Webinar/virtual training on Hand Hygiene (Standard precaution for infection prevention and control)

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Introduction

- Micro-organisms are found everywhere, in the environment, on surfaces, in the air and also on the human body.
- While some micro-organisms are beneficial, most are also harmful and are the major cause of infection in the Human population.
- Infection is a disease caused by microorganisms that invade tissues
- Microorganisms consist of bacteria, viruses, fungi, protozoans
- Infection prevention and control (**IPC**) is a scientific approach and practical solution designed to prevent harm caused by infection to humans and Laboratory workers.
- In the microbiology laboratory we assume that all micro-organisms are potentially pathogenic and act accordingly.

Introduction cont'd

- Two types of micro organism are present on the skin: Indigenous organisms, such as *Staphylococcus epidermis,* which are part of the natural microbial flora of the skin and are firmly attached to the skin and are found in skin crevices
- some strains may be pathogenic to another person, especially if that individual is compromised in any way e.g. very old, very young or ill. The second type are the,
- Transient organisms such as *Escherichia coli* which may be pathogenic.
  Skin micro-organisms are also present on skin flakes that are shed from the human body and so can be present in the air.
- Hand-hygiene is the single most effective technique that prevents the transmission of micro-organisms either directly or indirectly to others

Behaviour and injury prevention in the Lab

- “At risk behaviour”
- Mouth pipetting
- Hand to face contact
- Picking up glasses and wares with hands
- “Safe behaviour”
- Hand hygiene
- Using pipetting devices
- Safe sharps precautions
- Using a mechanical device to pick up broken glass.

Hand Hygiene

- Hand Hygiene is a standard precaution for infection prevention and control. It is a general term that applies to hand washing, either antiseptic hand wash, antiseptic hand rub, or surgical hand antisepsis

- Washing hands can keep you healthy and prevent the spread of respiratory and other infections from one person to another

- Hand hygiene is the a critical component and the cornerstone for infection prevention and control

Hand hygiene cont'd

- Appropriate hand hygiene is considered the leading measure to reducing the transmission of pathogens in Laboratories. The impact of hand hygiene on the risk of transmission of infectious and resistant organisms is recognized in laboratories, hospitals, community settings such as, households, schools, and day care centres
- Inappropriate hand hygiene practice has been identified as a significant contributor to the world's numerous outbreaks.

Hand hygiene cont'd

- Several studies have shown the impact of improved hand hygiene on the risk of infection transmission of multiresistant pathogens. Most studies have focused on methicillin-resistant *Staphylococcus aureus*, but now evidence is accumulating for transmission of Gram-negative pathogens during this recent years.

Why Hand hygiene

- Hand transmission is the most likely route of infection in the Laboratory
- Hands, fingers and wrist are easily contaminated during Laboratory procedures
- Hand to face contact is common in the Laboratory
- Generally no barrier between hands and face

Hand washing and Hand disinfection

- “Effective for”
- Removing /inactivating microbes
- Effectiveness varies depending on;
- agents used
- Contact time
- Surfaces covered.

- Antiseptic hand wash and alcohol based hand sanitizers are superior to traditional soap and water

