Hayatabad Medical Complex,
Peshawar, KPK Pakistan

Fax: No: 92 (0) 91-9217189
Tel: Exch: 92- 91-9217140-46
www.hmckp.gov.pk

Infection prevention and Control Standard Operating procedure (SOPs/Guidelines)

Khyber Girls Medical College/Hayatabad Medical Complex (KGMC/HMC) Peshawar, Pakistan

Dr. Mushtaq Ahmad

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INTRODUCTION

Khyber Girls Medical College / Hayatabad Medical Complex are committed to ensure safety and welfare of health care professional in all their allied institutions. We aim to ensure that all healthcare professional are protected, as much as reasonably possible.

The main purpose of infection Control program is to demonstrate a hospital's commitment to the Well-being of patients and staff, this commitment demonstrates the desire to provide quality standard of care and cleanliness within the clinical setting, assuring that every patient and staff Member within hospital is afforded his/her right to a clean and safe environment.

A hospital that adheres to standards of infection prevention is assured of protecting the right of a patient to a clean environment, especially when one is immuno-compromised. Moreover, Hospitals must ensure that the safety of employees, patients, and visitors is upheld by preventing acquisition and transmission of infections. With high standards for infection Control and prevention, a health system is able to promote high standard for patient care. Health-care waste should be considered as a reservoir of pathogenic microorganisms, which can cause contamination and give rise to infection. If waste is inadequately managed, these micro organisms can be transmitted by direct contact, in the air, or by a variety of vectors. Infectious waste contributes in this way to the risk of no socomial infections, putting the health of hospital personnel, and patients, at risk.

PURPOSE

The purpose of these SOPs is to set out the protocols and procedures to be followed by the KGMC/HMC to protect the staff, patients and attendants from hospital acquired infections through infection control program.

SCOPE

These SOPs apply to all healthcare professional working in KGMC/HMC and other allied institutions of KGMC.

WHO ARE AT RISK

Physicians, surgeons, nursing staff, emergency care providers, dentists, interns and medical students, labor room staff, laboratory technicians, hospital cleaning staff, waste handlers, patients and all those who visit the hospital .

Section 1

The infection Control Program

Purpose of an infection Control Program

Hospital Infection Control (IC) Program is needed for several purposes. Firstly there is a need to have a common minimal standard to which all healthcare facilities must adhere to. Secondly a common standard allows sharing of experiences. Finally not all facilities are in a position to develop such standards individually due to resource and other constraints. The national guidelines can then be used to provide guidance in such instances.

Additionally such a program can help

Provide an Infection Control objective consistent with the national health policy.
Provide a forum to develop and continually update guidelines for recommended health care surveillance, prevention, and practice.
Harmonize initial and continuing training programs for health care professionals, by sharing resources.
Facilitate access to materials and products essential for hygiene and safety.
Encourage health care establishments to monitor health-care associated (nosocomial) infections and to provide feedback to the professionals concerned.

SALIENT COMPONENTS OF THE INFECTION CONTROL PROGRAM ARE:

1. Basic measures for infection control, i.e. standard and additional precautions
2. Education and training of health care workers
3. Protection of health care workers, e.g. immunization, post exposure prophylaxis
4. Identification of hazards and minimizing risks
5. Routine practices essential to infection control such as aseptic techniques, use of single use devices, reprocessing of instruments and equipment, antibiotic usage,
6. Effective work practices and procedures, such as environmental management

practices including management of hospital/clinical waste, support services (e.g., food, linen), use of therapeutic devices

7. Incidence monitoring
8. Outbreak investigation
9. Surveillance
10. Infection control in specific situations
11. Research

Of these the first 8 are absolutely essential regardless of the size of the facility or resources since they directly determine the quality and nature of the care that is provided. In addition to implementing basic measures for infection control, health care facilities should prioritize their infection control needs and design their programs accordingly.

For ongoing effectiveness, the infection control program will have to be comprehensive, include surveillance and prevention activities and staff training. It must also be able to draw upon effective support at national and regional levels (please see below).

ORGANIZATION OF AN INFECTION CONTROL PROGRAM

The primary responsibility lies with the Hospital director (or hospital administrator or equivalent) who should:

1. Establish an Infection Control Committee which will in turn appoint an infection control team

2. Provide adequate resources for effective functioning of the infection control program

3. An Infection Control team with dedicated and protected time which can enforce rules and attend to daily needs of the program in real time.

THE INFECTION CONTROL COMMITTEE

Composition and Responsibilities

1. Provide a forum for multidisciplinary input, cooperation, and information sharing
2. Must have wide representation from relevant departments: e.g. management or corresponding officer, Medical and Surgical doctors, nursing, Operation theater in-charge, other health care workers, clinical microbiology, pharmacy, sterilizing service, maintenance, food services, housekeeping/ sanitary services, sterilizing service, Bio-medical/ civil engineering, microbiology departments and training services.
3. Must have a reporting relationship directly to either administration or the medical staff to promote program visibility and effectiveness
4. Must meet regularly no less than three times a year
5. In an emergency (such as an outbreak), this committee must be able to meet promptly.
6. One member of the committee should be elected as the chairperson (who should have direct access to the head of the hospital administration)
7. Appoint an infection control practitioner (health care worker trained in the principles and practices of infection control, e.g. a physician, microbiologist or a nurse) as secretary.
8. Oversee, Monitor and evaluate the performance of the infection control program and team.
9. Enforce compliance with basic infection control standards
10. To review and approve a yearly program of activity for surveillance and prevention
11. To assess and promote improved practice at all levels of the health facility
12. To ensure appropriate staff training in infection control and safety management, provision of safety materials such as personal protective equipment and products
13. Oversee training of health workers.
14. Oversee the development of facility specific infection control manual if needed
15. To review epidemiological surveillance data and identify areas for intervention

THE INFECTION CONTROL TEAM

An infection control team will be put together that is responsible for the day-to-day activities of the infection control program. Ideally 2 members should suffice (part or full time) with Infection Control responsibilities. These professionals may be administratively part of another unit (e.g. a microbiology laboratory, medical or nursing administration, public health services). The optimal structure will vary with the type, needs, and resources of the facility.

The Infection Control team must have the authority to enforce Infection Control Practices directly as needed and a direct reporting relationship with senior administration. The team or individual is responsible for the day-to-day functions of infection control, as well as preparing the yearly work plan for review by the infection control committee and administration. These teams/ individuals should have scientific and technical support responsibilities, e.g. surveillance and research, developing and assessing policies and practical supervision, evaluation of material and products, overseeing sterilization and disinfection, ensuring the sound management of medical waste and the implementation of training programs.

Responsibilities of the infection control team/ person

The team should consist of at least an infection control practitioner who should be trained for the purpose or has direct patient care responsibilities that involve infection related care

Carry out the surveillance program and Monitor and manage critical incidents
Compile periodic (at least 3 monthly) reports of hospital infections
Develop or endorse Infection Control Manual
Develop and disseminate infection control policies based on the IC Manual
Coordinate and conduct training activities
Enforce minimum infection control standards
Report directly to the medical superintendent or hospital administrator and the

Infection Control Committee

Health care establishments must have access to specialists in infection control,

epidemiology, and infectious disease, including physicians and infection control practitioners.

Often this would mean that such access may be arranged that these resources are available at district or provincial levels in resource constrained situations.

THE INFECTION CONTROL MANUAL

A hospital-associated infection prevention manual containing instructions and practices for patient care is an important tool. The manual should be developed and updated by the infection control team and reviewed and approved by the committee. These current national guidelines are intended to be used as a local facility based manual. It must be made readily available for health care workers, by having at least one copy available at all patient care areas including laboratories. It must be updated in a timely fashion.

EDUCATION AND TRAINING OF HEALTH CARE STAFF

Health administrators should be oriented towards the importance of the infection control program. Health care workers should be equipped with requisite knowledge, skills and attitudes for good infection control practices. The infection control team should:

Assess training needs of the staff and provide required training through awareness programs, in-service education and on-the-job training Organize regular training programs for the staff for essential infection control practices that are appropriate to their job description Provide periodic re-training or orientation of staff, review the impact of training

Section 2

Infection Control Practices

Infection control practices can be grouped in two categories
1. Standard precautions
2. Additional (transmission-based) precautions.

Transmission of infections in health care facilities can be prevented and controlled through the application of basic infection control precautions which can be grouped into Standard Precautions, that must be applied to all patients at all times, regardless of diagnosis or infectious status, and Additional (Transmission-Based) Precautions which are specific to modes of transmission (airborne, droplet and contact).

STANDARD PRECAUTIONS

Treating all patients in the health care facility with the same basic level of "standard" precautions involves work practices that are essential to provide a high level of protection to patients, health care workers and visitors.

