Handbook on Infection Prevention and Control for Primary Health Care workers

Activity supported by the
Canada Fund for Local Initiatives
Activité réalisée avec l'appui du
Fonds canadien d'initiatives locales

Canada

World Health Organization

Table of Contents

Introduction to IPC

Plan

- Background/rationale for the IPC package (Why?)
- Contents of the package (What?)
- Next steps (Where? When? How?)

Rationale

- No reference materials in many countries on how to ensure minimum IPC standards prior to an outbreak or early in the outbreak
- Nosocomial infections
- Development of parallel standards – need for a standardized, scientific evidence-based approach to IPC

Objectives

Overall objective: To enhance the quality of IPC/WASH interventions during outbreaks in the Republic of Mauritius.

Specific objectives of the IPC/WASH package

- Ensure facilities have a standardized approach to IPC
- Improve health workers' capacity in IPC/WASH
- Promote ownership of IPC standards by facility managers and healthcare providers
- Provide well-designed and up-to-date IPC tools

Target Audience

These materials also apply to all healthcare facilities
And are intended for use by:

- IPC focal points in healthcare facilities
- Healthcare facility Managers
- Medical personnel
- Cleaners
- Water and sanitation professionals and architects
- Government health workers
- Health sciences students, teachers, and all actors with a stake in IPC/WASH

Introduction to Infection Prevention and Control (IPC)

Objectives: Participants will be able to:

- Describe and explain IPC and why it is important?
- Discuss how infections are spread
- Describe standard precautions
- Explain and conduct risk assessments
- Describe healthcare associated infections (HAIs) and their implications

IPC and why it is important?

What is IPC?

- Infection prevention and control refers to the policies and procedures used to minimize the risks of infection transmission, particularly in healthcare settings.

IPC:The main purpose of infection prevention and control is to protect vulnerable individuals at risk of contracting infections while receiving care in health facilities.

Purpose of IPC

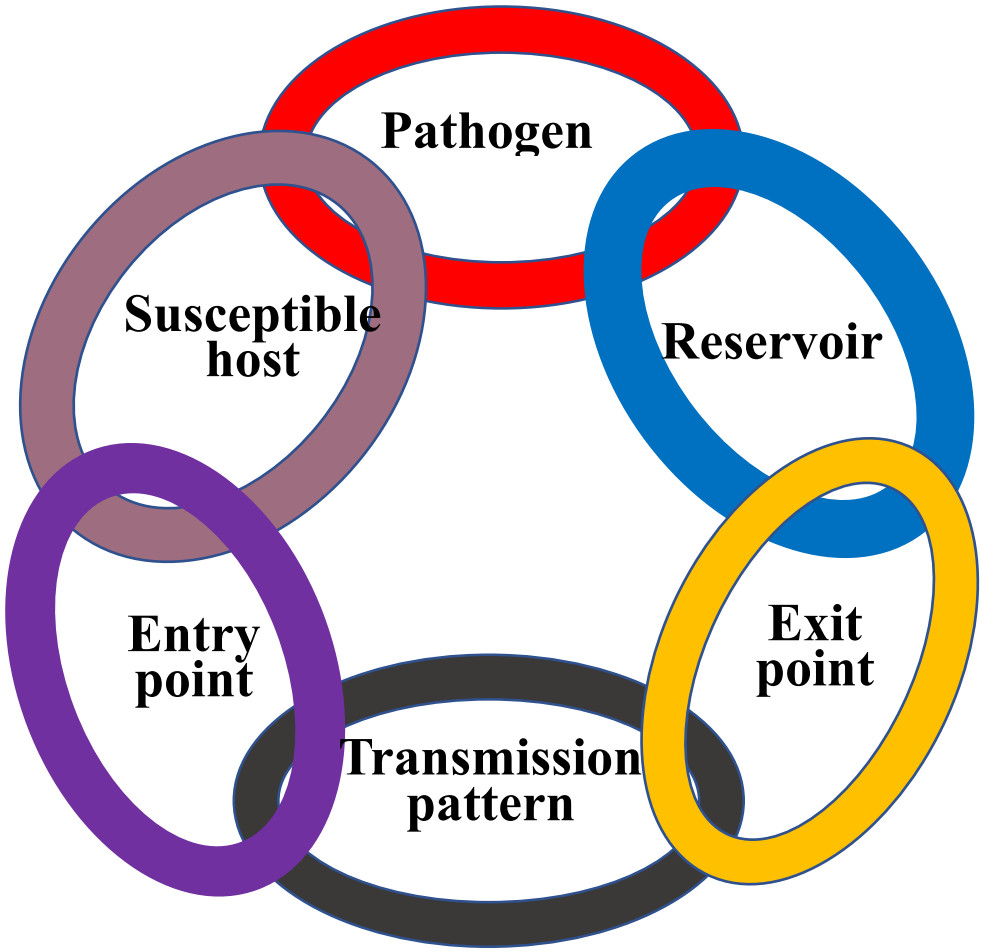
- Protect self
- Protect patients
- Protect family and community

How do infections spread?

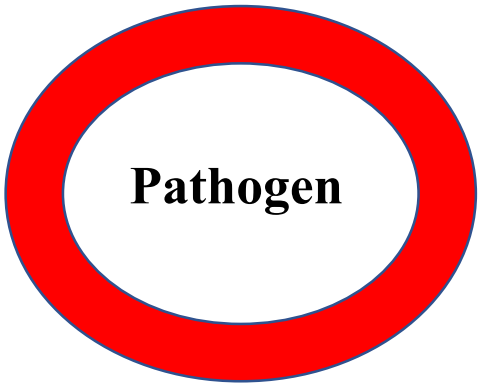
Transmission chain for infections

In order for an infection to spread, all links must be connected

Breaking one of these links will stop the spread of the disease!



Pathogen / Infectious agent

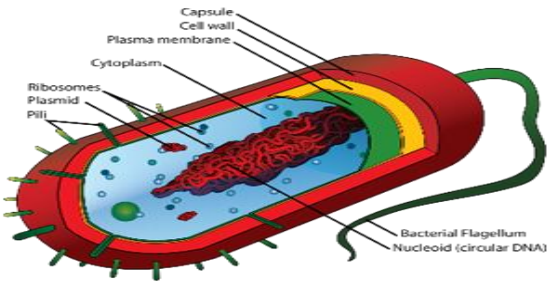


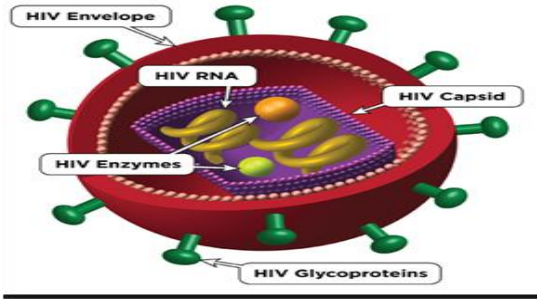
A pathogen is a microorganism that can cause disease:

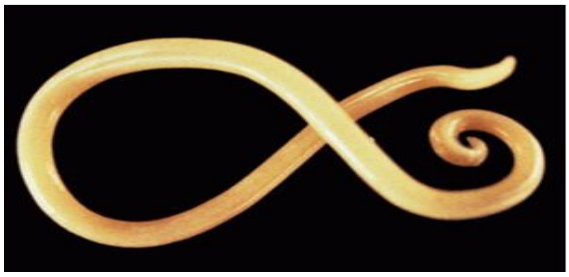
- Bacteria
- Viruses
- Worms
- Fungi
- Parasites
- Prions

Microorganisms can survive:

- In fluids (such as blood, vomit and water)
- In the air
- On surfaces (such as floors and tables)
- On clothing (including PPE)





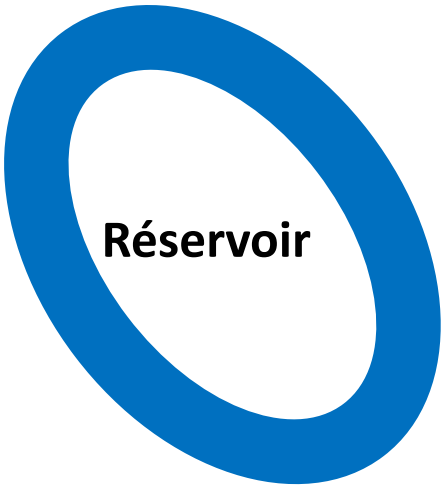


Reservoir

A place where a pathogen can survive.

Examples:

- Human body
- Animals and insects
- Water and soil
- Equipment and materials (e.g. mattress, stethoscope)





Human reservoir

There are three types of human reservoirs:

1. Sick persons – with signs and symptoms of illness (e.g. influenza).
2. Carriers – are infected but have no signs or symptoms; but can pass the infection on to others (e.g. early HIV infection).
3. Colonized persons – are carriers of an infectious agent but do not have an infection; can however spread the infection to others (e.g. multidrug-resistant Staphylococcus aureus)

Exit point

Upper respiratory system

- Saliva
- Sneeze
- Cough

Gastrointestinal system

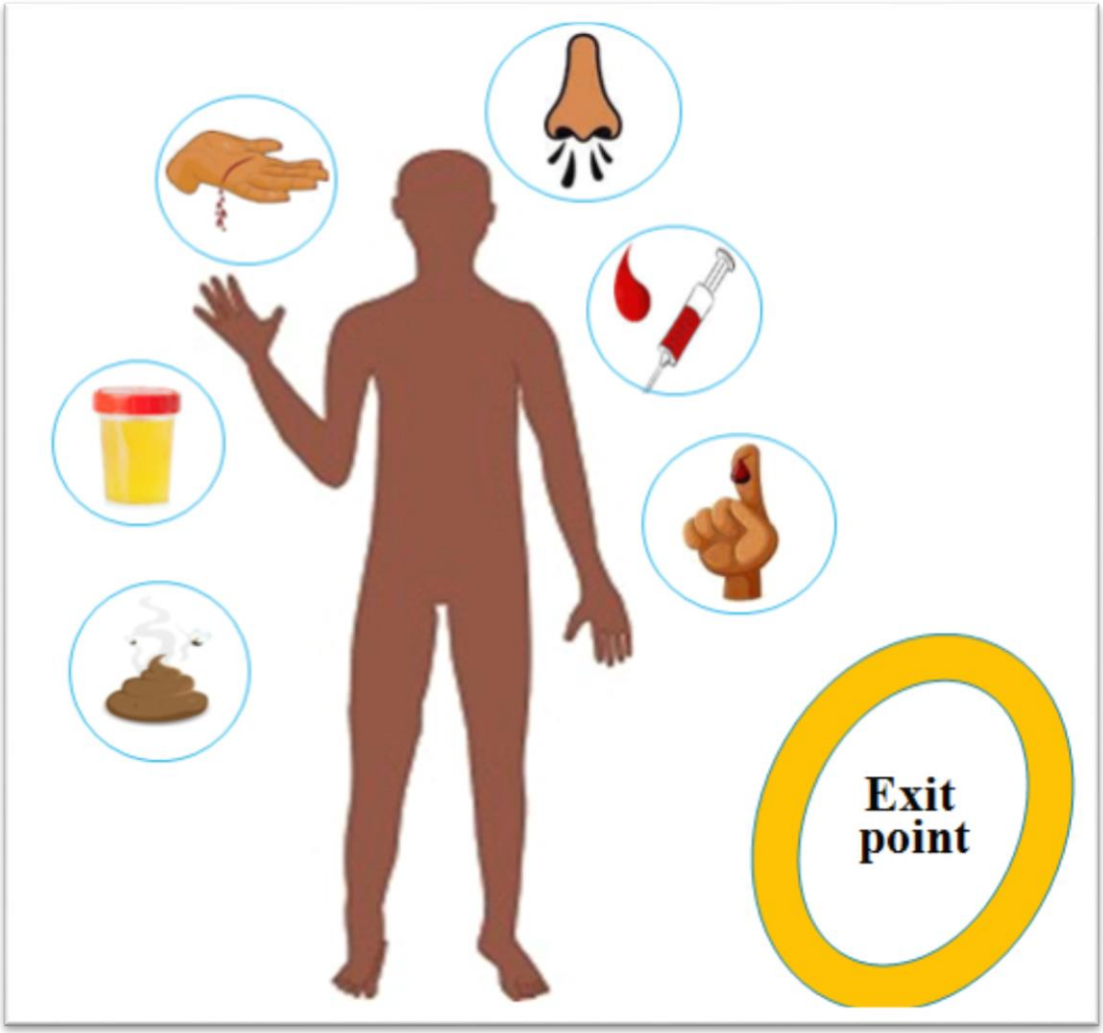
- Faeces/ diarrhoea
- Vomiting
- *Blood*
- Infected blood

Genitourinary system

- Semen
- Vaginal secretions
-

Urinary tract infection

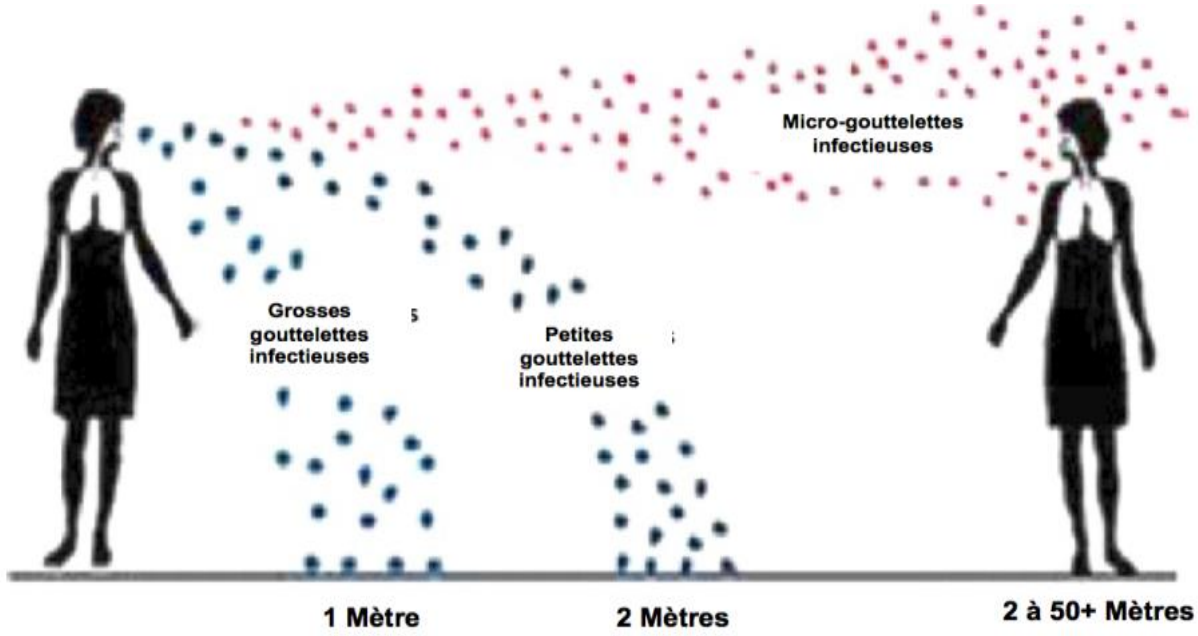
- Skin and mucous membranes
- Purulent discharge



Transmission routes

How pathogens spread from a reservoir to a host?

- ***Contact*: direct or indirect – spread through touch (e.g. cholera, Ebola)**
- ***Droplets* – spread by small or large droplet transmission (e.g. meningitis)**
- ***Airborne* – spread by microdroplet transmission (e.g. TB, chickenpox, measles)**



Transmission routes

How pathogens spread from one reservoir to another?

Common vehicle

Indirect transmission through contaminated material (water, food, surfaces…)

Vector

Transmission through insects such as mosquitoes, flies, ticks, and other invertebrates

Contact transmission

How pathogens spread from one reservoir to another ?



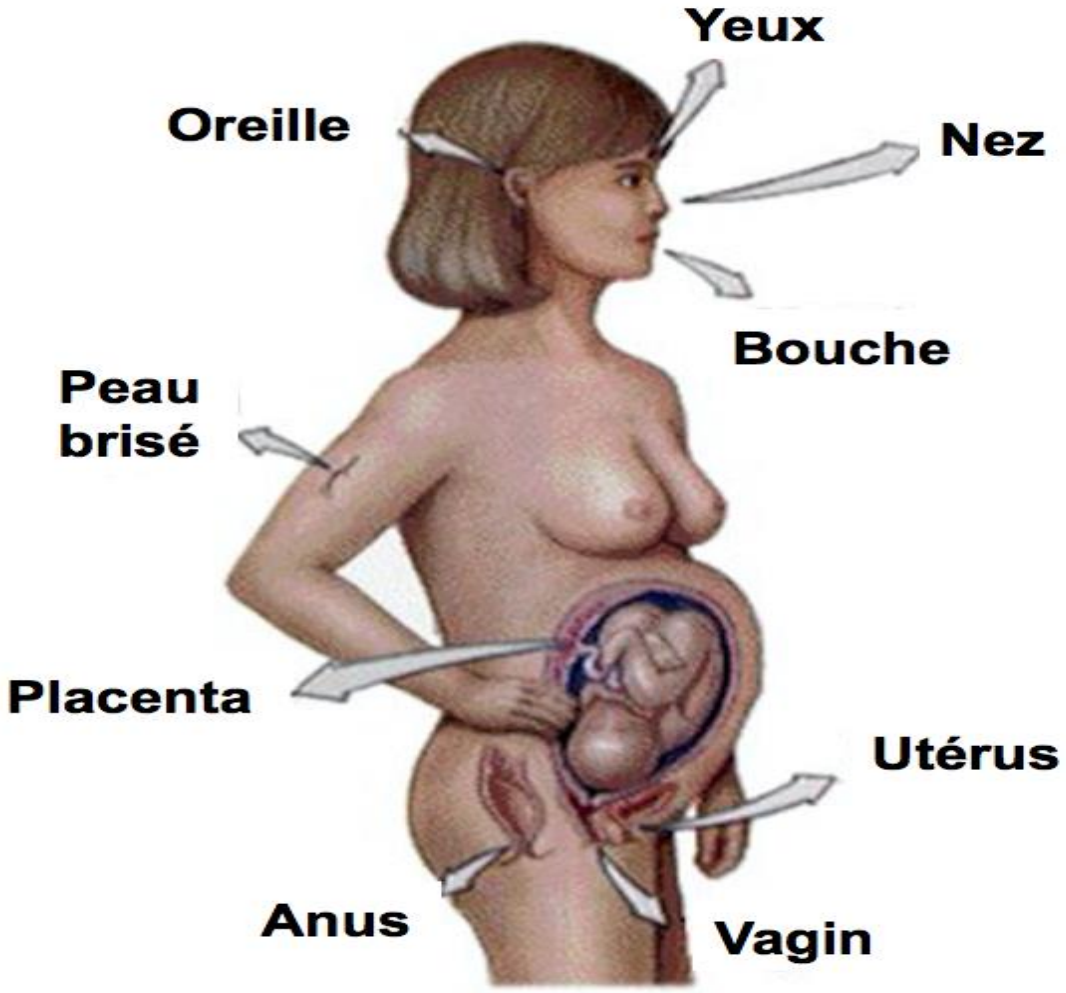
Handling a sick person, their body fluids and contaminated items



Handling a dead body, a sick or dead animal in the forest and direct contact, including sexual contact with a suspected case

Entry point

The mechanism by which pathogens enter the host



Susceptible host

- **Anyone at risk of becoming infected with a disease**
- **People at high risk of infection:**

  Pregnant women

  Preterm infants

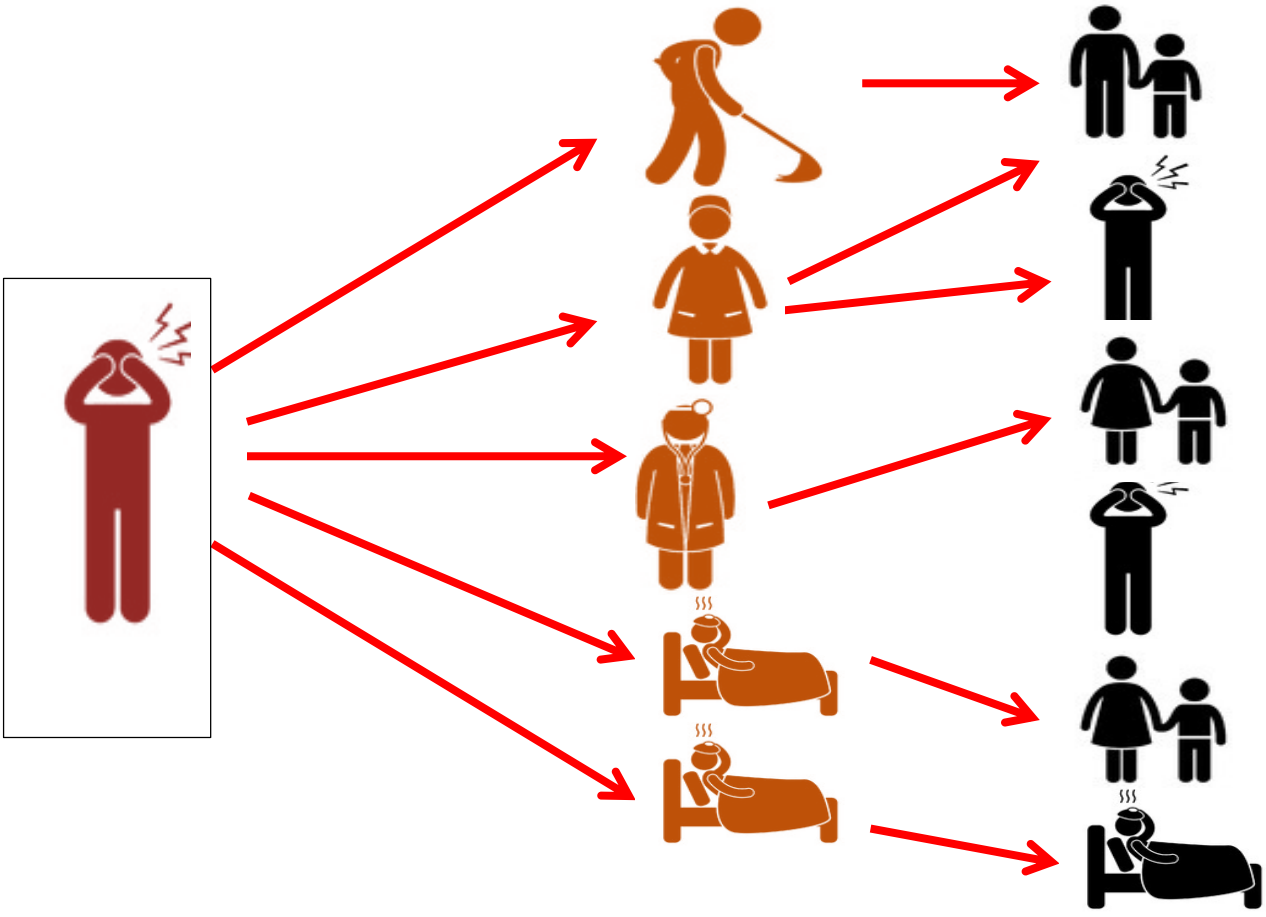
  Immunosuppressed patients

  Diabetic patients

  Operated patients

Malnutrition

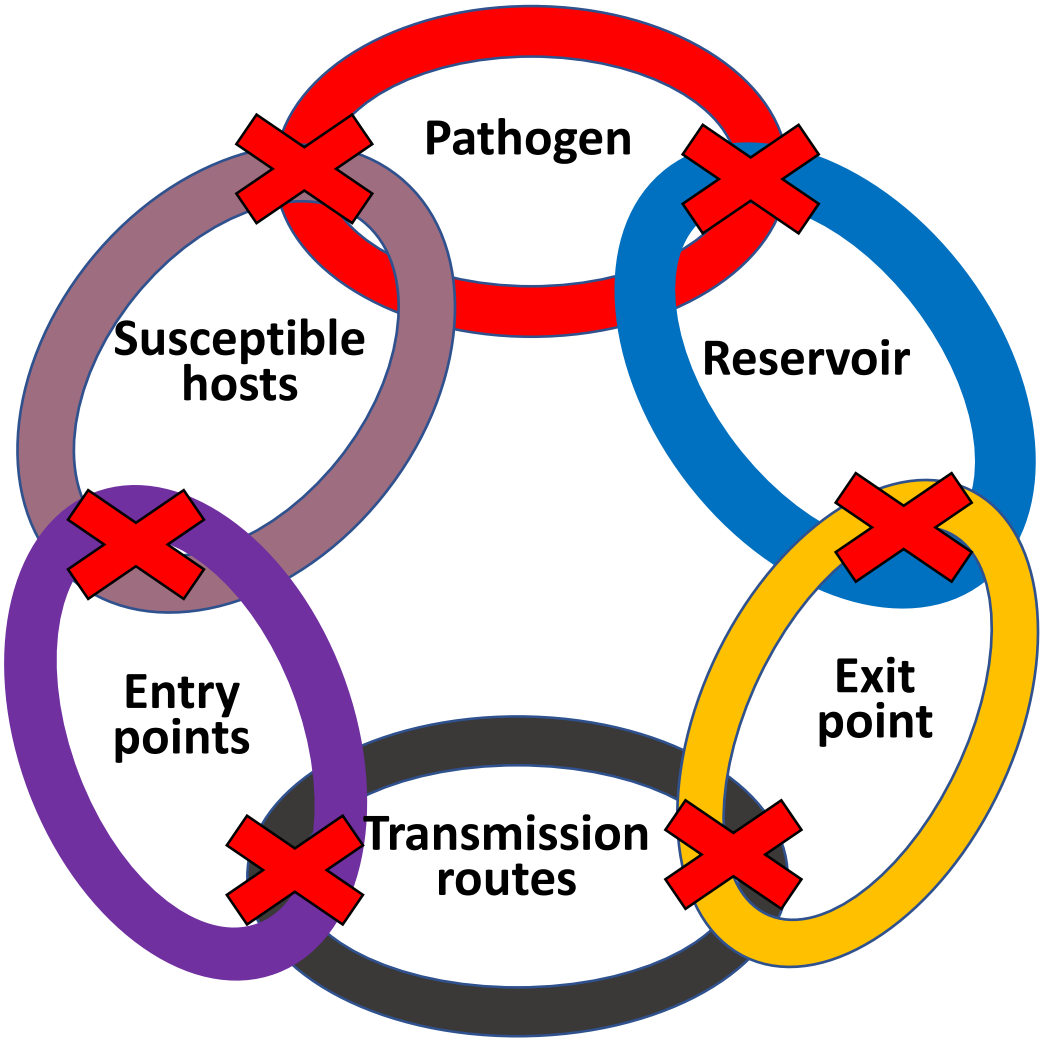
Who is at risk of infection?



Anyone who is not immune

How do you break the transmission chain?

We need to apply standard precautions to break the chain of transmission



Introduction to standard precautions

What are standard precautions?

- They are the basic level of infection control precautions which are to be used to reduce the risk of transmission of pathogens from both recognized and unrecognized sources in healthcare facilities.
- They are to be used in the care of **ALL** patients at **ALL** times.

Standard precautions: components

The following should be done to prevent the spread of infection:

1. Observe hand hygiene
2. Ensure respiratory hygiene
3. Use appropriate personal protective equipment (PPE) based on a risk assessment.
4. Perform environmental cleaning and disinfection
5. Ensure safe waste management
6. Sterilize patient care equipment
7. Ensure safe use of sharp instruments
8. Clean and disinfect used linen

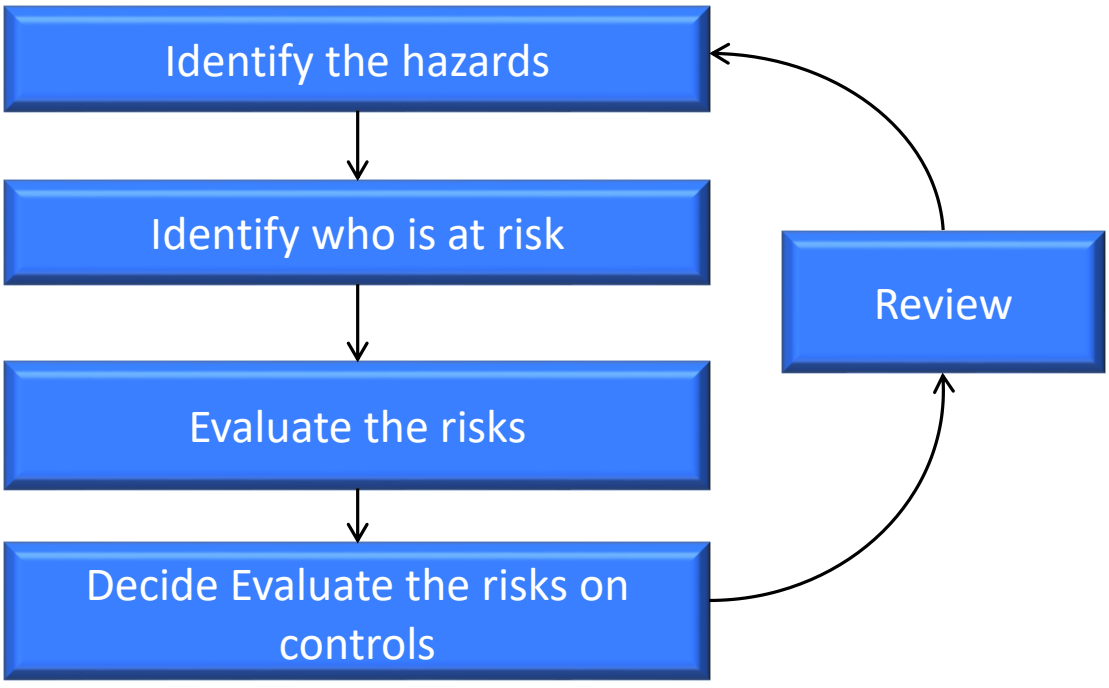
Risk assessment

What is risk assessment?

“A systematic examination of all aspects of work for the purpose of evaluating risks to worker and patient safety and health."

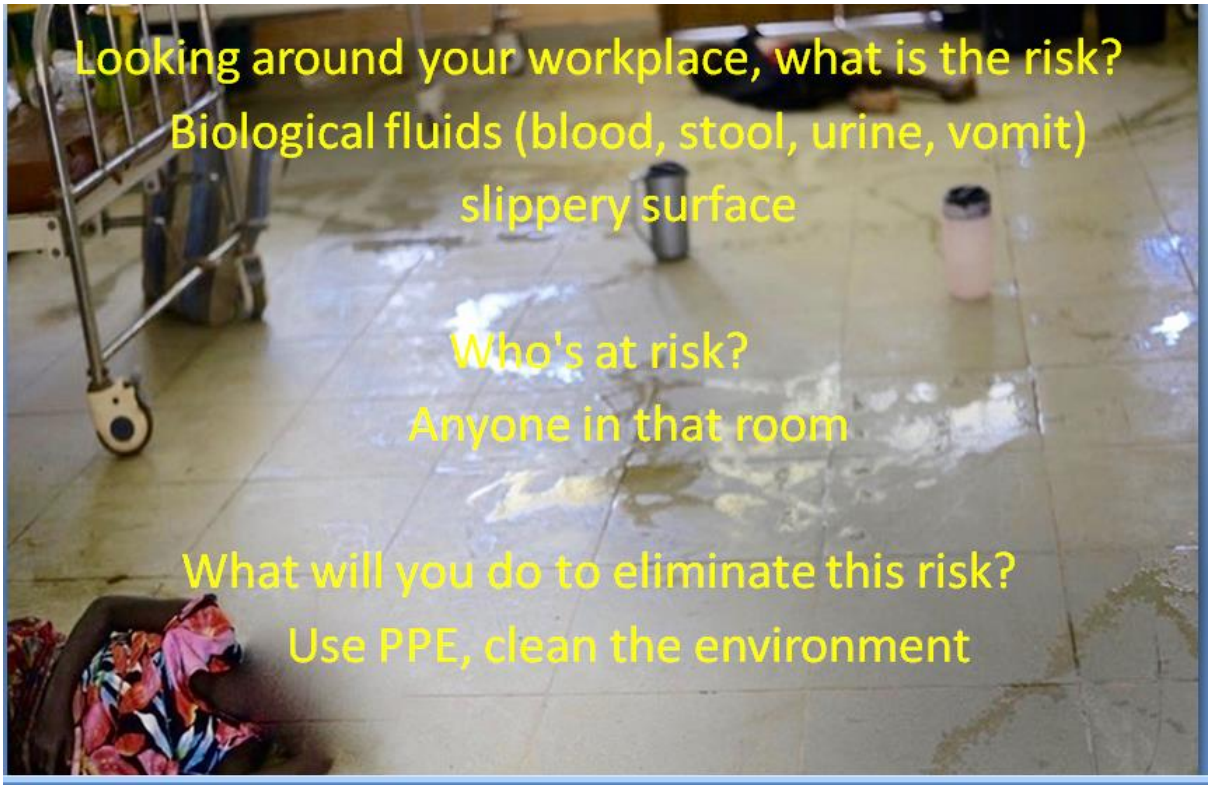
How to assess risk?

Undertake Risk assessment in five simple steps



How to assess risk ?

- First, look for those things at work (i.e. objects, situations, processes) that have the potential to cause harm, especially to people;
- Second, evaluate the severity and probability of the risks;
- Decide on the appropriate preventive or control measures (i.e. what PPE or chlorine concentration to use)



Facts about risk assessment

- While it is not possible to eliminate all risks, healthcare workers have a duty to protect themselves and others.
- This means: healthcare workers should avoid unnecessary risks by taking appropriate precautions.

What's wrong with this picture?

……
……
……
……
……
……
……
……
……
……
…….

Healthcare associated infections (HAIs)

What is HAI?

- Healthcare associated infection refers to an infection occurring in patient during the process of care which was not present at the time of admission.
- Both patients and healthcare workers are at risk.
- Previously called "hospital acquired" or "nosocomial“ infection.

When do HAIs occur?

These infections can occur:

In a healthcare facility where a patient has been admitted for another condition

- Up to 48 hours after the episode of care
- Up to three days after having been discharged
- Up to 30 days after a surgery
- Up to one year after an implant procedure

May also occur at home if home care is provided by a caregiver

Implications of HAIs

- More suffering, prolonged hospitalization, long-term disability, increased antibiotic resistance and unnecessary deaths.

- Additional financial burden on facilities and high costs to patients and their families

Most of these can be avoided by implementing standard precautions

Basic Microbiology

Microbes are everywhere- existed since 3 billion years. Many microbes are normal human flora.

What are pathogens?

Fact

Inside the human body, there are 10 trillion human cells and 100 trillion bacteria, protozoa, and fungal cells. When these microbes appear in parts of the body where they do not belong, they can cause infection.

Objectives

Participants must be able to:

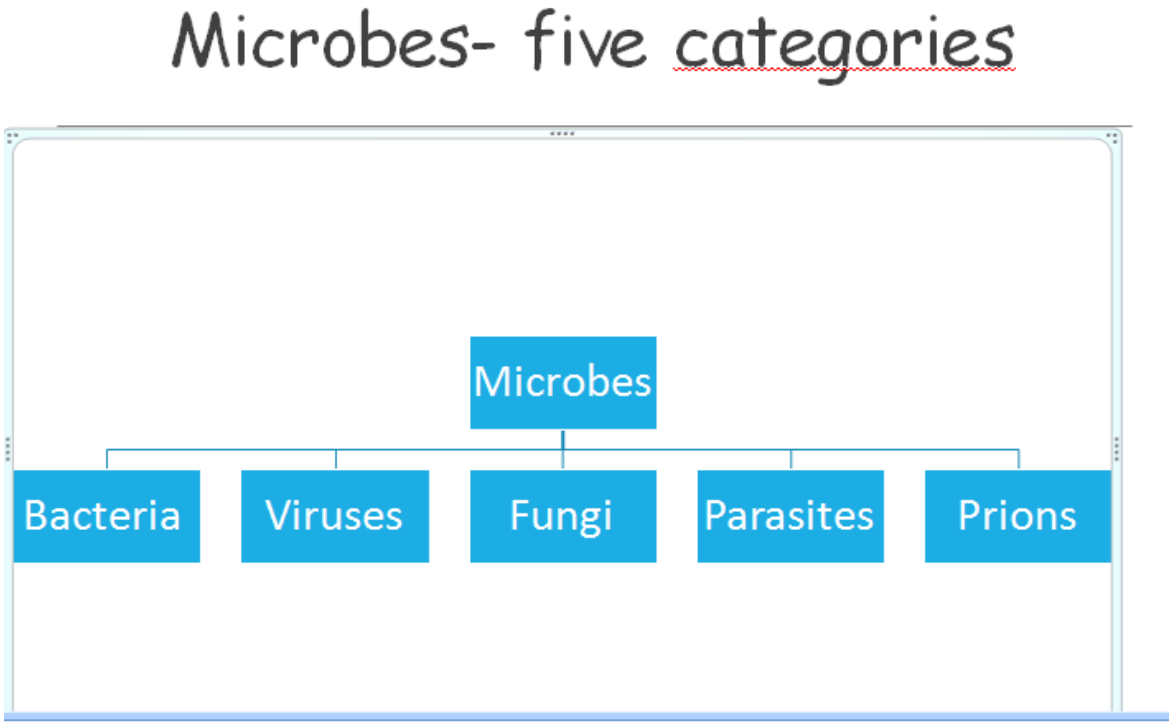
1. Describe the different types of microbes.
2. Describe the how these cause infections, how it is diagnosed and treated and how they spread?
3. Describe the relationship between IPC and Microbiology.

Microbes

'Microbes are categorized according to their biological classification (also called biological taxonomy).

Organisms are classified into seven main categories: kingdom, phylum, class, order, family, genus and species. Many microorganisms are known by their family, genus and species.

For example, bacteria are named by their genus and species, such as *Escherichia coli*, *Staphylococcus aureus*, and *Mycobacterium tuberculosis*. Some families of bacteria are known pathogens in health care, such as the Enterobacteriaceae family.



