State of Kuwait

Ministry of Health

Infection Control Directorate

Title: Recommended Practices for Prevention and Control of Infections in Dialysis Settings

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Recommended Practices for Prevention and Control of Infections in Dialysis Settings

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1. Introduction

An effective infection prevention and control program for dialysis units is comprised of multiple interventions which are designed to reduce the risk of infection based on the unique characteristics of the dialysis patient population and environment. The success of an infection prevention and control program requires that all members of the dialysis team understand their role. Each team member must be held accountable for compliance with infection prevention, control strategies, and interventions.

2. Purpose

Provide evidence-based recommendations for the prevention of healthcare-associated infections in all dialysis settings: acute, and chronic.

3. Scope

This policy applies to all dialysis settings in Kuwait. It provides basic infection prevention and control measures that are supported by strong evidence and regulatory requirements.

4. Definitions

Haemodialysis (HD): is a process that involves circulating the patient's blood outside of the body through an extracorporeal circuit, where it is separated from dialysis fluid by an artificial semi-permeable membrane.

Peritoneal dialysis (PD): is a process that uses the patient's peritoneum, or the lining of the abdomen, to dialyze waste products from the patient's blood.

Continuous ambulatory peritoneal dialysis (CAPD): is a process that involves multiple exchanges during the day (usually three) with an overnight dwell. A machine is not needed, and the person can walk around while the fluid is in the abdomen.

Dialysis station: A station that includes the dialysis machine, a purified water connection, the dialysate concentrate container(s) or connections(s), and the treatment chair.

Patient zone: is used to refer to the surfaces which the patient can touch, or can touch the patient, including the chair, armrests, bedside table top/counter, drawer/cupboard handles and the haemodialysis machine.

Dialysate: A balanced electrolyte solution which is introduced on one side of the semi-permeable dialyser membrane (opposite to the patient's blood) to exchange solutes with blood during haemodialysis. In peritoneal dialysis, this fluid infused and later removed from the peritoneal cavity.

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Reverse osmosis (RO): A process used to purify dialysis water by removing dissolved inorganic solutes as well as bacteria and their endotoxins.

High touch surfaces: is used to describe surfaces which are frequently touched by healthcare workers (HCWs). These include the same surfaces in the patient zone in addition to others such as the computer screens, and keyboards.

Low-level disinfection: disinfection that kills most bacteria and is accomplished by using general-purpose disinfectants.

Intermediate-level disinfection: disinfection that kills most bacteria and most viruses e.g., 1:100 dilution of bleach.

Airborne infection isolation room (AIIR): Formerly, negative pressure isolation room is a single-occupancy patient-care room used to isolate persons with a suspected or confirmed airborne infectious disease.

5.	Procedures

This policy will address the core interventions designed to reduce the risk of infection in HD patients (Appendix 1) as well as other key infection prevention measures that are essential for an effective infection prevention and control program for all dialysis settings.

5.1 Patient and Healthcare Workers (HCWs) Education

5.1.1 Patient involvement

- Dialysis HCWs should ensure patients are involved and understand their role in the infection prevention and control program.
- This can be supported via education of the patient/caregivers on hand hygiene, access site care, wound cleaning, respiratory etiquette, and understanding/reporting signs and symptoms of infection.
- Patient education tools in (Appendix 2,3,4).

5.1.2 HCWs education and oversight of compliance with infection prevention practice

- Dialysis facilities should have proper infection prevention (IP) program under the supervision of certified infection control practitioner.
- Infection control team can assist with education and training of dialysis HCWs.
- PD and HD catheters insertion should not be delegated to inexperienced unsupervised operators.
- Each dialysis center should have a dedicated team involved in the implantation and care of peritoneal catheters.

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- In each dialysis setting PD team and the HD access operators should have regular audit at not less than 12-month intervals on the outcome of catheter insertion, care and infection rate.

