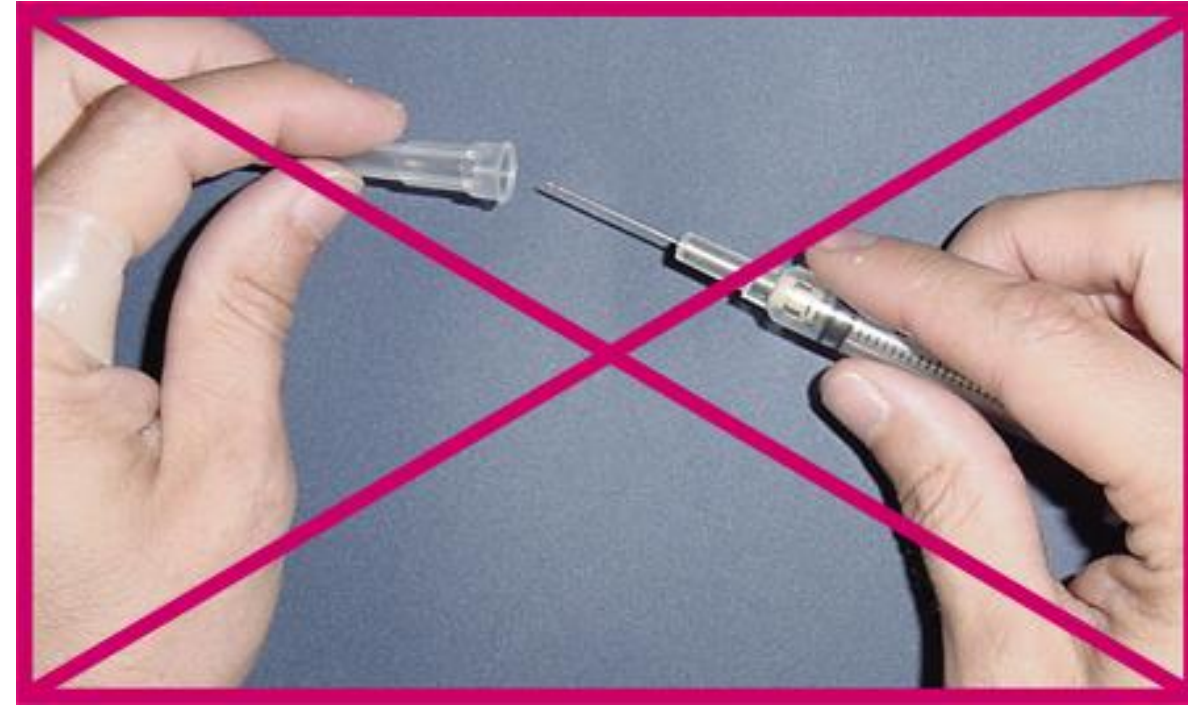
# Vaccination of HCW

- Hep B vaccine
  - 3 doses
  - anti-HBs levels should be tested 1-2 months after completion of the 3 dose vaccination series
    - anti-HBs  $>10\text{mIU/m}$  - responders
    - anti-HBs  $<10\text{mIU/m}$  – another course (3 doses) → check Abs
- Other useful vaccines
  - Rubella vaccine
  - Chickenpox (VZV) vaccine
  - Influenza



# Handling sharps

- Prevent injuries when using burs, needles, scalpels and other sharp instruments.
- Recapping should be avoided
- All sharps are disposed to a sharps bin
  - Dispose of the sharp container when it is  $\frac{3}{4}$  full.
  - Never let the sharp bin fill up more than  $\frac{3}{4}$  full.



# Work practices that increase the risk of a sharps injury

- Recapping needles
- Leaving used needles on the instrument tray
- Transferring a body fluid between containers
- Failing to dispose of used sharps properly in a puncture-proof sharps container



# Occupational Exposures

- Caused by burs, syringe needles, other sharps
- Allow the wound to bleed
- Wash wound and skin with soap and water
- Flush mucous membranes with water
- Irrigate eyes with clean water



# Occupational Exposures

- Contact infection control unit for immediate treatment and counseling
- Hep B vaccination history and vaccine response
- Collect a baseline serum sample from HCW
  - Anti-HIV Ab
  - Anti-HBs Ab
- Documentation of the injury
  - Source blood tested for
    - HIV Abs (STD campaign)
    - Hep B surface antigen
    - Hepatitis C Ab



# Occupational Exposure

- The risk of infection after percutaneous injury is approximately

Hepatitis B	30%
Hepatitis C	3%
HIV	0.3%



# Post-exposure prophylaxis (PEP)

- HIV
  - Anti-HIV treatment
- Hep B
  - According to the immune status of the HCW
  - Type of source





# Safe injection practice



- Never administer medications from the same syringe to more than one patient, even if the needle is changed with a new needle
- Never enter a medication vial, bag, or bottle with a used syringe or needle
- Never use medications packaged as single-dose or single-use for more than one patient
- Never use bags or bottles of intravenous solution as a common source of supply for more than one patient.



# Steps in Healthcare Waste Management

- Waste minimization
- Waste identification/segregation
- Handling and collection
- On-site transport and storage
- Treatment and disposal



# Waste

## Hazardous Waste




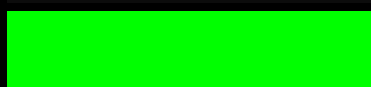



- Waste contaminated with biological chemical and/or other hazardous material
  - Infectious Waste
  - Pathological Waste
  - Sharps
  - Pharmaceutical Waste
  - Chemical Waste
  - Radioactive Waste

## Non-hazardous waste

- Waste that is not contaminated with blood, body fluids, or other infectious agents or materials
  - Paper
  - Packaging
  - Food Waste



# Waste identification

Infectious waste – Yellow	
Sharp waste – Yellow with a red stripe	
General waste – Black	
Biodegradable waste – Green	
Glass waste – Red	
Paper waste – Blue	
Plastic waste – Orange	



# Infectious Waste Containers

- Ideal infectious waste containers are those that have
  - Lids that remain closed except when waste is discarded
  - Pedal-operated devices to open the lids
  - Color-coded bags inside the containers



# Waste treatment

- Infectious waste
  - Incineration
  - Autoclave
  - Deep burial
- Sharps
  - Incineration
  - Burn in a deep pit
  - Autoclave and shred



# Management of a spillage of blood and body fluids

- Wear heavy duty
- Soak up fluid using absorbent material (paper towels, gauze, wadding)
- Pour 1% hypochlorite solution till it is well soaked. Leave for at least 10 minutes
- Remove the absorbent material and discard as clinical waste
- Clean area with detergent and dry
- Discard gloves as clinical waste
- Wash hands