1. **Bacteria**

Characteristics:

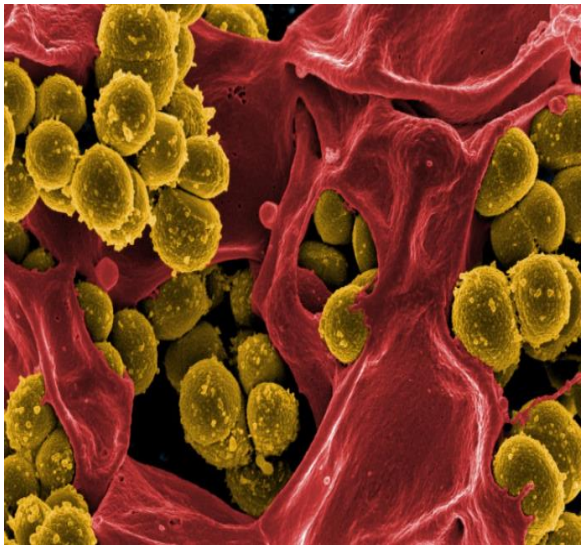
- unicellular (single cell), no nucleus
- largely harmless (normal flora)
- different growth characteristics with and without oxygen
- named by genus and species, such as *Escherichia coli*, *Staphylococcus aureus* and *Mycobacterium tuberculosis*

How to identify?

- visible with ordinary light and magnification (microscope)
- Gram staining, culture, other specialized laboratory tests

Examples of pathogens:

- Methicillin-resistant *Staphylococcus aureus* (MRSA), *Neisseria meningitidis*
- opportunistic pathogens—usually do not cause disease but take advantage of abnormal circumstances, such as a weakened immune system, and cause disease



Produced by the National Institute of Allergy and Infectious Diseases (NIAID), this digitally-colorized scanning electron microscopic (SEM) image depicts numerous mustard- colored, spheroid-shaped,methicillin-resistant, *Staphylococcus aureus* (MRSA) bacteria, enmeshed within the pseudopodia of a red-colored human white blood cell (WBC), known more specifically as a neutrophil.
Source: CDC Public Health Image Library

2. **Viruses**

Characteristics:

- acellular
- only able to replicate in a host's cells
- 10,000 times smaller than bacteria

How to identify?

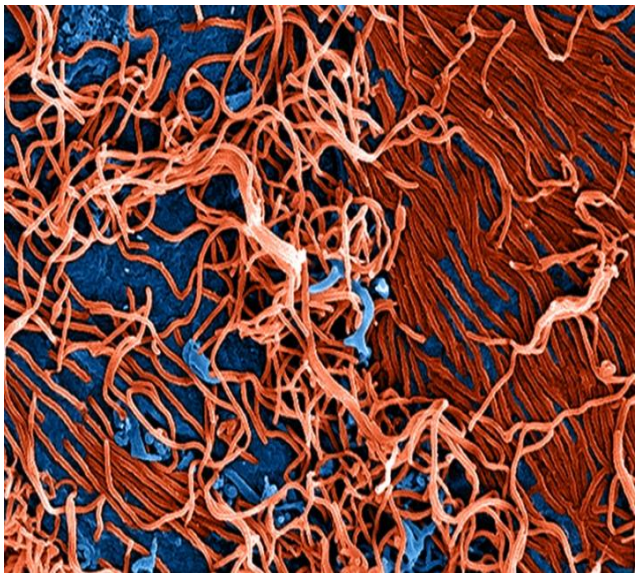
- grown in cell lines
- identified using specific fluorescent stains or methods such as enzyme-linked immunosorbent assay (ELISA) and other specialized laboratory tes

Examples of pathogens:

- influenza virus
- measles virus
- Ebola virus, Corona Virus

Treatment:

- antivirals or supportive treatment



Produced by the National Institute of Allergy and Infectious Diseases (NIAID), under a magnification of 25,000X, this digitally-colorized scanning electron microscopic (SEM) image depicts numerous filamentous Ebola virus particles (red) budding from a chronically-infected VERO E6 cell (blue).
Source: CDC Public Health Image Library

3. Fungi :

Characteristics:

- unicellular and multicellular
- most fungi are not dangerous (yeast, mould, mushrooms), but some can be harmful to health

How to identify?

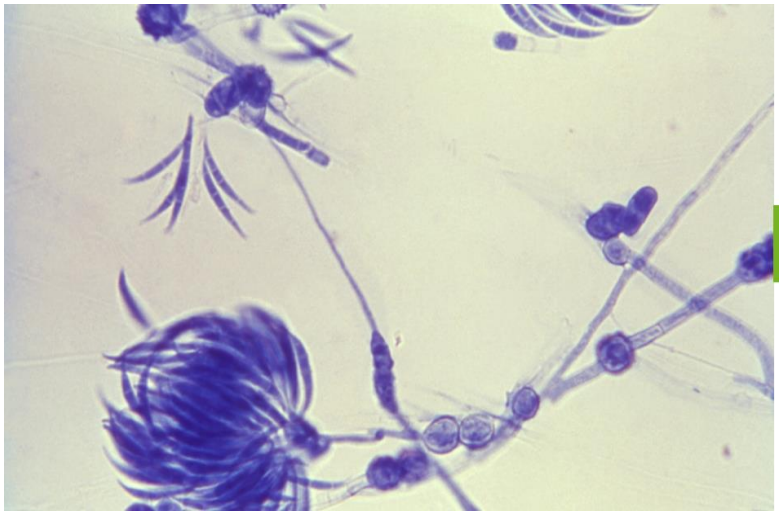
- culture and special stains and other specialized laboratory tests

Examples of pathogens:

- *Candida albicans*
- *Aspergillus*

Treatment:

- Antifungals



Under a magnification of 475X, this lactophenol cotton blue-stained specimen revealed some of the ultrastructural morphology exhibited by a Fusarium sp. fungal organism. Of importance here, are the septate filamentous hyphae, and the floral arrangement of the fusiform-shaped macroconidia. See PHIL 17972, for a higher magnification of this image.
Source: CDC Public Health Image Library/Dr. Hardin

4. Parasites

Characteristics:

- organisms that live on or in a host organism and get their food at the expense of the host
- unicellular or multicellular

How to identify?

- microscopes, blood tests and other specialized laboratory tests

Examples of pathogens:

- malaria (Plasmodium)
- guinea-worm disease (Dracunculus medinensis)
- Cryptosporidiosis diarrheal disease (Cryptosporidium)

Treatment:

- antiparasitics

This low-power photomicrograph reveals some of the ultrastructural morphology exhibited by coupled male and female Schistosoma mansoni parasites. “Unlike the flukes, adult schistosomes are either male or female, with the female residing in a gynecophoral canal within the male. Male worms are robust, tuberculate, and measure 6 mm – 12 mm in length. Females are longer (7 mm – 17 mm in length) and slender. Adult S. mansoni reside in the venous plexuses of the colon and lower ileum and in the portal system of the liver of their host.”
Source: CDC Public Health Image Library/Dr. D.S. Martin

5. **Prions**

Characteristics:

- defective proteins that misfold
- some evidence of transmission due to failure to remove prions from reusable devices

How to identify?

- brain biopsy or autopsy (tissue sample under microscope) and other specialized laboratory tests

Examples of pathogens:

- Creutzfeldt-Jakob Disease (CJD)

Treatment:

- supportive therapy only; no treatment has been identified

How do bacteria cause infection?

- As we have just learnt, most bacteria are important parts of the normal human flora. They help us do such things as digest our food.
- However, when these bacteria appear in parts of the body where they do not belong, they can cause infection. For example, bacteria normally found in the gastrointestinal tract could cause a urinary tract infection (UTI) if they are introduced to the bladder or kidneys.
- Closed areas, such as bladders, joints, and the bloodstream, are sterile areas of the body. That means these parts of the body are meant to be free from bacteria or any other living microorganism. When microbes enter these parts of the body, disease and infection can occur.

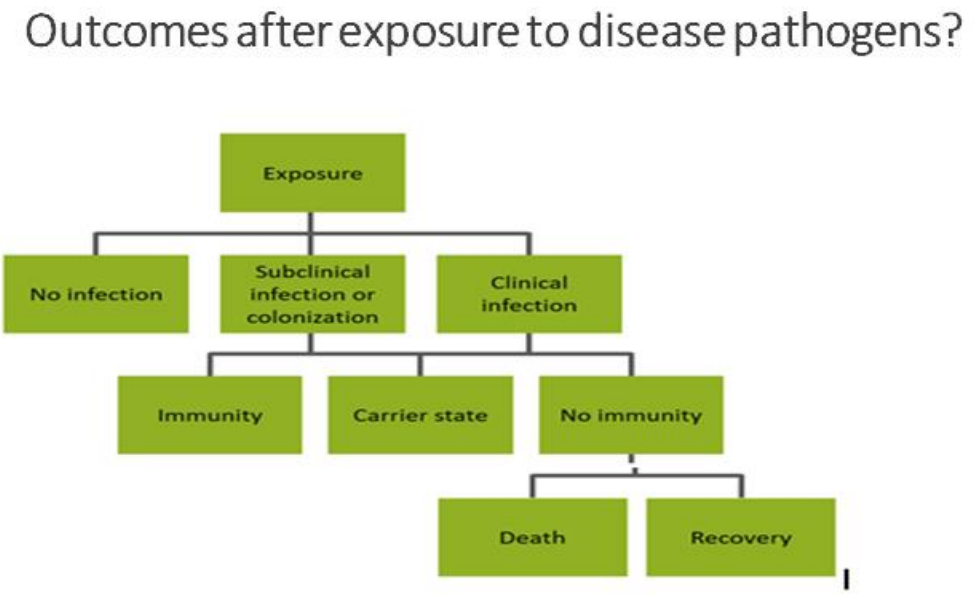
What is an infection?

The skin, mucous membranes, gastric juices, and blood are part of the body's defence system. These parts of the body protect against disease-causing pathogens. An infection occurs when a disease-causing organism (a pathogen) enters a host and multiplies.

What is an Exposure?

Many different types of exposure can occur. Exposure can occur in the community or in a health care setting—for example, being pricked by a used needle.

- Even after exposure, there are many factors that determine whether the pathogen will cause an infection.
- It is possible that no infection will occur, even after exposure.
- A pathogen can be present in a host without causing signs or symptoms of disease. This is called a subclinical infection or colonization.
- If a pathogen enters a host and causes signs and symptoms of disease, this is a clinical infection.



How is an infection diagnosed?

Signs and symptoms

When the body detects an infection, the immune system reacts to fight it. Signs and symptoms of an infection depend on the pathogen.

The following list of symptoms are indications that the body is fighting an infection:

Fever , pain, redness, swelling, fluid drainage etc

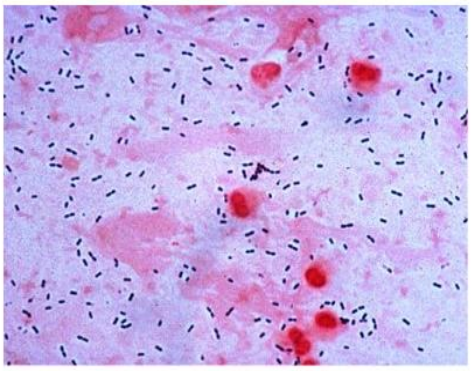
Laboratory diagnosis

Laboratory testing is not strictly required to diagnose an infection for treatment—but identifying the specific pathogen can help guide management and inform what, if any, Infection Prevention and Control (IPC) interventions may be required to help reduce or prevent the spread of infection to other susceptible hosts. In those facilities without lab access, clinicians should refer to their national treatment guidelines to determine how to choose a suitable treatment.

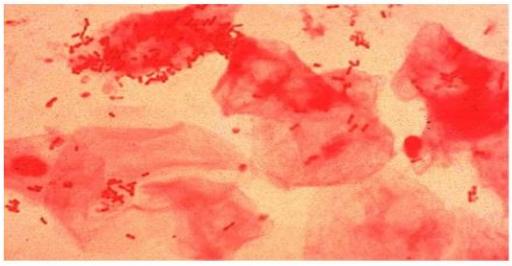
Different methods used for different types of microbes. Bacteria: Most common is gram staining and culture, Antimicrobial Susceptibility testing

How is an Bacteria diagnosed?

A **Gram-positive result** indicates that the bacteria has a very thick outer layer (cell wall) with additional proteins (peptidoglycan). Gram-positive cells appear purple under the microscope. Examples of Gram-positive bacteria are Staphylococcus, Enterococcus and Streptococcus.



A **Gram-negative stain** means that the bacteria does not have an extra layer in the cell wall. Gram-negative cells appear pink under the microscope. Examples of Gram-negative bacteria are *E coli, Klebsiella pneumoniae, Pseudomonas aeruginosa* and the *Acinetobacter* species.



Source: CDC Public Health Image Library

The Gram stain takes less than an hour to perform. The result of this test can help clinicians quickly decide which antibiotic to choose.

How is a bacterial infection treated?

Antibiotics:

- **Broad-spectrum antibiotics:** are a good choice when the agent of infection is unknown because of likelihood of effectiveness. **But, they also kill normal flora and lead to selection of** resistant organisms. **Eg:** chloramphenicol, tetracycline, ciprofloxacin, cotrimoxazole, and amoxicillin/clavulanate imipenem/meropenem

- **Narrow Spectrum Antibiotics act only against** limited types of bacteria. Vancomycin, penicillin, and linezolid are examples of antibiotics that will kill Gram-positive bacteria, but not Gram-negative bacteria. On the other hand, aztreonam and colistin will kill Gram-negative bacteria, but not Gram-positive bacteria. Narrow-spectrum antibiotics protect our normal flora and are less likely than broad-spectrum antibiotics to lead to AMR.

What is an AMR?

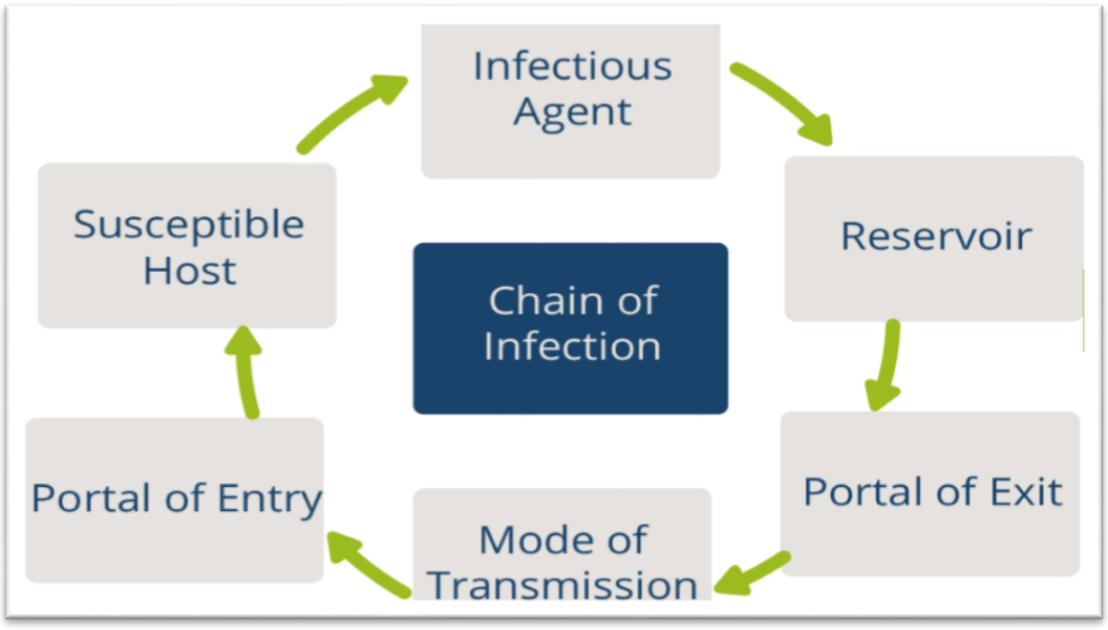
- **AMR occurs when a microorganism develops protection against an antimicrobial drug.**
- Microorganisms replicate very quickly. *E. coli*, for example, can double in quantity in about 40 minutes. During replication of genetic material, microorganisms can insert and delete certain portions of their genetic material. They can also pick up extra genetic material that helps them protect themselves against drugs meant to kill them. Due to the rapid way in which microorganisms replicate, AMR can develop quickly.
- These highly resistant organisms increase the risk of morbidity, mortality, and disability in patients. They can increase a patient's length of stay or cause complications that may require admission to an intensive care unit (ICU).

What is an MDRO?

- When microorganisms become resistant to more than one drug, they are called **multidrug-resistant organisms, or MDROs**. Laboratory tests are needed to determine if a microorganism is resistant to the drug designed to treat it. In the health care and public health fields, AMR is concerning because it means the microorganism is evolving. For clinicians, this could mean few or no treatment options. Some MDROs are caused by the overuse and misuse of antibiotics; this includes administering antibiotics when they are not needed, or recommending that they be taken for longer than necessary.

- It is increasingly important to identify and sustain systems and strategies that manage the risk of MDROs in your facility. When MDROs are discovered by laboratory tests, the physician and the IPC team should be alerted.

How do infections spread?
Through chain of infections as depicted below:



IPC and Microbiology: The IPC team is the health facility's line of defence against the spread of health care-associated infections (HAI) and AMR. Having a basic understanding of microbiology will allow you to make better decisions regarding which interventions to implement in your facility.
Here are some considerations you may need to make as an IPC person:

- Does my facility have, or have access to, a laboratory?
- What is the quality and capacity of the laboratory, if available?
- Are the standardized definitions and methods consistent?

Summary

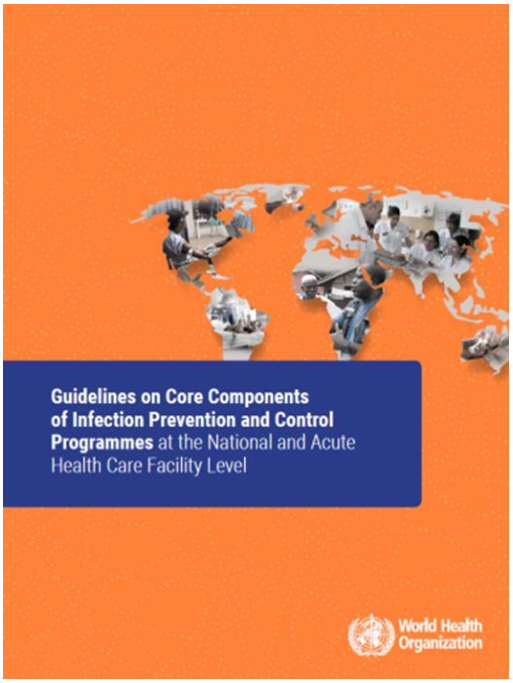
- In this course, you have learnt that, although not all microorganisms are harmful, pathogens can spread throughout the health care environment.
- Through the chain of infection, we can see how a pathogen can cause infection, from the reservoir to the portal of entry in the body.
- Microorganisms can become drug resistant through the misuse and incorrect administration of antibiotics, which lead to the spread of AMR. Pathogens can become resistant to many drugs; these pathogens are called MDROs.
- Microbiologists use Gram stains, cultures and many other methods in laboratories to identify and characterize pathogens, which then helps clinicians make appropriate treatment decisions.

WHO Core Components and Multimodal Strategies on IPC

Learning objectives

At the end of this session participants will be able to:

- list the eight core components of IPC programmes.
- describe the key considerations for each of the core components at the national and health facility levels.
- identify some implementation resources.

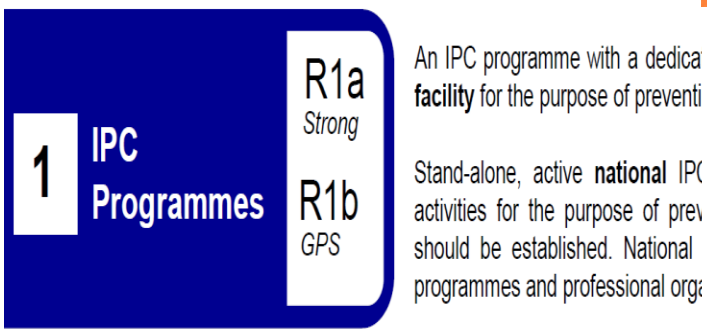


WHO core components for effective IPC programmes

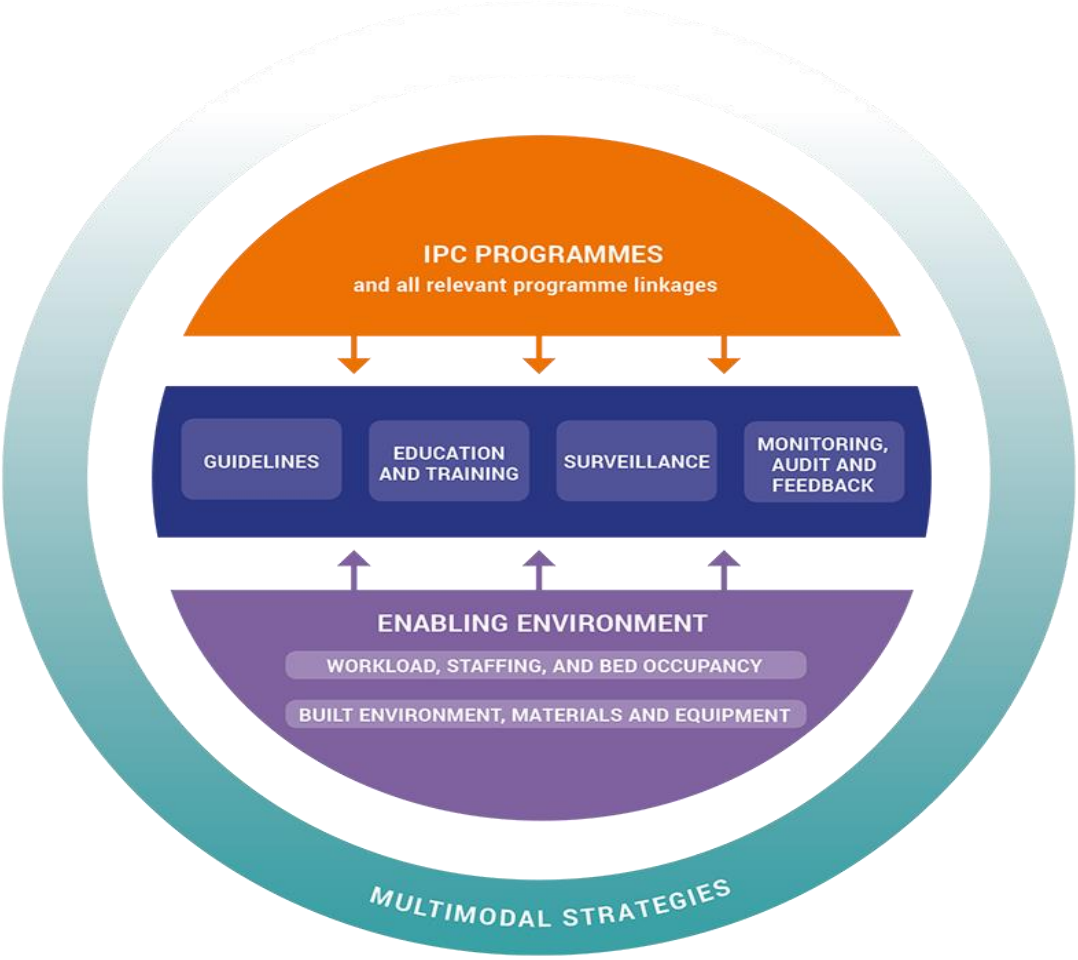
- The WHO Core Components are a road map to indicate how IPC can effectively prevent harm due to HAI and AMR.
  - 8 Core components
  - 8 Health Facility level
  - 6 National level
  - 11 evidence*-based recommendations
  - 3 good practice statements

Interrelatedness of the IPC core components:-

Core component 1: IPC programmes



- Clearly defined **objectives, functions and annual action plans**
- **Dedicated, trained IPC professionals (1 IPO/250 beds) & multidisciplinary team**
- **Budget & support** from the **senior management leadership**
- Good quality **microbiological laboratory**



Core Component 1: National level - Key remarks

- The national IPC Programme must
  - have clear objectives and functions
  - an appointed IPC with a defined scope of responsibilities
- The programme should include:
  - A technical team of IPC professionals with formal training
  - A multidisciplinary committee with authority to make decisions and influence the field
  - A protected budget
  - Linkages to other relevant programmes
  - Support of a national reference laboratory

Core Component 1: Facility level - Key remarks

The IPC programme should have:

- clearly defined objectives to contribute towards the prevention of HAI and the spread of AMR in health
- dedicated, trained professionals in every acute health facility
- support from the health facility leadership
- good quality microbiological laboratory support

Core component 2: IPC guidelines

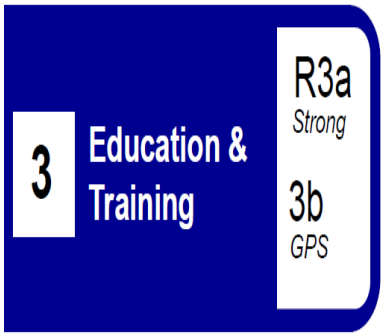
Evidence-based guidelines should be developed and implemented for the purpose of reducing HAI and AMR. Education and training of relevant health care workers on guideline recommendations and monitoring of adherence with guideline recommendations should be undertaken to achieve successful implementation.

- **Expertise** required
- **Local prioritization**
- Providing **resources for implementation**
- **HCWs education** on recommended practices
- **Monitoring** implementation

Core Component 2: National and facility level- Key Remarks

- Appropriate IPC expertise is necessary to write/ adapt or adopt a guideline both at the national and sub-national levels.
- Guidelines should be prioritized locally based on the most frequent and/or risky practices and adapted to local circumstances.
- Monitoring adherence to guideline implementation is essential.

Core component 3: IPC education & training



At the facility level IPC education should be in place for all health care workers by utilizing team- and task-based strategies that are participatory and include bedside and simulation training to reduce the risk of HAI and AMR.

The **national** IPC programme should support education and training of the health workforce as one of its core functions.

- **Pre-graduate, post-graduate, in-service** training
- **Evaluations** of training impact
- **Collaboration** with local academic institutions

Core Component 3: National level - Key remarks

The IPC national team plays a key role to:

- support and make IPC training happen at the health facility level

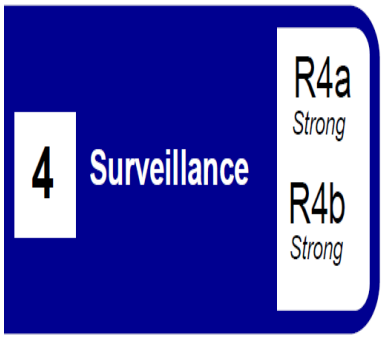
- support the development and maintenance of a skilled, knowledgeable health workforce
- support development of curricula in collaboration with local academic institutions
- provide guidance and recommendations for in-service training to be rolled out at the health facility level

Core Component 3: Health Facility level - Key remarks

IPC education and training should:

- be part of an overall health facility education strategy.
- include new employee orientation and the provision of continuous educational opportunities for existing staff, regardless of level and position.
- teach the basic concepts and theories of microbiology, infectious diseases and IPC
- be complementary to WASH training.
- Three categories of human resources were identified as targets for IPC training:
    - IPC specialists ,
    - all health care workers involved in service delivery and patient care, and
    - other personnel that support health service delivery
- Periodic evaluations should be undertaken routinely.

Core component 4: HAI surveillance



Facility-based HAI surveillance should be performed to guide IPC interventions and detect outbreaks, including AMR surveillance with timely feedback of results to health care workers and stakeholders and through national networks.

National HAI surveillance programmes and networks that include mechanisms for timely data feedback and with the potential to be used for benchmarking purposes should be established to reduce HAI and AMR.

- **Standardized definitions, appropriate methods, good quality laboratory support**, quality control needed
- **Training and expertise** needed

Core Component 4: National level - Key remarks

A national HAI surveillance programme should have:

- clear objectives, a standard set of case definitions
- methods for detecting infections and the exposed population
- processes for the analysis of data
- methods for evaluating the quality of the data
- clear regular reporting lines of HAI surveillance data from the local facility to the national level

Core Component 4: Facility level - Key remarks

Surveillance should be conducted by trained staff and should provide information for:

- describing the status of infections associated with health care
- identification of high-risk populations, procedures and exposures
- identification of the most relevant AMR patterns
- early detection of clusters and outbreaks
- evaluation of the impact of interventions

Core component 5: Multimodal strategies

At the **facility** level IPC activities should be implemented using multimodal strategies to improve practices and reduce HAI and AMR.

National IPC programmes should coordinate and facilitate the implementation of IPC activities through multimodal strategies on a nationwide or sub-national level.

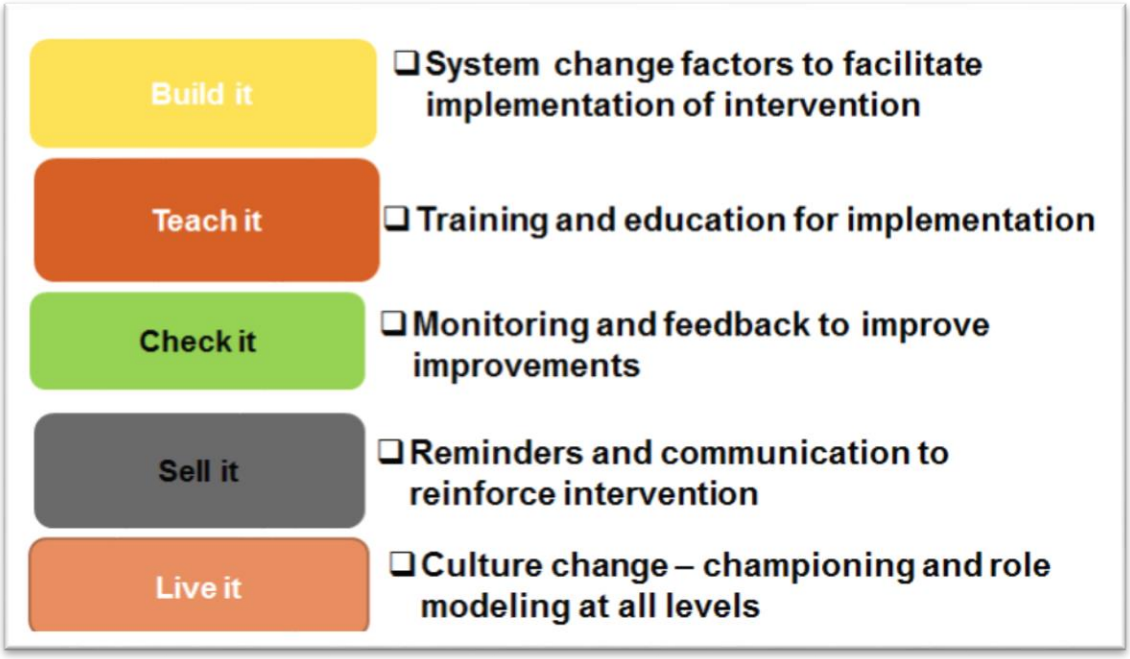
- A **multimodal strategy** comprises **several elements or components** (3 or more; usually 5) **implemented in an integrated way** with the aim of **improving an outcome and changing behaviour.**
- It includes tools, such as bundles and checklists, developed by multidisciplinary teams that **take into account local conditions**.

What is a multimodal strategy?

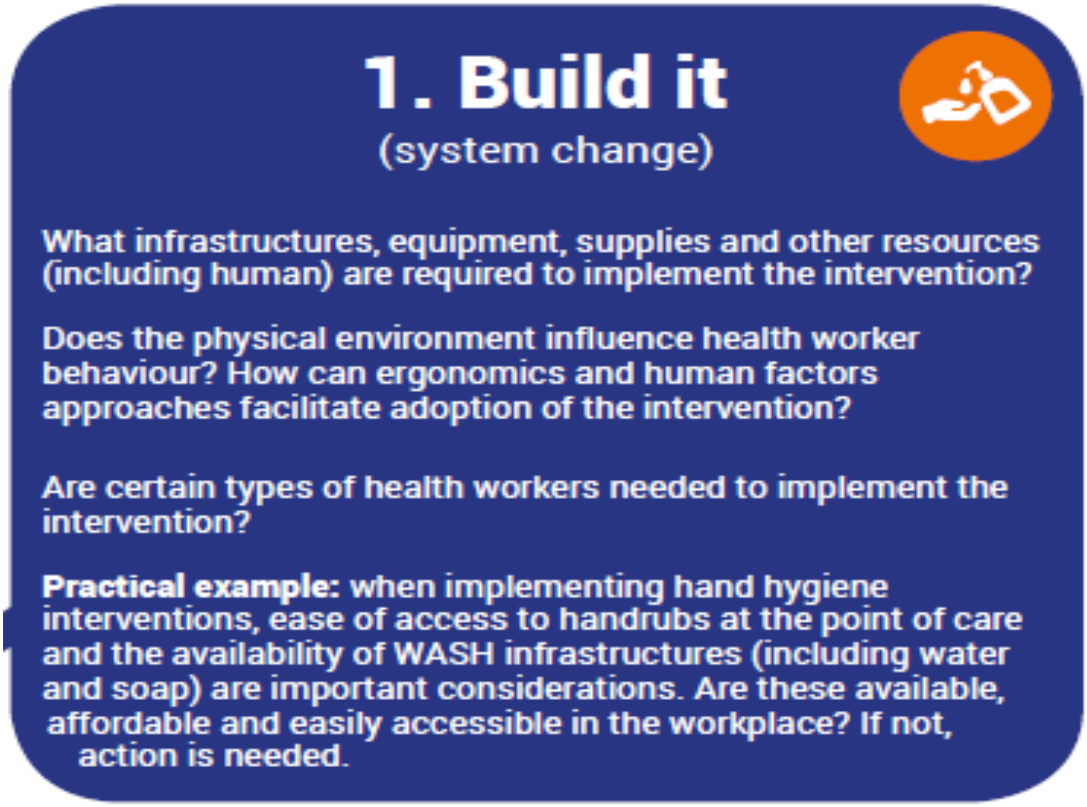
- ✓ ***It is "THE" modern way to implement IPC***
- ✓ to achieve the system change, appropriate organizational culture and behaviour that support IPC progress and, ultimately, the measurable impact that benefits patients and health care workers

- **Multimodal thinking** means that IPC practitioners do not focus only on single strategies to change practices (for example, training and education), but consider a range of strategies that target different influencers of human behaviour, e.g.,
  - procurement
  - monitoring and feedback,
  - Infrastructures
  - organizational culture

The WHO 5 areas of multimodal strategy



Multimodal thinking…



2. Teach it

(training & education)

Who needs to be trained? What type of training should be used to ensure that the intervention will be implemented in line with evidence-based policies and how frequently?

Does the facility have trainers, training aids, and the necessary equipment?

Practical example: when implementing injection safety interventions, timely training of those responsible for administering safe injections, including carers and community workers, are important considerations, as well as adequate disposal methods.

3. Check it

(monitoring & feedback)

How can you identify the gaps in IPC practices or other indicators in your setting to allow you to prioritize your intervention?

How can you be sure that the intervention is being implemented correctly and safely, including at the bedside? For example, are there methods in place to observe or track practices?

How and when will feedback be given to the target audience and managers? How can patients also be informed?

Practical example: when implementing surgical site infection interventions, the use of key tools are important considerations, such as surveillance data collection forms and the WHO checklist (adapted to local conditions).

Core component 5 – Multimodal strategies National level: key points

- Multimodal interventions should be within the mandate of the national IPC programme
- Ministry of Health support and the necessary resources are essential
- Interventions should be associated with overall cross-organizational culture change
- Strong consideration should be given to country adaptation of implementation strategies reported in the literature, as well as to feedback of results to key stakeholders.

Core component 5 – Multimodal strategies Facility level: key points

Successful multimodal interventions:

- should be associated with an overall organizational culture change
- require coordination and teamwork across the organization or health facility
- include the involvement of champions or role models in several cases
- need to be linked to national quality aims and initiatives

Core component 6: Monitoring/ audit of IPC practices & feedback

Regular monitoring/audit and timely feedback of health care practices should be undertaken according to IPC standards to prevent and control HAIs and AMR at the health care **facility** level. Feedback should be provided to all audited persons and relevant staff.

A **national** IPC monitoring and evaluation programme should be established to assess the extent to which standards are being met and activities are being performed according to the programme's goals and objectives. Hand hygiene monitoring with feedback should be considered as a key performance indicator at the national level.

- To achieve behaviour change or other process modification
- To document progress and impact

National level – key remarks

National level monitoring and evaluation should have in place mechanisms that:

- provide regular reports on the state of the national goals and strategies
- regularly monitor and evaluate WASH services, IPC activities and structure of health facilities
- promote the evaluation of the performance of local IPC programmes in a non- punitive institutional culture

Health Facility level – key remarks

- Auditing/monitoring at the health facility level is:
  - to achieve behaviour change, improve the quality of care and practice
  - aimed at engaging stakeholders and provides feedback

IPC programmes should be periodically evaluated to:

- assess the extent to which the objectives are met,
- assess whether the activities are being performed according to requirements and identify aspects that may need improvement

Core Component 7: Workload, staffing & bed occupancy (Health Facility Level)

In order to reduce the risk of HAI and the spread of AMR the following should be addressed: (1) bed occupancy should not exceed the standard capacity of the facility; (2) health care worker staffing levels should be adequately assigned according to patient workload.

- Standards for bed occupancy should be one patient per bed with adequate spacing between beds
- HCWs staffing levels should be adequately assigned according to patient workload
- Overcrowding recognized as being a public health issue that can lead to disease transmission

Health Facility Level – key remarks

- Standard for bed occupancy should be one patient per bed with adequate spacing (1 metre) between patient beds
- The WHO Workload Indicators of Staffing Need (WISN) method provides health managers with a systematic way to determine how many health workers of a particular type are required to cope with the workload of a given health facility and decision making (http://www.who.int/hrh/resources/wisn_user_manual/en/).