These include the following:
1. Hand washing and antisepsis (hand hygiene);
2. Use of personal protective equipment when handling blood, body substances, excretions and secretions;
3. Appropriate handling of patient care equipment and soiled linen;
4. Prevention of needle stick/ sharp injuries;
5. Environmental cleaning and spills-management; and
6. Appropriate handling of waste

HAND WASHING AND ANTISEPSIS (HAND HYGIENE)

Appropriate hand hygiene can minimize micro-organisms acquired on the handsduring daily duties and by contact with blood, body fluids, secretions, excretions and knownand unknown contaminated equipment or surfaces (for further details see Annex 1). It is recommended. The medical superintendent (or hospital administrator or equivalent) will be responsible for provision of water and soap at all patient points of contact.

After handling any blood, body fluids, secretions, excretions and contaminated items.

Before and after contact with each patient. Between tasks and procedures on the same patient to prevent cross-contamination between different body sites. Immediately after removing gloves.

Key recommendations Standard Practices
Hand Washing
Protective Barriers
Sharps disposal
Wastes disposal

Additional Practices

Air-borne
Droplet
Contact

Use of an alcohol based hand-rub or waterless antiseptic agent is preferable. Absent such agent washing with plain soap for a full minute is recommended. The hospital setting is a good setting for communication about personal hygiene, such as informing visitors and the general public about hygiene rules such as washing hands.

USE OF PERSONAL PROTECTIVE EQUIPMENT

Personal protective equipment may include gloves, protective eye wear (goggles),mask, apron, gown, boots/shoe covers and cap/hair cover. These should be used by:

Health care workers who provide direct care to patients and who work in situations where they may have contact with blood, body fluids, excretions or secretions

Support staff including medical aides, cleaners, and laundry staff in situations where they may have contact with blood, body fluids, secretions and excretions

Laboratory staff, who handle patient specimens

Family members who provide care to patients and are in a situation where they may have contact with blood, body fluids, secretions and excretions. Staff must be adequately trained in proper use and be aware that use of personal protective equipment does not replace the need to follow basic infection control measures such as hand hygiene.

The following principles guide the use of personal protective equipment:

Personal protective equipment must be made available for use at ALL times

Do not share personal protective equipment.

Change personal protective equipment completely and thoroughly wash hands each time you leave a patient to attend to another patient or another duty.

Personal protective equipment should be chosen according to the risk of exposure.

The health care worker should assess whether they are at risk of exposure to blood,body fluids, excretions or secretions and choose their items of personal protectiveequipment according to this risk.

Avoid any contact between contaminated (used) personal protective equipment and surfaces, clothing or people outside the patient care area

Discard the used personal protective equipment in appropriate disposal bags, and dispose of as per the policy of the hospital. Gloves

Wear gloves (clean, non-sterile) when touching blood, body fluids, secretions, excretions or mucous membranes.

Change gloves between contacts with different patients.

Change gloves between tasks/ procedures on the same patient to prevent cross contamination between different body sites.

Remove gloves immediately after use and before attending to another patient.

Wash hands immediately after removing gloves.

Use a plain soap, antimicrobial agent or waterless antiseptic agent.

Disposable gloves should not be reused but should be disposed of according to the health care facility protocol. Masks

Wear a mask to protect mucous membranes of the mouth and nose when undertaking procedures that are likely to generate splashes of blood, body fluids, secretions or excretions. (For further information about types of masks to be used see Annex 2.)

Wear surgical masks rather than cotton material or gauze masks. Surgical masks have been designed to resist fluids to varying degrees depending on the design of the material in the mask.

Do not reuse disposable masks. They should be disposed of according to the health care facility protocol. Protective eyewear/goggles/visors/face shield

Wear protective eyewear/goggles/visors/face shields to protect the mucous membranes of the eyes when conducting procedures that are likely to generate splashes of blood, body fluids, secretions or excretions. If disposable, discard appropriately. If they are reusable, decontaminate them according to the manufacturers' instructions. Gowns and plastic aprons

Wear a gown (clean, non-sterile) to protect the skin and prevent soiling of clothing during procedures that are likely to generate splashes of blood, body fluids, secretions or excretions. Impermeable gowns are preferable.

Remove a soiled or wet gown as soon as possible.

A plastic apron may be worn on top of the gown to protect exposure to blood, body fluids, secretions and excretions.

Launder gowns and aprons appropriately if they are reusable, according to the hospital guidelines. Do not reuse disposable gowns and aprons. They should be disposed of according to the health care facility protocol.

Caps and boots/ shoe covers

Wear caps and boots/shoe covers when there is a likelihood of patient's blood, body fluids, secretions or excretions splashing, spill or leak onto the hair or shoes.

Launder caps and shoe covers appropriately if they are reusable, according to the hospital guidelines.

Do not reuse disposable caps/shoe covers. They should be discarded according to the health care facility protocol.

Clean and disinfect reusable boots.

Patient care equipment

Handle patient care equipment soiled with blood, body fluids secretions or excretions with care in order to prevent exposure to skin and mucous membranes, clothing and the environment.

Ensure all reusable equipment is cleaned and reprocessed appropriately before being used on another patient. Linen

Handle, transport and process used linen that is soiled with blood, body fluids, secretions or excretions with care to ensure that there is no leaking of fluid.

Wash according to hospital protocols. Sterilize when needed.

PREVENTION OF NEEDLE STICK/SHARPS INJURIES

Take care to prevent injuries when using needles, scalpels and other sharp instruments or equipment.

Never recap or bend needles.

Place used disposable syringes and needles, scalpel blades and other sharp items in a puncture-resistant container with a lid that closes.

Such containers must be located in ALL patient care and laboratory areas where they are very easily accessible to personnel working in these locations.

Take extra care when cleaning sharp reusable instruments or equipment.

Sharps must be appropriately disinfected and/or destroyed as per the national standards or guidelines.

MANAGEMENT OF HEALTH-CARE WASTE

Uncollected, long stored waste or waste routing within the premises must be avoided.

A sound waste management system needs to be developed and closely monitored.

ADDITIONAL (TRANSMISSION-BASED) PRECAUTIONS

Additional (transmission-based) precautions are taken while ensuring Standard

Precautions are maintained. Additional precautions include:

1. Airborne precautions
2. Droplet precautions
3. Contact precautions.

AIRBORNE PRECAUTIONS

Airborne precautions are designed to reduce the transmission of diseases spread by

the airborne route. Airborne transmission occurs when droplet nuclei (evaporated droplets)

<5 micron in size are disseminated in the air. These droplet nuclei can remain suspended in

the air for some time. Droplet nuclei are the residuals of droplets and when suspended in the

air, dry and produce particles ranging in size from 1-5 micron. These particles can remain

suspended in the air for long periods of time, especially when bound on dust particles.

Diseases which spread by this mode include open/active respiratory tuberculosis (TB),

measles, chicken pox, pulmonary plague and hemorrhagic fever with pneumonia.

The following precautions need to be taken:

Implement standard precautions.

Place patient in a single room that has a monitored negative airflow pressure, and is often referred to as a “negative pressure room” (see Glossary). The air should be discharged to the outdoors or specially filtered before it is circulated to other areas of the health care facility.

Keep doors closed.

Anyone who enters the room must wear a special, high filtration, particulate respirator (e.g. N 95) mask. Limit the movement and transport of the patient from the room for essential purposes only. If transport is necessary, minimize dispersal of droplet nuclei by masking the patient with a surgical mask.

It is important to gain the support of engineering services to ensure that the negative airflow pressure is maintained.

DROPLET PRECAUTIONS

Diseases, which are transmitted by this route, include pneumonias, per tussis,

diphtheria, influenza type B, mumps, and meningitis. Droplet transmission occurs when there

is adequate contact between the mucous membranes of the nose and mouth or conjunctivae of a susceptible person and large particle droplets (>5 microns). Droplets are usually generated from the infected person during coughing, sneezing, talking or when health care workers undertake procedures such as tracheal suctioning. The following precautions need to be taken:

Implement standard precautions.

Place patient in a single room (or in a room with another patient infected by the same pathogen).

Wear a surgical mask when working within 1-2 meters of the patient.

Place a surgical mask on the patient if transport is necessary.

Special air handling and ventilation are not required to prevent droplet transmission of infection.

CONTACT PRECAUTIONS

Diseases which are transmitted by this route include colonization or infection with multiple antibiotic resistant organisms, enteric infections and skin infections.

The following precautions need to be taken:

Implement standard precautions.

Place patient in a single room (or in a room with another patient infected by the same pathogen). Consider the epidemiology of the disease and the patient population when determining patient placement.

Wear clean, non-sterile gloves when entering the room.

Wear a clean, non-sterile gown when entering the room if substantial contact with the patient, environmental surfaces or items in the patient's room is anticipated.