5.2 Patient Immunizations and Screening

- Dialysis patients are at increased risk for a variety of infections including tuberculosis (TB) and a number of vaccine preventable diseases.
- The immunizations should be a component of standard care for dialysis patients.
- The recommended vaccines are tetanus, influenza, pneumococcal, shingles and Hepatitis B Virus (HBV).

5.2.1 HBV Immunization and Screening

- Full series of vaccinations to reach the desired titer of antibody (≥10 mIU/mL).
- If the patient antibodies titer is <10 mIU/mL, he or she should be considered susceptible and screened monthly for HBsAg.
- If the patient achieves the anti-HBs level of at least 10 mIU/mL, he or she should be screened half-annually for those on haemodialysis and annually for those who on peritoneal dialysis as he/ she tends to lose their protective level.
- Patients who are both anti-HBs and anti-HBc positive do not require such follow-up screening.

5.2.2 Other Screening

- It is critical to ensure that screening for latent TB infection in patients with renal failure occurs at a very early stage, typically at baseline and whenever exposure is suspected.
- Screening HD patients for anti-HCV at 6-month intervals is recommended.

5.3 HCWs Immunization and Screening

- It is mandatory for all dialysis HCWs to receive immunization against HBV and Measles, Mumps and Rubella (MMR).
- Influenza, chickenpox (varicella), pertussis, diphtheria, and tetanus vaccinations are recommended but not mandated.
- TB screening of HCWs should also be performed in all HD facilities; this is commonly a two-step test on hire and then on an annual basis for any HCWs with direct patient contact.

5.4 Hand Hygiene

- HCWs should apply "My 5 moments for hand hygiene" as follow:
1. before touching a patient,

2. before any clean or aseptic procedure,

3. after body fluid exposure risk,

4. after touching a patient,

5. after touching a patient's surroundings.

- Other important times include:
    - before and after gloves use;
    - after touching contaminated items (including front of the HD machine);
    - before accessing or restocking supplies.
- The use of alcohol-based hand rub for hand hygiene is preferred over hand washing with soap and water, unless the caregiver's hands are visibly soiled.
- Alcohol dispensers should be placed at each patient station.
- A hand-washing station shall be located at the entry to the dialysis treatment area.
- Each single or multiple patients' room shall have a hand-washing station.
- At least one hand-washing station shall be provided for every three patient care stations or fewer.
- Fingernails should be kept short and clean.
- HCWs should not wear artificial fingernails or extenders if duties include direct contact with patients.
- Patients must be instructed to perform hand hygiene including before and after dialysis sessions.

5.5 Standard Precautions

In dialysis settings, in addition to standard precautions, more stringent measures are recommended. Dialysis HCWs must take more rigorous steps to protect their patients as well as themselves, as follow:

- Separate rooms are recommended for peritoneal dialysis training and care of complications related to continuous ambulatory peritoneal dialysis (CAPD).
- Isolation of HBsAg-positive patients (see HBV Isolation/Precautions)
- An aseptic technique shall be used by all HCWs undertaking invasive medical procedures including insertion and access of haemodialysis catheters and peritoneal dialysis catheters.
- Use dedicated equipment:
    - ✓ Any single-use disposable item must be used for only one patient and then discarded.
    - ✓ Items such as adhesive tape should be dedicated for use on a single patient and discarded.
    - ✓ Blood pressure cuffs should be made or covered with a material that can be cleaned and disinfected between patient uses.
    - ✓ Unused medications or supplies (e.g., syringes, alcohol swabs) taken to the patient's station should not be returned to a common clean area or used on other patients.
- Prohibit use of shared mobile supply or medication carts.

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- Gloves must always be worn for any contact with the patient or a patient's equipment.

5.5.1 Personal Protective Equipment (PPE) Guidelines for Standard Precautions in Dialysis Settings

A. Patients

- Wear a mask during initiation and discontinuation of dialysis treatment if vascular access is a catheter.
- Wear a mask in a dialysis facility when experiencing symptoms of an upper respiratory illness.