Core Component 8: Built environment, materials & equipment for IPC (facility level)

At the **facility** level patient care activities should be undertaken in a clean and/or hygienic environment that facilitates practices related to the prevention and control of HAI, as well as AMR, including all elements around the WASH infrastructure and services and the availability of appropriate IPC materials and equipment.

At the **facility** level materials and equipment to perform appropriate hand hygiene should be readily available at the point of care.

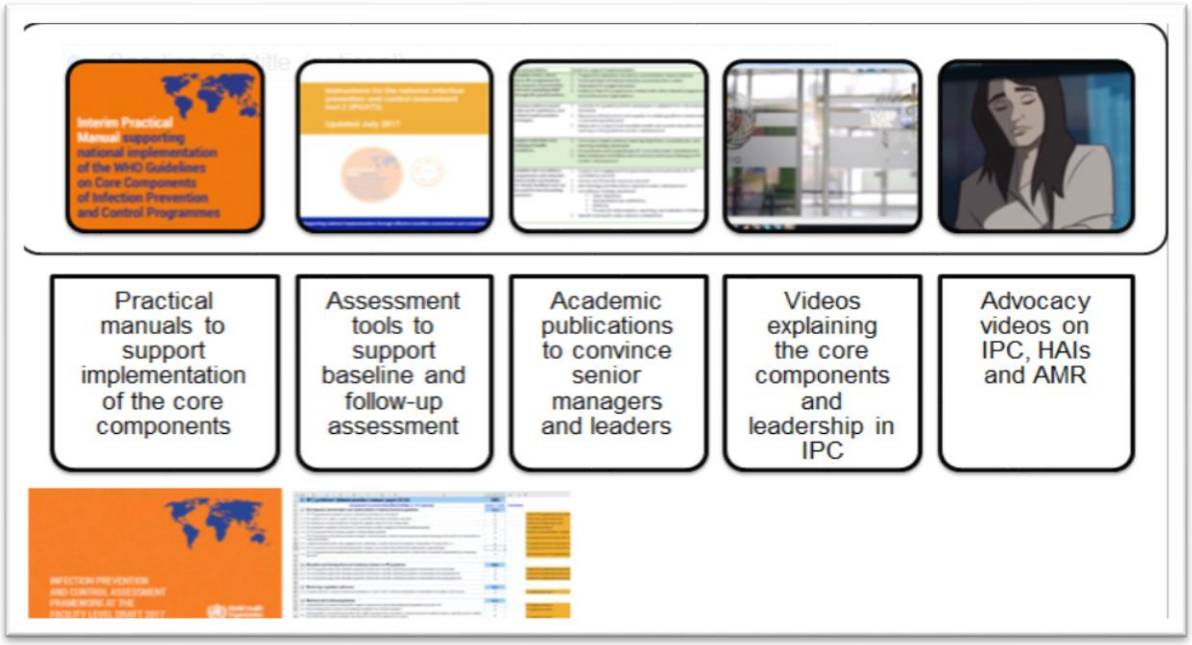
- Appropriate clean and hygienic environment, WASH services and materials and equipment for IPC, in particular for Hand Hygiene

National and facility level-key remarks

- Government and national IPC and WASH programmes play an important role.

- Appropriate environment, WASH services, materials and equipment are a core component of effective IPC programmes.
- Ensuring an adequate hygienic environment is the responsibility of senior health facility managers and local authorities.
- WHO standards for drinking water quality, sanitation and environmental health in health care facilities should be implemented.
- WHO standards for hand hygiene facilities should be implemented in all health care facilities.
- Hand hygiene products (for example, alcohol-based hand rub, if available) must be easily accessible -within arm's reach- of where patient care or treatment is taking place.
- Point-of-care products should be accessible without having to leave the patient zone. The WHO *Guidelines on hand hygiene in health care* state: "minimum sink-to-bed ratio 1:10 and 1:1 in isolation rooms**".**

IPC core components: implementation resources



Standard precautions: Hand Hygiene

Introduction

Tips:

If you shake hands with someone who is just from the toilet without washing their hands, you will find, once in three times, that person's fecal bacteria in your mouth in under two hours[1]

1. *On s'en lave les mains - tout connaître des nouvelles règles d'hygiène", Dr Frédéric Saldmann, Flammarion Publishers, 2007.*

Objectives

Participants will be able to:

1. Explain the importance of hand hygiene
2. Explain when to perform hand hygiene
3. Demonstrate how to perform hand hygiene
4. Explain what product to use and when
5. Explain how to promote hand hygiene

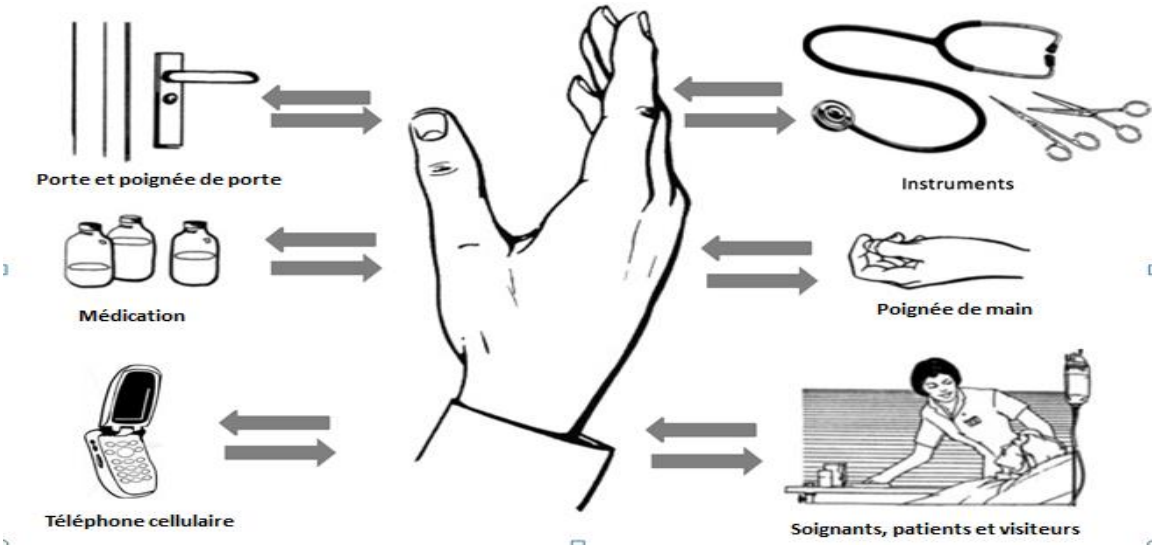
Importance of hand hygiene

Hand hygiene:

- Is the best way to prevent the spread of germs in health care facilities and in the community;
- Protects yourself, your colleagues, your patients and your family;
- Helps to prevent many health care associated infections (HAI).

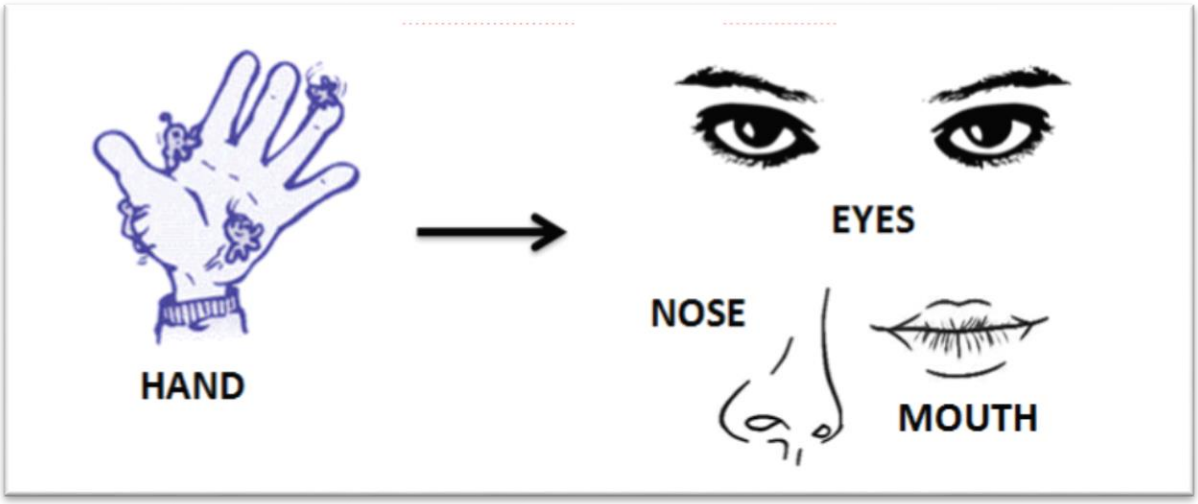
Why must we wash our hands?

The hand is our working tool and the key cog in the chain of contamination.



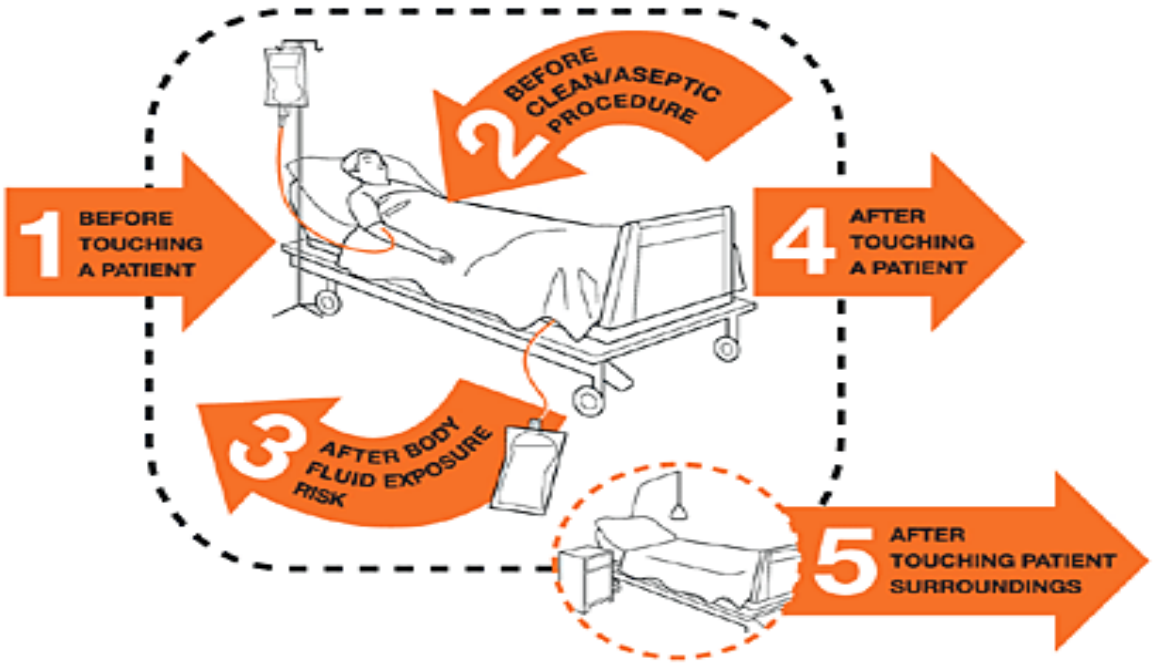
Why must we wash our hand?

Hand hygiene reduces the transmission of microorganisms to ourselves and to others.



Do not touch your face (eyes, nose, mouth) before hand hygiene.

When to perform hand hygiene?



World Health Organization (WHO)

When must we perform hand hygiene?

(Other key moments)

Always wash your hands before:

1. Putting on PPE
2. Preparing food
3. Eating

Always wash your hands after:

1. Taking off PPE
2. Proparing food
3. Cleaning
4. Handling wastes
5. Using the toilet
6. Sneezing, coughing

How to perform hand hygiene ?

General recommendations before hand hygiene

- Remove all hand and wrist jewelry;
- Finger nails must be short and without nail polish;
- Do not wear nail extensions;
- Roll up your sleeves.

Hand surfaces that are generally overlooked

Palm

Back of the hand

Colour gray: sometimes overlooked; Colour black: often overlooked

Hand hygiene technique

Everywhere: If the hands are soiled by dirt or body fluids = WASH THEM WITH SOAP AND WATER.

In hospital environment:

- If hands are not visibly dirty, and if resources allow, apply an alcohol-based handrub

Using 0.05% chlorinated water is also acceptable if no other product is available. *WHO 2014 Guidelines*

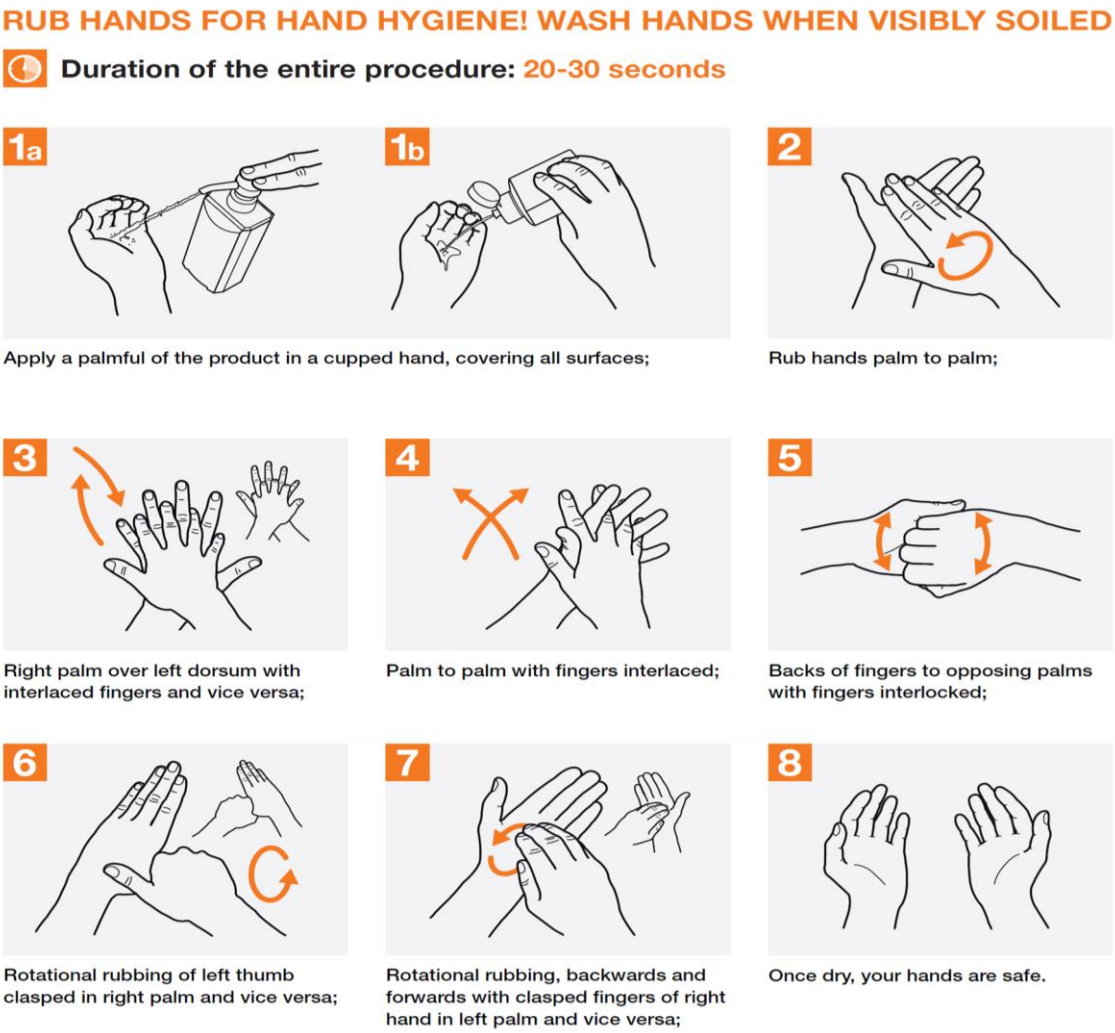
Alcohol-based handrub (AHR)

- *Is active where no stains are visible;*

- *Is a quick way to hand hygiene;*
- *Facilitates compliance with the rules of hand hygiene.*

Never use on hands that are visibly dirty or wet. Hand washing must take 20-30 seconds

Alcohol-based hand rub technique



Water and soap

Conditions for use of soap and water

- Hands are already wet;
- Hands are visibly soiled;
- Presence of a feeling of accumulation of alcohol-based hndrub (sticky or oily hands).

Neccesary items:

- Clean water
- Liquid soap (first choice) or tablet soap

- Hand towel (preferably paper).

REMARK:

- If you do not have a single-use towel, rinse the tap with soap and water before turning it off with your elbow.
- If you use tablet soap, make sure it is placed correctly so that water can flow freely.

Handwashing technique with soap and water

Handwashing stations are placed at all points of entry AND in patient care areas to encourage frequent use

Promotion of hand hygiene

Promotion of hand hygiene in health facilities


Post reminders:

- Put up visual aids on hand hygiene and handwashing techniques close to each station;
- Envisage the use of alcohol-based hand rubs for patients and visitors;
- Encourage patients to perform hand hygiene in health facilities

Promotion of hand hygiene at home

Encourage family members and visitors to practise hand hygiene at home

Consider using water and soap or an alcohols-based handrub.

When?

- Preparing food
- Eating

- Cleaning
- Handling wastes
- Using the toilet
- Sneezing, coughing

Standard Precautions Respiratory Hygiene

Introduction

Do you know?

When you sneeze, germs can travel 80 miles (129 km) per hour.[1]

Dr Kelly Raynolds, University of Arizona, 2009

Objectives

Participants will be able to:

1. Explain the importance of respiratory hygiene
2. Explain when respiratory hygiene is necessary
3. Demonstrate good respiratory hygiene techniques
4. Explain how to promote respiratory hygiene

Why practice respiratory hygiene?

To reduce the spread of germs among patients with respiratory symptoms (for example, cough).

When is respiratory hygiene necessary?

- It must be performed on first contact with a potentially infected person (e.g. emergency, reception of OPD).

Standard Precautions Personal Protective Equipment and according to risk management

Myth or reality

"This work will only last few minutes, so I don't need to wear a personal protective equipment"

Myth

Training Objectives

Participants will be able to:

1. Explain the importance of wearing a PPE
2. Identify the different types of PPE
3. Put on and remove PPE correctly
4. Select the appropriate PPE based on the risk assessment

What is PPE?

- Specialized clothing or equipment used by health personnel, patients or visitors to protect themselves or others from germs
- PPE = any piece of protective clothing (e.g. gloves, mask, gown, etc.)

Types of PPE

Why do we need PPE?

- To prevent contact with germs by creating a barrier between potentially infectious material and the entry paths (eg, eyes, nose, mouth, damaged skin, etc.)

Head Cover/ Hood

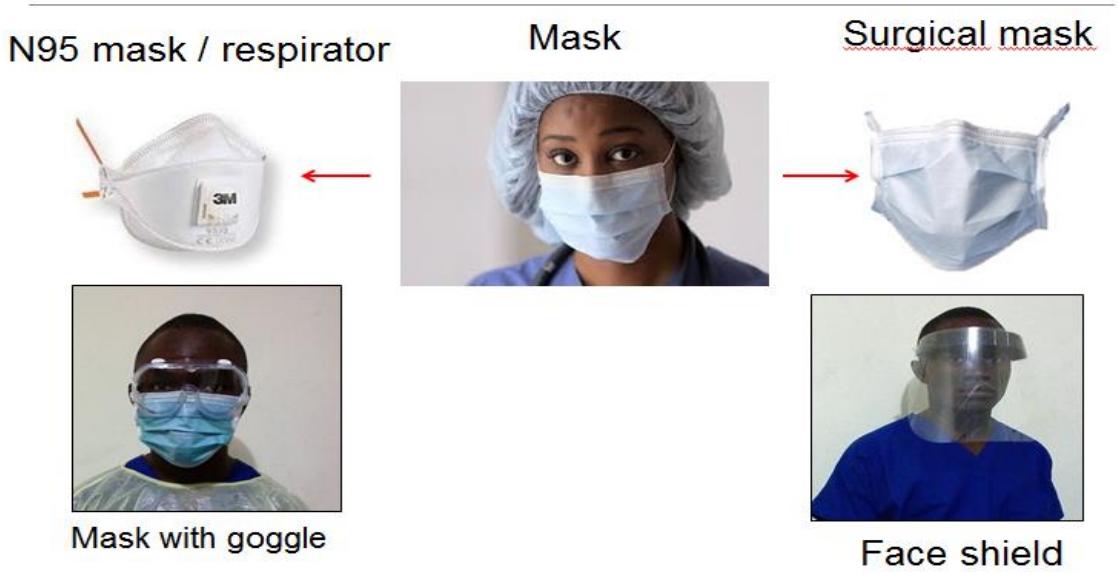
Wear a head cover to protect the hair and scalp from possible contamination;

- Anticipate sprays or aerial exposure
- In case their use is mandatory: surgery, sterilization, laundry, some types of isolation
- Hair can also be a source of infection and must therefore be covered or tied (surgery, laundry, sterilization)

Face protection

- Face protection prevents the transmission of germs to the eyes, nose and mouth
- Wear face protection:
    - During activities likely to generate splashes and sprays of body fluids (for example, aspiration, surgery, labor, cleaning of instruments)
    - When caring for a patient with a new or persistent cough

Type of face protection



Procedure mask:

- Protects nose and mouth from droplets sprayed when coughing and splashing body fluids
- Must be removed / changed if wet or dirty

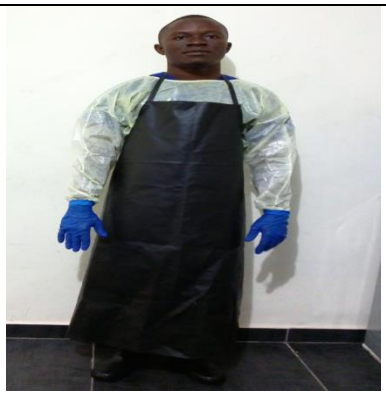
N95 mask / FFP2 respirator:

- Use to protect against airborne germs
- Requires an appropriate adjustment for your face (Fit test)

Blouse/Gown

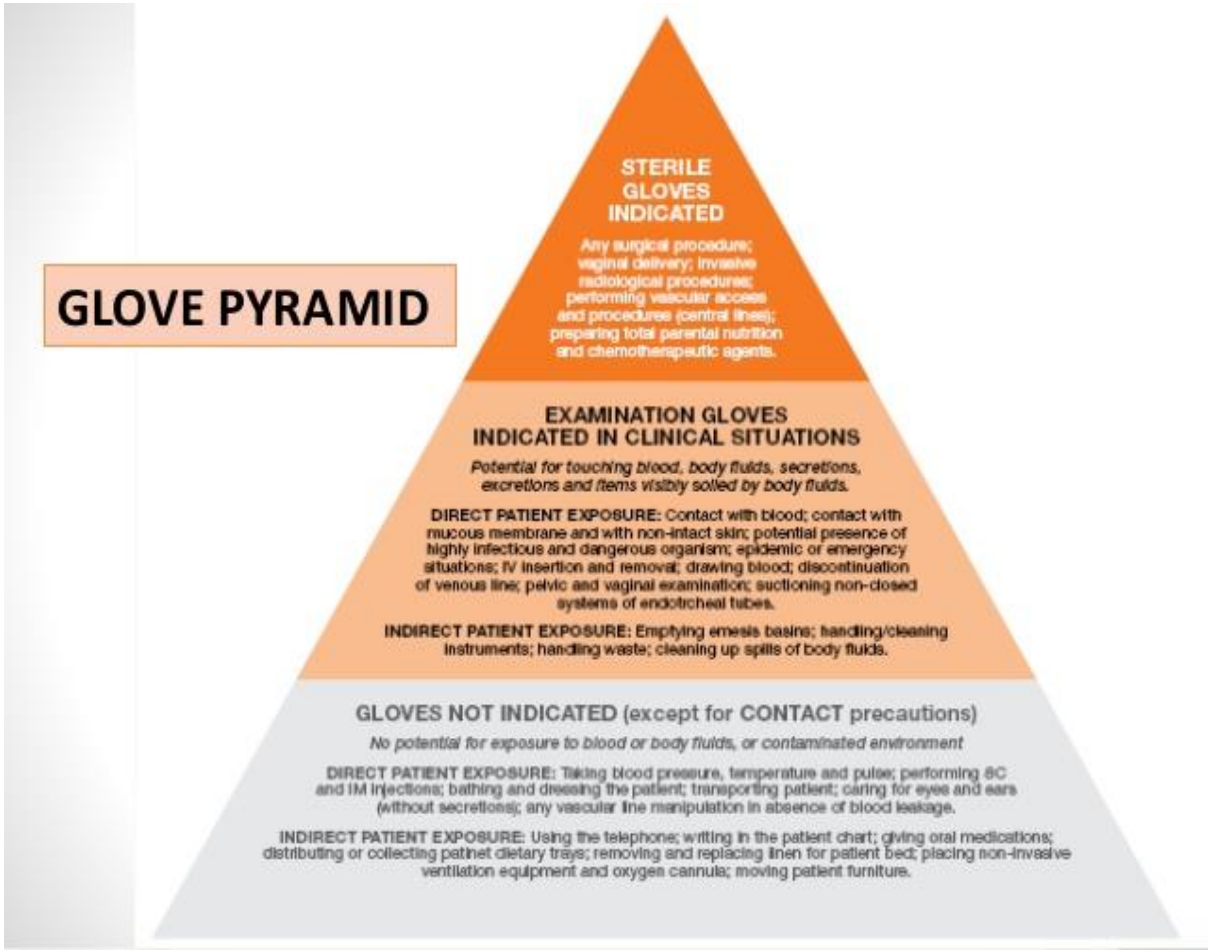
• Are put on to protect the skin and avoid getting clothes dirty • Are put on when: Cleaning up splashes or body fluids Risk of being splashed • Removed when soiled and perform hand hygiene immediately	  

Apron

• Aprons should be worn over gowns when they are likely to be exposed to a large amount of body fluids; • Aprons can be disposable or reusable; • Aprons should be thrown away or appropriately cleaned and disinfected between patients.	

Gloves :

Glove use pyramid: decision support



Gloves

Summary of indications for wearing and removing gloves

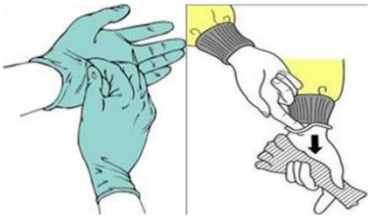
Indications	
Put on gloves	1. Before a sterile procedure 2. When contact with blood or other body fluids is anticipated, including contact with a damaged mucous membrane or skin, regardless of the need to create or maintain sterile conditions 3. In case of contact with the patient (and his immediate environment) when applying contact precautions
Remove gloves	1. As soon as the gloves are damaged or defective (or if their non-integrity is suspected) 2. As soon as contact with blood, body fluid, damaged skin or mucous membrane ends; 3. As soon as contact with a patient, or their immediate environment, or a contaminated body site ends; 4. When there is an indication for hand hygiene.

Basic rules when wearing gloves

Avant de porter les gants,
se laver les mains.

Un soin,
une paire de gants.

Un malade,
une paire de gants.



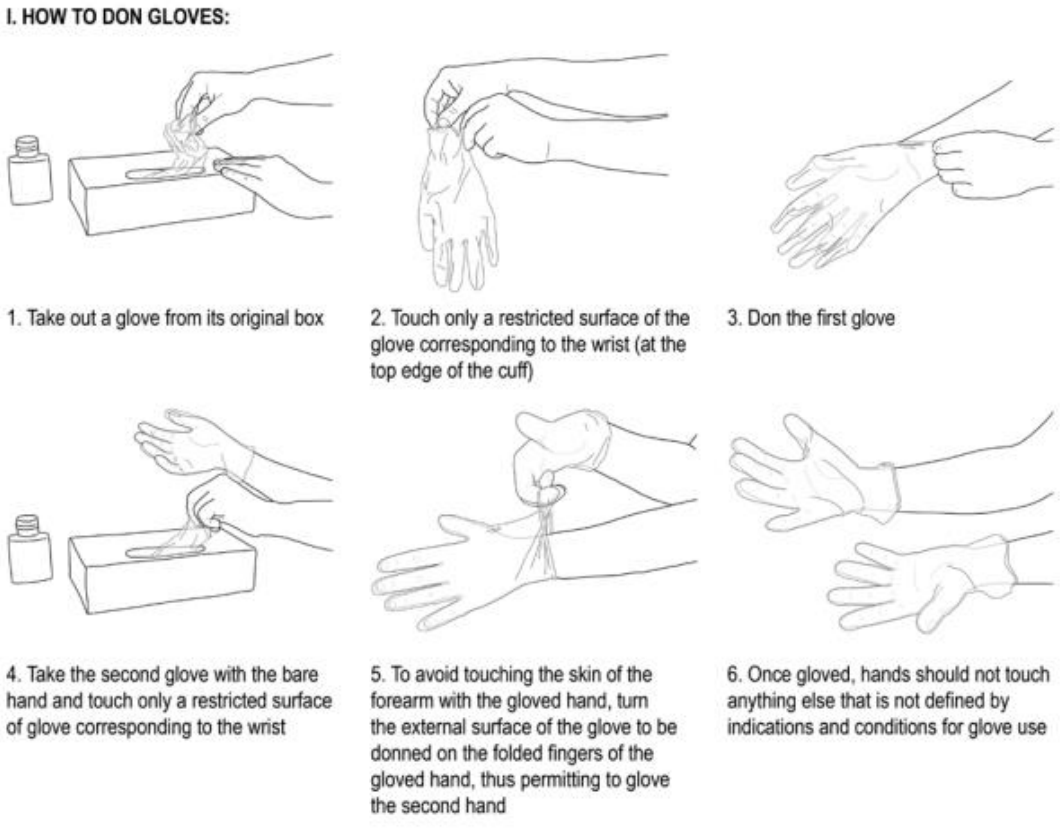
Retirer et jeter les gants dans une poubelle à déchets contaminés.

Après le retrait des gants,
se laver les mains.

Appropriate use of gloves:

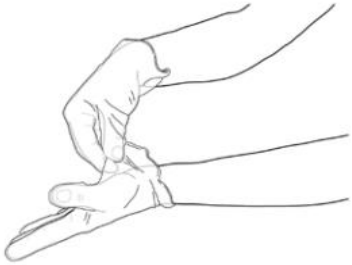
- **Do Not Replace hands hygiene**
- **Do NOT adjust pr touch PPE**
- **Do NOT pick up items (cell phone, pens, books, patient records, etc.)**
- **DO NOT reuse gloves**

How to put on non-sterile gloves?

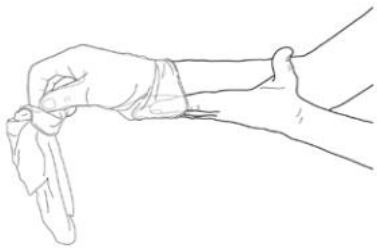


Make sure gloves cover the wrist of the blouse

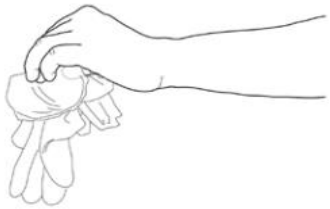
How to remove non-sterile gloves?



1. Pinch one glove at the wrist level to remove it, without touching the skin of the forearm, and peel away from the hand, thus allowing the glove to turn inside out

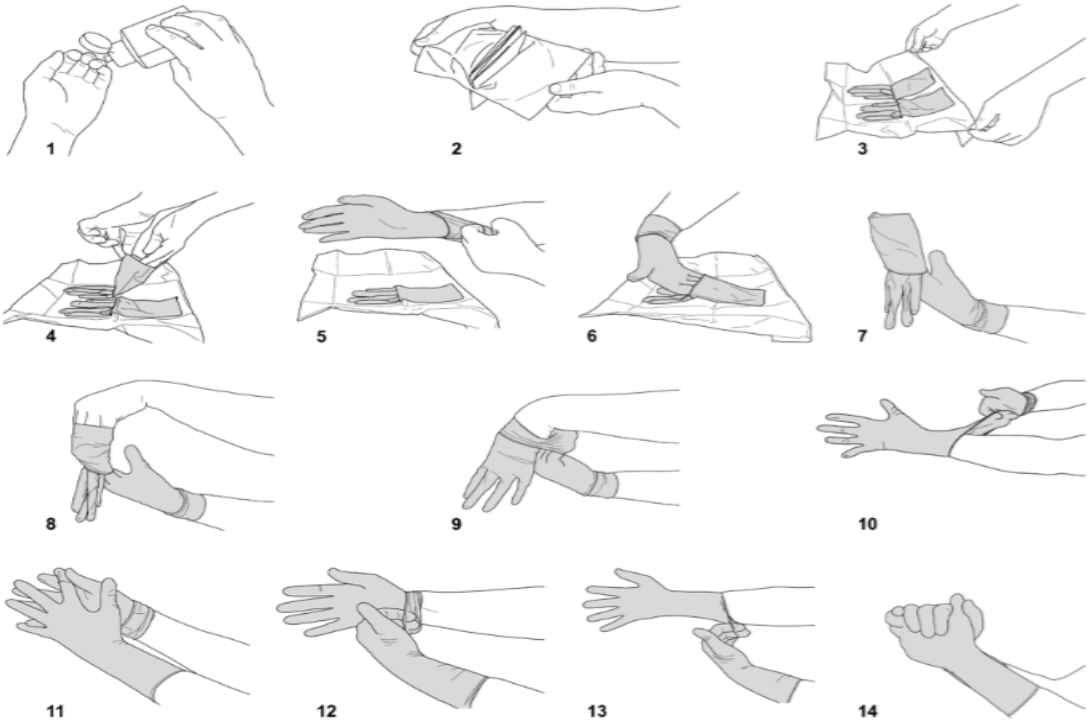


2. Hold the removed glove in the gloved hand and slide the fingers of the unglo-ved hand inside between the glove and the wrist. Remove the second glove by rolling it down the hand and fold into the first glove

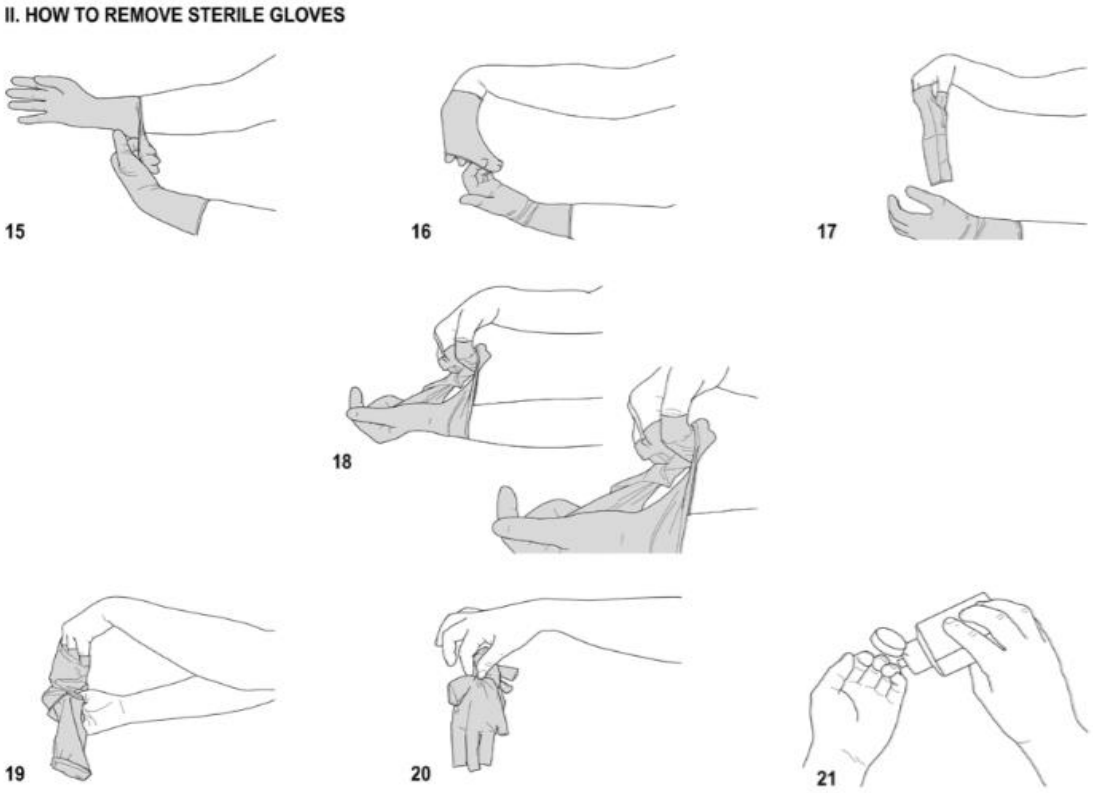


3. Discard the removed gloves

How to put on sterile gloves?



How to remove sterile gloves?



Boots and shoe-covers

- Wear boots or shoe covers when there is a risk that the patient's blood, body fluids or secretions will splash, spill or leak on your feet / shoes.
- Shoe covers are mainly used in the operating room.

Risk Assessment

Risk assessment: risk of exposure to blood, body fluids, respiratory droplets and / or open skin

- ❑ Select the PPE to wear based on this assessment
- ❑ Should be done every time, for each patient
- ❑ International Standard for Safe Care

Make it a routine!

Look at your workplace, what is the risk?

Who is at risk?

Risk assessment

Questions to ask yourself:

- Will I come into contact with biological fluids? Some blood? Does the patient have diarrhoea? Does he vomit?
- Does the patient have a cough?
- Will I come in contact with open skin / sore? Do I have open skin / sores?

PPE Choice

Questions to ask yourself:

- Is it designed for the task at hand or the risk to be avoided?
- Is it disposable or reusable?
- How often should it be changed, cleaned or disinfected?
- Is it available in several sizes? If yes, which size is best for me?
- Other problems to be aware of (supply, storage, availability)?