Limit the movement and transport of the patient from the room; patients should be moved for essential purposes only. If transportation is required, use precautions to minimize the risk of transmission. Patient placement Appropriate or selective placement of patients is important in preventing the transmission of infections in the hospital setting. General principles in relation to the placement of patients include the following:

Spacing between beds

In open plan wards there should be adequate spacing between each bed to reduce the risk of cross contamination/infection occurring from direct or indirect contact or droplettransmission. Optimum spacing between beds is 1-2m.

Single rooms

Single rooms reduce the risk of transmission of infection from the source patient too thers by reducing direct or indirect contact transmission. Where possible, single rooms should have the following facilities:

Hand washing facilities
Toilet and bathroom facilities

Anterooms

Single rooms used for isolation purposes may include an anteroom to support the use of personal protective equipment.
Cohorting:
For infection control purposes, if single rooms are not available, or if there is a shortage of single rooms, patients infected or colonized by the same organism can becohorted (sharing of room/s).

When cohorting is used during outbreaks these room/s should be in a well-defined area (a designated room or designated ward), which can be clearly segregated from other patient care areas in the health care facility used for non-infected/colonized patients.

Transportation of patients

Limiting the movement and transport of patients from the isolation room/ area only for essential purposes only will reduce the opportunities for transmission of micro-organism sin other areas of the hospital. If transportation is required, suitable precautions should betaken to reduce the risk of transmission of micro-organisms to other patients, health careworkers or the hospital environment (surfaces or equipment). For example: When transporting a patient with pulmonary tuberculosis (open/ active) placing a surgical mask on the patient while in transit is an appropriate precaution.

Section 3

Environmental Management Practices

A clean environment plays an important role in the prevention of hospital associated infections (Nosocomial Infections). Many factors, including the design of patient care areas, operating rooms, air quality, water supply and the laundry, can significantly influence the transmission of HAI.

PREMISES/ BUILDINGS

Facility design and planning should ensure:

Adequate safe water supply
Appropriate cleaning practices
Adequate floor space for beds
Adequate inter-bed space
Adequate hand washing facilities
Adequate ventilation for isolation rooms and high-risk areas like operation theatres, transplant units, intensive care areas, etc
Adequate isolation facilities for airborne, droplet, contact isolation and protective environment
Regulation of traffic flow to minimize exposure of high-risk patients and facilitate patient transport
Measures to prevent exposure of patients to fungal spores during renovations
Precautions to control rodents, pests and other vectors
Appropriate waste management facilities and practices AIR Ventilation
Ventilation systems should be designed and maintained to minimize microbial contamination. The air conditioning filters should be cleaned periodically and fans that can spread airborne pathogens should be avoided in high-risk areas.
High-risk areas such as operating rooms, critical care units and transplant units require special ventilation systems. Filtration systems (air handling units) designed to
provide clean air should have high efficiency particulate air (HEPA) filters in high risk areas. Unidirectional laminar airflow systems should be available in appropriate areas in the hospital construction. Ultra clean air is valuable in some types of cardiac surgery/neurosurgery/implant surgery theatres and transplant units.

For the operating room, the critical parameters for air quality include:

Frequent maintenance/validation of efficacy of filters (in accordance with manufacturer's requirements);
Pressure gradient across the filter bed and in the operation theatre;
Key Recommendations

Management of:
Premises/ Buildings
Air
Water
Sanitation
Waste Management
Laundry

Disinfection of Instruments
and Work Environment

- Air changes per hour (minimum 15 air changes per hour);
- Temperature should be maintained between 20°C and 22°C and humidity between 30% and 60% to inhibit bacterial multiplication;
- General areas should be well ventilated if they are not air-conditioned.

Special air handling for airborne precautions

Negative air pressure vented to the air is recommended for contaminated areas and is required also for isolation of patients with infections spread by the airborne route. An air handling system providing 6-12 air changes per hour with the air being discharged outside through a filtration mechanism is recommended. Systems must be checked by engineering services to ensure they are in fact offering negative pressure rooms.

An air-conditioned single room with an exhaust or a well-ventilated room is anadequate option for health care facilities without "negative pressure" rooms. If an airconditioned single room is not available as in many resource poor settings, a fan can beplaced in the room to direct airflow towards an outside window. The door/s to the aisle orother rooms should be kept closed at all times.

Protective environment:
A protective environment may be required for some immune suppressed patients. While details will depend on the specific form of immune suppression, some general principles apply. Ultra clean unidirectional air may be required in some units such as hematology or intensive care due to the level of immune suppression of the patients. To minimize airborne particles, air must be circulated into the room with a velocity of at least0.25m/sec through a high efficiency particulate air (HEPA) filter. The HEPA filter removes particles to a certain defined size. If particles 0.3 microns in diameter are removed, the air entering the room can be classified as being clean and free of bacterial contamination.

Other important ways of protecting patients with severely lowered immune systems include:

Strict enforcement of standard precautions.

- Health care workers and visitors should avoid contact with the patient if they have any infections (for example, upper respiratory tract infections or herpes simplex blisters).
- Where appropriate, staff and visitors should wear personal protective equipment to protect the patient from micro-organisms.
- Do not put flowers or plants in the room.
- Avoid decorative ponds (Pseudomonas colonization), waterfalls and other sources of aero solization in vicinity of patients.
- Ensure a tidy environment.
- Environmental cleaning should be done twice daily and should consist of damp dusting only – do not create aerosols.
- Use strict aseptic techniques for all clinical procedures.

WATER

The health care facility should provide safe water. If it has water storage tanks, they should be cleaned regularly and the quality of water should be sampled periodically to check for bacterial contamination.

Safe drinking water: Where safe water is not available, water should be boiled for 5 minutes to render it safe. Alternatively, water purification units may be used. Water must be stored in a hygienic environment without allowing hands to enter the storage container. Water must be dispensed from storage container by an outlet fitted with a closure device or tap. Storage containers and water coolers must be cleaned regularly.

CLEANING OF THE HOSPITAL ENVIRONMENT

Routine cleaning is important to ensure a clean and dust-free hospital environment. There are usually many micro-organisms present in "visible dirt", and routine cleaning help sto eliminate this dirt. Administrative and office areas with no patient contact require normal domestic cleaning. Most patient care areas should be cleaned by wet mopping. Dry sweeping is not recommended. The use of a neutral detergent solution improves the quality of cleaning. Hot water (80°C) is a useful and effective environmental cleaner. Bacteriological testing ofthe environment is not recommended unless seeking a potential source of an outbreak. Any areas visibly contaminated with blood or body fluids should be cleaned immediately with detergent and water. Isolation rooms and other areas that have patients with known transmissible infectious diseases should be cleaned with a detergent/ disinfectant solution at least daily. All horizontal surfaces and all toilet areas should be cleaned daily.

WASTE MANAGEMENT

Hospital waste is a potential reservoir of pathogenic micro-organisms and requires appropriate, safe and reliable handling. The main risk associated with infection is sharps contaminated with blood. There should be a person or persons responsible for the organization and management of waste collection, handling, storage and disposal. Waste management should be conducted in coordination with the infection control team.

Steps in the management of hospital waste include:

1. Generation
2. Segregation/ separation
3. Collection
4. Transportation
5. Storage
6. Treatment
7. Final disposal

Waste management practices must meet national and local requirements; the full detail in Annex 1

LAUNDRY

General instructions

Linen

The basic principles of linen management are as follows:

Place used linen in appropriate bags at the point of generation.

Contain linen soiled with body substances or other fluids within suitable impermeable bags and close the bags securely for transportation to avoid any spills or drips of blood, body fluids, secretions or excretions.

Do not rinse or sort linen in patient care areas (sort in appropriate areas).

Handle all linen with minimum agitation to avoid aerosolisation of pathogenic microorganisms.

Separate clean from soiled linen and transport/store separately.

Wash used linen (sheets, cotton blankets) in hot water (70°C to 80°C) and detergent, rinse and dry preferably in a dryer or in the sun. (Heavy duty washers/dryers are recommended for the hospital laundry.) See table 7 for details.

Autoclave linen before being supplied to the operating rooms/theatres.

Wash woolen blankets in warm water and dry in the sun, in dryers at cool temperatures or dry-clean.

Mattresses and pillows with plastic covers should be wiped over with a neutral detergent.

Mattresses without plastic covers should be steam cleaned if they have been contaminated with body fluids. If this is not possible, contaminations should be removed by manual washing, ensuring adequate personnel and environmental protection.

Wash pillows either by using the standard laundering procedure described above, or dry clean if contaminated with body fluids.