B. HCWs

1. Fluid resistant gowns should cover arms and be closed in front and be worn when:

- caring for an isolation patient with HBV.
- there is likelihood of blood contact, especially when initiating and removing patients from dialysis.
- there is a likelihood of body fluid contact especially with diarrheal illnesses, uncontrolled secretions, draining wounds, stool incontinence, and ostomy tubes and bags.
- during reprocessing of dialyzers.

2. Gloves use:

- Hand hygiene shall be performed before and after gloves use.
- Sterile gloves must also be available and used during procedures requiring aseptic technique such as central line insertion.
- Gloves shall be worn when :
  - ✓ caring for a patient.
  - ✓ touching the patient's medical equipment or handling lab specimens or used dialyzers.
  - ✓ cleaning machines, cleaning stations, or wiping off blood or other body fluid spills.
- Gloves shall be changed when :
  - ✓ moving from one patient or machine to another.
  - ✓ moving from a dirty to a clean site/task on the same patient (i.e., new gloves should be donned after touching the HD machine, prior to touching the same patient's vascular access)
  - ✓ after cannulation.

3. Mask should be:

- Worn if experiencing mild cold or cough illness in order to protect patients and other HCWs.

4. Face protection (mask with eye protection [goggles, face shield])

- Should be worn :
  - ✓ during initiation and discontinuation of dialysis.

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- ✓ during reprocessing dialyzers or cleaning equipment in a sink.
- ✓ within 1 metre of an unmasked coughing patient.
- Discarded between patients or if reusable clean and disinfect between uses as indicated.

Table (1): Overview: HCW and Patient PPE Guidelines for Dialysis Facilities

Task	Lab coats/ scrub	PPE		
		Gloves	Gown/Apron	Mask with eye protection or full face shield
HCWs				
Vascular access set-up		X	X	X
Cannulation		X	X	X
Decannulation		X	X	X
Central line connection, disconnection		X	X	X
Providing snack	X			
Adjusting dialysis machine—no patient Contact	X	X		
Transporting and pouring chemicals		X	X gown	X
Reprocessing equipment and dialyzers		X decontamination gloves (used once)	X gown	X
HBV isolation		X	X gown	Determined by task
Central line insertion	Full sterile barriers(sterile gown/gloves/barriers; full face protection)			
Central line removal		X	X	X
Patient				
During cannulation or decannulation			Barrier over clothing	
Central line connection, disconnection/dressing change				X
Visitor of MDRO patient		X	X	

Note:

- Lab-style cover coats, regular cotton, non-fluid resistant lab coats are not considered PPE and should be removed or worn under an isolation or fluid resistant gown when needed.
- Lab coat must be removed if it becomes soiled or wet.
- Lab coat must be removed prior to leaving the unit and for breaks and lunch.

5.6 Isolation Precautions

The relative risk of HIV and hepatitis C virus (HCV) infection is significantly less than that of HBV for both HCWs and patients.

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5.6.1 HBV Positive Patients

These precautions are required for hepatitis B surface antigen (HBs Ag) positive patients, undergoing peritoneal dialysis as those undergoing HD; as peritoneal fluid can contain high levels of HBV and should be managed in the same manner as the patient's blood.

- Patients are placed in a private room or segregated area.
- Dedicated dialysis machine.
- Dialyzers are single use and discarded in biomedical waste after treatment.
- Gown and gloves are required for each entry into room.
- Mask with eye protection is required for cannulation and decannulation.
- HCWs caring for HBV patients cannot care for HBV susceptible patients at the same time.
- HCWs caring HBV patients should be HBV-immune.