Basic principles

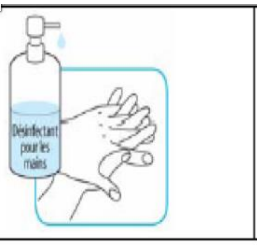
Always wash your hands before and after wearing PPE

- **PPE should be the right size**
- **NEVER reuse disposable PPE**
- **Properly clean and disinfect reusable PPE between each use**
- **Change PPE immediately if it is contaminated or damaged**

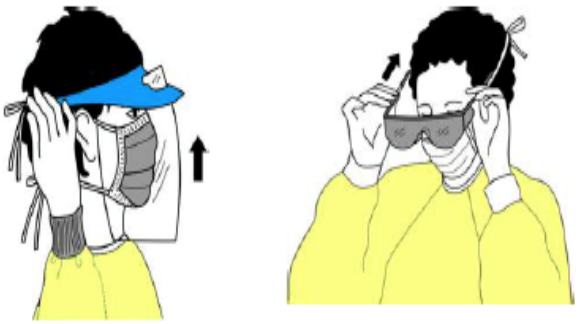
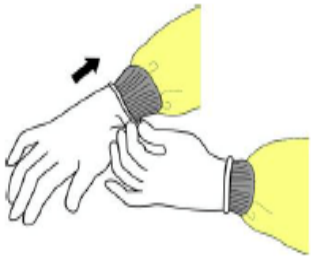
Basic principles

- **Always put on PPE before each contact with the patient**
- **Always remove PPE immediately after leaving the patient's care area**
- **Once you enter the patient area, PPE is always considered contaminated or dirty**
- **Regardless of why you are removing PPE, always be carefully to avoid contamination**

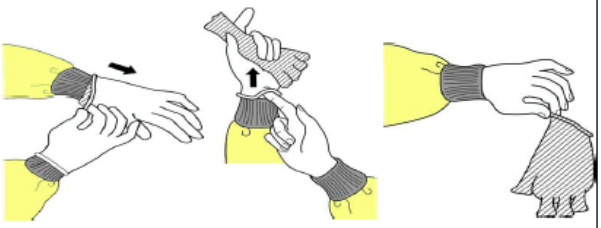
How to put on PPE?

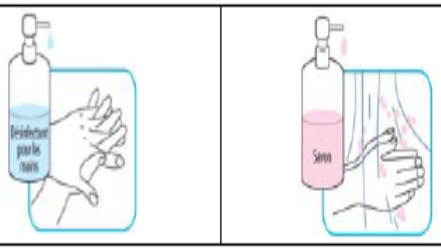
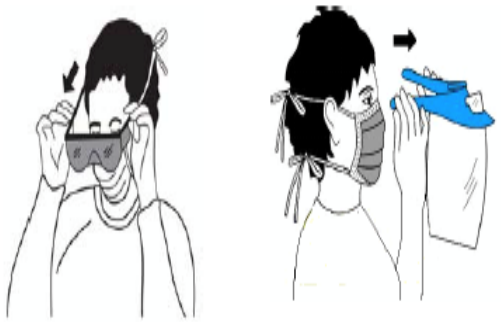
1 Assurer l'hygiène des mains *Images courtoisie de justcleanyourhands.ca*	 
2 Mettre la blouse • Choisir la taille et le type appropriés • L'ouverture se trouve dans le dos • Resserrer au niveau du cou et à la taille	 

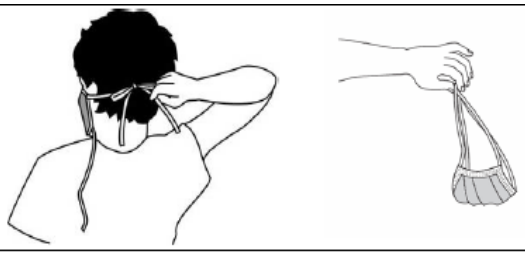
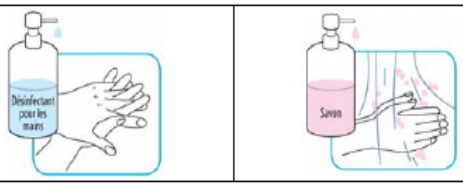
3 Mettre le masque • Utiliser un masque résistant aux liquides ou un masque chirurgical ou à visière • Couvrir le nez, la bouche et le menton • Ajuster la partie souple du nez • Bien tenir en place au moyen des lacets ou des boucles • Ajuster	 **Masque de procédure**
Ou le respirateur • Choisir le respirateur correspondant à votre essai d'ajustement • Couvrir le nez, la bouche et le menton • Ajuster la barrette nasale sur la voute du nez • Bien tenir en place au moyen de la bande élastique du haut, puis celle du bas • Ajuster • Vérifier l'ajustement : 1. Inhaler – le respirateur devrait s'affaisser. 2. Exhaler – remarquer s'il y a des fuites autour du visage.	 **N95 or FFP2**

4 Mettre le protecteur oculaire • Placer les lunettes de sécurité devant les yeux et tenir en place au moyen des boucles aux oreilles ou du bandeau • Placer l'écran facial devant le visage et tenir au front au moyen du bandeau • Ajuster pour le confort	
5 Mettre les gants • Mettre les gants en dernier • Choisir le type et la taille appropriés • Insérer les mains dans les gants • Étirer les gants de façon à couvrir les poignets de la blouse	

How to remove the PPE?

1 Enlever les gants • Saisir le bord extérieur près du poignet • Glisser le gant de votre main en le retournant à l'envers • Tenir ce gant dans la main gantée • Glisser un doigt non ganté sous la manchette du gant toujours en place • Retourner ce gant sens dessus dessous, de manière à former un sac pour les deux gants • Les jeter	
2 Enlever la blouse • Dénouer les attaches • Dégager votre cou et vos épaules • La faire retomber sur elle-même, retourner la surface contaminée vers l'intérieur • Plier ou rouler en boule • Envoyer au retraitement ou le jeter dans un contenant prévu à cette fin • Se laver les mains à l'eau et au savon ou avec une solution à base d'alcool	

3 Assurer l'hygiène des mains *Images courtoisie de justcleanyourhands.ca*	
4 Enlever la protection oculaire • Saisir les attaches aux oreilles ou à la tête de vos mains non gantées • Retirer le protecteur oculaire du visage • Le placer dans le réceptacle destiné à son retraitement	

5 Enlever le masque • Détacher l'attache du bas, puis celle du haut, ou dégager les boucles des oreilles • Retirer le masque du visage en tenant les attaches ou les boucles • Jeter	
Ou enlever le respirateur • Remonter d'abord l'élastique du bas par-dessus la tête • Enlever ensuite l'élastique du haut • Retirer le respirateur du visage en tenant l'élastique • Jeter	
6 Assurer l'hygiène des mains. *Images courtoisie de justcleanyourhands.ca*	

For each photo, find the error!

Find the errors!

The effectiveness of PPE depends on:

- Regular and adequate supply
- Adequate staff training
- Good hand hygiene practices
- Adequate behavior in the isolation area (including use of PPE)
- **Close supervision (in pairs) to put on and take off PPE**

Ensure PPE use is rational and appropriate PPE

- Based on the risk of exposure (e.g. type of activity) and
- the transmission dynamics of the pathogen (e.g. contact, droplet or aerosol).
- The overuse of PPE will have a further impact on supply shortages.
- Observing these guidelines will ensure rational use of PPE.
- The type of PPE used when caring for COVID-19 patients will vary according to the setting and type of personnel and activity

PPE for use in the context of COVID-19

Setting	Target Personnel or Patients	Activity and procedure	Type of PPE
Health Care Facilities			
Outpatient Facilities			
Triage	Health Workers Health Workers **(Risk Assessment -Risk for both TB and COVI-19 transmission is high) (Training, Reminders – Communications,) Cost benefit Analysis**	Preliminary screening not involving direct contact. Respiratory, Air borne , Contact Precautions	SURGICAL MASK AND VISOR Maintain spatial distance of at least 1 metre.
	Patients with respiratory symptoms	Any. Maintain spatial distance of at least 1 metre	SURGICAL MASK (if tolerated by patient).
	Patients without respiratory symptoms	Any-PPE required	Cloth mask from home/ Surgical mask
Outpatient Facilities			

Setting	Target Personnel or Patients	Activity and procedure	Type of PPE
Waiting room	Patients with respiratory symptoms (Patients in the	Any	**Provide medical /surgical mask if tolerated**. Immediately move the patient to an isolation room or separate area away from others; if this is not feasible, ensure spatial distance of at least 1 metre from other patients.
	Patients without respiratory symptoms	Any	Cloth mask from home/surgical mask
Administrative areas	All staff, including health care workers	Administrative tasks	Surgical Mask
Setting	Target Personnel or Patients	Activity	Type of PPE or procedure
Consulting Room	Health workers	Physical examination of patient with respiratory symptoms	Medical mask Gown Gloves Visor
	Health workers	Physical examination of patients without respiratory symptoms	Surgical mask Gloves
	Patients with respiratory symptoms	Any	Medical mask if tolerated by patient
	Patients without respiratory symptoms	Any	Cloth mask from home /surgical mask
Health Care Facilities			
Inpatient Facilities			

Setting	Target Personnel or Patients	Activity and procedure	Type of PPE
Patient Room (COVID-19 Ward)	Health Workers	Providing Direct Care to COVID-19 patients (Limit entry by health workers not providing direct care to the patient- Multiskilling of HCW to perform multiple tasks)	Medical Mask Gowns Gloves Eye Protection (Goggles/Face Masks)
	Health Workers	Aerosol generating procedure on confirmed COVID-19 Patients	Respirator N95 or FFP2 standard, or equivalent. Apron, Gown, Gloves Eye protection
	Cleaners	Entering the room of COVID-19 patients (if risk of splash from organic material or chemicals)	Medical mask; Gown; Heavy duty gloves; Eye protection-Visors Boots or closed work shoes
	Visitors	Entering the room of a COVID19 patient (Avoid unnecessary entry by visitors)	Medica/Surgical mask Gown Gloves
Other areas of patient transit (e.g. wards, corridors).	All staff, including health care workers.	Any activity that does not involve contact with COVID-19 patient	Surgical Mask or PPE Required
Laboratory	Lab technician	Manipulation of respiratory samples	Medical mask Gown Gloves Eye protection
Administrative areas/support.	All staff, including health care workers.	Administrative tasks that do not involve contact with COVID-19 patients	**Surgical Mask**
Community			
Home	Patients with respiratory symptoms	Any	Maintain spatial distance of at least 1 metre. Provide medical mask if tolerated, except when sleeping
	Caregiver	Entering the patient's room, but not providing direct care or assistance	Medical mask

Setting	Target Personnel or Patients	Activity and procedure	Type of PPE
	Care Giver	Providing direct care or when handling stool, urine, or waste from COVID-19 patient being cared for at home	Gloves, Medical mask, Apron
	Health workers	Providing direct care or assistance to a COVID-19 patient at home	Medical mask Gown Gloves Eye protection
Home	Patients with respiratory symptoms	Any. Maintain spatial distance of at least 1 metre.	Surgical mask, except when sleeping
	Caregiver	Entering the patient's room, but not providing direct care or assistance	Medical mask
	Care Giver	Providing direct care or when handling stool, urine, or waste from COVID-19 patient being cared for at home	Gloves, Medical mask, Apron
	Health care workers	Providing direct care or assistance to a COVID-19 patient at home	Medical mask Respirator N95/FFP2/ 3 or equivalent Gown Gloves Goggles or Visor
Public areas (e.g. schools, shopping malls, train stations)	Individuals without respiratory symptoms	Any	Cloth Face Masks
Setting	Target Personnel or Patients	Activity	Type of PPE or procedure
Ports of Entry			
Administrative areas	All staff	Any	Cloth Face Mask
Screening Area	Staff	First screening (temperature measurement) not involving direct contact.	Maintain spatial distance of at least 1 metre. Surgical Mask and Visor
	Staff	Second screening (i.e. interviewing passengers with fever for clinical symptoms suggestive of COVID-19 disease and	Medical mask and Visor Gloves

Setting	Target Personnel or Patients	Activity and procedure	Type of PPE
		travel history)	
	Cleaners	Cleaning the area where passengers with fever are being screened	Medical mask, Apron, Gown, Heavy duty gloves Visor Boots or closed work shoes
Temporary Isolation	Staff	Entering the isolation area, but not providing direct assistance	Maintain spatial distance of at least 1 metre. Medical mask Gloves
	Staff, health care workers	Assisting passenger being transported to a health care facility	Medical mask Gown Gloves Visors
	Cleaners	Cleaning isolation area	Medical mask Gown Heavy duty gloves Eye protection. Boots or closed work shoes
Points of Entry: Ambulance or transfer vehicle			
Ambulance or transfer vehicle	Health Care Workers	Transporting suspected COVID19 patients to the referral health care facility	Medical mask Gowns Gloves Goggles
	Driver	Involved only in driving the patient with suspected COVID19 disease and the driver's compartment is separated from the COVID-19 patient	Maintain spatial distance of at least 1 metre. Surgical Mask
		Assisting with loading or unloading patient with suspected COVID-19	Medical mask Gowns Gloves Eye protection
		No direct contact with patient with suspected COVID-19, but no separation between driver's and patient's	Medical mask

Setting	Target Personnel or Patients	Activity and procedure	Type of PPE
		compartments	
	Patient with suspected COVID19.	Transport to the referral health care facility.	Medical mask if tolerated
	Cleaners	Cleaning after and between transport of patients with suspected COVID-19 to the referral health care facility.	Medical mask Gown Heavy duty gloves Eye protection (if risk of splash from organic material or chemicals). Boots or closed work shoes
Special considerations for rapid-response teams assisting with public health investigations			
Community			
Anywhere	Rapid-response team investigators	Interview suspected or confirmed COVID-19 patients or their contacts.	No PPE if done remotely (e.g. by telephone or video conference). Remote interview is the preferred method.
		In-person interview of suspected or confirmed COVID-19 patients	Medical mask Maintain spatial distance of at least 1 metre. The interview should be conducted outside the house or outdoors, and confirmed or suspected COVID-19 patients should wear a medical mask if tolerated.
		In-person interview with asymptomatic contacts of COVID-19 patients	Maintain spatial distance of at least 1 metre. No PPE required The interview should be performed outside the house or outdoors. If it is necessary to enter the household environment, use a thermal imaging camera to confirm that the individual does not have a fever, maintain spatial distance of at

Setting	Target Personnel or Patients	Activity and procedure	Type of PPE
			least 1 metre and do not touch anything in the household environment.
	Patient	In-person interview of suspected or confirmed COVID-19 patients with rapid response team	Medical mask if tolerated Maintain spatial distance of at least 1 metre. The interview should be conducted outside the house or outdoors, and confirmed or suspected COVID-19.

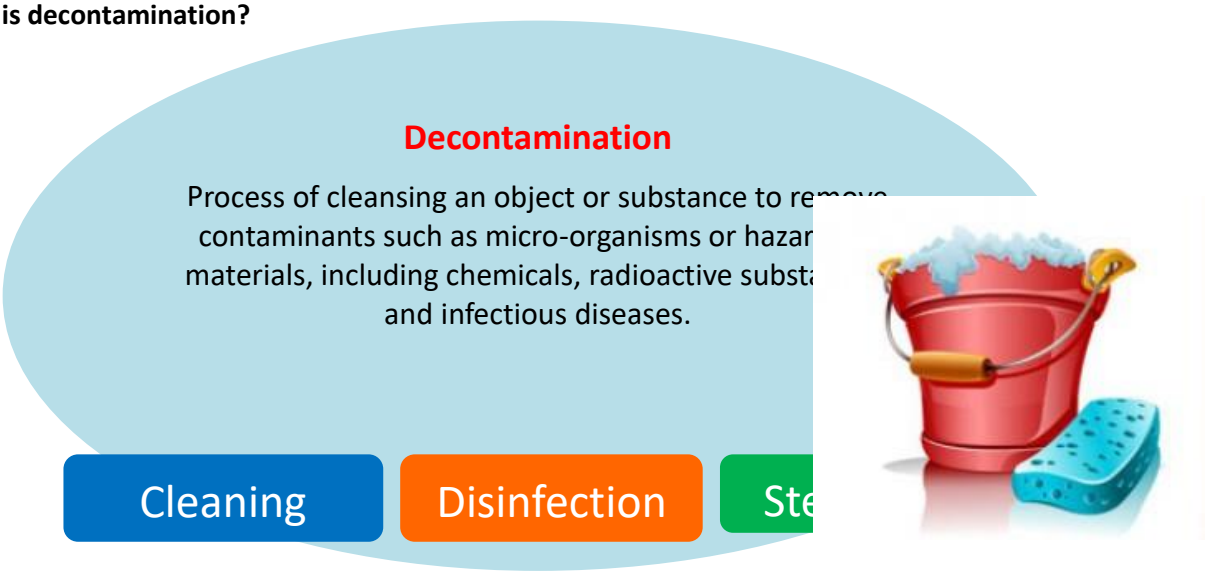
Type of mask for use by health workers depending on transmission scenario, setting and activity*

COVID-19 Transmission scenario	Who	Setting	Activity	What type of mask*
Known or suspected community transmission	Health worker or caregiver	Health facility (including primary, secondary, tertiary care levels, outpatient care, and LTCF)	In patient care area – irrespective if patients are COVID-19 suspect/confirmed	Medical mask (targeted continuous medical masking)
	Personnel (working in health care facilities but not providing care for patients, e.g. administrative staff)	Health care facility (including primary, secondary, tertiary care levels, outpatient care, and LTCF)	No routine activities in patient areas	Medical mask not needed. Medical mask should be considered only if in contact or within 1m of patients, or according to local risk assessment.
	Health worker	Home visit (for example, for antenatal or postnatal care, or for a chronic condition)	When in direct contact or when a distance of at least 1m cannot be maintained.	Consider using a medical mask
	Health worker	Community	Community outreach programs	Consider using a medical mask
Sporadic transmission or clusters of COVID-19 cases	Health worker or caregiver	Health care facility (including primary, secondary, tertiary care levels, outpatient care, and LTCF)	Providing any patient care	Medical mask use according to standard and transmission-based precautions (risk assessment)
	Health worker	Community	Community outreach programs	No mask needed
Any transmission scenario	Health worker or caregiver	Health care facility (including primary, secondary, tertiary care levels, outpatient care, and LTCF)	When in contact with suspect or confirmed COVID-19 patient	Medical mask
	Health worker	Health care facility (including LTCF), in settings where aerosol generating procedures (AGP) are performed	Performing an AGP on a suspected or confirmed COVID-19 patient or providing care in a setting where AGPs are in place for COVID-19 patients.	Respirator (N95 or N99 or FFP2 or FFP3)
	Health worker or caregiver	Home care	When in close contact or when a distance of at least 1 m cannot be maintained from a suspect or confirmed COVID-19 patient	Medical mask

*This table refers only to the use of medical masks and respirators. The use of medical masks and respirators may need to be combined with other personal protective equipment and other measures as appropriate, and always with hand hygiene.

Decontamination and sterilization of surfaces, materials, quipment's/medical devices and environment

What is decontamination?



Why decontamination is important?

Since microorganisms can live:

- On surfaces (tables, chairs)
- On medical equipment (thermometer, stethoscope)
- In body fluids (droplets, blood, sputum, etc.)

Decontamination helps to reduce the spread of microorganisms and other contaminants that may be a threat to human health

What is cleaning?

The first step needed to eliminate contamination from foreign materials, such as dust or soil.

It also helps to remove organic matter, such as blood, secretions, excretions and microorganisms, to prepare a surface or medical device for disinfection or sterilization.

What is disinfection?

A process for reducing the number of viable microorganisms to a less harmful level.

This process cannot inactivate bacterial spores, prions and some viruses.

Many chemicals can be used as disinfectant.

- Chlorine is the most commonly used disinfectant for disinfecting surfaces.

- It is not recommended for medical instruments/equipment

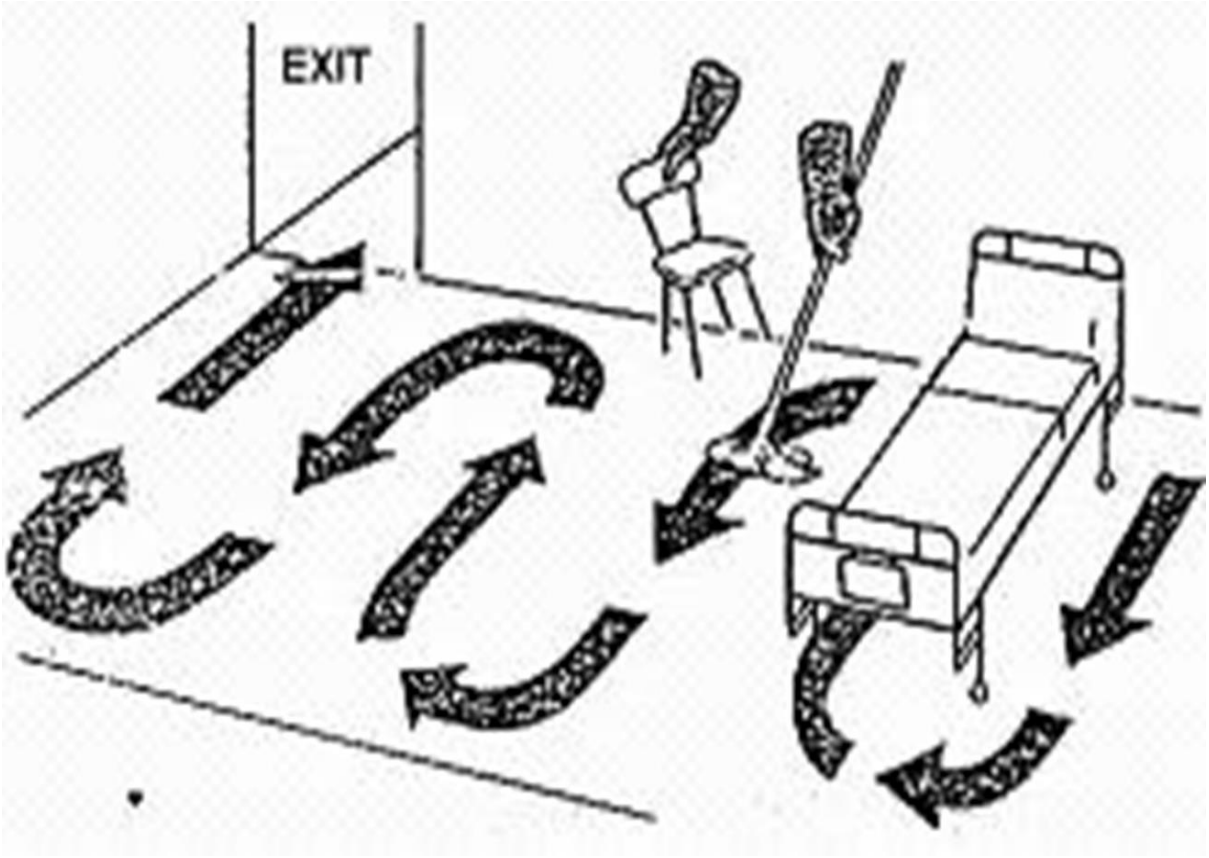
What is sterilization?

Validated method for use in rendering an object free of viable microorganisms, including viruses and bacterial spores, but not prions.

How to clean and disinfect surfaces

Cleaning/disinfection principles

- Always proceed from the highest area to the lowest area.
- Always proceed from the cleanest area to the dirtiest area.
- Always be sure to clean/disinfect patient care equipment between patients.
- One bucket = one task
- Buckets intended for specific uses must be labelled and/or of a specific colour.
- Isolation cleaners must be stored and used only in isolation.
- The isolation area must always be cleaned/disinfected last.



Steps for cleaning and disinfecting surfaces

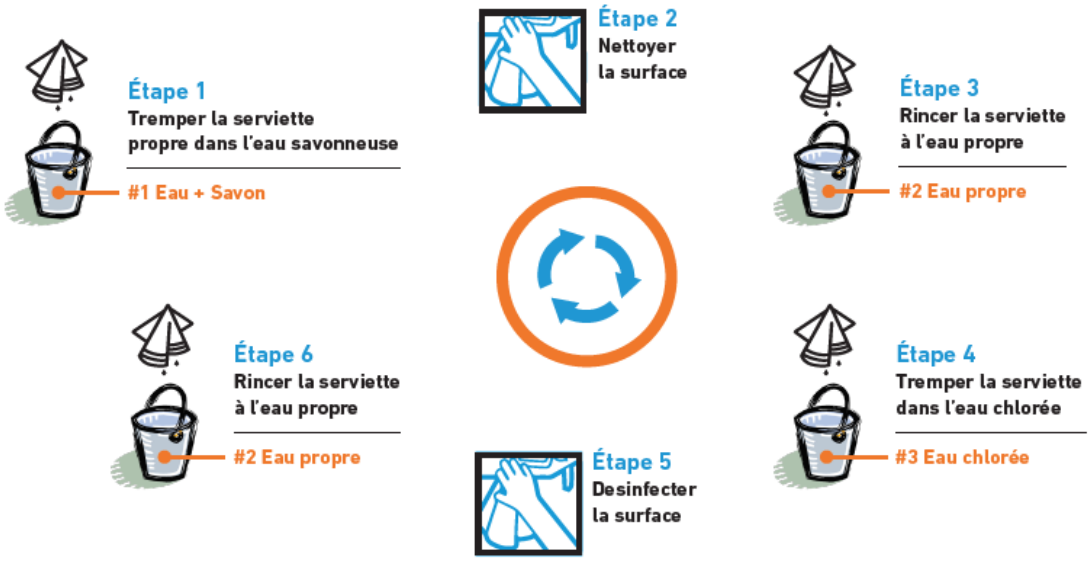
1) **IMPLEMENT** hand hygiene

2) **PUT ON** PPE (Household gloves, waterproof coat, apron, boots, mask, goggles or face shield)

3) **REMOVE** waste and dirty linen

4) **CLEAN AND DISINFECT** the area following the 3-bucket method ***Always clean before disinfecting; the use of disinfectants on a surface containing debris reduces the effectiveness of the disinfectant.***

Steps in the 3-bucket method



To avoid contamination and keep the disinfectant effective, change the water (bucket #2) and towel between each room/bed and/or when the water is dirty.

5) **ALLOW** surface to dry naturally

6) **EMPTY** wastewater in patients' latrines

7) **TAKE OFF** PPE according to the technique

8) **IMPLEMENT** hand hygiene

Never spray disinfectant on PPE and/or clinical care areas, whether occupied or unoccupied.

Key points to remember

- **USE a 0.5% chlorinated water solution to disinfect.**

  Always make sure to respect the **contact time of 10 minutes between the surface and the chlorine solution (do not allow to dry)**

- **NEVER soak a dirty towel in a bucket of chlorinated water. The chlorinated water will be contaminated**

- **NEVER wipe surfaces with a dry towel. A dry towel spreads debris/dirt instead of cleaning it up**

How to clean body fluid spills?

1) **Implement hand hygiene**

2) **Put on PPE** (Household gloves, waterproof coat, apron, boots, mask, goggles or face shield)

3) Clean up:

   - Wipe up the spill with a cloth or paper towel
   - Immediately dispose of the soiled cloth/wipe in a plastic bag for infectious waste disposal.
   - Clean thoroughly using a clean mop soaked in water and neutral detergent/soap (e.g. OMO), rinse with clean water

4) **Disinfect:** Disinfect the surface with a 0.5% chlorine solution. Always make sure to respect the contact time of 10 minutes between the surface and the chlorine solution (do not allow to dry)
   In order to avoid the formation of droplets, splashes or the dispersion of liquids, **never spray**
5) **Allow surface to dry**
6) **Take off PPE**
7) **Implement hand hygiene**

NEVER soak the dirty cloth/towel in chlorine or water after use, as they are considered highly infectious waste.

This increases the handling of infectious waste and the risk of contamination.

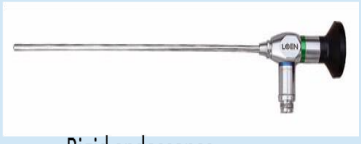
Classification of instruments

Factors to consider

TYPE OF INSTRUMENT/DEVICE **Critical, semi-critical or non-critical**	**PRESENCE of MICROORGANISMS** **Number (bioburden) and capacity to provoke an infection**
TYPE OF MICROORGANISM **Bacteria, spores, virus or prions**	**PATIENT SUSCEPTIBILITY** **Type of procedure: invasive** **or non-invasive**

Risk assessment:
Spaulding Classification

CATEGORY	DEFINITION	DECONTAMINATION METHOD	EXAMPLES OF COMMON ITEMS/EQUIPMENT
High Risk (Critical)	Medical devices that penetrate sterile tissue or the vascular system	Sterilization Moist (Autoclave) or dry heat, if stable to heat Chemical, if sensitive to heat. Heat sensitive items can also be treated with low temperature steam.	Surgical instruments, implants, prostheses and devices, urinary catheters, cardiac catheters, implants, needles and syringes, dressings, sutures, delivery kits, dental instruments, rigid bronchoscopes, cystoscopy



Rigid endoscopes

CATEGORY	DEFINITION	DECONTAMINATION METHOD	EXEMPLES OF COMMON ITEMS/EQUIPMENT
Intermediate Risk (Semi-critical)	Medical devices in contact with mucous membranes or non-intact skin	High-level disinfection by heat or chemicals (under controlled conditions with minimal toxicity to humans)	Respiratory therapy and anaesthesia equipment, flexible endoscopes, vaginal speculums, reusable bedpans and urinals, equipment, etc. Bedpans, urine bottles, patient bowls

Flexible endoscopes

CATEGORY	DEFINITION	DECONTAMINATION	EXEMPLES OF COMMON

		METHOD	ITEMS/EQUIPMENT
Low Risk **(Non-critical)**	**Items in contact with intact skin**	**Low-level disinfection, i.e. must be cleaned and disinfected using towels or cloths soaked in disinfectant.**	**Blood pressure cuffs, stethoscopes, ECG electrodes, etc.**

How to clean/disinfect reusable materials/equipment

<u>Non-critical</u>

1. **Soak the towels/cloths with alcohol (70%)**
2. **Clean up the instruments with the towel/cloth**
3. **Allow to dry**

Non-critical instruments do not need to be cleaned before being disinfected

How to clean semi-critical and critical instruments?

<u>Other types (semi-critical and critical)</u>

- Proceed according to criticality and type of instrument
  - High-level disinfection:
    - ❑ Chemical recommended for this type of procedure not available in DRC

- Specific environmental requirements (e.g. temperature, ventilation and hazardous waste disposal)

- Sterilization: Follow procedure in the sterilization module

How to clean plates and utensils?

1) **Dispose of leftover food**
2) **Wash with soapy water**
3) **Rinse with clean water**
4) **Wash plates, cups and utensils with a solution of chlorinated water (0.05%) for 10 minutes**
5) **Rinse with clean water and air dry**
6) **Pour used chlorinated water and soapy water into patients' latrines.**

How to clean reusable PPE (1)?

1) **Collect reusable PPE (boots, household gloves, apron and eyeglasses) from the PPE removal area**
2) **Remove body fluids with clean water**
3) **Wash with soapy water**
4) **Rinse with clean water**
5) **Soak the PPE in a bucket of 0.5% chlorinated water for 10 minutes**
6) **Rinse with clean water**
7) **Hang to dry**
8) **Pour used chlorinated water and soapy water into patients' latrines**

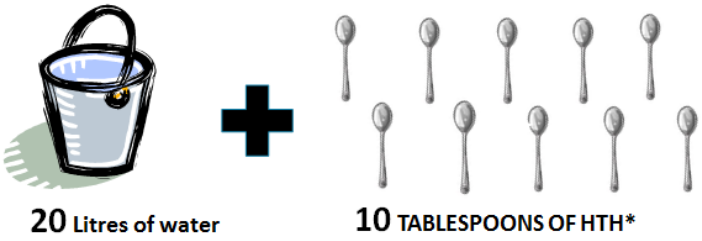
How to clean laundry?

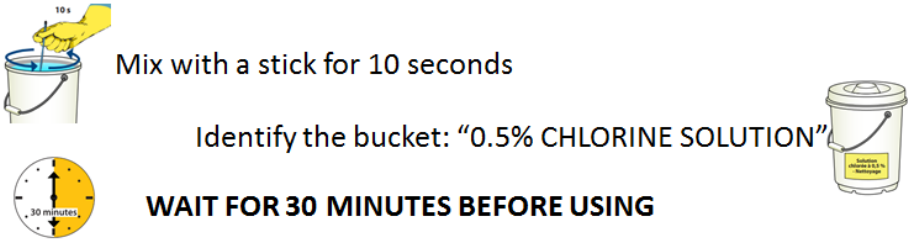
1) If there is solid dirt, faeces or vomit on the laundry, scrape it off with a solid, flat object, dispose of it in the patient's latrine and disinfect the used container.
2) Place soiled laundry in a receptacle (leak-proof bag or bucket) before transporting it out of the isolation area, and disinfect the outer surface of the receptacle.
3) Transport the container directly to the laundry room.
4) Put the laundry in a tub of hot soapy water and stir with a stick.
5) Rinse with clean water.
6) Soak in 0.05% chlorinated water for 30 minutes.
7) Rinse with clean water.

8) Spread out for drying.

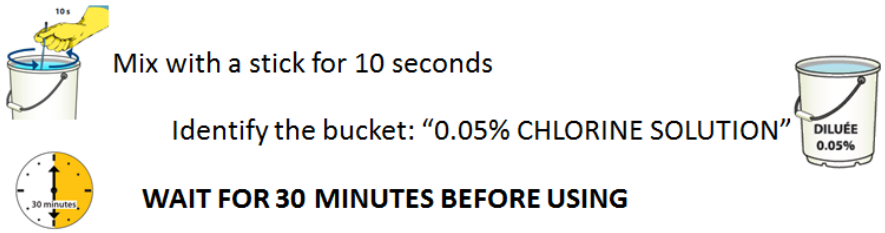
Preparing solutions

How to prepare 0.5% Chlorine solution with 70% HTH?





How to prepare 0.05% Chlorine solution with 70% HTH?

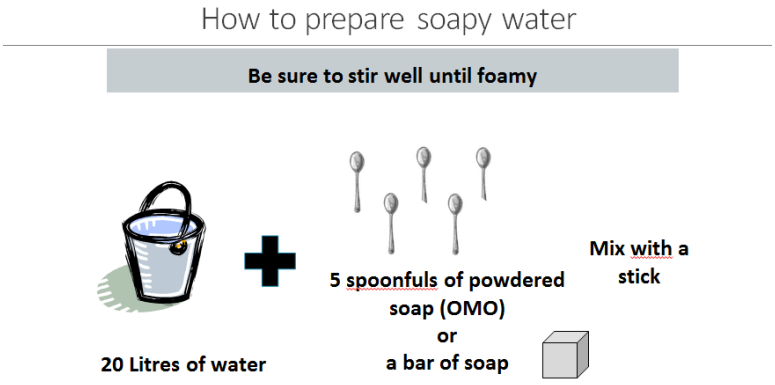


Chlorine solution mixture

If you don't mix the chlorine solution well, it could look like this:

How to prepare soapy water?

Be sure to stir well until foamy



How to clean the bucket for droppings?

1) Wash the bucket with water and soap
2) Rinse with clean water
3) Rinse the bucket with 0.5% chlorinated water

Always empty dirty water (with or without chlorine) in patients' latrines.

Cleaning frequency (At what frequency)

Items	**Cleaning frequency**
Surfaces (tables, chairs)	At least twice a day, or as required
Plates/utensils	After each patient
Medical equipment (thermometers)	After each patient
Reusable PPE: aprons, household gloves, goggles, boots	After cleaning up a spill After coming out of isolation When visibly dirty At the end of each day

Place	Cleaning frequency
Triage	At least twice a day, or as required (e.g. suspected case of EBOLA)
Isolation	At least once a day, after a leave or as required
Other patient care settings	At least once a day, after each patient or as required
Latrines	At least twice a day, or as required
All other places	Immediately after a body fluid spill

Introduction to Sterilisation

Objectives

Participants will be able to:

- Understand the concept of sterilisation and why it is important
- Identify environmental requirements
- Describe and prevent potential safety risks
- Identify the requisite type of PPE
- Describe the sterilisation methods

Sterilisation: Validated process used to render a product free from viable microorganisms, including viruses and bacterial spores, but not prions. Level of reprocessing required for critical medical devices, as identified by the Spaulding classification and presented in the module on decontamination

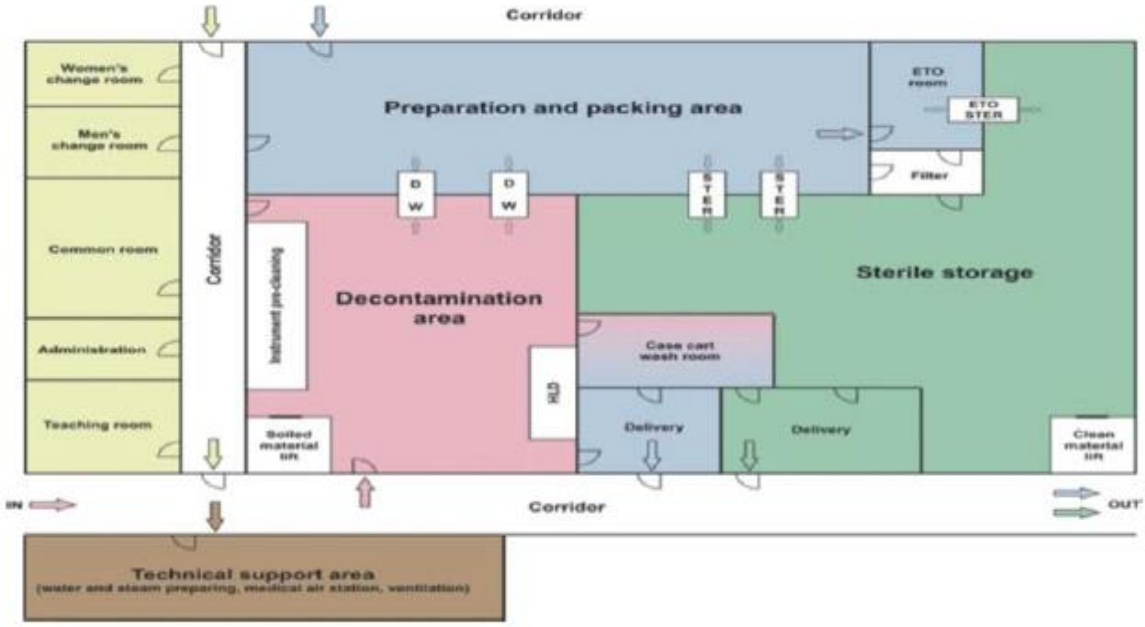
Why is Sterilisation Important?