Why do Laboratory workers take risk

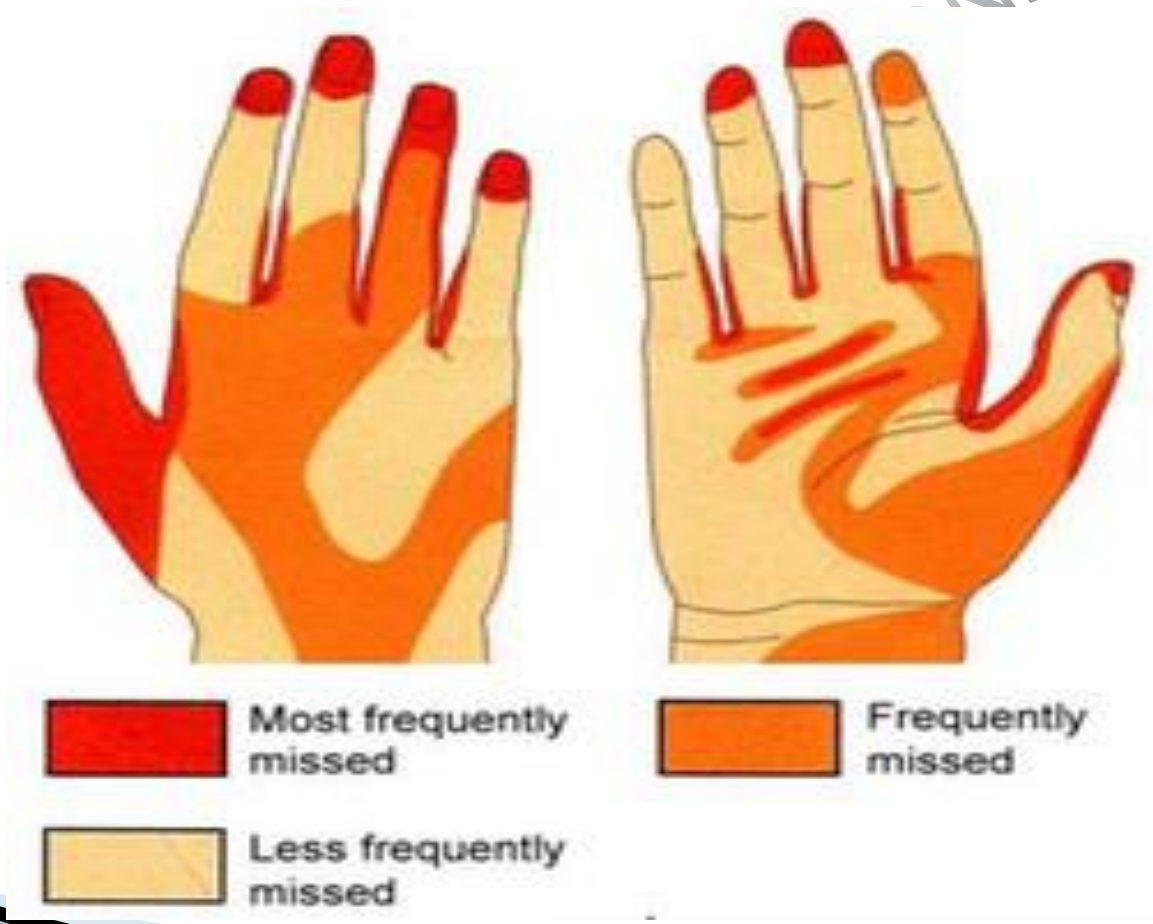
- Martyr to Science, “complex”
- Perception of risk is low
- Inadequate training; laboratory directors or principal investigators should train and retrain new staff to the point where aseptic techniques becomes their second nature.

Validation of hand washing

- It is essential to show that hand-washing method does remove micro-organisms from skin.
- Techniques to test for proper hand wash

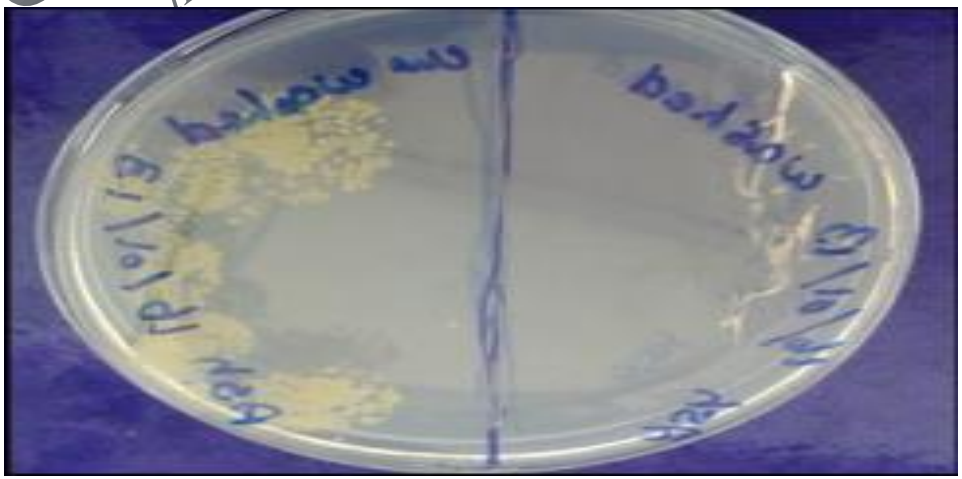
1)The fluorescent dye technique: fluorescent dye is applied to the hands prior to washing. Following washing the hands are examined under UV light for any traces of dye. The presence of traces of dye shows that hands have not been washed thoroughly

Validation of hand washing cont'd



Validation of hand washing cont'd

- Finger dab test; To make sure that bacteria on the skin have been removed, a finger dab test is carried out. Not thoroughly washed and thoroughly washed finger tips are pressed onto the surface of a NA plate and examined after incubation.



