

Sterilization and Chemical Disinfectants

REDUCING MICROBIAL LOAD

- Sterilization.
- High Level Disinfection
- Disinfection
- Cleaning

CLEANING

- The Removal of Soil and Organic Material from items and Objects

DISINFECTION

The Removal or Destruction of Harmful Micro-organisms but not bacterial spores

STERILIZATION

The Complete destruction or Removal of all Living micro-organisms including bacterial spores

Classification of Infection From Equipment and Environment and suggested level of Decontamination

- **Low Risk**

Items in contact with :

- A) Normal and Intact Skin.
- B) Inanimate objects which do not come in contact with the patient.
(i.e. walls, floors, ceilings and furniture)

- **Low Risk**

⇒ Cleaning and drying is usually adequate

- **Intermediate Risk**

Equipment which

- A) Does not penetrate the Skin.
- B) Does not enter sterile areas of the body.

BUT comes in contact

- A) With mucous membranes
- B) Non intact skin
- C) Other items contaminated with virulent or transmissible organisms (e.g. respiratory equipment, thermometers, endoscopes)

■ **Intermediate Risk**

⇒ Cleaning followed by Disinfection is usually adequate

■ **High Risk**

Items Penetrating

- A) Sterile Tissues.
- B) Body Cavities.
- C) Vascular System
(i.e. venflons, central lines, catheters, drainage tubes)

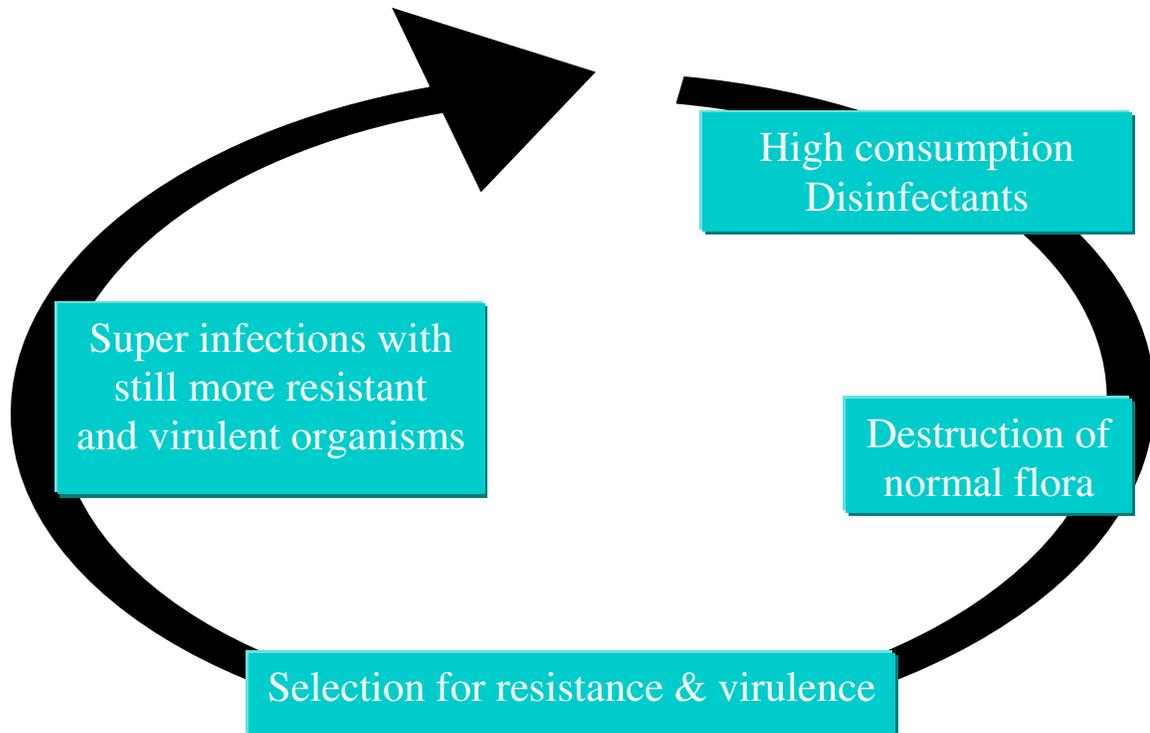
■ **High Risk**

⇒ Disinfection followed by Sterilization is required. High level Disinfection may sometimes be appropriate if sterilization is not possible

Sources of infection in ICU

- Endogenous flora
- Nosocomial flora
- Cross infection from other patients
- Technical equipment
 - ◆ ventilators
 - ◆ humidifiers, etc
- Tap water and other environmental sources