- Ensure that reusable medical devices can be used safely
- Ensure the safety of patients
- Reduce the risk of surgical site infections among patients
- Standards of care
- Boiling and steaming of devices **IS NOT** sterilisation (it is high-performance disinfection)

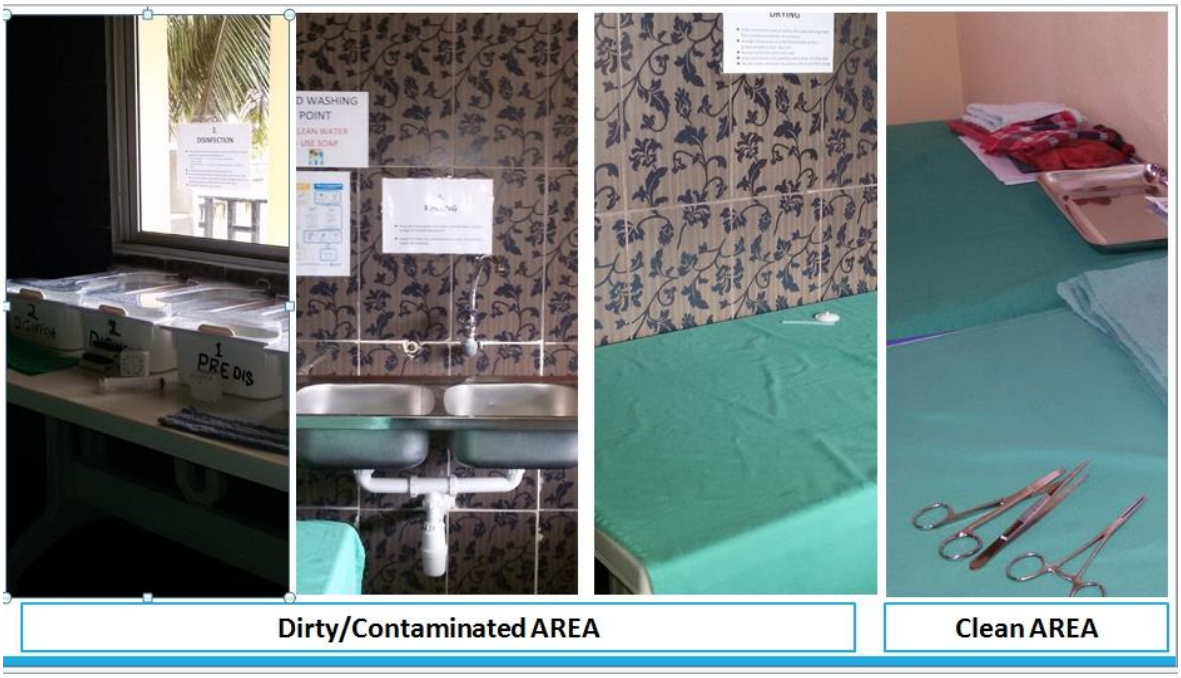
Environmental Requirements

- Dedicated area for decontamination (cleaning, disassembling and disinfection): **dirty/contaminated AREA**
- Dedicated area for inspection/assembly/packing: **clean AREA**
- Dedicated area for storage
- Restricted access (only authorised staff, trained in sterilisation techniques)
- Unidirectional workflow
- Surfaces are cleaned and disinfected at the start and end of each day
- Windows closed at all times
- Available clean water and access to hand hygiene stations

Example of Sterilisation (WHO Recommendation)



Example of Sterilisation
(Confined Space)



Potential Safety Hazards

- Burns from hot materials and the walls and door of the room
- Burns from residual steam and materials at end of cycle
- Burns from boiling liquids and spillage
- Injuries to hands and arms while closing door/lid of pot/autoclave
- Physical injury in an explosion

Safety Measures

- Only qualified staff must use the autoclave
- Staff must be properly trained on the “Sterilisation Process using an Autoclave”
- The names of those responsible for the sterilisation process should be posted near the equipment
- The process for using the autoclave should be posted near the equipment
- The equipment should be verified monthly or annually
- Equipment servicing should respect the manufacturer’s manual

Personnel Requirements

- All staff should be trained according to the relevant level of activity of the decontamination unit, including the proper use of PPE and the safe manipulation of chemicals
- All staff must be vaccinated against Hepatitis B
- Training must cover every aspect of the decontamination cycle
- Technical training on every reprocessing equipment
- Identify problems and interpret validation tests (i.e. inconsistent results)

Necessary Equipment

- Proper PPE : Cleaning and decontamination: Long rubber gloves (domestic gloves), work wear (uniform), apron (plastic/waterproof), face cover (goggles or visor and procedure mask), rubber boots, head cover (bonnet)
- Packaging: work wear (uniform/gown), procedure mask, head cover (bonnet), clogs/closed shoes
- When using the autoclave (sterilisation): heat-resistant gloves, work wear (uniform), scrubs, apron, eye shield, head cover (bonnet), closed shoes (boots)

PPE ZONE dirty/contaminated

Necessary Equipment

1. Cleaning materials: cloths, brushes, soap/disinfectant for cleaning
2. Clean absorbent towel
3. Chemical indicator tape (if available)

4. Timer

5. Sterilisation log
6. Clean water: low in minerals, preferably distilled
7. Heat source: electric burner (min.1500 W), gas or kerosene burner + fuel

Sterilisation Method

Steam sterilisation (Autoclave)

Advantages

- Rapid heating and penetration
- Short exposure time (temperature must be maintained during entire exposure period)
- Non-toxic for staff
- May damage delicate devices

Items to be sterilised must be:

- Cleaned
- Packaged to allow penetration of steam

The autoclave must be properly loaded

Dry Heat (aslo known as baking)

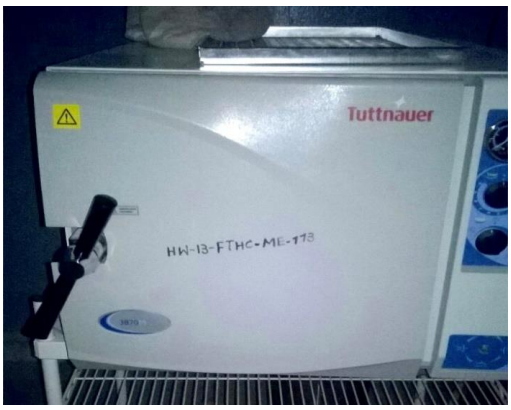
Advantages

- Non-corrosive
- Reaches internal parts which cannot be detached for direct contact with the steriliser (by thermal conduction)
- Non-toxic for staff
- Inexpensive

Items to be sterilised must be:

- Cleaned
- Packaged in materials which do not block heat from the devices and which are not damaged at the temperature used

The oven must be properly loaded



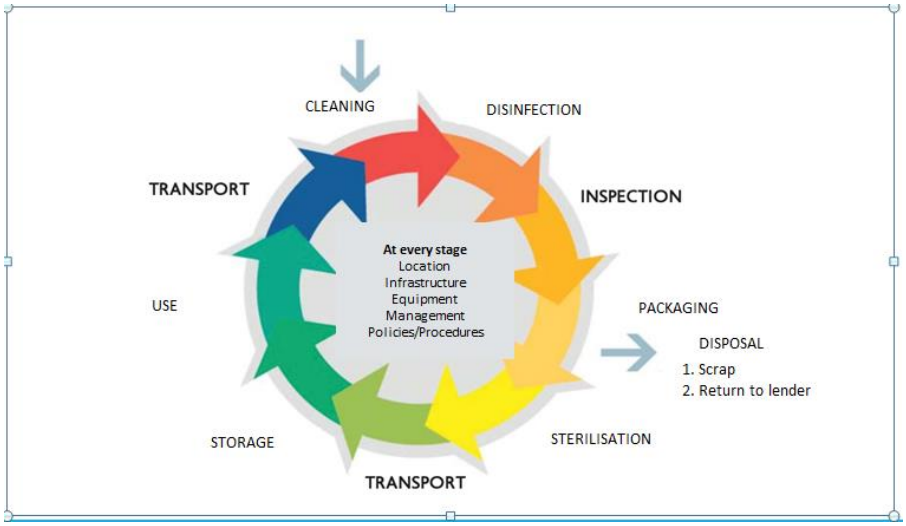
Sterilisation Process
Equipment Reprocessing, Guidelines and Recommendations

Participants will be able to:

1. Understand and describe reprocessing
2. Explain and execute the different stages of reprocessing
3. Describe and carry out quality assurance of the sterilisation process

What is Reprocessing?

The stages of preparing used medical equipment for reuse



Recommendations and Guidelines on Retreatment

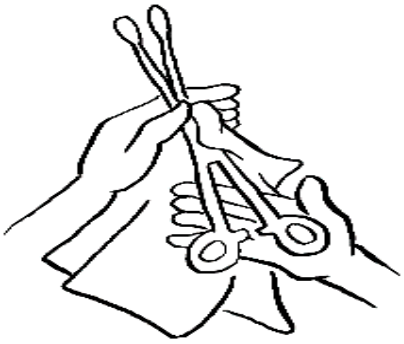
1. Pre-clean and check devices at point of use:

   Practice hand hygiene. Wear the appropriate PPE .Long rubber gloves (household gloves), work wear (uniform), waterproof apron, hair cover (bonnet), visor (eye protection), face mask, rubber boots.

   Separate sharp reusable medical devices or instruments which include sharp objects from other equipment. Wipe excess blood or organic materials with a wet cloth (prevents corrosion).

   Place the devices in a clearly identified airtight container. Keep the medical devices moist inside the transportation container by adding a moist towel with water (not saline)

   Do not soak the devices in disinfectant before transporting for sterilisation



2. Properly transport used devices:

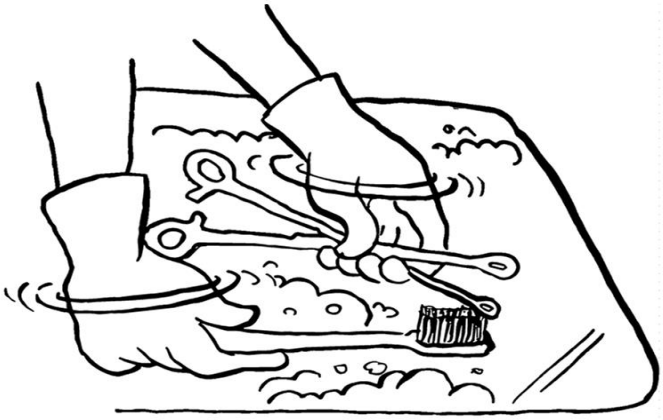
   Transport contaminated medical devices to a decontamination zone as soon as possible

   Fully enclosed, leak-proof, puncture-proof and easy to clean container. **Never** transport medical devices in containers with water as water is a splash hazard. Decontaminate the container after every use. Use the designated path/route for this purpose (**avoid** high traffic and patient care areas). Clearly identify all trolleys and contaminated containers

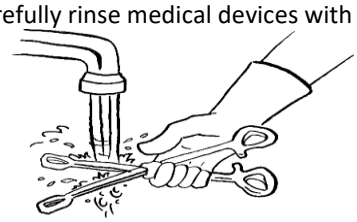
3. Clean instruments manually: Practice hand hygiene.

   Staff wear the appropriate PPE

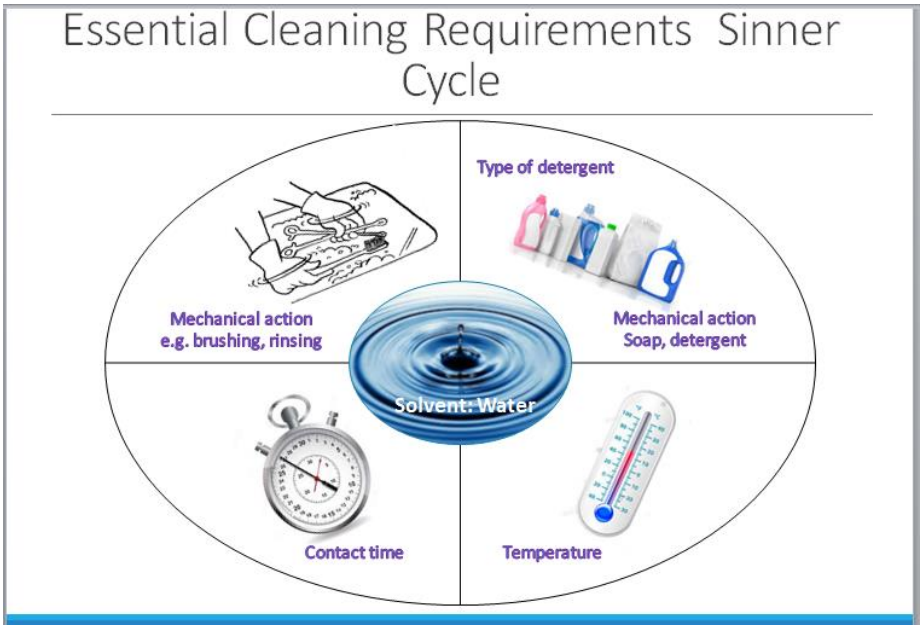
   1. long rubber gloves (domestic gloves)
   2. work wear (uniform)
   3. waterproof apron
   4. Head cover (bonnet)
   5. visor (eye protection)
   6. face mask
   7. rubber boots
   8. Use a soft brush and detergent (liquid or powder) to remove organic materials
   9. Soak the medical devices in clean water containing a detergent for 3-5 min
   10. Use a soft brush or old toothbrush to vigorously scrub the medical devices and other instruments to eliminate any foreign body. Keep the devices under water while scrubbing and cleaning to avoid splashing.



   11. Dismantle medical devices (if it is not already done) and other multi-part items, and make sure to brush ridges, cogs and joints where organic matter may accumulate or stick.
   12. Carefully rinse medical devices with clean water



   13. Air dry or use a lint-free, non-abrasive cloth to dry the medical devices

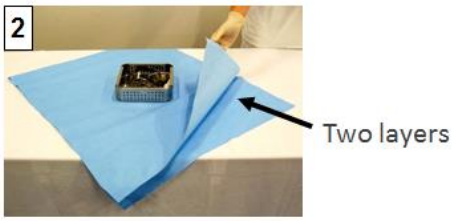


4. Prepare and condition devices (Inspection, Assembly and Packaging)

   Devices must be packed twice, attached with autoclave tape and properly labelled.

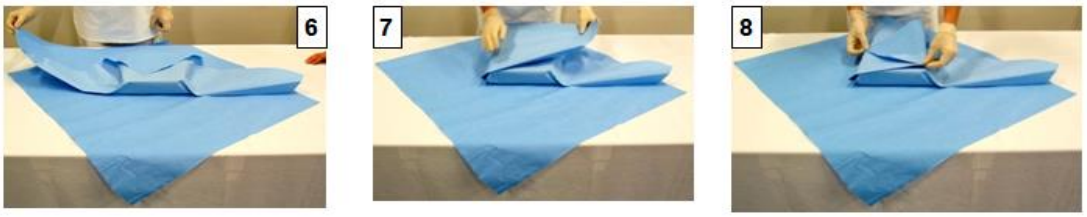
   1. The paper format must be three to four times bigger (width and length) than the set to be packaged
   2. Devices should not be packed too tight to allow steam circulation and avoid the formation of air pockets
   3. Make sure the label is not erased during the autoclaving process

Packaging Technique



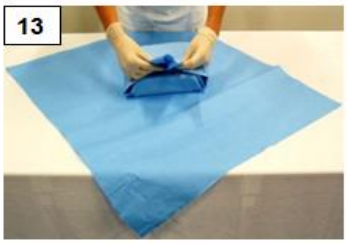
Place the wire basket (if used) or the devices at the centre of the wrap

Fold the outer corner toward you and turn back the corner outwards



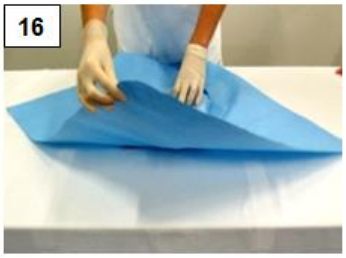
Fold the right corner towards the center and then turn the corner outwards

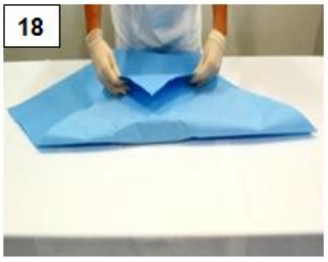
Fold the left corner towards the centre then fold the corner outwards

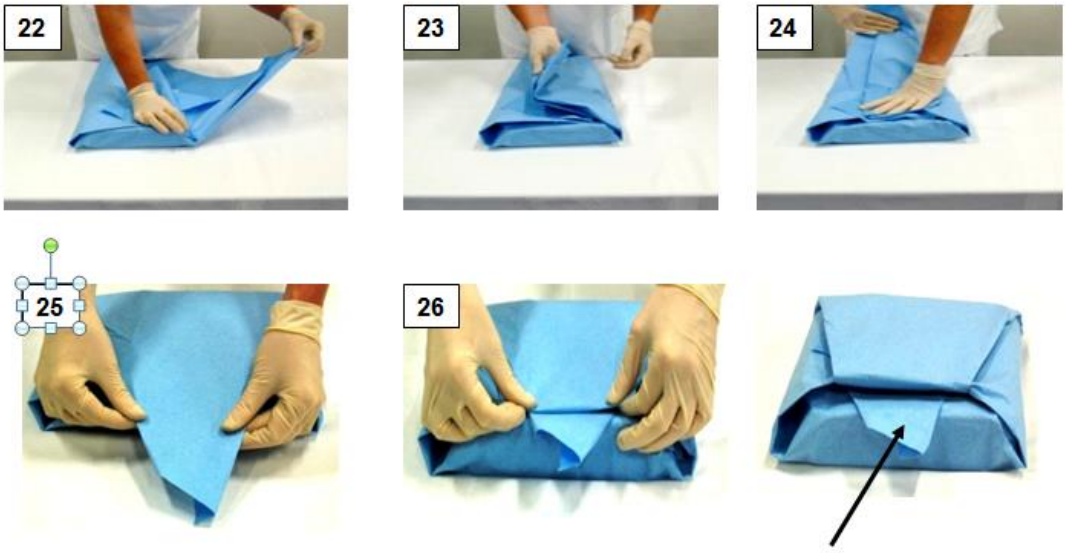


Fold the last corner towards the centre and the folding its edge outwards

Use the same method to wrap the second layer of paper







Fold the last corner of the second layer such that this corner is protruding, providing an aseptic opening of the set

Seal the package with two pieces of adhesive tape, sterilisation indicator

Mark the content, date and number of the sterilisation cycle

Store in a clean and dry place until sterilisation

5. Sterilise with autoclave

Before each sterilisation make sure the autoclave is in perfect operating condition. Follow the instruction manual to the letter. The autoclave must be placed in a well-lighted, well ventilated area, away from draughts, on a flat and stable surface

Stages of sterilization with a 39 L Autoclave

1. Preparation: Pour three litres of water between the autoclave reservoir and basket.

   Never heat the autoclave without water!

   Never pour cold water in a hot autoclave (risk of cracking)!

Insert the basket.

Place the items in the basket for sterilisation

- Space out the items
- Do not overload (max 75% of the volume of the autoclave)
- Place the packages vertically

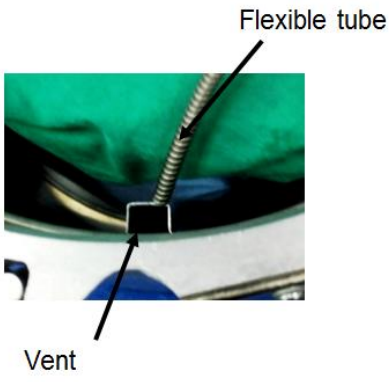
If available, *place a tape (chemical indicator) at the centre of the autoclave load and wrap it in two layers of crepe paper. Verify the expiry date before use!*

Place a clean absorbent cloth or a layer of crepe paper on the load to absorb condensation from the lid

Reposition the lid

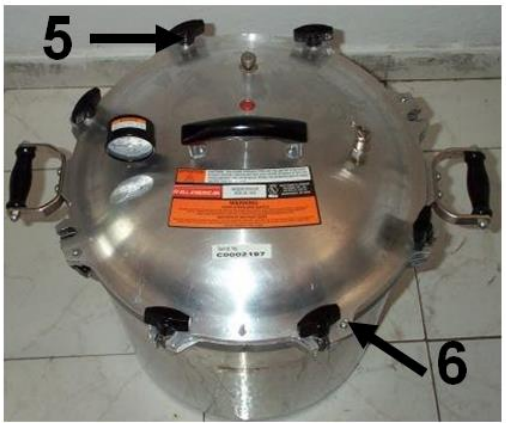
a) Align the arrow on the top with the notch

b) Connect the flexible metallic tube with the vent inside the basket



c) Close the lid by tightening opposite screws

d) Close the lid by tightening opposite screws

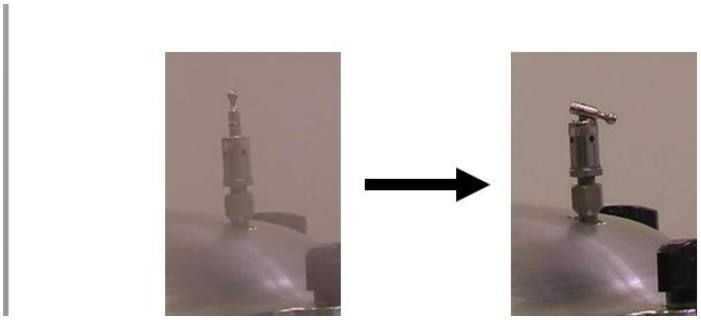


Place the autoclave on the heat source

Open the relief valve

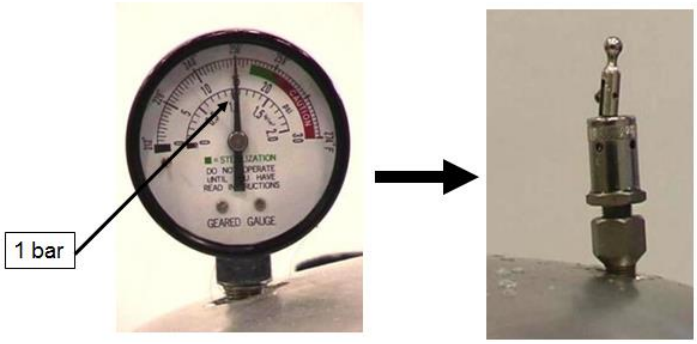
Turn the heat to maximum

2. Heating: As soon as a continuous jet of steam is released. Close the relief valve.

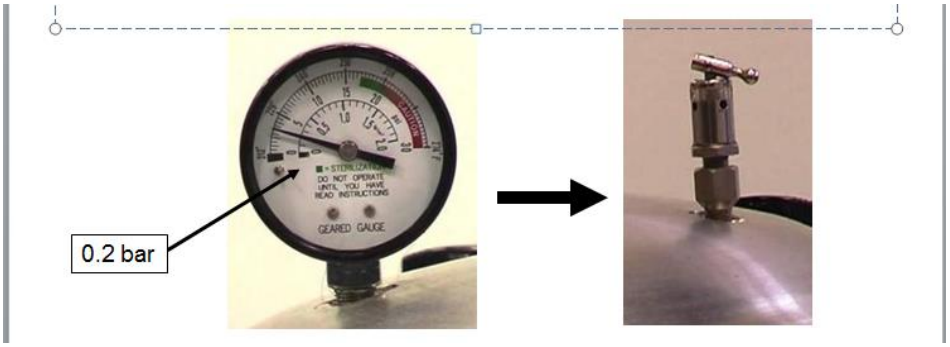


3. Relief:

- When pressure reaches one bar. Open the relief valve



- Then let the pressure drop to 0.2 bar. Close the relief valve



Repeat these two steps twice: It takes three relief rounds to completely evacuate air. If the temperature is too high, it may prevent pressure from dropping. ***If necessary, turn the burner down (or off)***

Let the pressure rise to 1.05 bar (121ºC)

1.05 bar

4. Sterilisation process: Once the pressure is at 1.05 bar, the relief valve will release constant steam

   Calculate ***sterilisation time***: 20 minutes

   Keep the pressure at 1.05 bar. Adjust the heat

   Regularly inspect the pressure during sterilisation

   Adjust heat if necessary

   IMPORTANT: The sterilisation operator must remain on site during the entire process

5. Water and steam evacuation: After 20 minutes. Turn the burner off. Open the relief valve. Release the steam

Once pressure is at 0. Wait **30 minutes** to cool

Open the lid

If the lid is hard to open, reheat for a few minutes (without checking the pressure), turn the burner off and immediately open the lid

6. Drying:

7. Verification and record-keeping

- Remove the absorbing cloth or the layer of crepe paper placed on the load
- Take out the sterile packages
- Make sure the wrapped packages are not damaged
- Moist, wet or torn packages must be repacked and resterilised
- Check the tape (chemical indicator)
- Make sure the colour has changed as per company indications

Note that the adhesive tape sealing the package must mention

- sterilisation date
- content description
- sterilisation cycle number (***number asigned by sterilisation operator and indicated in the log book as shown on slide 59***)

- The sterilisation log book mentions:
- date
- sterilisation cycle number

- cycle start/end time
- pressure
- content of load
- Glue the tape in the log book
- (if used)
- Sign the log book

Example of Log Book

Year:

Sterilisation Log Book

Facility Name:

Cycle Number	DATE	Plateau Time Start/End Time	Composition of Load	Attach chemical indicator (if used)	Technician's signature	COMMENTS
1						
2						
3						
4						

6. Check and document

7.

8. Transport sterile medical devices

   - Use a clean, well identified container or cart to transport sterile devices to the storage area
   - Containers should have a dedicated, dust-free, dry and clean area

9. Store sterile medical devices: Requirements for storing sterile medical devices:

   - The storage area is clean, dry and dust-free
   - The temperature is maintained around 24oC
   - All the devices are reprocessed if humidity increases to the point where the sterile package becomes damp or wet (e.g. > 70%),
   - Sterile devices are stored 20-25 cm from the floor, 45-50 cm from the ceiling and 15-20 cm from the exterior wall
   - Device rotation is a function of sterilisation dates (first in = first out)

IMPORTANT: UNPACKED DEVICES MUST BE USED IMMEDIATELY; THEY CAN NEVER BE STORED

Monitoring Reprocessing and Contingency Plan

1. Describe and monitor the stages of reprocessing

2. Describe and execute all components of the contingency plan
    - Equipment failure
    - Incident response
    - Intervention in case of spillage/cleaning

Follow up of the retreatment process

The monitoring log must be entered after every use. Used for servicing and maintenance programmes, incident reports, accidents, and malfunctions.

Monthly visual inspections of the autoclave

Annual preventive inspection to detect any malfunction/necessary equipment replacement

Only a qualified person should document and address autoclave-related problems.

Log books should be kept near the equipment and include:

- name of the operator
- telephone number
- date
- time
- duration of use

Contingency Plan

1. Equipment failure: If the equipment is not working as planned, a notice must be placed on the machine indicating it must not be used. Ensure that the problem is recorded in the autoclave log book (be specific). Notify the problem to competent staff so that ONLY trained professionals carry out repairs

2. Incident response: All incidents (spillage, release of dangerous organic matter, injuries to staff) must be reported to the supervisor. Staff injuries must be treated immediately. If a hot water or steam burn occurs, the injured body part must be placed under cold, clean water. A notice should be posted so that staff members do not use the autoclave until it is deemed safe for use

3. Intervention in case of spillage/cleaning

    - Can occur due to a reservoir overflow or rupture
    - Notify any spill or equipment malfunction and indicate clearly that the equipment is not working
    - Investigate why the spillage occurred
    - Appropriately separate spillage waste and dispose of them according to the type of waste (biohazards or sharps or cutting)
    - Keep a log book where events are documented and equipment can be monitored

If a spill occurs, start by decontaminating the staff member and keeping them safe

- Do not use the autoclave until the spill has been cleaned
- Must be cleaned by the autoclave operator
- Wait for the autoclave to be at room temperature before cleaning
- Contain the spill using paper or cloth towels
- Do not use aggressive materials to clean the autoclave (brushes, abrasive papers, etc); they leave scratch marks inside the autoclave which allow bacteria/spores to accumulate and contaminate the machine
- Clean the autoclave according to the manufacturer's recommendations
- Wear the appropriate PPE

Key actions of cleaning in the context of COVID-19

- CoVID-19 is susceptible to disinfectants (0.5% chlorine solution, 70% alcohol)
- 0.5% chlorine solution in the context of COVID-19 is a concentration that will inactivate the vast majority of other pathogens
- Contact time of a minimum of 5 to 10 minute is recommended for chlorine solution
- In indoor spaces, routine application of disinfectants to environmental surfaces by spraying or fogging is not recommended
- Prepare/review daily protocols per existing guidelines noting additional levels and frequency of cleaning in clinical areas including terminal cleaning
- Ensure adequate supplies of cleaning fluids and equipment, making allowance for additional cleaning requirements
- Hand-washing stations and toilet facilities are cleaned

Standard precautions for environmental cleaning and disinfection

WATER SUPPLY

Objectives:

- ❑ To know the types of water supply sources
- ❑ To know/estimate water needs
- ❑ To know the types of water storage
- ❑ To consider water control and quality

Quiz:

- ❑ What are the water supply sources you know?
- ❑ What is the importance of water in a hospital and outside a hospital?
- ❑ What is the water requirement (estimate) for an outpatient?
- ❑ What is the water requirement (estimate) for a hospitalized patient?

Key points

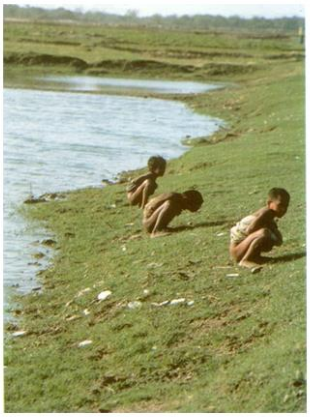
Water quantity – quantity of water available for use in health centres (HC) per day

Water quality – physical, chemical, radiological and microbiological properties of water that is fit for consumption

Access to water – nearness of water to users (health care providers, patients and visitors) in health centres

Types of water supply sources




Surface water

- Generally highly polluted (by bacteria, especially in the rainy season).
- The quality of surface water varies with seasons.
- Surface water generally requires treatment before use.
- Often shows high turbidity (bacterial risk + treatment).
- Contains limited toxic minerals (arsenic, lead, aluminium, mercury…)

Shallow groundwater

- Doubtful bacterial quality
- Less than three metres deep: should be considered as surface water
- Shallow groundwater quantity varies with seasons

Deep ground water

- Generally clear and of good bacteriological quality
- Sometimes contains substances that make it unfit for consumption (arsenic, fluorine)
- Is generally not really affected by seasonal variations

Rain water

- Industrial zones / rural areas
- Very low mineral content
- Could be a regular, temporary or complementary source of water
- Very low turbidity

Water supply Water supply standards in a health facility (HF) Water supplied to a health facility must be collected from **improved sources**, namely: running water, public taps/fountains, boreholes, protected wells, protected spring, protected rainwater, packaged or bottled water.
The water source must be located less than 500 m from the health facility and/or the HF must be equipped with storage tanks to cover at least 48 hours of water needs
Water must be available in all care delivery points (all outpatient and hospitalization treatment services).
Water must be available throughout the year (that is, not subject to seasons, power outages, etc.) and for all needs, namely: drinking, bathing, hand washing, cooking, dish washing (personal utensils), laundry, cleaning of premises, medical activities…..

Know the water needs

Water must be supplied on site from an improved source. It must be available for all needs:

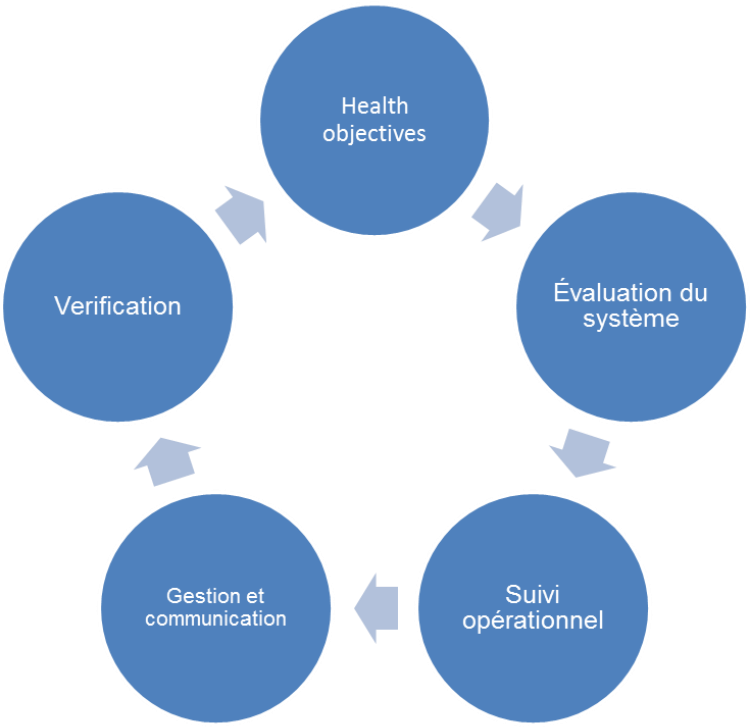
- Drinking
- Personal hygiene, including hand washing
- Personal utensils
- Cooking
- Laundry
- Cleaning
- Medical activities

Minimum water requirements in health facilities

Standards for minimum water quantities needed in a health facility (HF)	
Service /care (Who?, What?)	Quantity of water
Outpatients	5 litres/consultation
Hospitalized patients	40-60 litres/patient/day
Care attendants	15 litres/attendant/day
Personnel	5 litres/day
Operating room/maternity	100 litres/intervention
Nutritional supplementation unit (NSU)	0.5-5 litres/consultation
Outpatient therapeutic nutrition unit (OTNU)	15 litres/consultation
Intensive care nutrition unit (ICNU)	30 litres/patient/day
Cholera Treatment Centre (CTC)	60 litres/patient/day
Isolation Centre for acute respiratory infections	100 litres/patient/day
Isolation Centre for viral haemorrhagic fever	300-400 litres/patient/day

Estimating water needs by health centre category

HC category	Average water requirement
Level 1 (primary health centre), that is, outpatient	2 700 L / day
Level 2 (secondary health centre), that is, district hospitals	6 057 L/ day
Level 3 (tertiary health centre), that is, reference hospitals	23 470 L / day



Water storage standards in health facilities

1- Every health facility (HF) must have a clean water storage tank made from non-corrosive material and with inner walls made of water-inert materials, properly covered (with a tight lid), well kept (frequent cleaning), having no cracks or leaks, etc. from which water can be collected without getting in contact with the hands or other potentially contaminated surfaces (for example, a tap connected to an internal distribution network, etc.)

2- Every health facility must separate the clean water storage tank from the drinking water storage tank

3- The quantity of water in storage must be sufficient to meet the needs of the health facility for two days (48 hours). The 48-hour stock is calculated using the elements detailed in the standard for minimum quantities of water needed

Water quality and control: characteristics of drinking water

1. It contains no pathogens (no infectious agent)
2. It has a low concentration of toxic substances
3. It is clear and sparkling (non-turbid)
4. It is not salty

5. It has no colour, smell or taste
6. It is not corrosive or encrusting

Water quality standards in a health facility

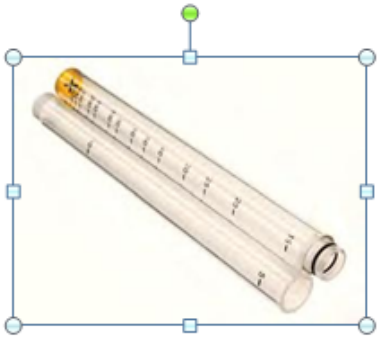
1. Every health facility must have clean water, drinking water and sterile water used in specialized medical activities:
    - Clean water can be used for bathing, hand washing, cooking, dish washing (personal utensils), laundry, cleaning of premises
    - Potable water is recommended for drinking and medical activities (kidney dialysis ...)
    - Drinking water should be properly stored in a clean bucket/tank with a lid and a tap

WHO water safety framework

- Health objectives
- Evaluation of distribution system
- Operational monitoring
- Management and communication
- Verification

The quality of drinking water in every health facility must be controlled on a regular basis. The result of such control must correspond to the parameters contained in the synoptic table below.

Physical parameters	Health parameters (microbiological)	Chemical parameters
Turbidity: less than 5 NTU Temperature: Smell: neutral Colour: clear and sparkling	0 *E. coli*	pH: 6.5 to 8.5 Residual chlorine: (0.2 – 0.5 mg/l) Nitrate: 25 - 50 mg/l Arsenic: 0.01 mg/l Fluoride: 1.5 mg/l

Physical parameters	Turbidimeter
Turbidity: less than 5 NTU Clear water (minimum turbidity measured using a tube) Chlorination and possible direct filtration methods **Turbidity ≥ 20 NTU** Limit for microbiological analysis Limit for direct chlorination (pre-treatment required)	

Chemical parameters	Pooltester
FRC (Free residual chlorine): 0.2 - 0.5 mg/l	
It helps to limit contamination at point of usage. Effective for 48 hours at most	

Microbiological indicators	

- ❑ Too many different pathogens, making it difficult to quantify them all
- ❑ Bacteria still present in large numbers in the faeces of humans and warm-blooded animals:

  Faecal coliform or thermotolerant coliform, 60 to 90% of which are Escherichia Coliforms (E. coli)

  Their presence indicates a possible existence of pathogenic organisms (infectious agents)

Household water treatment

- ❑ What are the types of water treatment or disinfection products you know?