REPROCESSING OF INSTRUMENTS AND EQUIPMENT

The risk of transferring infection from instruments and equipment is dependent on the following factors:

1. The presence of micro-organisms, the number and virulence of these organisms

2. The type of procedure that is going to be performed (invasive or non-invasive)

3. The body site where the instrument/and or equipment will be used (penetrating the

mucosal or skin tissue or used on intact skin)

The risk of transmission of infection by instruments and equipment is assessed according to the “Spaulding Classification”. This system classifies the risk of transmission according to the site where the instrument was to be used. Contact sites for instruments maybe classified as critical, semi-critical or non-critical. Table 1 shows these classifications. The level of reprocessing required is based on the classification and level of risk. Any instrument or equipment entering into a sterile part of the body must be sterilized. Where the instrument or equipment will be in contact with mucous membranes or non-intact skin, it must have undergone disinfection, and where there will be contact with intact skin, disinfection or cleaning should be used.

Effective reprocessing of instruments and equipment includes:

1. Clean instruments and equipment immediately after use to remove all organic matter and chemicals

2. Disinfection (by heat and water or chemical disinfectants)

3. Sterilization

For more information on the selection and use of disinfectants see APIC Guidelines3forselection and use of disinfectants (1996.)

Reprocessing Principles: Principles that must be applied to ensure instruments and equipment have been appropriately reprocessed are:

1. Staff Training

Personnel who work with the sterilizing service and are responsible for there processing of instruments and equipment must have undergone formal training in how to clean, disinfect and sterilize instruments and equipment.

The level of training must be appropriate for the level of responsibility that the staff member is expected to undertake.

2. Appropriate Level of Reprocessing

As described above it is essential that the correct level of reprocessing of an instrument/equipment is chosen according to its intended use. This decision is made according to its intended use.

Steam sterilization is the most effective method. However, this may not always be possible as some instruments may not be able to withstand the temperature or moisture required for sterilization using steam. Other methods may be used to achieve sterility such as ethyleneoxide or automated low temperature chemical sterilant systems, provided the manufacturer ofthe instrument / equipment agrees that this is an effective means to sterilize them.

3. Servicing of instruments and equipment

Prior to sending medical devices for service they should be reprocessed appropriately.

If however they are unable to be reprocessed before being repaired, they should be placed in a fluid resistant plastic bag or container and labeled appropriately before being sent for repair.

Also it should be recognized that some equipment can not be effectively sterilized or reprocessed. Alternately, the reprocessing of some equipment may not be practical due to cost or other considerations. It is essential that such equipment is not reprocessed or reused.

Items that require special treatment include:

Endoscopes, Respiratory and anesthetic apparatus,

Diagnostic ultrasonic transducers.

Instruments and equipment like these may not be able to withstand the heat or themoisture of steam or thermal disinfection or even some chemical agents. These instruments should be sterilized/ reprocessed according to specific methods described by their manufacturers.

Storage:

Storage of instruments and equipment is an essential component in ensuring the product maintains its level of sterilization or disinfection. Most instruments and equipment are dry and packaged once they have been sterilized. They should be stored in a clean, dry

environment and protected from any damage. Correct storage of sterile instruments and equipment is a critical component in keeping them sterile.

6. Patient care equipment

Any equipment that is used for a patient, and touches only their intact skin, such as bedpans, urinals, commode chairs, blood pressure cuffs etc. should be cleaned or cleaned and disinfected – usually in hot water (at least 700C).

CLEANING, DISINFECTION AND STERILIZATION

Cleaning

Prior to any reprocessing to achieve disinfection or sterility all instruments and equipment MUST be cleaned. If not cleaned properly, organic matter may prevent the disinfectant or sterilant from having contact with the instrument/equipment and may also bind and inactivate the chemical activity of the disinfectant. If an instrument/equipment is un able to be cleaned then it is unable to be sterilized or disinfected. After an instrument has been used, prior to it drying, it should be washed to remove any gross soiling. At this stage, detergent and water is appropriate to use.

There are four main methods used for cleaning of instruments and equipment:

1. Manual cleaning

All surfaces of the instrument/equipment must be cleaned taking care to reach all channels and bores of the instrument. If instruments are being washed manually the following procedure should be followed:

Wear personal protective equipment (plastic apron, thick rubber gloves, eye protection, surgical mask and/or face shield),

Remove any gross soiling on the instrument by rinsing in tepid water (15-18 degrees),

Take instrument apart – fully and immerse all parts in warm water with a biodegradable, non-corrosive, nonabrasive, low foaming and free rinsing detergent or use an enzymatic cleaner if necessary,

Ensure all visible soil is removed from the instrument – follow manufacturers' instructions,

Rinse in hot water (unless contraindicated),

Dry the instrument either in a drying cabinet, or hand dry with clean lint-free cloth,

Inspect to ensure the instrument is clean.

2. Enzymatic cleaners

Used for fiber optic instruments, their accessories and other items that are difficult to clean. These products are hazardous and care should be taken when in contact with them.

3. Ultrasonic cleaners and automated washers

Ultrasonic cleaners and automated washers are recommended for cleaning basic instruments that can withstand this process. Using a machine to wash the instruments will cut down on the handling of the instruments. These cleaners must be compliant with national guidelines and standards, and must be used according to the manufacturers' instructions.

Ultrasonic cleaners do not disinfect the instruments. By causing high frequency, high-energy

sound waves to hit the instrument/equipment, the soiling matter drops off the instrument, or becomes easy to remove during the rinsing process.

These cleaners are not appropriate for use on cannulated instruments (they can not clean inside the instrument), plastic materials, two or more different metals, or some glass Instruments, syringes and lenses. Daily efficiency tests should be done.

4. Disinfection

Disinfection removes micro-organisms without complete sterilization.

Disinfection is used to destroy organisms present on delicate or heat-sensitive instruments which can not be sterilized or when single use items are not available.

Disinfection is not a sterilizing process and must not be used as a convenient substitute for sterilization. Thermal disinfection is not appropriate for instruments that will be used in critical sites as these instruments must be sterile.

Certain products and processes will provide different levels of disinfection.

These levels are classified as:

1. High-level disinfection: Destroys all micro-organisms except some bacterial spores(especially if there is heavy contamination).

2. Intermediate disinfection: Inactivates Mycobacterium tuberculosis vegetative bacteria, most viruses and most fungi, but does not always kill bacterial spores.

3. Low-level disinfection: Can kill most bacteria, some viruses and some fungi, but cannot be relied on to kill more resistant bacteria such as M. tuberculosis or bacterial spores.

The two methods of achieving disinfection are thermal and chemical disinfection.

1. Thermal disinfection (pasteurization)

If an instrument is able to withstand the process of heat and moisture and is not required to be sterile, then thermal disinfection is appropriate. By using heat and water at temperatures that destroy pathogenic, vegetative agents, this is a very efficient method of disinfection.

The level of disinfection depends on the water temperature and the duration the instrument is exposed to that temperature.

2. Chemical disinfection

The performance of chemical disinfectants is dependent on a number of factor sincluding: temperature, contact time, concentration, pH, presence of organic or in organic matter and the numbers and resistance of the initial bio burden on a surface.

Instrument grade disinfectants are classified as high, intermediate or low level. When used according to the manufacturers' guidelines, disinfectants will fall into one of these There is no single ideal disinfectant. Different grades of disinfectants are used for different purposes. Only instrument grade disinfectants are suitable to use on medical instruments and equipment. Hospital grade or household grade disinfectants must not be use done instruments, they are only suitable for environmental purposes.

Monitoring of the disinfectant is important if it is a multi-use solution.

It is important that it is stored correctly and according to the manufacturers in structions. Be sure not to contaminate the solution when pouring out for use. Glutaraldehyde is

generally the most appropriate chemical disinfectant that will provide high-level disinfection. This chemical must be used under very strict controlled conditions and in a safe working environment. Glutaraldehyde 2% is an appropriate high level disinfectant for endoscopes, respiratory therapy equipment and for material that is destroyed by heat. An immersion time of > 20 min is required. Flexible endoscopes are very easy to damage and particularly difficult to disinfect. It is extremely important that meticulous mechanical cleaning must always precede sterilization or disinfection procedures.

For the selection of disinfectants see APIC Guideline for selection and use of disinfectants (1996.)

Sterilization

Sterilization is the destruction of all micro-organisms and can be achieved by either physical or chemical methods. Sterilization is necessary for medical devices penetrating sterile body sites. Cleaning to remove visible soiling in reusable equipment should always precede sterilization. All materials must be wrapped before sterilization. Only wrapped/packed sterilized materials should be described as sterile. Before any instrument or equipment goes under the process of steam sterilization, the following should be checked:

1. Ensure that the instrument can withstand the process (e.g. steam under pressure),
2. Ensure that the instrument has been adequately cleaned,
3. Ensure that the instrument does not require any special treatment,
4. Ensure that records of the sterilization process and for the traceability of instruments are kept.

Instruments and equipment will only be sterile if one of the following sterilizing processes is used:

1. Steam under pressure (moist heat)
2. Dry heat
3. Ethylene oxide
4. Automated environmentally sealed low-temperature peracetic acid, hydrogen peroxide plasma and other chemical sterilant systems or sterilants
5. Irradiation.