Hand hygiene compliance among Laboratory personnel

- Laboratory workers are at risk of infection because of their daily exposure to micro-organisms.
- Consequently, many cases of laboratory-associated infections have been reported. CDC and many other groups have provided standards and guidelines for laboratory safety.
- Hand hygiene is an important element of all these standards .
- While health-care workers (HCW) in patient care should disinfect their hands mainly to prevent
- transmission of pathogens to patients,
- laboratory personnel should do so to protect themselves and other people

Hand hygiene compliance among Laboratory personnel cont'd

- a study to measure the compliance of laboratory personnel with different components of hand hygiene was conducted.
- The level of compliance at the end of duty was 100%; however, 36.7% of subjects wore a ring, 46.9% wore a watch, and 6.1% wore a bracelet.
- Pathogenic microorganisms were exclusively found on hands of laboratory personnel who wore jewelry.
- Efforts to improve hand hygiene should be directed not only at healthcare workers but also at laboratory personnel.

Importance of Hand Hygiene

- Hand hygiene decreases colonization with transient flora. Transient flora colonizes the superficial layers of the skin. It has a short-term persistence on skin, but a high pathogenic potential. It is usually acquired by healthcare workers and Laboratory personnel during direct contact with patients, contaminated environmental surfaces, or laboratory devices, it is responsible for most nosocomial infections and spread of antimicrobial resistance organisms in healthcare and laboratory workers.

Importance of hand hygiene cont'd

- Studies have shown that appropriate hand hygiene;
- Reduces the number of people who get sick with diarrheal by 23-40%
- Reduces diarrheal illness in people with weakened immune systems by 58%
- Reduces respiratory illnesses, like colds, in the general population by 16-21%
- Reduces absenteeism due to gastrointestinal illness in schoolchildren by 29-57%

Methods of hand hygiene

- Washing hands with plain (i.e. non-antimicrobial) soap and water.
- Hand antisepsis - Refers to either antiseptic hand wash or antiseptic hand rub with 70% alcohol based hand sanitizer this is best for Laboratory personnel
- Surgical hand antisepsis - Antiseptic hand wash or antiseptic hand rub performed preoperatively by surgical personnel to eliminate transient and reduce resident hand flora.

Methods of hand hygiene cont'd

- Washing hands with soap and water are recommended for visibly soiled hands and is the best way to get rid of germs in most situations. If soap and water are not readily available,
- you can use an alcohol-based hand sanitizer that contains at least 60% alcohol. These sanitizers are the most efficacious agents for reducing the number of bacteria and viruses on hands and are recommended for routine decontamination of hands (except when hands are visibly soiled)

Key Times to Wash Hands

- You can help yourself and your loved ones stay healthy by washing your hands often, especially during these key times when you are likely to get and spread germs:
- **Before, during,** and **after** preparing food
- **Before** eating food
- **Before** and **after** caring for someone at home who is sick with vomiting or diarrheal
- **Before** and **after** treating a cut or wound
- **After** using the toilet
- **After** changing diapers or cleaning up a child who has used the toilet
- **After** blowing your nose, coughing, or sneezing
- **After** touching an animal, animal feed, or animal waste
- **After** handling pet food or pet treats
- **After** touching garbage

Key Times to Wash Hands cont'd

- **During the COVID-19 pandemic, you should always wash your hands:**
- After you have been in a public place and touched an item or surface that may be frequently touched by other people, such as door handles, tables, shopping carts, or electronic cashier registers/screens, etc.
- Before touching your eyes, nose, or mouth because that's how germs enter our bodies.