5.6.2 HCV Positive Patients

- Standard precautions recommended for all dialysis patients are sufficient to prevent HCV transmission between patients.
- Patients who are anti-HCV positive (or HCV RNA positive) do not have to be isolated from other patients or dialyzed separately on dedicated machines.
- Dialyzers can be reused (for same patient) with HCV infection.
- Only in units with high prevalence of HCV infection (>30%) and/or evidence of new seroconversion associated with dialysis, isolate patients in separate room.

5.6.3 HIV Positive Patients

- Standard Precautions recommended for all HD patients are sufficient to prevent HIV transmission between patients.
- HIV-infected patients do not have to be isolated from other patients or dialyzed separately on dedicated machines.
- HIV-infected patients can participate in dialyzer reuse programs.
- Because HIV is not transmitted efficiently through non–sharps-associated exposures, reprocessing dialyzers from HIV positive patients should not place HCWs at increased risk for infection.

5.7 Respiratory Hygiene/Cough Etiquette

To prevent the transmission of all respiratory infections in dialysis settings, respiratory hygiene should be implemented at the first point of contact with a coughing or potentially infected person.

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- Dialysis facilities should have adequate signage and supplies (tissue, alcohol hand rub) to support the following prevention efforts:
  - ✓ Patients and HCWs should cover the nose/mouth when coughing or sneezing with tissues or masks to contain respiratory secretions and dispose of them in the nearest waste receptacle after use.
  - ✓ Patients unable or unwilling to use tissue or wear a mask should be spatially separated from others by at least 1 meter.
  - ✓ HCWs who care for individuals who are coughing or have a respiratory illness should don a mask with eye protection when within 1 meter of the individual.
  - ✓ Patients and HCWs should perform hand hygiene after contact with respiratory secretions and contaminated objects/materials.

5.8 Medication Safety and Safe injection

5.8.1   Aseptic Technique:
- Perform hand hygiene prior to accessing supplies, handling vials and intravenous (IV) solutions, and preparing or administering medications.
- Use aseptic technique during all aspects of parenteral medication administration, medication vial use, injections, and glucose monitoring procedures.
- IV medications should be prepared in a clean area away from the patient treatment area to avoid contamination.
- Discard all opened vials, IV solutions, and prepared or opened syringes that were used in an emergency situation.

5.8.2.   IV Solutions:
- Never use IV solution containers (e.g., bags or bottles) for the purpose of IV flush solutions (or other purposes) for more than one patient.
- Use single-dose containers for flush solutions.
- Never use infusion supplies such as needles, syringes, flush solutions, administration sets, or IV fluids on more than one patient.
- Complete infusion of lipid containing solutions within 24 hours, lipid emulsions within 12 hours, and blood/ blood products within 4 hours.
- Disinfect IV ports prior to accessing, using friction and 70% alcohol, iodophor, or chlorhexidine/ alcohol agent. Allow to dry prior to accessing.

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5.8.4 Syringes:

- Never use medication in a syringe for more than one patient even if the needle is changed between patients.
- Utilize sharps safety devices whenever possible.
- Discard syringes, needles, and cannulas after used on a patient or in the IV administration system.
- Dispose of used needles at the point of use in an approved, puncture resistant sharps container.

5.8.5 Vials:

- Use single-use or single-dose vials whenever possible.
- Use multidose medication vials for a single patient whenever possible and access all vials using a new sterile syringe and needle/cannula with adherence to aseptic technique.
- Cleanse the access diaphragm of vials using friction and 70% alcohol. Allow to dry before inserting a device into the vial.
- Discard single-dose vials after use.
- Never store vials in clothing or pockets.
- Never pool or combine leftover contents of vials for later use.
- Never leave a needle or cannula inserted into a medication vial rubber stopper because it leaves the vial vulnerable to contamination.
- Dispose of opened multidose medication vials 28 days after opening unless the manufacturer specifies a different (shorter or longer) date for that opened vial. Date vial to reflect date opened and date of expiration. Vaccines are to be discarded per manufacturer's expiration date.
- Examine the vial for any particulate matter, discoloration, or turbidity. If present, do not use and discard immediately.
- All vials used during an emergency should be discarded as sterility cannot be guaranteed.
- Do not use medication carts to transport medications to patient stations.