The above sterilizing methods are designed to give a sterility assurance level of at least one in a million or 10-6 (see glossary) as long as the process is validated and is according to the manufacturers' guidelines.

Ultraviolet light units, incubators, microwave ovens and domestic ovens must not be used for sterilizing.

1. Steam under pressure (moist heat) sterilization

This is the most efficient and reliable method to achieve sterility of instruments and equipment. This method sterilizes and dries the sterile package as part of the cycle. This is recommended in office-based practice.

There are several types of steam under pressure sterilizers (also called autoclaves):

Downward (gravity) displacement sterilizers (jacketed and non-jacketed) - these are designed for the sterilization of waste, solutions and instruments. Self-contained (bench top) sterilizers – these are recommended for office-based practice as they are able to do small quantities or fairly simple items. Bench top sterilizers do not take wrapped items and therefore items must be used immediately after they are removed from the sterilizer. There will be differences in themodels and types of features that are offered may vary.

These variations may include: drying stage, ability to take packaged and un wrapped items, systems to monitor temperature, pressure and holding time. Pre-vacuum (porous load) sterilizers – these are not suited for liquid sterilization but are optimized for sterilization of clean instruments, gowns, drapes, toweling and other dry materials required for surgery.

2. Dry heat sterilization

Dry heat sterilization is caused by hot air that destroys pathogens by the process ofoxidation. Dry heat sterilizes have had limited value because it is difficult to maintain the

same temperature throughout the load, while the high temperatures and long time required to achieve sterility makes this method undesirable for many situations. The manufacturers' instructions must be followed. The door to the unit must not be opened while in sterilizingcycle.

3. Ethylene Oxide (EO)

Ethylene oxide gas is appropriate to use for sterilization of instruments/ equipment made from heat labile materials or those devices that contain electronic components. The time required to process the instrument is dependent on the temperature, humidity and concentration level of the gas.

The gas must penetrate the packaging and reach all surfaces of the instrument/equipment requiring sterilization. The time for such a process is between 12 hours to over 24hours. Because EO is toxic, this gas is restricted in health care facilities and must be usedaccording to strict guidelines to ensure staff safety. The manufacturer's instructions must befollowed for the packaging, sterilization process, validation and aeration process.

4. Automated chemical (low temperature) systems

Hydrogen peroxide plasma in a fully automated cycle can achieve low temperature, low moisture sterilization within a 45-80 minute cycle depending on the model of sterilizerused. The packaging used must be non-woven/ non-cellulose polypropylene wraps. Peracetic acid is a low-temperature sterilization method. Peracetic acid 0.2% is placedin an environmentally sealed chamber and fully automated processing system. The processachieves moist, low temperature sterilization within 25-30 minutes.

5. Irradiation

Gamma radiation is available from some commercial gamma irradiation facilities. However, it is not readily available for use in health care facilities. Only those instrument sand equipment that have undergone the entire sterilizing process can be regarded as sterile.Items must be wrapped or packaged appropriately to be considered sterile.

Materials for packaging include:

Paper - this prevents contamination if it remains intact. It maintains sterility for a long period, can act as a sterile field and can also be used to wrap dirty devices after the procedure.

Non-woven disposable textiles.

Containers - these can be used only if they contain material intended for a single treatment procedure for a single patient.

The end-user must check the physical integrity of the package before use.

Quality control parameters for the sterilization process which also serve as a check list for the Sterilization Department include:

Load number,
Load content,
Temperature and time exposure record chart,
Physical/chemical testing,
Biological testing, e.g. using Bacillus subtilis.
Regular engineering maintenance on sterilization equipment must be performed and documented. Boiling of medical devices for reuse is not recommended since it does not guarantee esterility. However, in certain resource-poor situations where steam sterilization is not possible, these items should be thoroughly cleaned and subjected to a cycle in a pressure cooker for 30 minutes.

Special consideration – Creutzfeldt-Jacob disease (CJD)
The only infectious agent that requires special treatment in order to ensuredis infection is the Creutzfeldt-Jacob disease (CJD)-prion. Historically, CJD has been transmitted through implanted brain electrodes that were disinfected with ethanol and formaldehyde after use on a patient known to have CJD. Iatrogenic transmission has been observed in some patients who have been recipients of contaminated human growth hormone,gonadotropin and corneal, pericardial and dura mater grafts. These prions resist normalinactivation methods.
If material has been contaminated with prions or contamination is suspected thepreferred method is steam sterilization for at least 30 minutes at a temperature of 132oC in a gravity displacement sterilizer. If a pre-vacuum sterilizer is used, 18 minutes at 134oC hasbeen found to be effective. Semi critical and non-critical items may be immersed in 1Nsodium hydroxide, a caustic solution, for 1 hour at room temperature and then steamsterilized for 30 minutes at a temperature of 121oC.

For further information about preparing bleach solutions for disinfection purposes in resourcepoor settings please view the WHO and CDC combined document “Infection Control forViral Hemorrhagic Fevers in the African Health Care Setting.” (1998)

http://www.cdc.gov/ncidod/dvrd/spb/mnpages/vhfmanual.htm
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Section 4

Care of Health Care Workers

Health care workers (HCW) are at risk of acquiring infection through occupational exposure. Hospital employees can also transmit infections to patients and other employees.

Thus, an employee's health program must be in place to prevent and manage infections in hospital staff. Employees' health should be reviewed at recruitment, including immunization history and previous exposures to communicable diseases (e.g. tuberculosis) and immune status. Some previous infections such as varicella-zoster virus must be assessed by serological tests.

Immunization recommended for staff includes: hepatitis A and B, influenza, measles,mumps, rubella, tetanus, and diphtheria. Immunization against varicella, rabies may be considered in specific cases. The PPD (Mantoux is one such test) skin test will document aprevious tuberculosis (TB) exposure. A variable number of employees are expected to have received BCG vaccinations previously. There is very little information about the role of BCG in a subsequently positive PPD test. Since the BCG mediated protection (from subsequent development of active TB) is highly variable and unreliable, it is advisable to test and manage all healthcare workers with PPD according to guidelines. All positives test must be assumed to be positive due to TB exposure rather than previous BCG. These individuals must be assessed for active TB and ifnegative treated for prior TB exposure. Specific post-exposure policies must be developed, and compliance ensured for a number of infectious diseases for example: human immunodeficiency virus (HIV), viralhepatitis, severe acute respiratory syndrome (SARS), varicella, rubella and tuberculosis.Health care workers with infections should report their illnesses/incident to staff clinics for further evaluation and management.

Sharp injuries:

Needle stick injuries are the commonest of sharps injuries, although other contaminated sharp instruments may also cause injuries. All health care workers with potential exposure should be vaccinated. For other personnel, the risk of hepatitis B, hepatitisC and HIV infection should be assessed and appropriate immunization or chemoprophylactic steps taken.

Immediate treatment of such injuries should encourage washing thoroughly with running water and an antiseptic solution. Consult the infection control team for further advice. An incident reporting system should be in place. It should not be seen as punitive; active support by managers should encourage prompt and accurate reporting.

Key Recommendations

Basic Principles

Standard Precautions

Immunizations

PPD

SOPs attached Annex 2

Disease Specific Recommendations

Exposure to human immunodeficiency virus (HIV)

The route of transmission for HIV is person to person via sexual contact, sharing of needles contaminated with HIV, infusions that are contaminated with HIV, transplantation of organs or tissues that are infected with HIV. The risk of a health care worker acquiring HIV after a needle stick or other "sharps" injury is less than 0.5%. Risk reduction must be undertaken for all blood borne pathogens, including: adherence to standard precautions using personal protective equipment and appropriate use of safety devices and a needle disposal system to limit sharps exposure. Training for health care workers in safe sharps practice should be ongoing.

Information on preventive measures must be provided to all staff with potential exposure to blood and blood products. Policies which are in keeping with the local and national guidelines must include screening of patients, disposal of sharps and wastes, protective clothing, managing inoculation accidents, sterilization and disinfection. Hospital policy must include measures to obtain serological testing of source patients promptly where necessary, usually with the patient's informed consent. Post exposure prophylaxis should be started as per local or national guidelines.

Exposure to hepatitis B virus

The route of transmission for hepatitis B virus is through body substances such as blood and blood products, saliva, cerebrospinal fluid, peritoneal, pleural, pericardial ands ynovial fluid, amniotic fluid, semen and vaginal secretions and any other body fluid containing blood. Following standard precautions is important, but immunization is the best way of preventing transmission to health care staff.

All HCWs that are in contact with patients or body fluids must be vaccinated against Hepatitis B. Staff infected with blood-borne pathogens may transmit these infections to patient sand require careful evaluation with respect to their duties. This status should not be used ascause for discrimination.