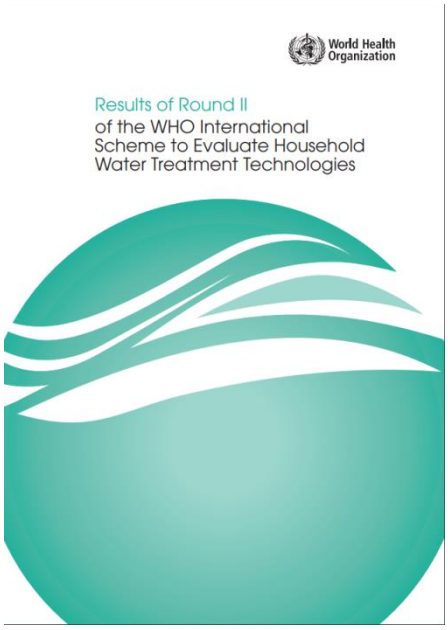
WHO evaluates the performance of water treatment technologies:

Performance target	**Bacteria (required removal level: log_{10})**	**Virus (required removal level: log_{10})**	**Protozoa (required removal level: log_{10})**	**Performance classification**
★★★	≥ 4	≥ 5	≥ 4	Comprehensive protection: very high rate of pathogen removal
★★	≥ 2	≥ 3	≥ 2	Comprehensive protection: high rate of pathogen removal
★	Meets at least the two-star (★★) criteria for the two classes of pathogens			Targeted protection
–	Does not meet one-star (★) criteria			Little or no protection

- Generally, filters =★★★ or★★, flocculation/disinfection and UV = ★★, and chlorine =★
- Chlorine DOES NOT eliminate *cryptosporidium,* a major cause of diarrhoea in low-income countries
- To find all the most recent results in English please go to: *http://www.who.int/household_water/scheme/products/en/*

Water treatment

Comprehensive protection ★★★ or ★★	Targeted protection ★	Little or no protection –
•Aquapak •Aquasure TAB10 •DayOne Waterbag™ •JAMEBI Solar Water Pasteurizer •SolarBag® •Lifestraw Family 1.0 •Lifestraw Famly 2.0 •Lifestraw community filter •P&G Purifier of water	•Aquatabs •Aquatabs Flo •BlueQ™ 2-stage •Mesita Azul ° •Nazava Water Filter •Oasis Water Purification Tablets* •SPOUTS Water Purifaaya Filter •Tulip Table Top Water Filter •Uzima Filters UZ-01 •WATA-Standard™ •Water Elephant •Wadi Solar •H2g0 Purifier	•Biocool CleanWater •Chloritard •GrifAid®M3 •LifeFilta LFJC Jerrycan •Silverdyne •Tembo ceramic pot



Learn more at: https://www.who.int/water_sanitation_health/water-quality/household/scheme-household-water-treatment/en/

Example – Household water treatment

- ❑ **General information on Aquatabs**

AQUATABS, makes it possible to obtain odourless and tasteless drinking water.

Indications:

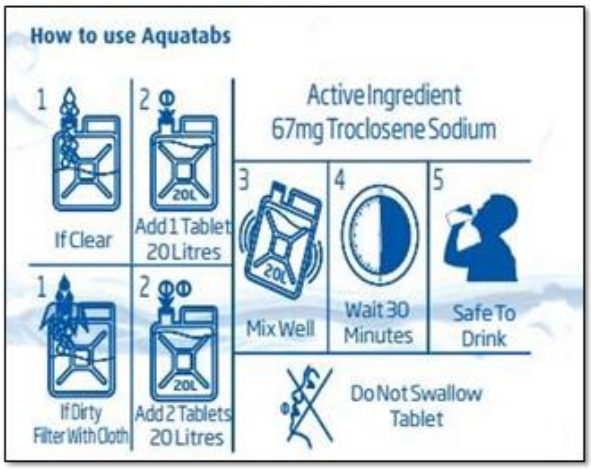
Disinfecting water for drinking, brushing of teeth, washing of fruits and vegetables.

It contains derivatives which ensure a lingering effect to protect the water against recontamination for 24 hours.

- ❑ Use of Aquatabs 67mg tabs/BOX-16000

1. **In case of emergency**, (murky water, water of questionable quality and contaminated water); Aquatabs are not recommended for turbid water
2. Filter the water using a clean piece of cloth
3. Use one tablet in 10 litres of water
4. Let it stand for at least 30 minutes before drinking
5. Check the residual chlorine level (0.2 - 0.5 mg/l); if too low, add more Aquatabs
6. **Under normal circumstances**, (Water from boreholes, protected wells, public taps or drinking water)
7. Use one tablet in 20 litres of water
8. Let it stand for at least 30 minutes before drinking.

❑ Use of Aquatabs 67mg tabs/BOX-16000



Important considerations in chlorination

- Chlorine requirements vary and depend on many factors [natural organic matter (TOC), salts, pH, temperature]
- The objective is to obtain a constant concentration of free residual chlorine
  - *(≥0.2 mg/l at supply point; ≥0.5 mg/l in the entire water distribution pipe network in the event of an outbreak)*
- Must perform residual tests; adjust dosage as required – adopt a site-specific approach
- More centralized chlorination approaches, preferably

References and bibliography

- https://www.who.int/csr/resources/publications/ebola/water-sanitation-hygiene/en/
- WHO. (2008). Essential environmental health standards in health care facilities. http://www.who.int/water_sanitation_health/hygiene/settings/ehs_hc/fr/
- WHO (2017). Guidelines for drinking-water quality, fourth edition incorporating the first addendum. https://www.who.int/water_sanitation_health/publications/drinking-water-quality-guidelines-4-including-1st-addendum/fr/
- WHO (2014). Plan de gestion de la securite sanitaire de l'eau. http://www.euro.who.int/__data/assets/pdf_file/0017/351305/WEB-2371-OMS-WSH-WSPFiledGuideForSmallSuppliesInFrench-20170911.pdf?ua=1
- WHO (2011). Evaluating household water treatment options. Health-based targets and microbiological performance specifications. http://www.who.int/water_sanitation_health/publications/2011/household_water/en/
- WHO (2011). Technical note on drinking-water, sanitation and hygiene in emergencies. http://www.who.int/water_sanitation_health/publications/technotes/fr/

- Action against hunger: Water, sanitation and hygiene for populations at risk: http://www.actioncontrelafaim.org/fr/content/eau-assainissement-hygiene-pour-les-populations-risques
- Deere, Dan; Stevens, Melita; Davison, Annette; et al. (2001): „Management strategies“. In: Water Quality: Guidelines, Standards and Health: Assessment of risk and risk management for water-related infectious disease. London: WHO, IWA Publishing, 257–288. — ISBN: 924154533X
- WHO/UNICEF (2019). WASH in health care facilities. Global baseline report 2019. https://www.who.int/water_sanitation_health/publications/wash-in-health-care-facilities-global-report/en/
- WHO (1979), J. M. Lanoix, M. L. Roy, Manuel du technicien sanitaire http://apps.who.int/iris/handle/10665/40504?locale=fr
- DAVIS, J.; LAMBERT, R. (2002): Engineering in Emergencies. A Practical Guide for Relief Workers. London: Intermediate Technology Publications, Ltd.
- House, S.; Reed, B. (1997): Emergency Water Sources. Guidelines for Selection and Treatment. Loughborough: Water, Engineering and Development Centre (WEDC): http://sheltercentre.org/sites/default/files/Emergency%20Water%20Sources%20%28WEDC%29.pdf

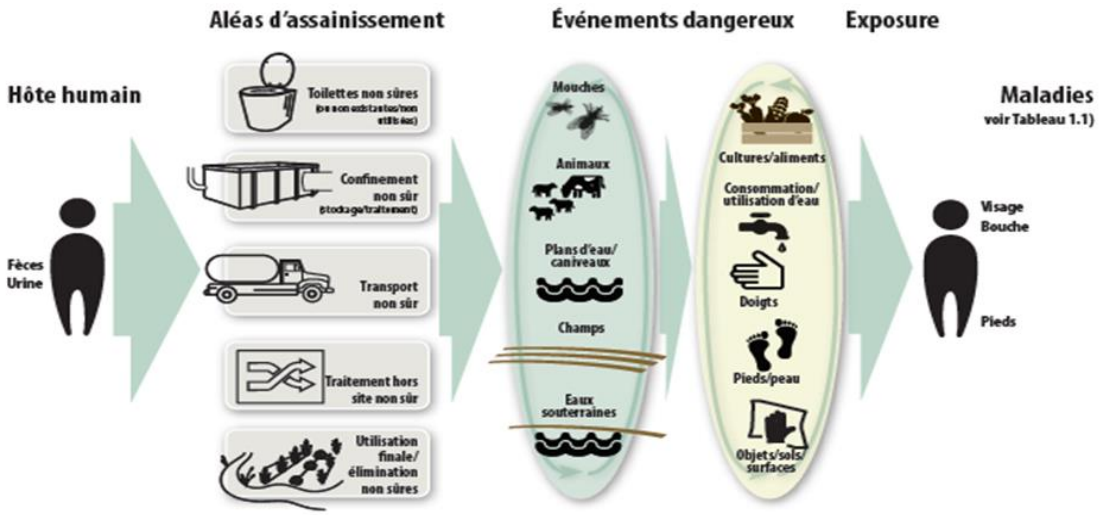
B SANITATION: solid and liquid waste management

Objectives:

- To know various types of latrine, their adaptation, the advantages and disadvantages of using them
- To know the ratios of persons per latrine in emergency and post-emergency situations
- To know latrine cleaning and maintenance equipment

Quiz:

- ❑ What are the types of latrines you know?
- ❑ What must be the minimum distance between an emergency / post-emergency latrine and a traditional or unimproved well?
- ❑ Name some materials and tools usually used in the cleaning and maintenance of latrines



Solid waste management

A sanitation / latrine system must meet the following criteria as far as possible

1. **DISEASE PREVENTION:** A sanitation system must be able **destroy** or **isolate pathogens of faecal origin**.
2. **ACCESSIBILITY:** A sanitation system must **be within the reach of all,** including **the poorest segments of the population**.
3. **ENVIRONMENTAL PROTECTION:** A sanitation system must **prevent environmental pollution** and **protect water resources**.
4. **ACCEPTANCE:** A sanitation system must respect **cultural and social values** and provide users with a toilet that **protects intimacy**, is **clean** and **convenient.**

Minimum number of toilets: community, public places and institutions

Place	Short term	Medium and long term
(Outpatient) health centres	Two toilets (one for the staff, one for patients, that is accessible to persons with disabilities)	Three to four toilets (one for staff, one for female patients, one for male patients, one for patients with an EVD)
Hospitals	One toilet for 20 beds or 50 outpatients	One toilet for 10 beds or 20 outpatients
Feeding centres	One toilet for 50 adults One toilet for 20 children	One toilet for 20 adults One toilet for 10 children
Reception /transit centres	One toilet for 50 persons Women : Men ratio = 3:1	
Community	One toilet for 50 people (common toilet)	One toilet for 20 people (extended family) One toilet for five people or a nuclear family
Market areas	One toilet for 50 stands	One toilet for 20 stands
Offices		One toilet for 20 workers

Excreta disposal standards

There must be a functional hand washing point within the latrine block or less than five metres (5m) from the latrine, with clean water and soap or other detergent
Latrines for women must meet menstrual hygiene requirements
The latrines must be found within the premises of the health facility
Do not build a latrine on an slope or a piece of land threatened by erosion.

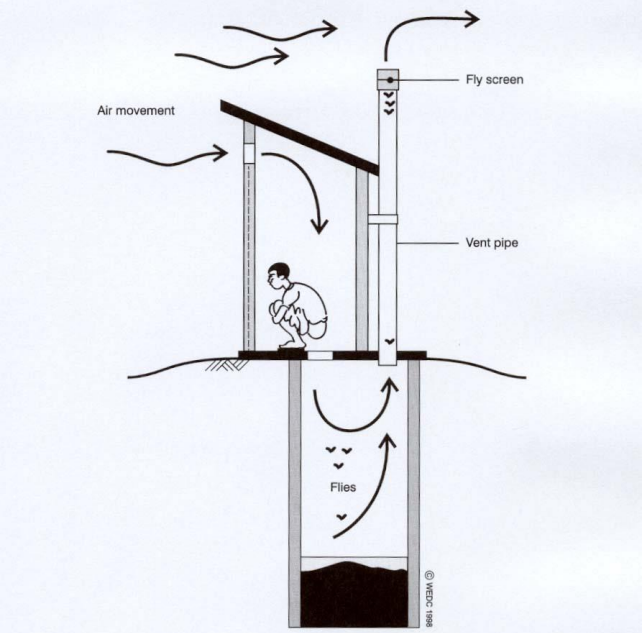


Figure 6.7. Ventilated improved pit latrine

Adapt at least one latrine for persons with reduced mobility
The bottom slab must be placed at least 1.5 m above the water table
Latrines must be emptied in a manner that is safe (for humans and the environment)
The distance from the health facility depends on the type of soil, soil gradient, depth of the groundwater and type of latrine. Generally, latrines should be located: • five to 25 m from the health facility buildings (latrine without water) • 20 to 45 m below the water point (traditional wells) • 50 to 100 m below an improved or unimproved water spring • at least five m from a tree (latrine without water)

Solid waste management: simple pit latrine

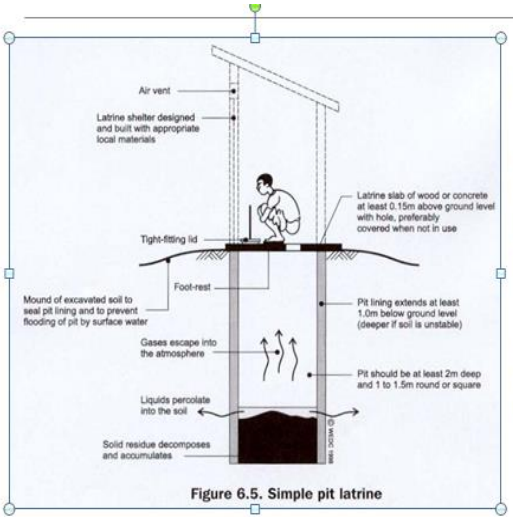


Figure 6.5. Simple pit latrine

Traditional latrines are suitable for rural and peri-urban areas.

Traditional latrines are particularly suitable when water is scarce and where the groundwater level is low. They are not suitable in rocky or compact soils (difficult to dig) or in flood-prone areas.

Traditional latrines should be constructed at an appropriate distance from houses to minimize nuisance from flies and odours, to ensure convenience and safe transportation.

Advantages

- Can be built and repaired using local materials
- Does not require a permanent water source
- Can be used immediately after construction
- Low (but variable) investment cost, depending on materials used

Disadvantages

- Flies and odours are normally perceptible.
- The faecal sludge requires secondary treatment and/or appropriate landfill disposal.
- The cost of emptying pit latrines can be higher than that of building.
- A latrine must not be built **less than 15 metres** from a well, or in a manner in which it can pollute surface water by seeping.
- Poor infiltration of liquids in clayey soils.
- In flood-prone areas, the pits **can overflow** during the rainy season.
- Can cause **groundwater pollution** if the water table is less than two metres and even more in calcareous soils (limestone)

Solid waste management: ventilated improved pit (VIP) latrine

Context

VIPs are suitable for rural and peri-urban areas. In urban or densely populated areas, VIPs are often difficult to empty and/or there is insufficient space for infiltration.

VIPs are particularly suitable where water is scarce and the level of the water table is low. They should be located in a well ventilated area. They are not suitable for rocky or compact soils (difficult to dig) or in flood-prone areas.

Pits can collapse/overflow during floods

Advantages

- Insects and odours are significantly reduced (compared to unventilated pits)
- Does not require a permanent water source
- Suitable for all types of users (sitting, squatting position, anal cleaning with water, without water)
- Can be built and repaired using local materials
- Can be used immediately after construction
- Low (but variable) investment cost depending on materials used and the depth of the pit
- Requires a small piece of land

Disadvantages

- Faecal sludge requires secondary treatment and/or appropriate landfill disposal
- The cost of emptying pit latrines can be higher than that of building

- A latrine must not be built **less than 15 metres** from a well, or in a manner in which it can pollute surface water by seeping
- Poor infiltration of liquids in clayey soils
- In flood-prone areas, the pits **can overflow** during the rainy season
- Can cause **groundwater pollution** if the water table is less than two metres and even more in calcareous soils (limestone

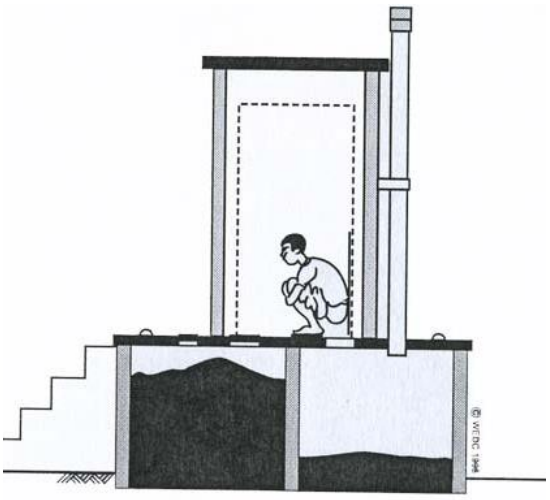


Figure 6.14. Raised twin-pit ventilated latrine

Solid waste management: raised twin-pit ventilated latrine

Context

- The raised twin-pit ventilated latrine is more appropriate than the single-pit VIP in densely populated and peri-urban areas. The faecal sludge is manually drained (by excavation, not pumping), such that the use of a vacuum truck is not necessary.
- The twin-pit VIP looks like the "Alternating Pit" technology with the difference that the Alternating Pit is specifically designed to produce humus, and therefore requires regular addition of soil, ash and/or leaves.
- Twin-pit VIPs are particularly suitable when water is scarce and the level of the groundwater table is low.

Advantages

- Longer lifespan than single-pit VIP (not determined, if well maintained)
- Possibility to use the stored matter as soil fertilizer
- Flies and odours are significantly reduced (compared to unventilated pits)
- Does not require a permanent water source
- Suitable for all types of users (sitting, squatting position, anal cleaning with water, without water)
- Can be built and repaired using local materials
- Can be used immediately after construction
- Requires very little land.

Disadvantages

- Pathogens decomposition level from low to moderate
- Higher investment costs than for the single-pit VIP; reduced operating costs if the emptying is carried out by users themselves.

Solid waste management: improved latrine with septic tank

Context

A septic tank is a watertight chamber made of concrete for the storage and treatment of sewage and greywater.

The septic tank is suitable where it is possible to dispose of or transport the effluent. Given that the septic tank needs to be emptied on a regular basis, a vacuum truck should be able to access the facility. It is also suitable in areas with limited space as the pit is located underground, and requires a small area of land.

Advantages

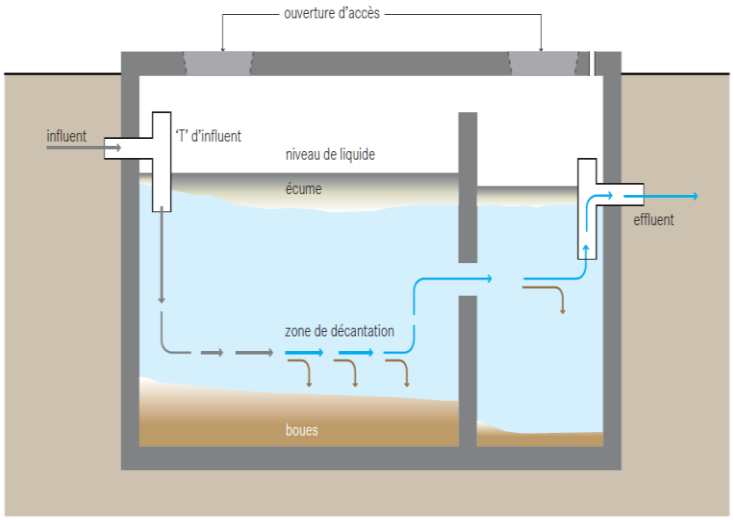
- Resistant to organic and hydraulic shock loads
- No electrical energy required
- Greywater can be managed simultaneously
- Can be built and repaired using local materials
- Long lifespan
- No real problem with flies or odours, if correctly used
- High decomposition of organic matter
- Moderate construction costs, moderate operating costs depending on emptying; may be at a reduced cost based on the number of users

Disadvantages

- Requires a permanent water source
- The effluent requires secondary treatment and/or appropriate landfill disposal
- Low rate of pathogen decomposition
- Requires expertise for designing and construction
- Pre-treatment is required to avoid clogging

Solid waste management: cleaning and maintenance material and tools

- Scrub brush with handle
- Broom with handle
- Powdered soap or bar soap
- Sanitation gloves
- 20-litre bucket with lid
- 20-litre jerrycan
- Spade
- Pickaxe
- Hoe
- 32-page exercise book
- Pen



References:

WHO/UNICEF (2014). Ebola virus disease: Key questions and answers concerning water, sanitation and hygiene. https://www.who.int/csr/resources/publications/ebola/water-sanitation-hygiene/en/

WHO (2018). Guidelines on sanitation and health. https://www.who.int/water_sanitation_health/publications/guidelines-on-sanitation-and-health/en/ (French version will be online September 2019).

WHO (2015). Sanitation safety planning: manual for safe use and disposal of wastewater, greywater and excreta.

https://www.who.int/water_sanitation_health/publications/ssp-manual/en/

WHO (2008) Normes essentielles en matière de santé environnementale dans les structures de soins. http://whqlibdoc.who.int/publications/2010/9789242547238_fre.pdf

WHO (2011). Technical notes on water, sanitation and hygiene in emergencies

http://www.who.int/water_sanitation_health/publications/2011/tn9_how_much_water_en.pdf

WHO/UNICEF, (2015), Water, sanitation and hygiene in health care facilities: Status in low- and middle-income countries and wy forward

. http://www.who.int/water_sanitation_health/publications/wash-health-care-facilities/en/

Standard Precautions: Waste management

85% of waste generated by health facilities is not infectious.

True or false?

Objectives

Participants will be able to:

1. Explain the importance of waste management
2. Identify the types of waste generated in health facilities
3. Describe the stages of waste management

Why is waste management important?

- Poor waste management (sorting, collection, transportation, storage, processing and elimination) is a potential threat to the health of the population and environment
- Healthcare facilities are responsible for properly managing the waste they generate

Types of waste generated during heath care:

- **There are two categories of waste generated from heath-care activities:**

Health-Care Generated Waste

- Contains several human pathogens which cause nosocomial infections, as well as injury causing chemical and pharmaceutical products.
- Includes all waste generated from clinical and laboratory services
- Must be managed from the time of production until final disposal

General Waste

- packaging
- food waste
- newapapers
- bottles etc

Infectious Waste

Solid Iinfectious wastes are

- Waste contaminated by biological fluids
  - PPE
  - tampons
  - bandages
- Intravenous infusion tubing
- Waste from the isolation area

Liquid Iinfectious Waste

- Biological culturing mediums
- Bodily fluids, human excrement
- Rinsing liquid from operating rooms

Anatomical waste

- Human tissue and organs (e.g. placenta)
- Body parts
- Fœtus (dead)
- Unused blood products

Other Dangerous Waste

- Most health facilities generate small amounts of other dangerous waste from health-care activities (chemical, radioactive and pharmaceutical products)
- It can also be harmful to health and the environment if improperly sorted and disposed
- Separate circuits (collection, processing and disposal) must be introduced in departments where this waste is generated



Sharp and Cutting Waste

Used or unused sharp/cutting objects:

- Hypodermic, intraveinous or other needles
- Syringes with attached needles
- Infusion sets
- Scalpels
- Straws
- Knives
- Blades
- Broken glass

Waste Management

1. **Waste Sorting**

- Sort waste as it is generated
- Any person generating waste is responsible for ensuring it is safely sorted at the same time as it is being produced
- A three bin system is the foundation of a safe waste management system

The Sorting System- three bin systems

Key Points for Sorting Waste

- Introduce a colour code for waste sorting
    - Different coloured bins (if possible); use colours available in the facility or on the market
    - Different coloured bag inside the bin
- Where there is no colour code, signs can be used to distinguish the types of bins and facilitate waste sorting
- Bins with bags

2. **Collect Waste**

- Wash hands before and after handling waste
- Handle waste with care to avoid tearing/puncturing bags

- Do not re-sort the waste
- Never carry a waste bag against the body
- Avoid heavy loads (use transportation equipment like a wheelbarrow)
- General and infectious waste bags should be collected when they are 3/4 full, or at least once a day
- Sharp and cutting waste must be collected when the container is 3/4 full.
- Tie the bags securely
- Never squeeze, shake or press waste to reduce its volume
- After removing the bag from the bin, replace it with a new one

3. Transporting Waste

- Wear recommended protective equipment (domestic gloves, boots, apron or long sleeved gown, goggles)
- Transport waste in a cart or wheelbarrow, from the place of production to the storage area
- Use transportation equipment when transporting waste
- Clean and disinfect equipment at the end of each day

4. Storing Waste

- Infectious waste must be stored separately from general waste
- Waste must be stored in an intermediary or centralised location: With an adequate, specific and airy surface are and Washed daily and protected before waste processing and disposal
- Transport waste directly to the storage area
- Waste must not be stored beyond 24 hours before their final disposal
- Control access to the storage area to block access for animals, children and unauthorized people

5. Processing/Waste Treatment

Processing aims at reducing hazards from medical waste to safeguard public health and the environment

- General Waste: No processing required for general waste
- Infectious waste: Incineration and Sterilisation (autoclave)

6. Waste Disposal/elimination

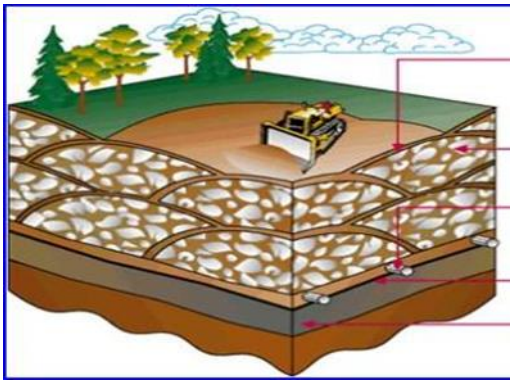
General Waste

1. In a municipal landfill (if available)
2. If not, in an on-site burial pit

Infectious Waste

3. Ash pond: Disposal of incineration ash
4. Encapsulation: Elimination of expired vaccines and drugs by adding immobilisation materials, e.g. cement, and by sealing the container.
5. Placenta/organic waste pit: Disposal of placenta and body parts

7. **Disposal of General Waste, including Waste Sterilised in an Autoclave**



- **Burial pit**
- **On-site burial**
  1. Dig 2-3 metres deep
  2. Cover with clay or other materials to prevent the contamination of underground and well water.
  3. Bury only non-infectious healthcare waste
  4. Cover each layer of waste with a new layer of soil.
- **Waste Pit**
  - Used for waste processing and disposal
  - <u>Only in emergencies</u> if there is no incinerator/autoclave
  - Leads to increased smoke pollution and other health hazards

- **Anatomical Waste (Placenta Pit): Placenta must be disposed in a placenta pit**
  Every other tissue, organ, body part, dead foetus, unused blood products should also be disposed in the placenta pit

Disposal of liquid infectious waste

- Collected body fluids, small amounts of blood and rincing liquid from operating rooms and

intensive care can be evacuated without pre-treatment to the sewage system, toilets or latrines

What wrong in this picture?

Write your response here

……
……
……
……

Standard Precautions for Injection Safety and needle stick injury management

Fact or myth?

“Wearing gloves reduces potential for transmission of pathogens during a single prick of the needle"

Fact

- **86% of contaminants are wiped away by gloves**
- Significantly reduces the quantity that comes in contact with your tissues

Objective

Participants must be able to:

1. Identify the different types of sharp objects in health care facilities
2. Discuss sharps safety
3. Describe the sharps container
4. Identify the basic principles of injection safety
5. Describe the protocol for managing sharps-related accidents.
6. Explain how to promote safety in health care facilities

What are sharp objects?

‘Any object or instrument that has a sharp point or sharp edges that can cut through or wound the human skin during handling"

Examples of sharp objects:

What is injection safety?

This is a set of practices that aim to prevent the transmission of pathogens or hematogenous transmission (like Hepatitis B and C, HIV and Ebola virus) during sharps-related accidents.

Seven steps to injection safety:-

1. *A clean and organized work space* is necessary to prevent contamination and ensure safe preparation of the injection.
2. Always practice *hand hygiene* before preparing an injection
3. Always use a *sterile and new syringe and needle* in a new, well-sealed package
4. Use a single-dose sterile *vial of medication and diluent* whenever possible. If you use a multidose vial, take more precautions to avoid contamination.
5. *Disinfect the skin and* preparation
6. *Collect* sharp objects and place them in an appropriate box
7. *Ensure the appropriate management* of wastes

Good basic practices for sharps safety

- Wear gloves for Intravenous injections
- Use instruments, rather than your hands, to pick up needles and scalpels
- Avoid passing sharp instruments from hand to hand: use a recipient or tray
- Once used on a patient, needles and syringes are contaminated
- Needles and syringes must be used for a SINGLE patient
- Never administer an injectable medication using a drip or syringe already used for another patient, even if you change the needle
- Never pierce an ampule or vial with an already used syringe or needle.
- Never use the same ampule of medication for more than one patient.

How to use a multidose vial?

- Never use a single-dose vial for multiple purposes
- Use a multidose vial only when so labelled by the manufacturer
- If possible, conserve a patient's multidose vial by storing it with his/her name on the vial
- Mark on the vial the date of first use after opening
- Store multidose vials somewhere different from the treatment room
- Clean the vial septum with an antiseptic, at each use
- Use a new syringe and new needle each time the septum is pierced

Dispose of a multidose vial

- If the sterility or content thereof is compromised
- If the expiry date has passed
- If it was not properly stored after opening
- After the date and number of hours recommended by the manufacturer

Basic principles: handling sharps

Basic principles: élimination of sharps

Dispose of needles and syringes immediately after use and at service point

Do not put fingers in the container

Do not force sharp objects into the container

Do not fill the container

Maximum ¾

Basic principles: elimination of sharps

Always do this

Never do this

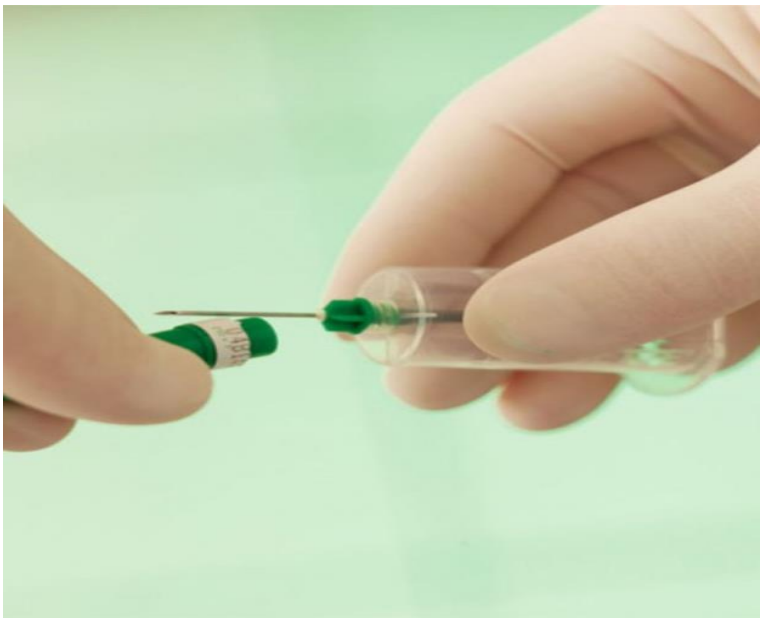
Risk Assessment

Sharps-related accidents occur during their use or when the used object is transported or eliminated incorrectly, i.e. they are not placed in the right container or are placed in a full container

Stages to consider:

1. *Think of the task you are about to carry out; is there a risk of accident by sharps?*
2. Decide who could be injured and how
3. *Choose preventive measures*

What is wrong in this picture?



Record your response here

What is wrong in this picture?

Record your response here

Properties of the sharps container

- Resistant to leakage and perforation
- Thick plastic or other combustible material
- Opening wide enough for the sharps
- Closing (without risk of injury)
- Stable on a horizontal surface
- When shut, cannot be reopened
- Clearly identified « Sharps container »

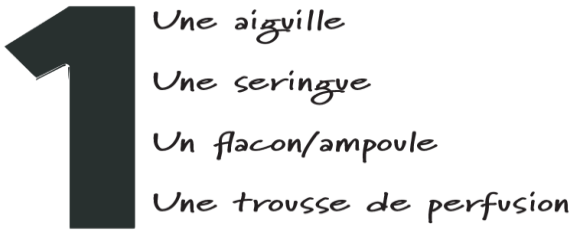
Examples of sharps containers

Where to place sharps containers ?

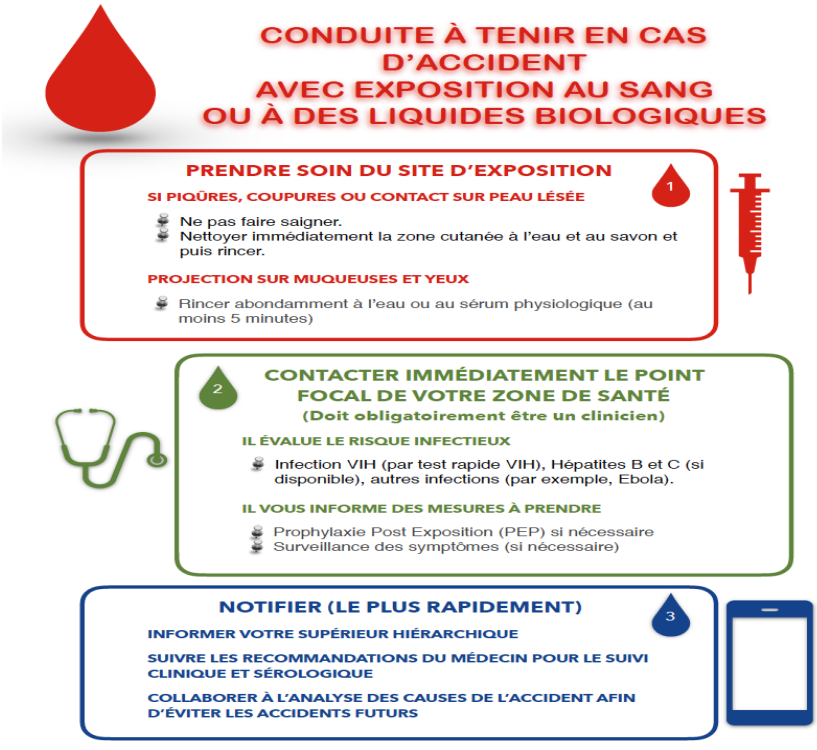
- In all patient care spaces (out of children's reach)
- On the medicine trolley, on the wall or on a horizontal surface nearby
- Never place them on the ground as this will be a danger for children, and the carton box might break with water and humidity

Principles of injection safety

- ***Injections MUST NOT BE USED UNLESS WHEN ABSOLUTELY NECESSARY***
- **One Patient One Syringe/needle**



What to do in case of sharps-related accident?



Promote injection safety

- Use *posters/aides mémoires* in patient care sectors
- Eliminate the use of injections if there is a sure and effective alternative solution
- Provide safe injection arrangements
- Enquire about all sharps-related acccidents and provide post-exposure prophylaxis when necessary

Find the errors in picture

Write your response here

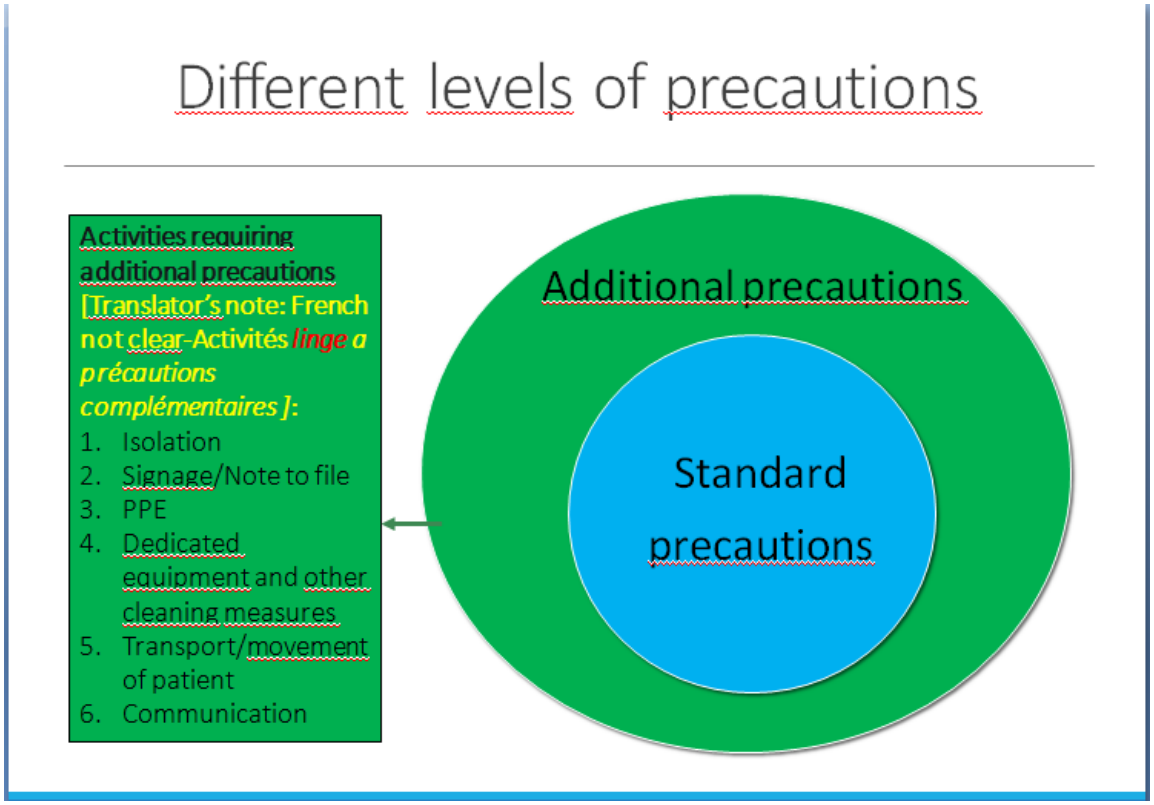
……
……
……
……

Transmission Based precautions: Additional Precautions

Objectives

Participants shall be able to:

1. Explain when to use additional precautions
2. Explain different categories of additional precautions
3. List additional precautions
4. Select type of additional precaution based on assessment
5. Implement additional precautions



When to use additional precautions?