Checklists of injectable medication preparation and administration should be employed to support adherence to aseptic technique. (Appendix 5)

5.9 Transmission-Based Precautions

Transmission-Based Precautions are recommended in addition to standard precautions when the route of suspected or known infection is not completely interrupted using standard precautions alone. There are three categories of transmission-based precautions: contact precautions, droplet precautions, and airborne precautions.

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5.9.1 Contact Precautions:

    i.   Ambulatory Setting: The routine use of infection control practices recommended for dialysis units (gloves for all patient and environmental contact), which are more stringent than the standard precautions routinely used in hospitals, should prevent transmission by the contact route.

    ii.   Inpatient Setting: Hospital policy should be followed.

    iii.   Additional precautions are recommended for MDRO in dialysis facilities:

- HCWs treating the patient should wear an isolation gown over their usual clothing and remove the gown when finished caring for the patient.
- Dialyze the patient at a station with as few adjacent stations as possible (e.g., at the end or corner of the unit).

5.9.2 Droplet Precautions:

    i.   Ambulatory Setting: Respiratory hygiene/cough etiquette precautions should be followed. If hospitalization is required, the patient should be spatially separated by at least 1 meter from other patients and a mask worn until transport can be arranged. Only immune HCWs should care for patients with a vaccine preventable disease.

    ii.   Inpatient: Hospital policies should be followed.

5.9.3 Airborne Precautions:

    i.   Ambulatory Setting: Patient identified with a suspected airborne disease should be masked immediately and geographically separated from other patients, preferably in a single room. Arrangements should be made for HD treatments at a facility that can provide an airborne infection isolation room.

    ii.   Inpatient Setting: Patients are placed in an airborne infection isolation room. Respirators are required for HCWs caring for TB, varicella, measles, or other airborne diseases. Only immune HCWs should care for patients with a vaccine preventable disease.

5.10 Presurgical (HD Access) Infection Prevention

    HD access-associated surgery can be performed on an inpatient or outpatient basis. Dialysis patients are often more immunocompromised than other preoperative patients, so guidelines for surgical infection prevention should be strictly followed.

5.10.1 Preoperative Showers/Bathing

- Preoperative bathing or showering with an antiseptic agent such as chlorehexidine gluconate (CHG) is recommended.

- CHG-impregnated bathing cloths used to bath the entire body with special focus on the preoperative surgical site the night before (prior to arrival to the hospital) and morning of surgery is recommended.
- For bathing instructions see (Appendix 4).

5.10.2 Hair Removal
- Hair should only be removed if absolutely essential i.e. interfering with the operative site.
- It should be performed with clippers instead of razors.
- Hair removal should be performed immediately prior to the surgical procedure and outside of operating room so that clipped hair does not contaminate the operating room environment.

5.10.3 Vascular Access Protection
- Avoid IV line placements and phlebotomy in the arm where the dialysis vascular access is going to be placed.

5.10.4 Active Surveillance Screening for MRSA and Decolonization
- In HD settings with high MRSA rate, consider screening all patients preoperatively.
- For those who test positive, nasal mupirocin is applied to the nasal passages 3 times daily for 5 days before surgery.

5.11 Postsurgical Care
- Temporary catheters are associated with a greater risk of infection and associated hospitalization than permanent access (fistula/graft).
- As prevention is the preferred strategy in access care, the goal is to remove the temporary catheter as soon as possible.
- The patient should also be informed regarding actions they can take to reduce the risk of postoperative infection, including the following:
  - ✓ Hand hygiene must be performed before donning gloves, prior to wound care or vascular access.
  - ✓ The patient should be reminded not to touch the skin at the site where the catheter enters the skin or where the fistula/graft has been placed.
  - ✓ The area around the new access should be covered with a clean, dry dressing.
  - ✓ The patient's clothes should not impede or compromise the access.
  - ✓ The patient and nurse must wear a mask when a catheter (not fistula or graft) is connected or disconnected from the blood lines during dialysis.
- Clear instructions should be provided to the patients when to contact the healthcare providers.