Exposure to hepatitis C virus The route of infection is mainly parenteral. Sexual transmission does occur but is far less frequent. No post exposure therapy is available for hepatitis C, but sero conversion (if any) must be documented. As for hepatitis B viral infection, the source person must be teste for HCV infection. For any occupational exposure to blood borne pathogens, counseling and appropriate clinical and serological follow-up must be provided.

Tuberculosis

Health care workers have varying risks for exposure to tuberculosis. Health careworkers at the greatest risk of exposure are those working in TB-risk areas such as medical wards, chest clinics, bronchoscopy units, radiology units, TB laboratories, HIV wards and autopsy rooms. If a staff member has been exposed to TB they should report to the Infection Control

Practitioner or the Staff Health Nurse depending on the hospital protocol for healthcare worker exposures.

Meningococcal meningitis
Transmission of meaning ococci to health care staff is most likely within 24 hours of admission of the patient, prior to the patient receiving appropriate antibiotic/chemoprophylaxis. Health care workers in close respiratory contact with such casess hould receive chemoprophylaxis with ciprofloxacin or an effective alternative agent. Closerespiratory contact with the patient includes mouth-to-mouth contact, sharing of drink containers or cigarettes.

SARS

The health care facility should have a clear set of guidelines for preventing staff exposure to SARS. Health care workers in contact with suspected or probable SARS patients should be monitored daily for signs and symptoms of SARS, particularly for changes in temperature. If staff members indicate any signs or symptoms of SARS, they should be assessed by the infection control practitioner or the infection control team as to the appropriateness of home isolation.

Other infections; Varicella, Influenza, Pertussis, Diphtheria, Rabies

Transmission of these micro-organisms may be uncommon, but policies to manage staff exposure should be developed. Vaccination of hospital staff against varicella isrecommended. Influenza vaccinations should be given yearly. Rabies vaccinations may be appropriate in some facilities in countries where rabies is enzootic.

Section 5

Special Situations

INFECTIONS WITH MULTI-DRUG RESISTANT ORGANISMS

The overuse and misuse of antimicrobials has resulted in the development of antimicrobial resistance in many parts of the world. In health care settings, the spread ofresistant organisms is facilitated when hand washing, infection control precautions, andequipment cleaning are suboptimal.The strategies for control of antimicrobial resistance consist of:

Appropriate use of antimicrobials
Strengthening of basic infection control measures.

Appropriate antimicrobial use

Each health care facility should have an antimicrobial use program. This policy mustbe implemented through the Infection Control Committee or an Antimicrobial UseCommittee (see below).
Following suggestion improve the antibiotic utilization.
Antibiotic use must be justifiable on the basis of the clinical diagnosis and known or expected infecting micro-organisms
Appropriate specimens for bacteriological examination must be obtained before initiating antibiotic treatment, in order to confirm the treatment is appropriate
The selection of an antibiotic must be based not only on the nature of the disease and that of the pathogenic agent(s), but on the sensitivity patterns, patient tolerance, and cost
Resistance patterns of the facility must be assessed routinely and periodically and communicated to practicing physicians
Narrow spectrum agents are preferable in order to avoid resistance development
Antibiotic combinations should be avoided, if possible
Selected antibiotics may be restricted in use
Doses must be appropriate (low dosages may be ineffective for treating infections, and encourage resistance development, while excessive doses may have adverse effects, and may not prevent resistance). Antimicrobial use committee
This committee recommends antibiotics for the formulary, establishes prescribingpolicies, reviews and approves practice guidelines, audits antibiotic use, oversees education,and interacts with pharmaceutical representatives. The committee may be a subcommittee ofthe Hospital Infection Control Committee (HICC) or an independent committee working iliaison with HICC.

The most important antibiotic-resistant bacteria are:
methicillin-resistantStaphylococcus aureus (MRSA),
vancomycin resistant Enterococcus faecium andKey Situations
Multi-drug resistant Infections
MRSA
VRE
MDR-TB

Viral Hemorrhagic Fevers
Enterococcus faecalis (VRE); multiresistant gram-negative bacteria; and multidrug-resistant tuberculosis (MDR-TB).
Organisms with acquired resistance to multiple antibiotics are common in manyhospitals. Other organisms may be important in some health care facilities, but this documentwill focus on MRSA, VRE and MDR-TB.Control of endemic antibiotic resistanceEnsure appropriate use of antibiotics (optimal choice, dosage and duration of antimicrobial therapy and chemoprophylaxis based on defined hospital antibiotic policy, monitoring and antibiotic resistance, and up-to-date antimicrobial guidelines).
Institute protocols (guidelines) for intensive infection control procedures and provide adequate facilities and resources, especially for hand washing, infection control precautions (e.g. isolation), and environmental control measures.
Improve antimicrobial prescribing practices through educational and administrative methods.
Limit use of topical antibiotics.
Methicillin-resistant Staphylococcus aureus (MRSA)
Epidemic strains of MRSA have tremendous potential for nosocomial transmission.
MRSA strains are often resistant to several antibiotics and are often sensitive only to Vancomycin and one or two other antibiotics5
that may only be given intravenously and at
great cost. Once introduced into a hospital they spread rapidly, since transmission is usually through the hands of health care staff.
The following precautions are required for the prevention of spread of epidemic MRSA:
Minimize ward transfers of staff and patients,
Ensure early detection of cases, especially if they are admitted from another hospital.
Screening of high risk patients will ensure early detection and appropriate precautionscan be implemented,Isolate infected or colonized patients in a single room, isolation unit or cohorting in a larger ward,Treat patients with MRSA pneumonias with airborne precautions in place,Reinforce hand washing by staff after contact with infected or colonized patients; consider using an antiseptic hand washing agent or alcohol hand-rub or hand gelWear gloves when attending to the patient or when handling MRSA contaminated materialsWear a gown or apron when attending to the patient or when handling contaminated materialsDevelop protocols or guidelines for management of patients and staff during an outbreakEnsure that operating surgeons should not perform surgeries until declared negative for carriage
Vancomycin-resistant enterococcus (VRE)
Enterococci may be cultured from surgical wound infections, liver and intraabdominal abscesses, and foot ulcers in diabetic patients.

E. faecium and E. faecalis are commensalorganisms in the gastrointestinal tracts of healthy individuals.

Transmission

The major route of transmission of VRE within the health care facility is the hands ofHCWs following contact with patients with VRE or their immediate environment. Usually
this is associated with inadequate hand washing.
Susceptibility

VRE readily colonizes the bowel without causing symptoms of infection. VRE does not cause diarrhea.

Patients who are at an increased risk for VRE colonization or infection are, for example:Critically ill patients (Intensive Care Unit patients),Immunocompromised patients (patients on chemotherapy or transplant patients),Patients who have had intra-abdominal or cardiothoracic procedures,Patients who have central venous catheters,Patients who have had a prolonged hospital stayPatients who have had recent broad-spectrum antibiotic therapy, or who have received oral or intravenous Vancomycin.

It may be necessary to screen for VRE in the health care facility, especially in highrisk patients as above.

Infection control measures for VRE

Standard precautions with additional contact precautions should be applied.

Contact precautions

It is essential that all staff, visitors or any other person entering the patient's room strictly follow standard and contact precautions.

Daily environmental cleaning is essential.

Patient must have his/her own patient care items.

Any item must be disinfected after it is removed from the patient's room prior tobeing sent to another area in the hospital or being used on another patient.

Multidrug-resistant tuberculosis (MDR-TB)

Tuberculosis (TB) is caused by infection with Mycobacterium tuberculosis. It affectsone third of the world's population. Of particular concern is the rise in drug-resistant TB andmultidrug-resistant TB (MDR-TB). Multidrug resistant TB is resistant to any combination of

anti-TB drugs that includes Isoniazid and Rifampicin (the two most effective anti-TB drugs).

Susceptibility

MDR-TB arises in areas where TB control is poor, such as developing countries.

Occurrence

The incidence of MDR-TB in developing countries is high and in some countries it threatens the success of TB control program.

Several geographical areas have been identified by WHO as having a prevalence of MDR-TB greater than 3% of newly diagnosed cases. Transmission

TB is usually transmitted by exposure to airborne droplet nuclei produced by people with pulmonary or laryngeal disease, during expiratory efforts such as coughing and sneezing.

Prolonged, close contact with such patients increases the risk of transmission.

Infection control measures for MDR-TB

Rapid detection

Immediate implementation of infection control precautions for all suspect or proven cases

Diagnosis and treatment of TB

Transport of patient – patient should wear a surgical mask

Appropriate infection control precautions include standard precautions plus additional precautions (airborne precautions) Standard and airborne precautions.

See section 2.