Additional precautions shall be used:

- On patients with suspected or confirmed infection by a highly transmissible pathogen,
- When a pathogen is considered important from an epidemiological point of view,
- When medical interventions are increasing the risk of transmission of a specific infectious agent,
- When the clinical situation does not allow for the systematic application of standard precautions.

This ***package of additional measures*** is based on the specific mode of transmission of infectious diseases and ***seeks to complement standard precautions***.

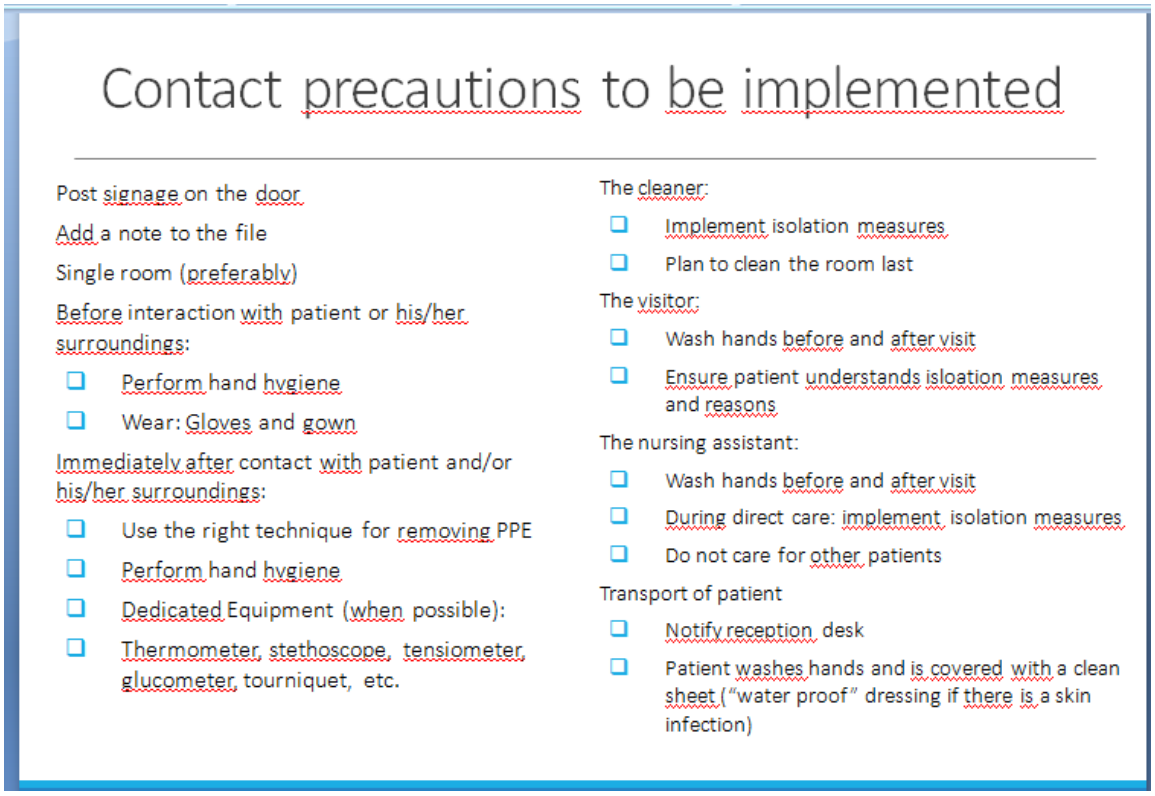
Classification of additional measures

- Additional precautions may be classified into three major categories:
  - ❑ Contact (EVD, Lassa Fever)
  - ❑ Droplets (Meningitis)
  - ❑ Airborne (Tuberculosis, Measles)

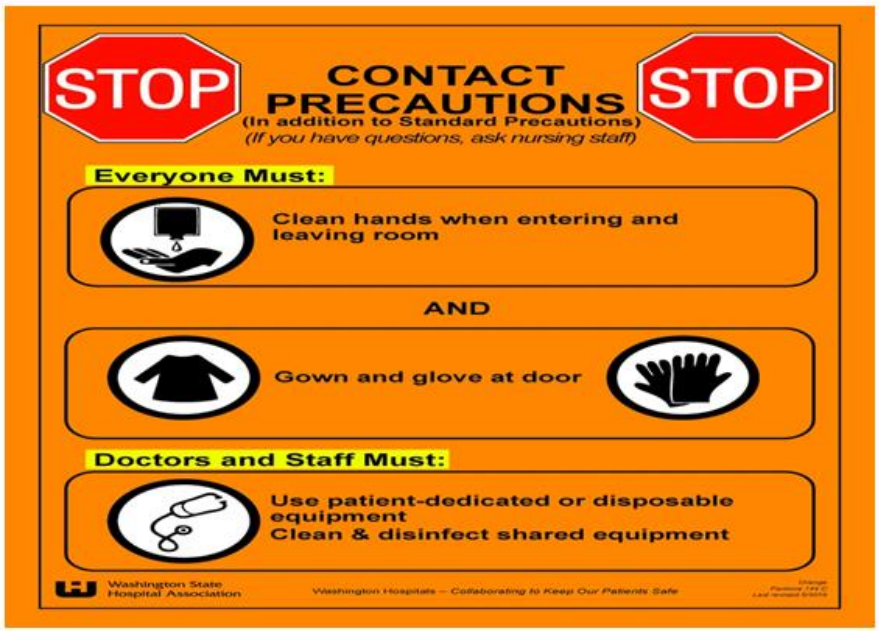
Some infections may fall under more than one category (e.g. contact + droplets)

When to choose contact precautions?

- When a patient is known or suspected to be infected with and/or a carrier of a disease which can be transmitted through contact with the patient or his/her environment and/or equipment



Contact precautions



When to choose droplet precautions?

- When a patient is known or suspected to be infected and/or a carrier of a diseases that can be transmitted by respiratory droplets
- Respiratory droplets are small quantities of liquid from the lungs, mouth or nose that are released into the air when people cough, speak or sneeze

Droplet precautions to use at work

Post signage on door/bed

Add note to file

Single room (preferably)

Stay one meter away from patient

- Perfom hand hygiene
- Wear surgical mask

Immediately when at a distance of more than one meter from patient:

- Remove surgical mask
- Perform hand hygiene

The cleaner:

- Implement isolation measures
- Plan to clean the room last

The visitor:

- Wash hands before and after visit
- Wear surgical mask
- Ensure patient understands isolation measures and reason

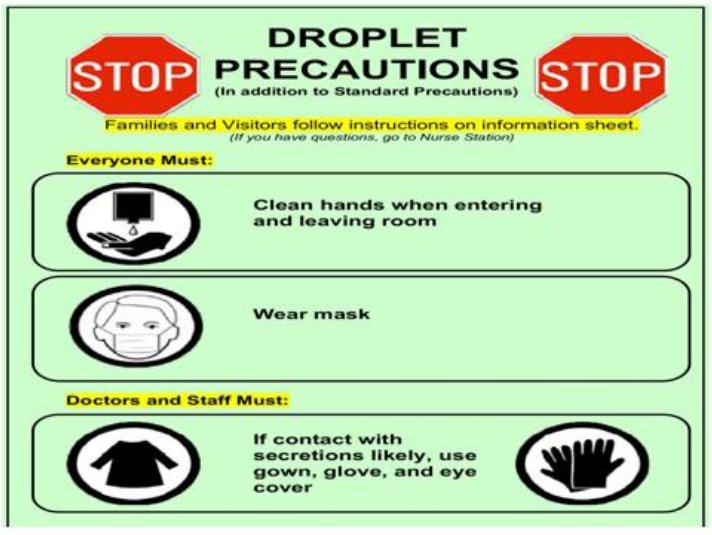
Nursing assistant:

- Wash hands before and after visit
- Wear surgical mask
- Ensure patient understands isolation measures and reason

Transport of patient

- Notify reception desk
- Patient washes hands and wears surgical mask

Droplet precautions



When to choose airborne precautions?

- When a patient is known or suspected to be infected and/or a carrier of a disease that can be transmitted over long distances by air

Airborne precautions to implement at work

Post signage on the door/bed

Add a note to file

Single room (***mandatory***)

Ensure proper ventilation of room

- ❑ Negative pressure ***or*** natural ventilation

Before entering the room

- ❑ Perform hand hygiene
- ❑ FFP2 or N95 respiratory mask

After leaving the room:

- ❑ Remove FFP2 or N95 respiratory mask
- ❑ Perform hand hygiene

The cleaner:

- ❑ Implement isolation measures
- ❑ Plan to clean the room last

The visitor:

- ❑ Implement isolation measures
- ❑ Ensure patient understands isolation measures and reason

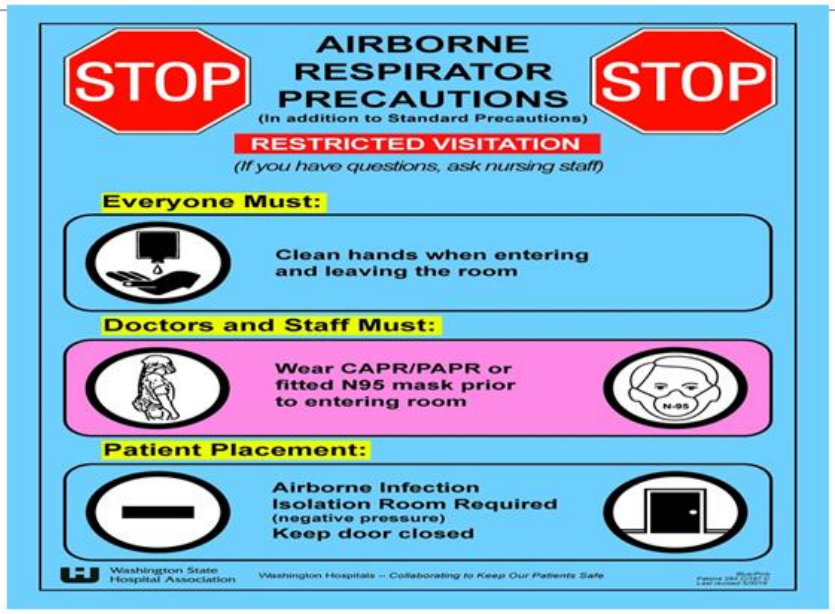
Nursing assistant:

- ❑ Implement isolation measures
- ❑ Ensure patient understands isolation measures and reason

Transport of patient

- ❑ Notify reception desk
- ❑ Patient washes hands and wears surgical mask

Airborne precautions



Natural ventilation

Option 1

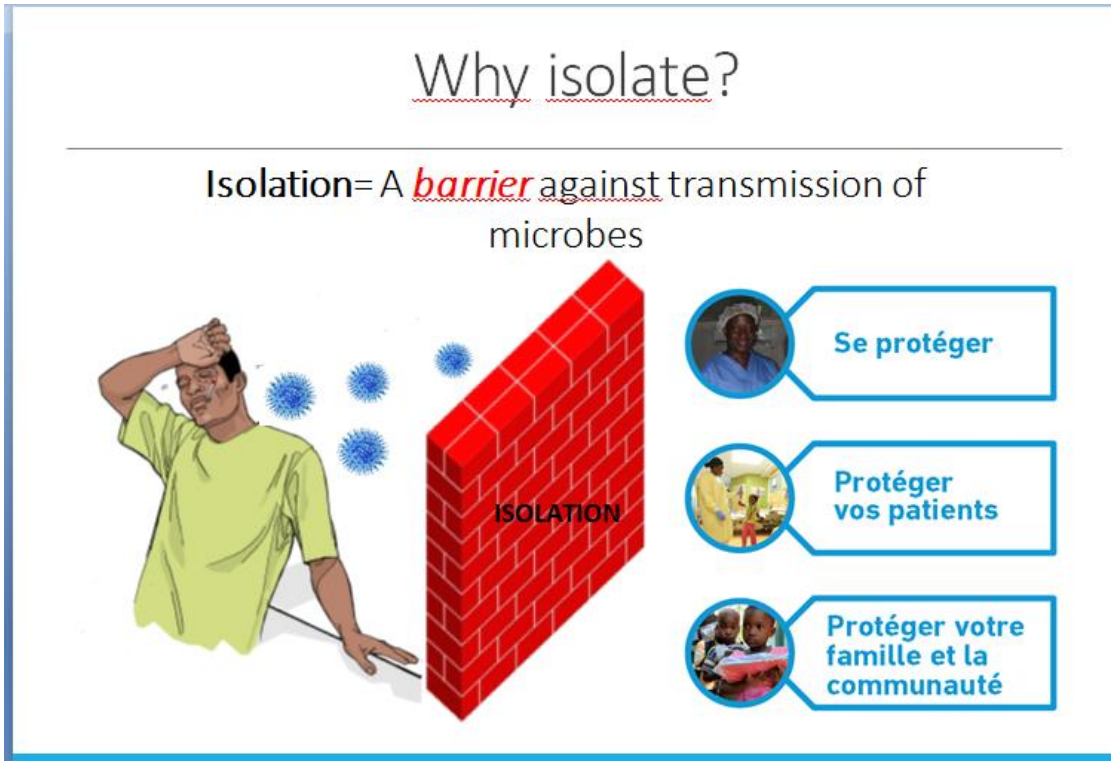
- ❑ Exhaust fan or similar portable option to help direct the flow of air towards the window, leading directly outside
- ❑ Windows open and doors closed

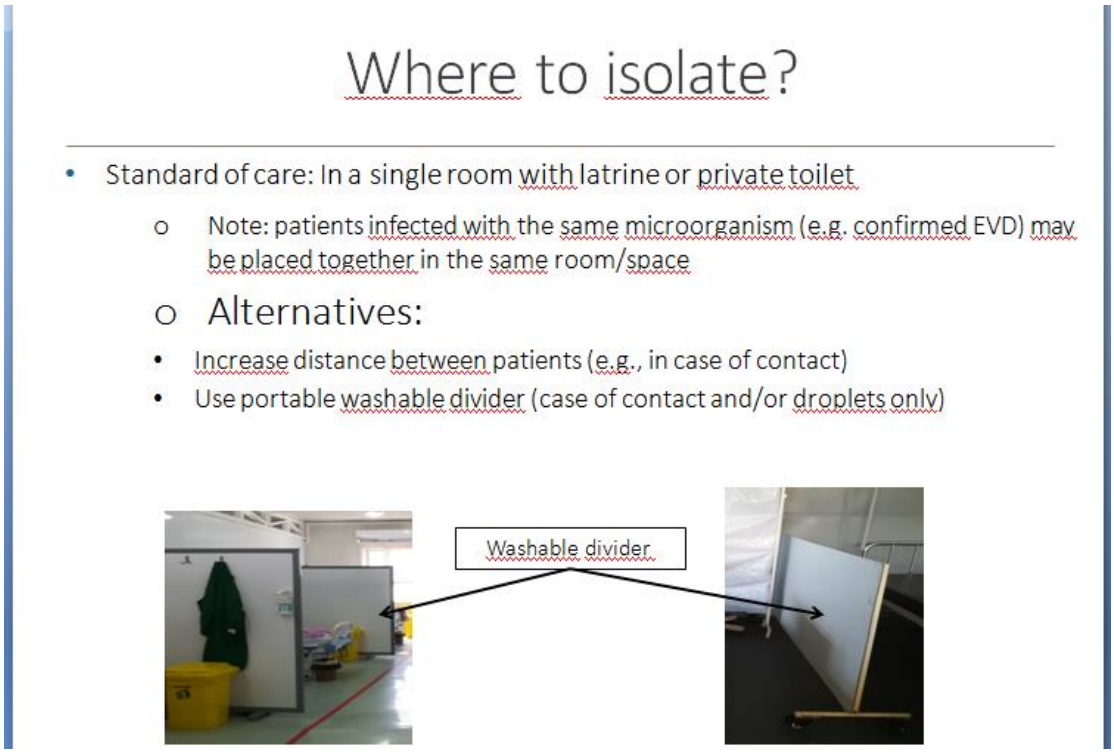
Option 2

- ❑ All windows and doors open
    - ❑ ***Only*** if they lead directly outside. If not, keep door closed.

Examples of clinical syndrome requiring additional precautions pending diagnosis

SYNDROMES	TYPE OF ADDITIONAL PRECAUTIONS	SINGLE ROOM?
Abscess or draining wound that cannot be contained with a dressing	Contact	Yes
Acute diarhea or vomiting with suspected infectious aetiology	Contact	Yes
A rash suggestive of chickenpox or measles	Airborne	Yes, ensure proper ventilation (negative pressure or natural ventilation)– only vaccinated staff will be allowed in.
Undiagnosed skin rash, without fever	Basic practices, gloves for skin contact	No
Acute respiratory infection accompanied by risk factors and symptoms suggestive of tuberculosis	Contact	Yes
Respiratory infection accompanied by risk factors and symptoms suggestive of tuberculosis	Airborne	Yes, ensure proper ventilation (negative pressure or natural ventilation).
Persons suspected of having meningitis or sepsis with petechial rash, unknown aetiology	Adult : Droplets Pediatrics : Droplets + Contact	Yes





Isolation space includes :

- Hand-washing station with soap and clean water and/or alcohol-based solution
- Supplies (a bed, basin/urinal, trash bin, safety box, etc.)
- Medical equipment dedicated to patient (thermal flashlight, tensiometer, thermometer) – ***depending on type of isolation***

- Zone identified for wearing and removing PPE

How to isolate?

1. DETERMINE additional precautions to take depending on transmission
    a. Implementation by clinician in charge based on assessment
    b. Immediately notify focal point (if detected in the institution)
2. Wear PPE depending on type of isolation required
3. ISOLATE patient
4. INFORM patient, family and visitors and ensure they understand isolation measures and reasons
5. POST signage on door or on bedside
6. LIMIT access to family and visitor
7. LIMIT movement of patient outside the room to medical purposes only. If movement is necessary, inform stretcher bearer and receiving service
8. LEAVE ALL NECESSARY EQUIPMENT in isolation zone till the end
9. DECONTAMINATE reuseable equipment between each use (if impossible to dedicate) and before removing it from isolation zone (e.g after unloading patient)
10. HANDLE and DISPOSE of all waste carefully (they are all infectious)
11. WORK together with IPC focal point

Scenario 1

Patient presents at emergency room with respiratory symptoms. It is flu(influenza) season in your community. The nurse calls IPC focal point to ask for help.

What initial measures should you recommend to the nurse?

A. Give patient mask to contain respiratory symptoms
B. Move patient to another area of waiting room, away from other patients.
C. Place patient in a negative pressure room.
D. Wait for laboratory results to come in to take measures.

Scenario 2

You are examining a child at emergency department and you notice a skin rash. The mother tells you that the child had a fever, runny nose and red eyes.

1. Which PPE should be worn?
2. What precautions and control measures should be implemented?

Scenario 3

You are caring for a malaria patient in intensive care. After a few days, the patient's condition deteriorates and you suspect Ebola.

1. What is the mode of transmission?
2. Which PPE should be worn?
3. What precautions and control measures should be implemented?

A general Introduction to emerging respiratory viruses and COVID 19 Disease

Objectives

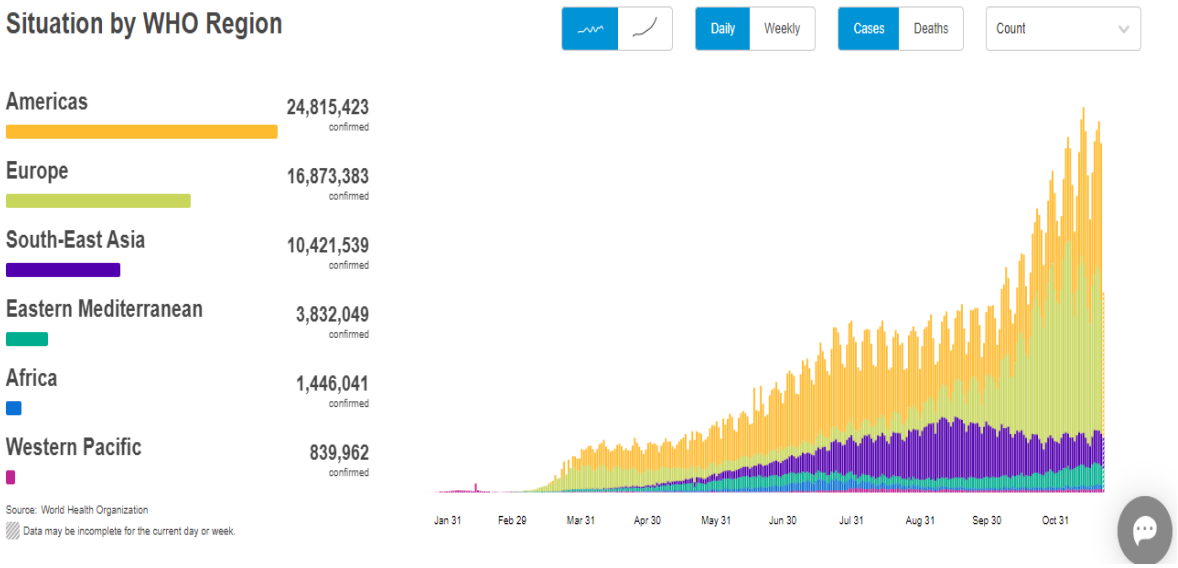
Participants will be able to:

1. Describe Coronaviruses
2. Describe the global spread of COVID-19
3. Describe the incubation period, persons at risk and modes of transmission.
4. Recognize and describe the clinical signs and symptoms of COVID-19
5. Describe the management of patients with COVID-19

Epidemiology

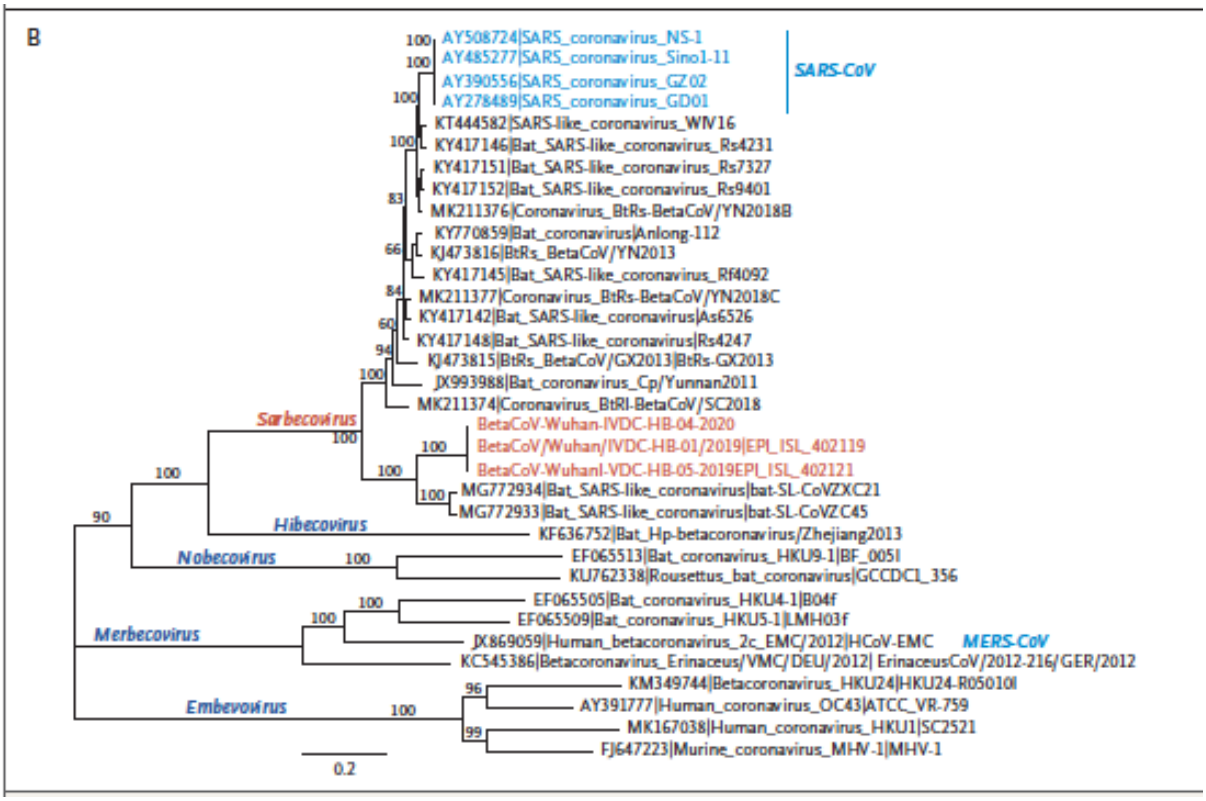
- 31 December 2019 - WHO reported a cluster of pneumonia cases of unknown cause in Wuhan City, Hubei Province, China
- 9 January 2020 – CDC China detected a new coronavirus in patients' respiratory secretions
- 21 January 2020 - global spread > 200 reported cases, including 4 in Thailand, 1 in Japan, 1 in Taiwan, 1 in South Korea and 1 in the United States.
- 21 January 2020 - At least 3 deaths
- 14 February - Africa reported a case of COVID-19 in Egypt
- 11 March - WHO declares COVIC-19 a pandemic
- 16 March - 28 African countries were affected
- The disease is called COVID-19 and the virus SARS-CoV-2

Epidemiological Situation



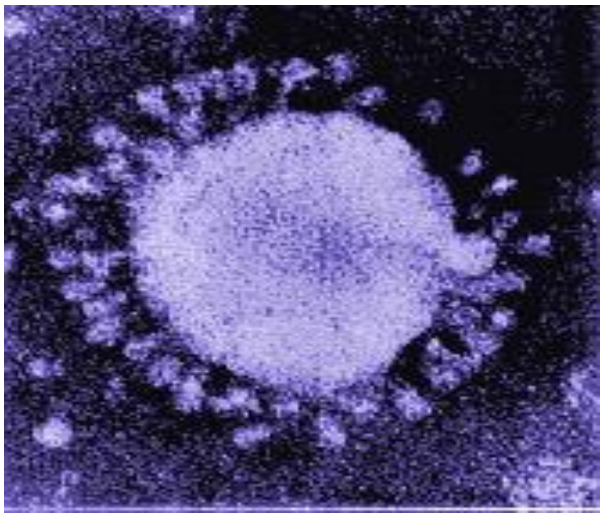
What's SARS-CoV-2?

- It is a novel coronavirus that was previously unknown in humans
- It is a beta coronavirus.
- Similar to other bat coronaviruses
- Different from SARS-CoV and MERS-CoV
- The exact origin is still unknown

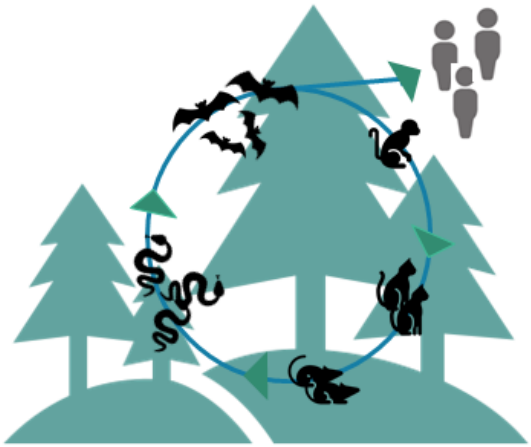


What are coronaviruses?

- Family: Coronaviridae
- Positive polarity, medium tall-ANRNA virus
- First discovered in humans in 1965
- Name derived from the golf club-shaped spike peplomers of the outer membrane
- Looks like a crown or halo, hence the name "Corona".



Where do coronaviruses come from?



Zoonotic

Circulates in bats, snakes, cats, camels and other animals.

Known to jump from one species to another

Most result in mild respiratory and digestive tract disease.

Others result in serious illness:

- SARS - Severe acute Respiratory Syndrome - (Civet)China 2002
- MERS - Middle East Respiratory Syndrome (Camels) -2012

What drives its spread and impact?

- Environmental conditions - polluted air, overcrowding, humidity, hygiene, temperature
- Health care and infection prevention and control (IPC) practices - Quality and access
- Host-related factors - e.g. age, cigarette smoking, immunity and nutritional factors, associated diseases, etc.
- Pathological characteristics: mode of transmission, virulence factors, microbial load (inoculum size).

How are humans infected?

The first case of animal-to-human transmission presumably originated from a seafood market in Wuhan, China. The first case was linked to this market. This was followed by human-to-human contamination. The subsequent cases had no exposure to the market and were detected outside the province and China itself.

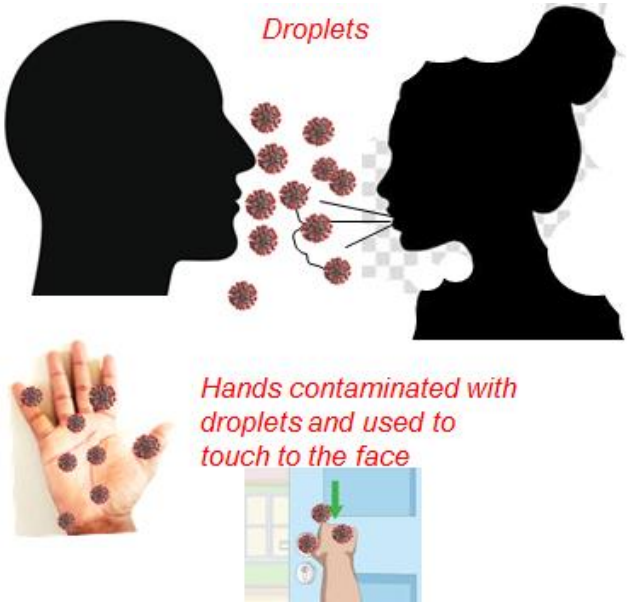
Incubation period: approximately 1-14 days (median of 5-6 days). Most infections are found in symptomatic patients. Not enough information to conclude that asymptomatic patients can transmit the virus.

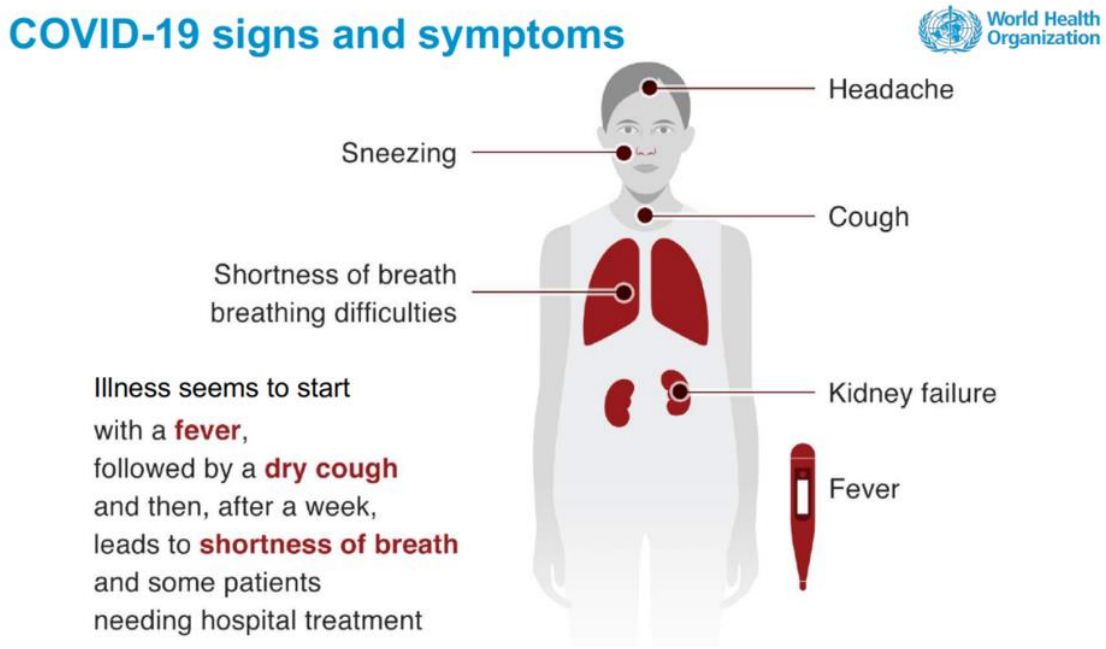
Transmission

Initial transmission was from animal to human.

Human-to-human transmission by:

- inhaling droplets coughed or sneezed by a person with a respiratory infection
- contact with patients' respiratory secretions
- hands contaminated after touching surfaces soiled with patients' respiratory secretions





Symptoms of nCoV-2019

Early stage.

Fever (>38C)

AND

Respiratory symptoms:

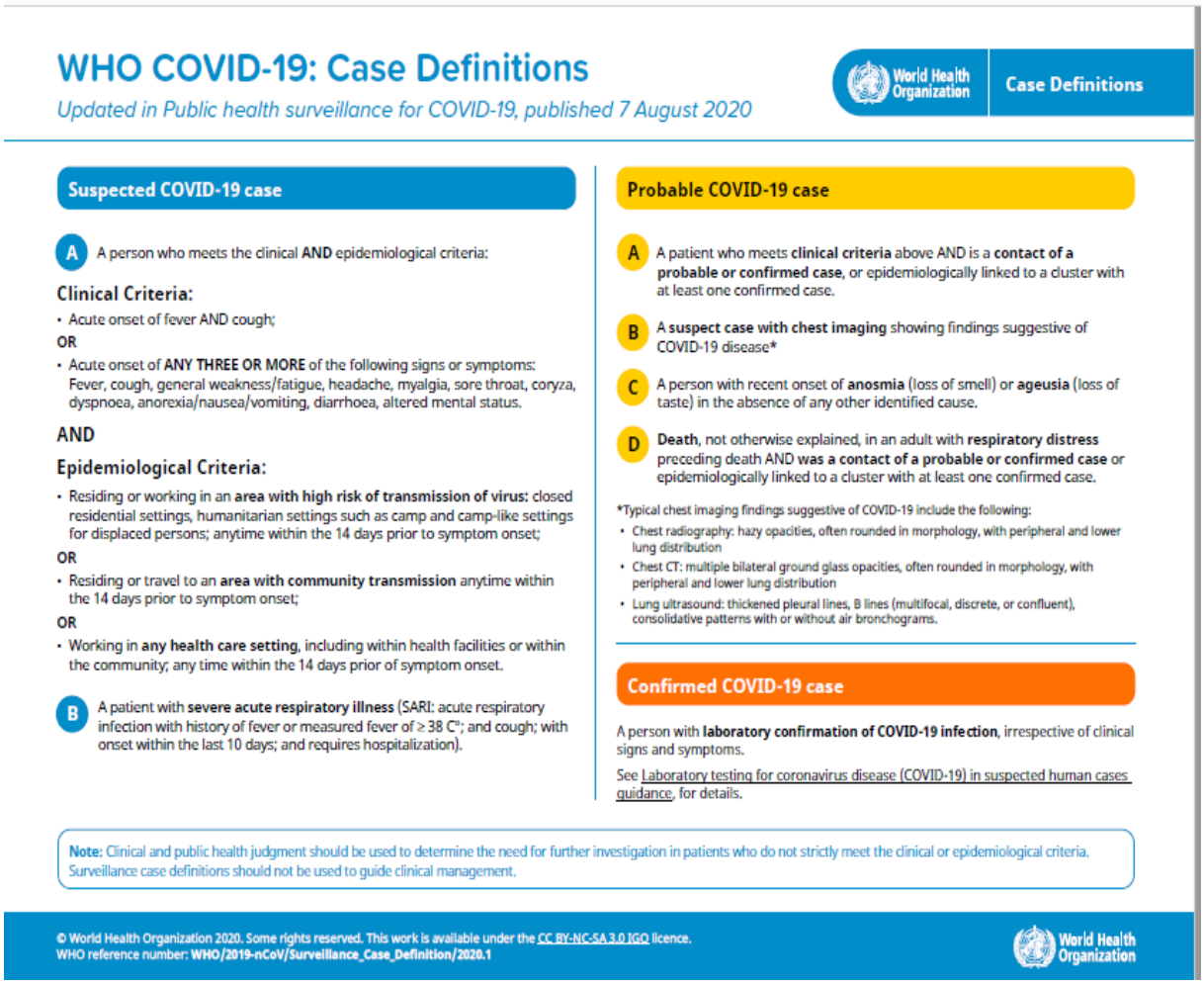
- Cough
- Shortness of breath
- Runny nose
- Weakness
- Malaise
- Nausea/vomiting
- Diarrhoea
- Headache'.

Advanced stage.