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5.12 Vascular Access Insertion and Care

- If temporary access is needed for dialysis, a tunnelled cuffed catheter is preferable to uncuffed catheter.
- Arteriovenous (AV) fistulas and grafts are preferred over HD catheters in patients with chronic renal failure, due to their lower associated risk of infection.
- All types of catheters require meticulous skin preparation and strict aseptic technique.
- Do not routinely replace HD catheters to prevent catheter related bloodstream infection(CRBSI).

5.12.1 Catheter Insertion

A number of steps designed to reduce the risk of (CRBSI) for percutaneous insertion of HD catheters, including the following:

- ✓ A checklist should be employed to support reliable and consistent practice and adherence to aseptic technique. (Appendix 5)
- ✓ Scrupulous hand hygiene should be performed prior to insertion using either an alcohol-based hand rub or antimicrobial soap and water.
- ✓ Use of the femoral vein should be avoided in adults.
- ✓ Maximal sterile barrier precautions (including mask, cap, sterile gown, and sterile gloves) should be used by the catheter inserter, and the patient should be covered with a full body sterile drape.
- ✓ For patients older than 2 months, a skin preparation solution containing greater than 0.5% CHG and 70% isopropyl alcohol should be applied to the insertion site and allowed to dry before the skin is punctured.
- ✓ If chlorehexidine is contraindicated, use tincture iodine or iodophor or 70% alcohol.

5.12.2 Catheter Care

A number of practices designed to reduce the risk of CRBSI for care of percutaneously inserted HD catheters, includes the following:

- ✓ The catheter exit site should be examined for proper position of the catheter and absence of infection by experienced personnel before accessing the bloodstream at each HD session.
- ✓ Aseptic technique should be used to prevent contamination of the catheter system, including the use of a surgical mask for HCWs and patient and clean gloves for HCWs during all catheter system connect, disconnect, and dressing procedures.
- ✓ The hub of HD catheters can be disinfected prior to removing the caps.
- ✓ After removing the cap:
  - o The hub should be wiped with CHG, alcohol, or povidone-iodine.
  - o The catheter hub should be connected immediately to limit exposure to air.

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- o This procedure should also be followed at the time the patient is disconnected at the end of dialysis session or for any other reason.
- ✓ Catheter manipulation should be kept to an absolute minimum.
- ✓ Checklists of catheter connection and disconnection should be employed to support adherence to aseptic technique. (Appendix 5)
- ✓ Catheter scrub-the –hub protocol should be employed to. See (Appendix 6) for full instructions.

5.12.3 Exit-site care

- ✓ The catheter exit-site dressing should be changed every 2-3 days (after each HD session) if gauze/ tape, or every 7 days if transparent dressing is used in addition to whenever the dressing is wet or soiled.
- ✓ The catheter insertion site should be cleaned/disinfected at the time of the dressing change with CHG/ alcohol or povidone-iodine solution; ointment should be applied (povidone-iodine or triple antibiotics).
- ✓ CHG-impregnated exit-site dressing can be applied.
- ✓ A checklist of catheter exit site care should be employed to support adherence to aseptic technique. (Appendix 5)

A. Skin Antiseptics for Exit-Site Care

- ✓ A solution containing chlorhexidine in a concentration greater than 0.5% in 70% isopropyl alcohol is the standard in inpatient settings for insertion and care of central venous devices.
- ✓ CHG is superior over povidone-iodine given its rapid and persistent antimicrobial activity.
- ✓ Povidone-iodine is an alternative if the patient develops sensitivity or becomes allergic to CHG.