Health care workers

HCWs working in areas where there are patients with TB, such as chest clinics,bronchoscopy units, radiology units, and TB laboratories are at greater risk of occupationalexposure to TB.Such HCWs should have yearly PPD tests. If they test positive they should have an Xray and clinical review.

INFECTIONS WITH VIRAL HEMORRHAGIC FEVERS

Viral hemorrhagic fevers (VHF) are severe acute viral illnesses that will present witha sudden onset of fever, lethargy, weakness and headache. This may be followed bypharyngitis, diarrhea and vomiting and a maculopapular rash. Hemorrhagic diathesis oftenoccurs along with liver damage, renal failure, central nervous system involvement andterminal shock with multi-organ failure.

National Infection Control Guidelines

Viral hemorrhagic fevers include; Ebola-Marburg viral diseases, African hemorrhagic fever, Marburg virus disease, Ebola virus, Congo Crimean hemorrhagic fever (CCHF). The case fatality rate of Marburg virus infection (reported primary cases) is approximately 25% whereas case-fatality of Ebola infections in Africa range from 50% - 90%.

Mode of transmission

Human-to-human transmission by:

Direct contact with infected blood
Secretions
Organs
Semen

Risk of transmission increases as the illness becomes worse, highest level oftransmission being in the late stages of the illness when the patient is vomiting.

Infection control precautions

Strict infection control precautions MUST be followed at all times when caring for allpatients with VHF. These include:

(a) Standard Precautions (see section 3),

(b) Isolation Precautions for VHF. These guidelines only give a brief overview:

Isolate the patient, wear personal protective equipment (at all times when in contact with patient or environment),
Clean and disinfect spills, waste, and reusable equipment safely
Clean and disinfect soiled linen and laundry safely,
Use safe disposal methods for non-reusable supplies and clinical waste,
Provide information about the risk of VHF transmission to health care workers,
Reinforce the use of VHF isolation precautions with all health care workers,
Provide information to families and the community about prevention of VHFs and care of patients.

Hand washing

Appropriate hand washing can minimize micro-organisms acquired on the hands bycontact with body fluids and contaminated surfaces. Hand washing breaks the chain ofinfection transmission and reduces person-to-person transmission.All health care personnel and family caregivers of patients must practise effectivehand washing. Patients and primary care givers need to be instructed in proper techniques andsituations for hand washing.Compliance with hand washing is, however, frequently sub-optimal. Reasons for thisinclude: lack of appropriate equipment; low staff to patient ratios; allergies to hand washingproducts; insufficient knowledge among staff about risks and procedures; the time required,and casual attitudes among staff towards bio-safety.

Purpose

Hand washing helps to remove micro-organisms that might cause disease.

- Washing with soap and water kills many transient micro-organisms and allows them to be mechanically removed by rinsing.
- Washing with antimicrobial products kills or inhibits the growth of micro-organisms in deep layers of the skin
- Use of alcohol based gel is the preferred method of hand cleansing.

TYPES OF HAND WASHING

Hand washing

Hand washing is usually limited to hands and wrists; the hands are washed for a

minimum of 10 – 15 seconds with soap (plain or antimicrobial) and water.

Hand antisepsis/ decontamination

Hand antisepsis removes or destroys transient micro-organisms and confers a

prolonged protective effect. It may be carried out in one of the following two ways:

- Wash hands and forearms with antimicrobial soap and water, for 15-30 seconds (following manufacturer's instructions).
- Decontaminate hands with a waterless, alcohol-based hand gel or hand rub for 15-30 seconds. This is appropriate for hands that are not soiled with protein matter or fat.

Immersion of hands in bowls of antiseptics is not recommended.

Surgical hand antisepsis

Surgical hand antisepsis removes or destroys transient micro-organisms and confers aprolonged effect. The hands and forearms are washed thoroughly with an antiseptic soap for aminimum of 2-3 minutes. The hands are dried using a sterile towel. Surgical hand antisepsis is required before performing invasive procedures.

FACILITIES AND MATERIALS REQUIRED FOR HAND WASHING

Running water

Access to clean water is essential. It is preferable to have running water: large washbasinswith hand-free controls, which require little maintenance and have anti-splash devices.When no running water is available use either a bucket with a tap, which can be turned onand off, a bucket and pitcher, or 60%-90 % alcohol hand rub.

Materials used for hand washing/hand antisepsis

Soap: Plain or antimicrobial soap depending on the procedure.Plain soap: Used for routine hand washing, available in bar, powder or liquid form.Antimicrobial soap: Used for hand washing as well as hand antisepsis.

If bar soaps are used: Use small bars with soap racks that can be drained.

Do not allow bar soap to sit in a pool of water as it encourages the growth of some micro-organisms such as pseudomonas.

Clean dispensers of liquid soap thoroughly every day.

When liquid soap containers are empty they must be discarded, not refilled with soap solution.

Specific antiseptics: recommended for hand antisepsis:

2%-4% chlorhexidine,
5%-7.5% povidone iodine,
1% triclosan, or
70% alcoholic hand rubs.

Waterless, alcohol-based hand rubs: with antiseptic and emollient gel and alcohol swabs,which can be applied to clean hands.Dispensers should be placed outside each patient room.

Facilities for drying hands

Disposable towels, reusable single use towels or roller towels, which are suitablymaintained, should be available.

If there is no clean dry towel, it is best to air-dry hands

Equipment and products are not equally accessible in all countries, or health carefacilities. Flexibility in products and procedures, and sensitivity to local needs willimprove compliance. In all cases, the best procedure possible should be instituted.

Steps in hand washing

Preparing for hand washing:

Remove jewelry (rings, bracelets) and watches before washing hands,
Ensure that the nails are clipped short (do not wear artificial nails),
Roll the sleeves up to the elbow.

Wet the hands and wrists, keeping hands and wrists lower than the elbows (permits the water to flow to the fingertips, avoiding arm contamination).

Apply soap (plain or antimicrobial) and lather thoroughly.

Use firm, circular motions to wash the hands and arms up to the wrists, covering all areas including palms, back of the hands, fingers, between fingers and lateral side of fifth finger, knuckles, and wrists. Rub for minimum of 10-15 seconds.

Repeat the process if the hands are very soiled.
Clean under the fingernails.
Rinse hands thoroughly, keeping the hands lower than the forearms.
If running water is not available, use a bucket and pitcher.
Do no dip your hands into a bowl to rinse, as this re contaminates them.
Collect used water in a basin and discard in a sink, drain or toilet.
Dry hands thoroughly with disposable paper towel or napkins, clean dry towel, or airdry them.
Discard the towel if used, in an appropriate container without touching the bin lids with hand.
Use a paper towel, clean towel or your elbow/foot to turn off the faucet to prevent recontamination.
A general procedure for hand washing is given in the figure below and must be conducted over at least one full minute.

Using antiseptics, hand rubs, gels or alcohol swabs for hand antisepsis

Apply the product to the palm of one hand. The volume needed to apply varies by product.
Rub hands together, covering all surfaces of hands and fingers, until hands are dry.
Do not rinse
Note: When there is visible soiling of hands, they should first be washed with soap and water before using waterless hand rubs, gels or alcohol swabs.
If soap and water are unavailable, hands should first be cleansed with detergentcontaining towelettes, before using the alcohol-based hand rub, gel or swab.

Personal Protective Equipment

IF FULL PERSONAL PROTECTIVE EQUIPMENT NEEDS TO BE WORN BEFORE

ENTERING THE PATIENT CARE AREA

There has been much debate about the order for putting on and taking off personalprotective equipment. The order for putting on personal protective equipment is notimportant, however, for practicality, the following sequence is given as an example:

Wash hands.
Wear scrub suit / old set of thin clothes before entering the designated changing room or area.
Wear boots /or shoe covers with trousers tucked inside.
Wash hands.
Wear cap.
Wear the mask.
Wear the gown.
Wear an impermeable apron if splashes of blood or body fluids are expected.
Wear protective eye wear/ goggles.
Wash hands and dry them.
Wear gloves with gown sleeve cuff tucked into glove.

REMOVING PERSONAL PROTECTIVE EQUIPMENT WHEN LEAVING THE

PATIENT CARE AREA

The order in which personal protective equipment is removed is not as importantas the principle behind choosing such an order. The key principle is that when removingpersonal protective equipment the wearer should avoid contact with blood, body fluids,secretions, excretions and other contaminants. When hands become contaminated theyshould be washed or decontaminated with 70% alcohol solution.

The following is an example of how to remove personal protective equipment:

Using gloved hands, untie the gown string if tied in front and remove shoe covers.
Remove gloves (fingers under cuff of second glove to avoid contact between skin and outside of gloves) and discard in an appropriate manner.
Wash hands.
Remove gown and apron, without contaminating clothing underneath.
Touch only inside of gown and apron while removing. Place in appropriate disposal bag.
Remove goggles, mask, and cap and place in an appropriate container.
Dispose according to the health care facility protocol. Remove boots (if worn) and place in appropriate container.
Wash hands up to wrists thoroughly with soap and water, dry and decontaminate hands using 70% alcoholic hand-rub before leaving facility.