Key Times to Wash Hands for Laboratory workers

- Before and after conducting an experiment
- After touching a sample
- Before and After handling a grown culture
- After handling a sharp object
- Before and after donning a glove
- After touching a Laboratory bench
- After decontaminating a grown culture
- After handling a Laboratory Equipment
- After cleaning the Laboratory
- Before entering the Laboratory
- Before and after leaving the Laboratory

Indication for Hand hygiene

- **When hands are visibly dirty** or contaminated with proteinaceous material or are visibly soiled with blood or other body fluids, **wash hands** with either a non-antimicrobial soap and water or an antimicrobial soap and water.

- **If hands are not visibly soiled, use an alcohol-based hand rub** for routinely decontaminating hands in all other clinical situations under listed;

- Decontaminate hands after contact with inanimate objects (including laboratory equipment).

Indication for Hand hygiene cont'd

- Decontaminate hands after removing gloves.
- Before eating and after using a restroom, wash hands with a non-antimicrobial soap and water or with an antimicrobial soap and water.
- Antimicrobial-impregnated wipes (i.e., towelettes) may be considered as an alternative to washing hands with antimicrobial soap and water. Because they are not as effective as alcohol-based hand rubs or washing hands with an antimicrobial soap and water for reducing bacterial counts on the hands, they are not a substitute for using antimicrobial soap and water.

Indication for Hand hygiene cont'd

- Wash hands with antimicrobial soap and water if exposure to Bacillus anthracis is suspected or proven. The physical action of washing and rinsing hands under such circumstances is recommended because alcohols and other antiseptic agents have poor activity against spores.

- Note: The temperature of the water does not influence microbe removal. A report studying the effect of temperature ranging from 5°C to 50°C on the removal of different types of bacteria showed that heat did not influence the Transient or residual flora. Instead, **friction, thorough rinsing** and **contact time** are considered the most essential factors for effective hand washing.

5 steps to proper hand washing in the laboratory

- Make sure all organic matter is removed from hand
- Wet your hands with clean, running water, turn off the tap, and apply soap.
- Lather your hands by rubbing them together with the soap. Lather the backs of your hands, up to your wrist between your fingers, and under your nails.
- Scrub your hands for at least 20 seconds.
- Rinse your hands well under clean, running water.
- Dry your hands using a clean towel or air dry them. **Use a towel to turn off the faucet!**

Alcohol-based hand sanitizer

- Four steps to proper use of hand sanitizers;
- Make sure all organic matter is removed from hand
- Apply a dime sized amount of waterless hand sanitizer to the palm of one hand
- Rub hand together covering all surfaces of hand and fingers
- Rub until waterless hand sanitizer is absorbed

Factors Affecting adherence to proper Hand Hygiene

- **Self-reported factors for poor adherence with hand hygiene :**
- Handwashing agents cause irritation and dryness
- Sinks are inconveniently located/shortage of sinks
- Lack of soap and paper towels
- Often too busy/insufficient time
- Understaffing/overcrowding
- Hand hygiene interferes with activities
- Low risk of acquiring infection
- Wearing of gloves/beliefs that glove use obviates the need for hand hygiene
- Lack of knowledge of guidelines/protocols

Factors Affecting adherence to proper Hand Hygiene cont'd

- Not thinking about it/forgetfulness
- No role model among colleagues or superiors
- Being sceptical regarding the value of hand hygiene
- Disagreement with the recommendations
- Lack of scientific information of definitive impact of improved hand hygiene on health-care-associated infection rates
- **Additional perceived barriers to appropriate hand hygiene**;
- Lack of active participation in hand-hygiene promotion at individual or institutional level
- Lack of role model for hand hygiene
- Lack of institutional priority for hand hygiene
- Lack of administrative sanction of non-compliers/rewarding compliers
- Lack of institutional safety climate

- Improved hand hygiene practices constitutes one of the major successes of infection control; it is associated with decreased transmission and reduced infection rates.

- The most important element of containment is strict adherence to standard microbiological practices and techniques

- In conclusion, Hand hygiene is an important aspect of protecting yourself and others from infection transmission caused by either Transient Flora or Resident Flora therefore, strict adherence to proper hand hygiene in the laboratory and in general is critical.

Equipping the laboratory with the finest safety devices does not insure against all possible Laboratory infection. Equipment is no substitute for safe techniques

- Reitman and wedum, 1956

Thank you for listening