B. Exit-Site Dressings and Ointment

- ✓ Use povidone idodine antisepetic ointment or bacitracin /gramicidin/ polymyxin B ointment at the HD catheter exit site after catheter insertion and at the end of each dialysis session only if this ointment does not interact with the material of the HD catheter per manufacturer's recommendation.

Table 2: Considerations for Accessing Catheters and Cleansing Catheter Exit Sites

Prepare procedure site using dialysis precautions.
Conduct procedures using aseptic technique (correct handwashing, masks for patient and staff, "no-touch" technique, and disposable clean gloves).
CHG > 0.5% with 70% alcohol is the preferred solution for cleansing of long-term catheter sites.* For patients with sensitivities to CHG > 0.5% with 70% alcohol, CHG aqueous* may be used instead. For patients with sensitivities to CHG aqueous, povidone solution† may be used.
Skin cleansing should include the following steps: • Apply solution/swab in a circular motion working from catheter exit site outwards.   • Cover an area 10 cm in diameter.   • Repeat this step twice.

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• Do not rinse of or blot excess solution from skin.
• Allow solution to dry completely before applying dressing.

To cleanse the connection between any central venous catheter hub and cap, use two swabs:
• Grasp connection with one swab.
• Use second swab to clean from catheter connection up catheter for 10 cm.
• Cleanse hub connection site and cap vigorously with the first swab.
• Discard swab.
• Do not drop a connection site once it is cleaned.

To cleanse the section of the catheter that lies adjacent to the skin, gently swab the top and undersides of the catheter starting at the exit site and working outwards.
* Check catheter manufacturer's warnings about effect of disinfectants on catheter material.
† Use according to manufacturer's directions.

5.12.4 Permanent Access: Fistulas/Grafts

- Skin preparation technique for subcutaneous arteriovenous accesses is critical process to prevent infection.

Table 3: Skin Preparation Technique for Subcutaneous Arteriovenous Accesses

• Locate, inspect, and palpate the needle cannulation sites prior to skin preparation.
• Repeat preparation if the skin is touched by the patient or staff once the skin preparation has been applied, but the cannulation not completed.
• Wash access site using an antibacterial soap and water and scrub.
• Cleanse the skin by applying CHG > 0.5% /70% isopropyl alcohol or 70% alcohol and/or 10% povidone-iodine as per manufacturer's instructions for use.
o Apply >0.5% CHG/70% isopropyl alcohol solution using back and forth friction scrub per manufacturer's instructions. Allow the area to dry. Do not blot the solution.
o Alcohol should be applied in a rubbing motion for 1 minute immediately prior to needle cannulation.
o Povidone-iodine needs to be applied 2–3 minutes for its full bacteriostatic action to take effect and must be allowed to dry prior to needle cannulation.
• Clean gloves should be worn by the dialysis staff for cannulation. Gloves should be changed if contaminated at any time during the cannulation procedure.
• New, clean gloves should be worn by the dialysis staff for each patient with proper infection control measures followed between each patient.

- Infection prevention efforts are required for any venipuncture procedure, including cleaning and disinfection of the cannulation site, and sterile technique when handling the needle.

- Taking blood pressure, drawing blood, or putting IVs in the access arm should be prohibited.
- For arteriovenous graft (AVGs) and most arteriovenous fistula (AVFs), if "rotating sites" technique is used, the needle insertions must be made at least an inch apart to avoid damaging the vessel or graft, and possibly lead to infection.

- For AVF, if "same site" cannulation technique is used a protective scab removal must be performed under aseptic technique prior to the next cannulation. If not performed properly, scab removal can contribute to infection risk.