USE OF FULL PERSONAL PROTECTIVE EQUIPMENT

Boots/shoe covers

Boots/shoe covers are used to protect the wearer from splashes of blood, body fluids, secretions and excretions.
Waterproof boots should be worn for heavily contaminated, wet flooring and floor cleaning.
Selecting boots/shoe covers
Shoe covers should be disposable and waterproof.
Waterproof boots should be washable.

Wearing boots/shoe covers

Wear waterproof boots if needed,
wear shoe covers over your personal shoes so as to cover your shoes adequately.

Removing boots/ shoe covers

Remove shoe covers first with gloved hands and discard.
Remove boots last, before leaving the room and disinfect.
Wash hands thoroughly.

Caps

Caps that completely cover the hair are used when splashes of blood and bodyfluids are expected. They should protect the hair from aerosols that may otherwise lodgeon the hair and be transferred to other parts of the health care worker such as face orclothing by the hands or onto inanimate objects.
Selecting cap

Use a disposable, waterproof cap of an appropriate size which completely covers the hair.
Wearing cap
Place or tie cap over the head so as to cover hair completely.

Removing cap

Remove by holding inside of the cap lifting it straight off head and folding inside out.
Discard in proper container.
Wash hands immediately.

Masks

A surgical mask protects health care providers from inhaling respiratorypathogens transmitted by the droplet route. It prevents the spread of infectious diseasessuch as varicella (chickenpox) and meningococcal diseases (meningococcal meningitis).

An N957mask protects health care providers from inhaling respiratory pathogensthat are transmitted via the airborne route. This helps to prevent the spread of infectiousdiseases such as TB, MDR-TB.In order to prevent the spread of infection, the appropriate mask should be wornby health care providers and visitors when attending to a patient suffering from acommunicable disease that is spread via the airborne or droplet route.The patient with a communicable disease spread via the droplet or airborne routeshould wear a surgical mask when being transferred to other departments or hospitals.Disposable masks are for single use only and should be discarded after 4- 6 hoursuse. They should not be stored in bags and re-used, shared or hung around neck, etc. If amask is splashed wet, it should be changed using clean gloves and strict hand washing.

Selecting a mask

A surgical mask should be worn in circumstances where there are likely to besplashes of blood, body fluids, secretions and excretions or when the patient has acommunicable disease that is spread via the droplet route.An N95 respirator mask needs to be chosen for those circumstances when apatient has a communicable disease that is spread via the airborne route.A mask with a higher level of filtration may be required when dealing with highlytransmissible diseases such as viral hemorrhagic fever.

Remove the clean mask from the container with clean hands.
Ensure the mask is fitted properly. Each N95 mask/respirator is different and must be appropriately fitted to each health care worker– called a “fit test”. Health care workers must ensure they know how to properly fit a respirator according to the manufacturers’ instructions.
If glasses are worn, fit the upper edge of the mask under the glasses. This will help to prevent them from clouding over. A secure fit will prevent both the escape and the inhalation of micro-organisms around the edges of the mask and fogging of the eyeglasses. Precautions
Avoid talking, sneezing, or coughing if possible.
Masks can not be worn with beards/unshaven faces.
The mask should completely seal the face at all times to ensure effective filtering of micro-organisms Removing the mask
Wash hands and remove mask - handle only the strings.
Discard in an appropriate bag/container and seal the bag.
Wash hands.

Gown

Gowns made of impervious material are worn to protect the wearer'sclothing/uniform from possible contamination with micro-organisms and exposure toblood, body fluids secretions and excretions.The gown should be used only once for one patient and discarded or sent forlaundering. Health care workers should remove gowns before leaving the unit.

Selecting a gown

Gowns should be clean and non-sterile. The gown should be impervious and waterrepellent. It should be long enough to cover the clothing of the wearer and should havelong sleeves and high neck. Disposable gowns are preferable. If they are not available,cotton reusable gowns can be used with a plastic apron underneath.

Wearing the gown

Wash hands, and dry.
Hold the gown at the neck on the inside permitting to unfold.
Slide hands and arms down the sleeves.
Fasten the ties at the neck.
Overlap the gown at the back as much as possible and secure the waistband. Request assistance to fasten the waist ties. Removing the gown
Remove the gown after removing gloves.
Untie the waist-band with a gloved hand if it is tied in front before removing the gloves.
Remove gloves and wash hands.
Untie the neck-ties (be sure not to touch outside of the gown).
Slide the gown down the arms and over the hands by holding in inside of the sleeves.
Hold the gown with both the hands (inside the shoulders) at the shoulder seams.
Turn the gown inside out (contaminated side in). The hands are then brought together and the gown is rolled and discarded in the container provided.

Discard appropriately

If reusable - discard if visibly contaminated. If there is shortage of gowns they may be reused during one shift for the same patient. Hang gown with outside facing in when not in use.
Discard at the end of each shift.
Wash hands thoroughly before touching anything else.

Apron

An apron protects the wearer and the uniform from contact with the contaminated body fluids. Plastic aprons are used over the gown when caring for patients where possible splashes with blood and body substances may occur.
Need not be used if the gown is of impermeable material.

Selecting the apron

Select water repellent, plastic aprons, which are disposable If disposable ones are not available then reusable plastic aprons can be used.
Size: long enough to protect the uniform and the gown but should not touch the ground. Should cover the front and sides. It should open in the back. A tie around the waist keeps the apron in place. Wearing the apron
Wash hands.

Ensure that the sleeves are rolled above the elbows before putting on the apron.
Wear the apron over the uniform and tie around the waist at the back.

Removing the apron

Wash hands and dry.
Remove, touching only the inside part of apron.
Discard, folding the outside part in.
Decontaminate or dispose according to the health care facility guidelines.
Wash hands thoroughly before touching anything else.

Protective eyewear/goggles

Protective eyewear/goggles should be worn at all times during patient contact when there is a possibility that a patient's body fluids may splash or spray onto the caregiver's face/eyes (e.g. during throat, endotracheal and tracheostomy suctioning, removal of in dwelling catheter etc). The amount of exposure can be reduced through the use of protective eyewear. Full face shields may also be used to protect the eyes and mouth of the health care worker in such high-risk situations.

Ordinary spectacles do not provide adequate protection, although caregivers may wear their own glasses with extra protection added at the sides. Goggles that fit over glasses are available. Protective eyewear should be changed after each shift.

Protective eyewear should be washed and decontaminated after removal and in between use. Selecting protective eyewear

Goggles should be made of clear polycarbonate plastic with side and forehead shields.
These should be optically clear, anti-fog and distortion-free.

Goggles that fit over glasses are also available. Disposable goggles are preferred but reusable ones can be used after cleaning and decontamination.

Wearing protective eye wear

Wear the eyewear by securing it over the bridge of the nose and also over the mask.

Removing protective eye wear

Remove and place in appropriate container for cleaning and decontamination prior to reuse by next person. Gloves

Use gloves when there is potential exposure to blood, body fluid, excretions or secretions.

Change gloves between patients, between tasks and procedures on the same patient, and when they become soiled.

Remove gloves promptly after touching contaminated items and environmental surfaces and before moving to another patient.

Remove gloves before leaving the patient's bedside and decontaminate hands immediately.

After glove removal and hand washing, ensure that hands do not touch potentially contaminated environmental surfaces or items in the patient's room.

Discard gloves after attending to each patient.

Selecting gloves

Use disposable gloves that are:

Clean/non-sterile for routine care of the infectious patients;
Sterile for invasive procedures.

Use heavy-duty rubber gloves for cleaning instruments, handling soiled linen or dealing withspills of blood and body fluids. They can be washed and reused.

Choose gloves that fit properly.
Check there is no puncture in gloves.
Do not use gloves if they are torn, as punctured gloves do not provide protection.

Wearing gloves

Wash hands and dry them.
Pick up the first glove by its cuff.
Wear the first glove. Bunch the glove up and then pull it onto the hand; ease fingers into the glove.
Repeat for the other hand.

Removing gloves

When removing personal protective equipment, remove gloves first.
Grasp the outside of one glove, near the cuff, with the thumb and forefinger of the other hand. Pull the glove off, turning it inside out while pulling and holding it in the hand that is still gloved.
Hook the bare thumb or finger inside the remaining glove and pull it off by turning it inside out and over the already removed glove to prevent contamination of the ungloved hand.
Roll the two gloves together taking care not to contaminate the hands.
Discard appropriately.
Wash hands and decontaminate with 70% alcohol hand rub/solution.

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[1] KGMC/HMC/MTI, Peshawar, Pakistan Dr. Mushtaq Ahmad