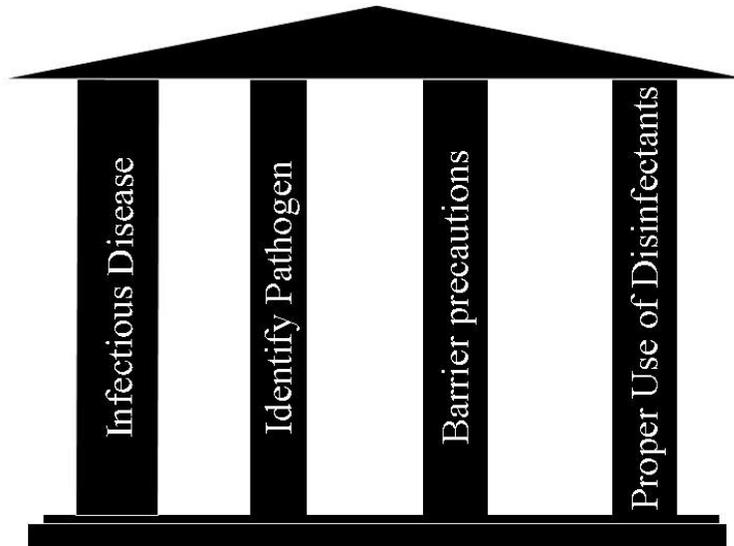
The vicious circle



Why can spread of resistant organisms in hospitals not be controlled by traditional infection control measures?

- Infectious inoculums extremely small in predisposed patients
- Effectiveness of hand Disinfection and isolation procedures is often hampered by compliance problems

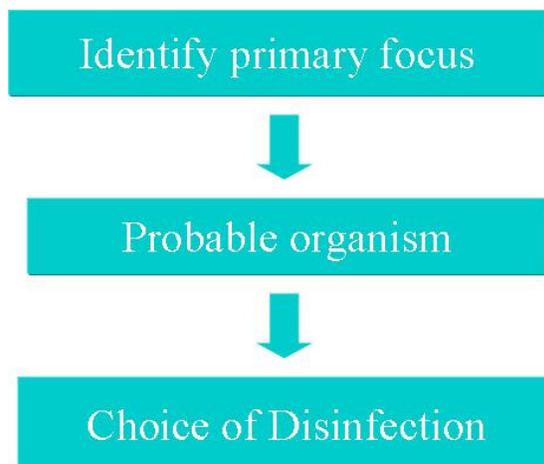
Important infection control measures



The critically ill patient

- Septicaemia of unknown origin is no proper basis for empirical antibiotic therapy
- Impossible to cover the patient against all possible pathogens
- Solution:
Establish a working hypothesis as basis for empirical therapy

Creating a working hypothesis as basis for empirical therapy



How is therapy evaluated ?

- When is Disinfection is still indicated?
- If yes, choose the disinfected with:
 - ◆ best clinical effect
 - ◆ best ecological profile
 - ◆ lowest toxicity
 - ◆ lowest cost prize

Abuse in Cleaning and Disinfection

- Effect on infection morbidity
- Occupation Health Hazard
- Emergence of resistant bacteria
- Cost-effectiveness

Bleach (Presept Tabs, Milton)

- Has a very good effect on viruses and bacterial by a strong oxidising effect.
- Does not become deactivated when comes in contact with organic material.
- Can be used for spillages and surface decontaminations of heavily soiled equipment.
- Can irritate the skin and be corrosive for certain equipment.
- Preparations are in tablet form (dissolved in water) and Granules.

Iodine Preparation

- Wide range of bacterial, virucidal and fungal activity.
- Inactivated by organic matter.
- Useful for skin preparation prior insertion of peripheral lines.
- Preparation both in alcohol and in aqueous form.
- Can be used for antiseptic hand wash.

Chlorhexidine in aqueous saponeous solution

- Very good skin disinfectant.
- Has no effect whatsoever as an environmental disinfectant.
- Effect on the skin is considered to be fair but if abused can cause skin dryness.
- Can be used as antseptic skin wash since its wide spectrum activity against bacteria, fungi and some viruses.

Cetrimide - Saponeous Solution

- Very good wound cleanser as for removing road debris.
- It is a quaternary ammonium compound mixed with Chlorhexidine gluconate.
- Not to be used as an environmental disinfectant.
- Not to be routinely used for wound cleansing.

Phenolics (hycolin)

- Wide range of Bacterial activity including Tubercle bacilli. Also good fungal activity.
- Poor activity against bacterial spores and Viruses.
- Can be absorbed through the skin.
- Absorbed by rubber and plastic.
- Stable and not readily inactivated by organic material.

Alcohol (70% Isopropanol)

- Destroys both bacteria and fungi.
- No effect on bacterial spores.
- Poor effect against viruses.
- To be used on clean surfaces since does not penetrate organic material.
- Useful for skin Disinfection.
- Can damage certain equipment.

Glutaraldehyde (Cidex, Asep)

- It kills Bacteria, Viruses, fungi rapidly.
- Tubercle Bacilli within 60 minutes.
- Bacterial Spores in 3-10 Hours.
- Penetrates organic material slowly.
- Highly irritate to skin and can cause Dermatitis, running nose and asthma.
- Can be used as a Chemical sterilant and widely used for Fibre –Optic Endoscopes.