All early symptoms plus

- Pneumonia
- Bronchitis

WHO Case definition of COVID 19



WHO COVID-19: Case Definitions

Updated in Public health surveillance for COVID-19, published 7 August 2020

World Health Organization | Case Definitions

Suspected COVID-19 case

A A person who meets the clinical **AND** epidemiological criteria:

Clinical Criteria:

- Acute onset of fever AND cough;

OR

- Acute onset of **ANY THREE OR MORE** of the following signs or symptoms: Fever, cough, general weakness/fatigue, headache, myalgia, sore throat, coryza, dyspnoea, anorexia/nausea/vomiting, diarrhoea, altered mental status.

AND

Epidemiological Criteria:

- Residing or working in an **area with high risk of transmission of virus:** closed residential settings, humanitarian settings such as camp and camp-like settings for displaced persons; anytime within the 14 days prior to symptom onset;

OR

- Residing or travel to an **area with community transmission** anytime within the 14 days prior to symptom onset;

OR

- Working in **any health care setting**, including within health facilities or within the community; any time within the 14 days prior of symptom onset.

B A patient with **severe acute respiratory illness** (SARI: acute respiratory infection with history of fever or measured fever of ≥ 38 C°; and cough; with onset within the last 10 days; and requires hospitalization).

Probable COVID-19 case

A A patient who meets **clinical criteria** above AND is a **contact of a probable or confirmed case**, or epidemiologically linked to a cluster with at least one confirmed case.

B A **suspect case with chest imaging** showing findings suggestive of COVID-19 disease*

C A person with recent onset of **anosmia** (loss of smell) or **ageusia** (loss of taste) in the absence of any other identified cause.

D **Death**, not otherwise explained, in an adult with **respiratory distress** preceding death AND **was a contact of a probable or confirmed case** or epidemiologically linked to a cluster with at least one confirmed case.

*Typical chest imaging findings suggestive of COVID-19 include the following:

- Chest radiography: hazy opacities, often rounded in morphology, with peripheral and lower lung distribution
- Chest CT: multiple bilateral ground glass opacities, often rounded in morphology, with peripheral and lower lung distribution
- Lung ultrasound: thickened pleural lines, B lines (multifocal, discrete, or confluent), consolidative patterns with or without air bronchograms.

Confirmed COVID-19 case

A person with **laboratory confirmation of COVID-19 infection**, irrespective of clinical signs and symptoms.

See Laboratory testing for coronavirus disease (COVID-19) in suspected human cases guidance, for details.

Note: Clinical and public health judgment should be used to determine the need for further investigation in patients who do not strictly meet the clinical or epidemiological criteria. Surveillance case definitions should not be used to guide clinical management.

WHO reference number: WHO/2019-nCoV/Surveillance_Case_Definition/2020.1

World Health Organization

Who is at risk?

- Anyone can be infected
- But those prone to severe illness include:
    - Older adults
    - People with underlying medical conditions, such as diabetes mellitus, asthma, etc.
    - People who are already sick
- Most deaths have been reported among older adults and those with underlying conditions.

Laboratory tests

- Can be detected by RT-PCR

Treatment

- There is no treatment yet except for the use of dexamethasone in critical patients
- Vaccine has been developed or are in the final stages of development
- Treatment is symptomatic
- Infection prevention and control measures to limit exposure is the core control strategy.

Prevention

- Standard precautions:
- Additional precautions

Summary

- COVID-19 is a new Coronavirus discovered in China
- It is transmitted through droplets and contaminated hands.
- The incubation period is 1 to 14 days with a mean of 5 to 6 days.
- Symptoms are similar to seasonal flu
- The mortality rate is about 2.3% and the majority of deaths in China have been reported among older adults and persons with underlying medical conditions.
- There is no treatment or vaccine
- Standard measures to limit transmission of the virus include hand hygiene, respiratory hygiene, proper cooking of food and social distancing.

Triage, Isolation and notification

PROCEDURE FOR TRIAGE, ISOLATION AND NOTIFICATION IN THE CONTEXT OF COVID-19

Objectives

Participants will be able to:

1. Explain and perform triage
2. Identify who, where, and how to isolate cases of suspected COVID-19
3. Determine when and where to notify

Triage

What is triage?

Key Definitions and Human Resources

Definitions:

1. Triage*: The process by which a clinician assesses a patient's clinical urgency.*
   - *The purpose of the triage system is to ensure that the standard of emergency care provided is consistent with clinical guidelines. The triage process is based on the rationale that reducing the time to provide medical care will improve the patient's clinical outcome.*
2. *Screening: is the strategy used to identify an epidemic-prone disease.*

Importance of the process (why?)

Many people will visit your healthcare facility!

Some with Covid-19 symptoms and some without symptoms, including other diseases with epidemic potential.

To protect yourself, your patients and your colleagues, you must..:

TRIAGE: Patients in a designated area: triage, before entering the health care facility.

ISOLATE: Suspected COVID-19 patients in a designated isolation area.

NOTIFY: to ensure that suspected COVID-19 patients receive care in a designated facility

Who should be triaged?

Everybody!

- All health personnel
- All patients (including babies and children)
- All visitors (including family and friends accompanying patients)
- All COVID-19 response teams and other stakeholder support staff

- All personnel working in the healthcare facility must be screened daily for COVID-19 upon arrival at the hospital.
- Do NOT come to work if you are sick (see a doctor).
- Healthcare workers should be screened for COVID-19 and suspected cases isolated
- Health care workers can be screened alongside patients or at a separate entrance reserved for health care workers.
- If a health care worker is identified as a suspect case, apply follow case definition procedures - isolate and inform

When to triage?

1. **Before** entering the health facility.
2. All **inpatients** must be assessed daily (hospital monitoring).

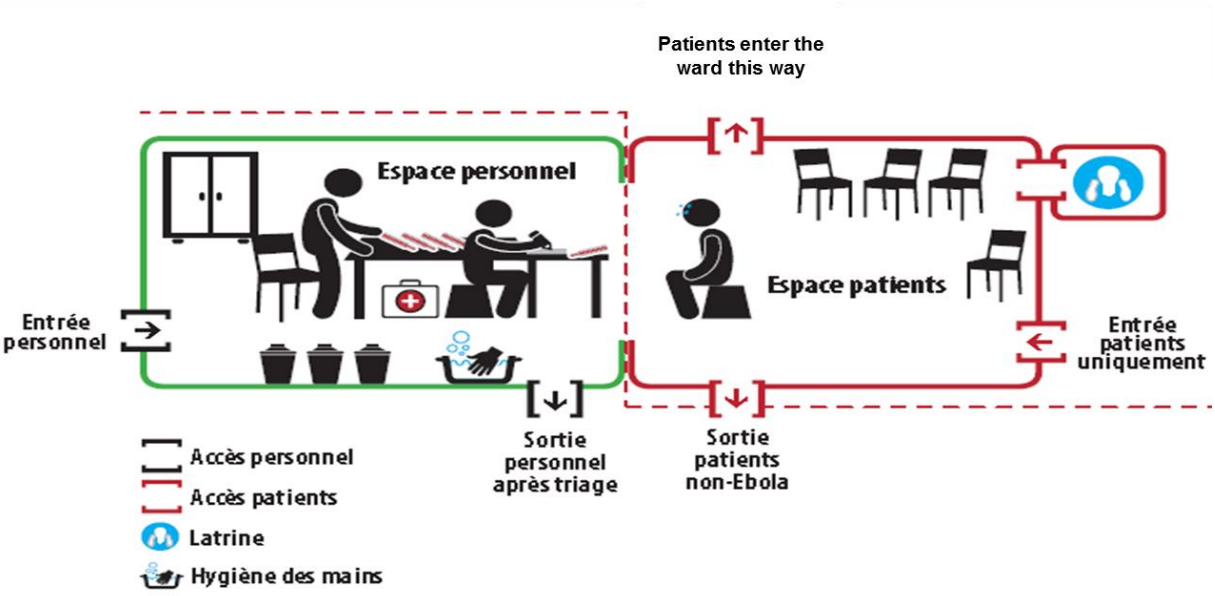
(***even if already triaged at the entrance of the health care facility)***

Where to triage?

- The triage station should be located *at the entrance to the health facility* (triage at reception area) and *at the obstetrics department* (triage in obstetrics).
- All other entrances must be closed completely.

If it is impossible to close the other points of access, they must have a triage station.

Where to triage? Process and facility



The implementation of the triage process does not require the construction of a facility.

Two chairs separated by a table (minimum 1 meter) could suffice.

<u>The triage area must have:</u>

- a hand hygiene station
- an infrared thermometer (Thermoflash)
- a triage register
- triage forms
- Waste disposal bins
- PPE for the management of suspect cases: surgical mask, gloves, gown (disposable, clean, non-long-sleeved, non-sterile)

How to triage?

Keep a minimum distance of one metre at all times

Do not touch the patient

Apply standard and additional precautions (if necessary) - Risk assessment

Explain to the patient the purpose and the course of the procedure.

Complete the triage form and use the information on the triage form alongside the case definition to determine if the patient is a suspect case.

PPE to be donned in triage station: Quiet and private area

PPE to be donned at the triage station: Active area

Basic protection that covers areas where germs are most likely to enter the body

- Gloves
- Goggles and mask (or face shield)
- Gown
- Closed work shoes

1. Fill out the triage form and use the information on the triage form alongside the case definition determine if the patient is a suspect case.

Screening Register for 2019nCoV

Symptoms and Signs + Exposure History

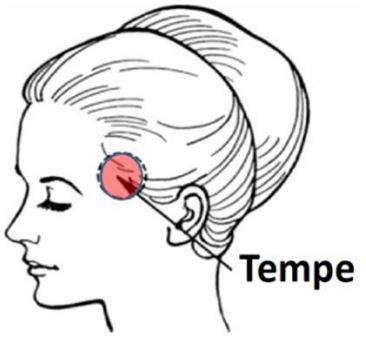
Patient name and address	Fever >37.5°C axillary / >38.0°C core temp	cough	Difficulty breathing	History of Travel to China in 14 days prior to symptoms	Close contact with confirmed case of nCoV	Exposure to healthcare facility in a country where hospital associated nCoV infections have been reported	Close contact with a person who came back from China in previous 14 days	Comment

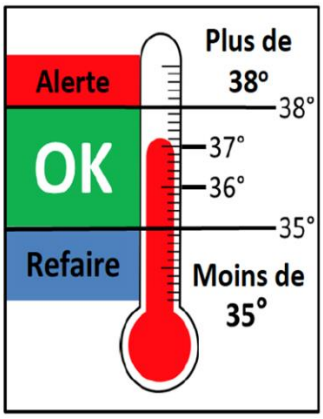
Key to comments:

Signs and Symptoms no Exposure = No nCOV(N)
Exposure only = Contact (C)
Signs and Symptoms +Exposure = Suspect (S)

2. TEMPERATURE

- Check temperature with an infrared thermometer (Thermoflash). Record the temperature on the chart, then assess exposure history and symptoms (refer to case definition).





3. Patient Assessment?
   Are symptoms of COVID-19 present?

Respiratory symptoms:

- Cough
- Shortness of breath
- Runny nose
- Weakness
- Malaise
- Nausea/vomiting
- Diarrhoea
- Headache'.

3. Contact

- Contact history over the last 14 days?

Travel to a country reporting covid-19 local transmission

- Contact with a confirmed or probable COVID-19 case

4. Refer to Case definition of COVID-19

Monitoring healthcare units:

- Patients may not have any COVID-19 symptoms during triage and admission.
- Symptoms may develop while patient is hospitalized.
- *Daily monitoring of inpatients for COVID-19 symptoms* is essential.

Daily actions

- Apply standard precautions for all patients
- *Take the temperature of all inpatients* at least twice a day.
- *Assess* the patient at least once a day or immediately, in case of high fever (> 38°C), based on the definition of suspect case or probable case (Detection and Alert Algorithm).
- A record of each patient's results must be kept.
- Graphic: Screening register

Isolation

Definition: Isolation is defined as the separation of suspect patients from other patients.

Who should be isolated?

Any person who meets the following criteria for suspected case definition. (Refer to case definition algorithm under general introduction to COVID-19)

Where to isolate?

- Once a patient has been identified as a suspected COVID-19 case, he or she should be separated from other patients.
- Identify an isolation area reserved for suspect cases ONLY.
- If there is a designated isolation facility, use it!

You can still isolate a patient even in the absence of a facility!

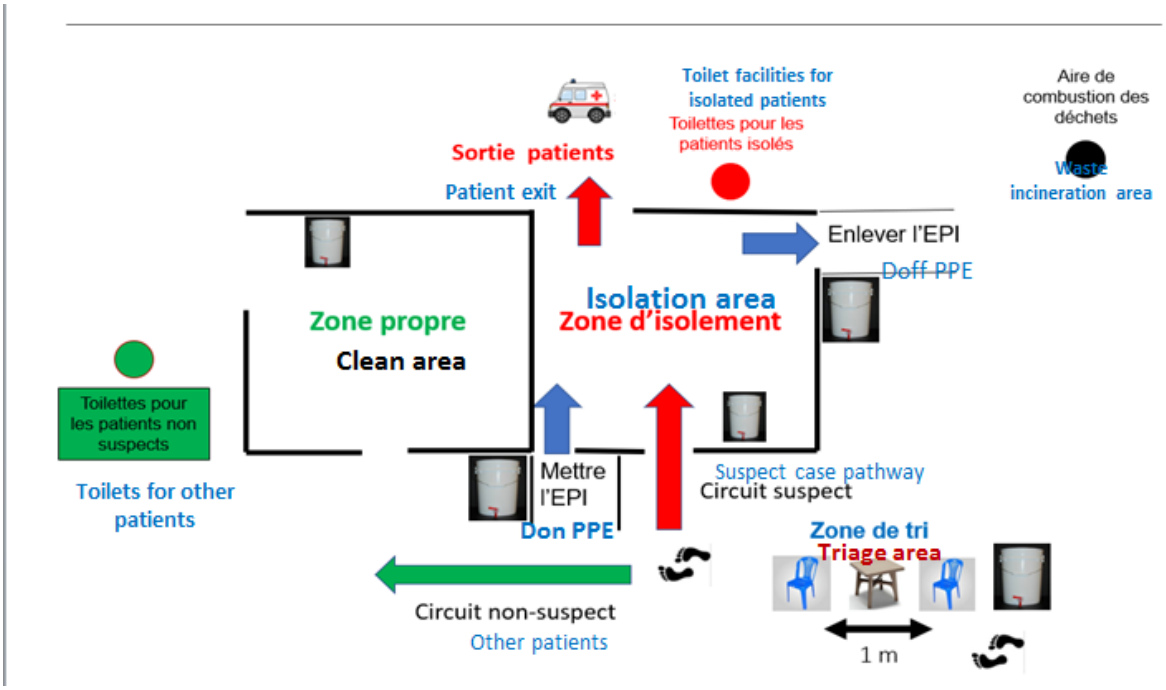
KEY POINTS

- Identify the "Isolation" area
- Separate isolation area from other units/departments
- Place beds of patients in isolation at least 1 meter apart.
- Provide en-suite toilet facilities or a bedpan / urinal in the isolation area

Essential triage facilities

- Triage area
- Clean area
- PPE donning area
- Isolation room:
  - A hand washing station
  - Supplies (PPE, a bed, basin/urinal, garbage cans, etc.)
- PPE doffing area
- All health personnel must wear appropriate PPE in the isolation area.

One-way traffic



How to isolate?

- Don PPE when taking the suspect case to the temporary isolation area.
- Immediately alert the on-call physician, medical director or head nurse to confirm suspected COVID-19 infection

For children and accompanying persons:

- In the case of a child, a parent should always be with the child. If the parent does not have a fever or any symptoms, the health worker will require the parent to wear PPE before entering the isolation area.
- In the case of an adult, the accompanying person(s) will not be allowed to stay with the patient in the isolation area.

Communication in isolation?

Tell the patient:

1. They are in isolation because they present COVID-19 symptoms
2. A health worker will assist you throughout your stay, as appropriate.
3. A health worker will reassess you before any decision is made on whether or not to transfer you to the COVID-19 treatment centre.
4.

2. Must have:

1. Hand washing station
2. PPE: gown, glove, mask, eye protection (shield or goggles)
3. Equipment used exclusively for cleaning and disinfection of the isolation area
4. Waste disposal bins

Alert/Notification

WHEN?

- Once the clinician has established that the criteria for suspect case definition has been met

HOW?

- Alert using dedicated numbers provided by surveillance
- Fill out the triage form to be given to the Ministry of Health investigation team.

Under no circumstances should this procedure delay the management of a life-threatening emergency.

Overview of COVID-19-testing centre

Jawaharlal Nehru Hospital Covid-19 Testing Centre

JNH :

- Declared as a pandemic by WHO on 11th March 2020
- 1st Local case of Covid -19 in Mauritius was reported on 18th March 2020
- No new local case since 26th April 2020
- End of lockdown on the 30th May 2020
- At present:
  - 41 active cases
  - Total cases = 415 (36 health care workers)
  - Deaths: 10 (1 health care professional)

JNH Fever Clinic- Before Covid-19 Testing Centre

- Opened on 15th March 2020 at Unsorted OPD
- PCR testing (nasopharengeal and throat swab) was started on 16th April 2020 for all patients attending fever clinic
- Attendance of patients : 967

- PCR was done in 399 cases
- PCR Screening was performed on 128 health care workers.

Set up was designed by our Flu Clinic staffs with separate Entry and Exit pathways

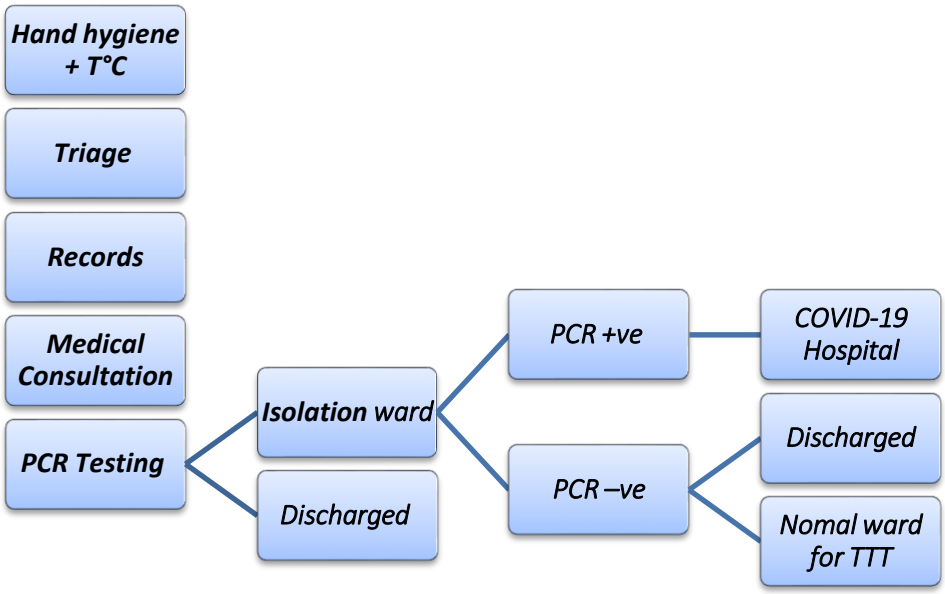
- Wearing of mask is mandatory
- Hand hygiene
- Temperature check up
- Triage
- Records of patient's details
- Medical examination and management
    - High risk symptomatic patients were transferred by ambulance to isolation ward for further management
    - Simple cases were discharged on symptomatic treatment and counselled about hand and respiratory hygiene and self-isolation at home

- Funded by WHO
- Opened on the 9th May 2020
- Inaugurated on the 16th May 2020 by Minister of Health and Wellness: Hon. Dr Jagutpal K. K.
- In the presence of
    - Hon. Hurreeram M. S.(Minister of infrastructure and development)
    - Dr Laurent Musango (WHO Representative)

SETUP OF COVID-19 TESTING CENTRE

- **RECEPTION**
    - Hand hygiene/ Proper wearing of mask
    - Temperature recording

- **TRIAGE**: Patients presenting following symptoms are oriented to FLU clinic:
    - Fever
    - dry cough
    - weakness
    - Generalised body pain
    - nasal congestion
    - Headache
    - sore throat
    - diarrhea
- **Records**: Patient identification and personal details are recorded
- **Medical consultation**: Patients are examined by medical practitioners
- **PCR TESTING**
    - Throat swab and nasopharyngeal swab are done observing all airborne and contact precautions
    - Patient details are input on the computerised system
    - PCR results are received through our online network software within 48 hrs
- **Management of patients** stable patients / no contact with covid-19 positive cases : discharged on treatment
- Suspected cases are placed in ISOLATION ROOM while awaiting admission in isolation ward until their PCR results
- Isolation ward
    - Positive cases: Transferred to COVID-19 HOSPITAL by Rapid Response Team (RRT)
- Negative cases: Discharged or Transferred to normal ward for further management
- Since the opening of JNH covid-19 testing centre
    - Total no. of attendance= 6230 patients
    - PCR performed = 6084



PERIOD	ADMISSION		DEATH	
Lockdown (20 March–31 May 2020)	**MALE**	**74**	**MALE**	**6**
	FEMALE	**46**	**FEMALE**	**2**
Post lockdown (1 June- 15 October 2020)	MALE	35	MALE	0
	FEMALE	27	FEMALE	0

JNH Isolation Ward

- **2 COVID-19 positive cases**
- **One patient died due COVID-19**
- **2 cases of airborne contamination by COVID 19** were reported among healthcare workers
- Two cases of death due ischemic heart disease were reported within 24hrs of admission
- 2 cases of **TB** were reported and transferred to Poudre d'Or hospital
- 2 female cases of **SLE** were also diagnosed.

IPC in FLU Clinic

- Hand hygiene for all patients and staffs
- Respiratory hygiene for all patients and staffs
- Daily proper cleaning of all equipment, tables, chairs, surfaces, door handles etc..
- Damp dusting and mopping of the floor with disinfectant every 2hours
- Immediate mopping in case of body fluid spills
- Patients are asked to keep the same chair as far as possible and the area is disinfected after.
- Proper PPE is used for each procedure
- Safe disposal of waste

Conclusion

- Implementation of the covid-19 circuit needed **great team work**
- **Substantial progress** has been made from the improvised fever clinic to the actual fully equipped covid-19 testing centr**Challenges**:
    - Proper wearing of mask by patients
    - Stigmatisation about covid-19
    - Triage of patients
    - Patient denying history of travel
- **Public awareness** about covid-19 testing centres in hospital

Occupational health and exposure Assessment of Health care workers

Objectives

1. Understand why, how, when and where to undertake assessments of health care workers risk exposure;
2. Understand how to classify and manage levels of risk exposure.

Overview of risk exposure form for health care workers

Objective:

Assess, categorize and manage health care workers exposed to confirmed or probable cases of COVID-19

Who will be assessed?

Health care workers exposed to a confirmed case in a health facility

When?

As soon as possible, after exposure to a confirmed case in a health care facility

Who does assessment?

IPC focal point

How?

By using all of the following documents:

- Assessment form for health care workers-fill this form;
- SOP on health care workers risk exposure for guidance
- Case management

Where?

A health care facility where confirmed case was identified

STEP 1

Identify health workers possibly exposed using contact list:

- Health workers must be identified based on the following discussions with :
    - Multidisciplinary teams (Surveillance, IPC, Communication, PSY)

- Health care workers in service
- Administrators of health centres
- Cases and/or their families/representatives

STEP 2

Determine health case workers risk exposure:

- Fill risk assessment form for exposed health care workers
- Identify level of potential risk exposure to the SARS-CoV-2 virus following results of assessment form

Exposure:

Exposure will depend on two factors:

- The health care worker had contact with patient or his/her immediate environment

AND

- Health care worker did not implement standard and/or additional precautions.

Activities that could have led to exposure

Le travailleur de la santé est-il entré en contact avec le patient ou l'environnement immédiat du patient ? □ Oui □ Non	
Activités pouvant avoir conduit à une exposition (cochez toutes les réponses qui s'appliquent) *	
□ Fourni des soins généraux aux patients (pris les signes vitaux, examiné le patient…)	
□ Fourni des soins de maternité ou vu un patient en soins prénataux (à l'exclusion des accouchements)	
□ Ligne intraveineuse manipulée (médicaments ou perfusions intraveineux administrés)	
□ Patient baigné ou lavé	□ Patient déplacé ou transporté
□ Injection donnée	□ Été en contact avec des surfaces contaminées
□ Déchets manipulés	□ Linge, vêtements ou matelas manipulés
□ A nettoyé la chambre du patient ou la salle où le patient est resté	□ Patient alimenté ou médicament oral administré

Precautions:

- Determine if health care worker was wearing PPE correctly during interaction with patient
- Determine if health care worker maintained a safe distance of at least 1 metre from the patient
- Determine if health care worker is IPC- trained with emphasis on COVID.

STEP 3

- *Determine actions to take:*
- *Daily monitoring for 14 days from day of exposure.*
- *If health care worker develops symptoms during those 14 days of monitoring, he/she should abstain from all activity and be examined (laboratory test including test to confirm or rule out diagnosis)..*

IPC Scorecard and WHO- Hand Hygiene (Observation Tool)

IPC Score Card

IPC SCORECARD for rapid assessment of health facilities (COVID-19)

Health facility name: _____ Number of beds: _____

Number of health personnel: _____

Type of health facility		
	Primary health centre (private or publuc health post/centre)	☐
	Hospital (CSR/HGR)	☐
	Mobile clinic	☐
	Modern-traditional healers.	☐

Health zone: _____ Health area : _____

Date of assessment: ____/_____/_____

Assessor name: _____ Assessor contact: _____

	ASSESSMENT/THEMATIC CRITERIA	QUOTES YES	QUOTES NO	SCORE	COMMENTS
	1. Focal point and hygiene committee on site				
1	The facility has a focal point or a Hygiene/IPC Committee with responsability, accountability and authority				
2	ToR available and known to the FP				
3	The FP is allowed time to perform the IPC tasks				
	2. Triage available				
4	Temperature and symptoms of COVID-19 are correctly verified - Functional ThermoFlash				
5	Triage form and register available				
6	Proper use of triage form and register				
	3. Identification of an isolation/waiting area				
7	Well identified "Isolation" area away from other units/services				
8	Exclusive latrines/toilets in the isolation area or presence a bedpan/urinary				
9	The isolation area comprises: hand washing facilities, equipment (PPE, bedpan/urinary, etc.), an area for putting on PPE and another for taking off PPE (well respected circuit)				
	4. Hand washing/Hand washing facilities				
10	At each entrance and care setting: should include clean water + soap and/or Hydro-alcoholic solution and/or 0.05% chlorinated water solution [where the first two are not available]				
11	The staff is able to implement hand hygiene correctly (according to WHO technique)				
12	Presence of posters on the various hand hygiene techniques at each LVM station				

The 12 Rapid Assessment Standards

1. Focal point and hygiene committee in place
2. Triage in place
3. Set up isolation/waiting zone
4. Hand washing/ Hand hygiene stations
5. Availability and use of PPE
6. Waste sorting
7. Waste disposal
8. Staff training
9. Warning 0f suspected intra-hospital cases
10. Sterilisation
11. Bio-cleaning of patient environment

12. Exposure of health care worker to SARS-CoV-2 virus

Instructions

- Use a scorecard for each health care facility – applies to all types of health facilities other than ETCs
    - Frequency of assessments: once a week for six weeks. However, the reassessment may be undertaken after three weeks, if assessors feel it is absolutely vital to allow extra time for implementing prevention activities.
    - Ideally, health facilities should be assessed by the same supervisor as often as possible
- Meet each standard during every facility assessment

SCORE

0= does not meet any standard
1= meets 1 standard
2= meets 2 standards
3= meets 3 standards

Interpretation of results, prioritisation of monitoring and reassessment

- The colour shows frequency of monitoring :
    - ❑ **Red** (0 - 49%) = once a day
    - ❑ **Jaune** (50 -79%) = once every 2 or 3 days
    - ❑ **Vert** (80-100%) = once a week
- Monitoring: this involves supporting the facility and assisting the focal point to fill gaps
- Reassessment: once a week for all health facilities for six weeks. However, reassessment may take place after three weeks if assessors deem it absolutely necessary to allow for more time to implement prevention activities.

Action Plan

Date: _____ / _____ / _____

Health zone	Health area	Health facility	Category	Sector

Respondent Name	Facility IPC Score	Name of Assessor
Respondent Function		Assessor Phone No.
Respondent Phone No.	Number of Partners	List of Partners
		1 2 3
		4 5 6

	Gaps identified	Action Plan	Designated Official	Date of execution
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

Hand Hygiene Observation Form

Facility:		**Period Number*:**		**Session Number*:**	
Service:		**Date:** (dd/mm/yy)	/ /	**Observer:** (initials)	
Ward:		**Start/End time:** (hh:mm)	: / :	**Page N°:**	
Department:		**Session duration:** (mm)		**City**:**	
Country:**					

Prof.cat			**Prof.cat**			**Prof.cat**			**Prof.cat**		
Code			**Code**			**Code**			**Code**		
N°			**N°**			**N°**			**N°**		
Opp.	**Indication**	**HH Action**	**Opp.**	**Indication**	**HH Action**	**Opp.**	**Indication**	**HH Action**	**Opp.**	**Indication**	**HH Action**
1	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed ○ gloves	**1**	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed ○ gloves	**1**	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed ○ gloves	**1**	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed ○ gloves
2	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed ○ gloves	**2**	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed ○ gloves	**2**	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed ○ gloves	**2**	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed ○ gloves
3	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed ○ gloves	**3**	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed ○ gloves	**3**	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed ○ gloves	**3**	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed ○ gloves
4	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed ○ gloves	**4**	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed ○ gloves	**4**	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed ○ gloves	**4**	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed ○ gloves

5	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed ○ gloves	**5**	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed ○ gloves	**5**	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed ○ gloves	**5**	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed ○ gloves
6	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed ○ gloves	**6**	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed ○ gloves	**6**	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed ○ gloves	**6**	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed ○ gloves
7	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed ○ gloves	**7**	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed ○ gloves	**7**	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed ○ gloves	**7**	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed ○ gloves
8	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed ○ gloves	**8**	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed ○ gloves	**8**	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed ○ gloves	**8**	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed ○ gloves

* To be completed by the data manager.

General Recommendations

(refer to the Hand Hygiene Technical Reference Manual)

1. In the context of open and direct observations, the observer introduces him/herself to the health-care worker and to the patient when appropriate, explains his/her task and proposes immediate informal feed back.
2. The health-care worker, belonging to one of the main four following professional categories (see below), is observed during the delivery of health-care activities to patients.
3. Detected and observed data should be recorded with a pencil in order to be immediately corrected if needed.
4. The top of the form (header) is completed before starting data collection (excepted end time and session duration).
5. The session should last no more than 20 minutes (± 10 minutes according to the observed activity); the end time and the session duration are to be completed at the end of the observation session.
6. The observer may observe up to three health-care workers simultaneously, if the density of hand hygiene opportunities permits.
7. Each column of the grid to record hand hygiene practices is intended to be dedicated to a specific professional category. Therefore numerous health-care workers may be sequentially included during one session in the column dedicated to their category. Alternatively each column may be dedicated to a single health-care worker only of whom the professional category should be indicated.
8. As soon as you detect an indication for hand hygiene, count an opportunity in the appropriate column and cross the square corresponding to the indication(s) you detected. Then complete all the indications that apply and the related hand hygiene actions observed or missed.
9. Each opportunity refers to one line in each column; each line is independent from one column to another.
10. Cross items in squares (several may apply for one opportunity) or circles (only a single item may apply at one moment).
11. When several indications fall in one opportunity, each one must be recorded by crossing the squares.
12. Performed or missed actions must always be registered within the context of an opportunity.
13. Glove use may be recorded only when the hand hygiene action is missed while the health-care worker is wearing gloves.
14.

Short description of items

Facility:	to complete according to the local nomenclature	
Service:	to complete according to the local nomenclature	
Ward:	to complete according to the local nomenclature	
Department:	to complete according to the following standardized nomenclature:	
	medical, including dermatology, neurology, haematology, oncology, etc.	surgery, including neurosurgery, urology, EENT, ophthalmology, etc.
	mixed (medical & surgical), including gynaecology	obstetrics, including related surgery
	paediatrics, including related surgery	intensive care & resuscitation
	emergency unit	long term care & rehabilitation
	ambulatory care, including related surgery	other (to specify)
Period N°:	1) pre- / 2) post-intervention; and then according to the institutional counter.	
Date:	day (dd) / month (mm) / year (yy)	
Start/end time:	hour (hh) / minute (mm).	
Session duration:	difference between start and end time, resulting in minutes of observation.	
Session N°:	attributed at the moment of data entry for analysis.	
Observer:	observer's initials (the observer is responsible for the data collection and for checking their accuracy before submitting the form for analysis.	

Page N°:	to write only when more than one form is used for one session.	
Prof.cat:	according to the following classification:	
	1. nurse / midwife	1.1 nurse, 1.2 midwife, 1.3 student.
	2. auxiliary	
	3. medical doctor	3.1 in internal medicine, 3.2 surgeon, 3.3 anaesthetist / resuscitator / emergency physician, 3.4 paediatrician, 3.5 gynaecologist, 3.6 consultant, 3.7 medical student.
	4. other health-care worker	4.1 therapist (physiotherapist, occupational therapist, audiologist, speech therapist), 4.2 technician (radiologist, cardiology technician, operating room technician, laboratory technician, etc), 4.3 other (dietician, dentist, social worker and any other health-related professional involved in patient care), 4.4 student.
Number:	number of observed health-care workers belonging to the same professional category (same code) as they enter the field of observation and you detect opportunities.	
Opp(ortunity):	defined by one indication at least	
Indication:	reason(s) that motivate(s) hand hygiene action; all indications that apply at one moment must be recorded	
	bef.pat: before touching a patient	aft.b.f: after body fluid exposure risk
	bef.asept: before clean/aseptic procedure	aft.pat: after touching a patient
		aft.p.surr: after touching patient surroundings
HH action:	response to the hand hygiene indication(s); it can be either a positive action by performing handrub or handwash, or a negative action by missing handrub or handwash	
	HR: hand hygiene action by handrubbing with an alcohol-based formula HW: hand hygiene action by handwashing with soap and water	Missed: no hand hygiene action performed

Observation Form – Basic Compliance Calculation

	Facility:						**Period:**			**Setting:**					
	Prof.cat.			**Prof.cat.**			**Prof.cat.**			**Prof.cat.**			**Total per session**		
Session N°	**Opp (n)**	**HW (n)**	**HR (n)**	**Opp (n)**	**HW (n)**	**HR (n)**	**Opp (n)**	**HW (n)**	**HR (n)**	**Opp (n)**	**HW (n)**	**HR (n)**	**Opp (n)**	**HW (n)**	**HR (n)**
1															
2															
3															

4														
5														
6														
7														
8														
9														
10														
11														
12														
13														
14														
15														
16														
17														
18														
19														
20														
Total														

Calculation	Act (n) = / Opp (n) =	Act (n) = / Opp (n) =	Act (n) = / Opp (n) =	Act (n) = / Opp (n) =	Act (n) = / Opp (n) =
Compliance					

Compliance (%) = Actions x 100

Instructions for use

1. Define the setting outlining the scope for analysis and report related data according to the chosen setting.
2. Check data in the observation form. Hand hygiene actions not related to an indication should not be taken into account and vice versa.
3. Report the session number and the related observation data in the same line. This attribution of session number validates the fact that data has been taken into count for compliance calculation.
4. Results per professional category and per session (vertical):
   - 4.1 Sum up recorded opportunities (opp) in the case report form per professional category: report the sum in the corresponding cell in the calculation form.
   - 4.2 Sum up the positive hand hygiene actions related to the total of opportunities above, making difference between handwash (HW) and handrub (HR): report the sum in the corresponding cell in the calculation form.
   - 4.3 Proceed in the same way for each session (data record form).
   - 4.4 Add up all sums per each professional category and put the calculation to calculate the compliance rate (given in percent)
5. The addition of results of each line permits to get the global compliance at the end of the last right column.

Observation Form – Optional Calculation Form

(Indication-related compliance with hand hygiene)

	Facility:						Period:			Setting:					
	Before touching a patient			Before clean/ aseptic procedure			After body fluid exposure risk			After touching a patient			After touching patient surroundings		
Session N°	Indic (n)	HW (n)	HR (n)	Indic (n)	HW (n)	HR (n)	Indic (n)	HW (n)	HR (n)	Indic (n)	HW (n)	HR (n)	Indic (n)	HW (n)	HR (n)
1															
2															
3															

4															
5															
6															
7															
8															
9															
10															
11															
12															
13															
14															
15															
16															
17															
18															
19															
20															
Total															
Calculation	**Act (n) =** **Indic1 (n) =**			**Act (n) =** **Indic2 (n) =**			**Act (n) =** **Indic3 (n) =**			**Act (n) =** **Indic4 (n) =**			**Act (n) =** **Indic5 (n) =**		

Ratio act / indic*					

Instructions for use

1. Define the setting outlining the scope for analysis and report related data according to the chosen setting.
2. Check data in the observation form. Hand hygiene actions not related to an indication should not be taken into account and vice versa.
3. If several indications occur within the same opportunity, each one should be considered separately as well as the related action.
4. Report the session number and the related observation data in the same line. This attribution of session number validates the fact that data has been taken into count for compliance calculation.
5. Results per indication (indic) and per session (vertical):
   4.1 Sum up indications per indication in the observation form: report the sum in the corresponding cell in the calculation form.
   4.2 Sum up positive hand hygiene actions related to the total of indications above, making the difference between handwash (HW) and handrub (HR): report the sum in the corresponding cell in the calculation form.
   4.3 Proceed in the same way for each session (observation form).
   4.4 Add up all sums per each indication and put the calculation to calculate the ratio (given in percent)

***Note:** This calculation is not exactly a compliance result, as the denominator of the calculation is an indication instead of an opportunity. Action is artificially overestimated according to each indication. However, the result gives an overall idea of health-care worker's behaviour towards each type
of indication.