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- Checklists of AVGs /AVFs cannulation and decannulation should be employed to prevent infection. (Appendix 5)

5.13 Peritoneal Access Insertion and Care

Prevention of Peritonitis

- Whenever possible, catheter insertion should be performed at least 2 weeks before starting PD.
- Systemic prophylactic antibiotics should be administered immediately prior to catheter insertion.
- There is no specific recommendation on catheter design or type for prevention of peritonitis; however catheter of a suitable size should be used.
- There is no specific recommendation on the choice of dialysis solution for prevention of peritonitis.
- Daily topical application of antibiotic (mupirocin or gentamicin) cream or ointment to the catheter exit site is recommended.
- Mupirocin ointment (which contains polyethylene glycol), should be avoided in patients with polyurethane catheters, as structural damage to the catheter has been reported.
- Prompt treatment of exit-site or catheter tunnel infection is advised to reduce subsequent peritonitis risk.
- Evidence of the benefit of one of the following solution over another for or cleaning exit-sites is not available (soap and water, povidone-iodine, chlorhexidine, hydrogen peroxide, alcohol, and combinations of topical antiseptic agents).
- Following catheter placement, the initial dressing should not be changed for several days unless there is obvious and excessive bleeding.
- A sterile technique (including sterile dressing) should be used in the immediate post-operative period (~14 days).
- After 14 days, the exit-site can be cleaned daily with an antiseptic soap solution in the shower.
- The application of a cover dressing is optional once the exit-site is well healed.
- Disconnect systems with a "flush before fill" design is recommended for use for CAPD.

5.14 Surveillance
- All HD facilities should report the details of each dialysis event that occurred among patients.
- Every PD facility should monitor, at least on a yearly basis, the overall peritonitis rate, peritonitis rate of specific organisms, the percentage of patients per year who are peritonitis-free, and the antimicrobial susceptibilities of the infecting organisms.

5.15 Multidrug resistant organisms (MDRO) Screening and Management

- Screening recommendations should be adopted with cooperation between nephrology, infection control, infectious diseases and/or microbiology departments regarding the dialysis service's MDRO screening program.

- Any screening program should be based on risk assessment taking into considerations the facility demographics including predominant microorganisms and antimicrobial resistance patterns (antibiograms), as well as human and physical resources to effectively and safely isolate patients where indicated.

- No single approach to screen and control of MDRO is appropriate for all health care facilities. Appendix (7) is showing examples of recommended screening programs.

- Active surveillance cultures do not replace the need to obtain microbiological specimens as part of clinical management of the patient.

- It is not advised to screen routinely HCWs for MDROs. The exception may be ongoing transmission of a MDRO within a unit, for which no other source is identified.

- It is not advised to screen routinely close contacts of dialysis patients for MDROs.

- Ideally, contact precautions should be implemented for all patients infected or colonized with MDROs.

- A separate (isolation) room shall be designated only for MDRO-positive patient(s), using contact precautions. (For more details refer to isolation policy).

- Patients with the same MDROs may be managed together (cohorted).

- Patients with different MDROs should be managed separately.

- The use of separate machines or dedicated HCWs is not necessary.

- For MDROs environmental cleaning and disinfection refer to section 5.16.3

5.16 Environmental Cleaning/Disinfection

- Environmental cleaning in dialysis settings present a unique set of challenges, and shall be performed by trained personnel.

- Sufficient time between the completion of one patient's treatment and post dialysis care and the initiation of the next patient's care is important for permitting reliable and consistent cleaning and disinfection of the dialysis station.

5.16.1 Cleaning and Disinfection of Environmental Surfaces

- The process of physical cleaning of environmental surfaces using detergent, water, and friction is the critical step required prior to surface disinfection.

- Cleaning and disinfection of surfaces (patient zone/high touch surfaces) should be performed between all patient treatments, including (MDROs) and bloodborne pathogens.
- If patients are moved to a separate seating area prior to removing cannulation needles or while trying to achieve haemostasis, the chairs and armrests in those areas must be disinfected in between patients.
- Non critical surfaces (e.g., dialysis bed or chair, countertops, external surfaces of dialysis machines) should be disinfected with a ministry of health approved disinfectant unless the item is visibly contaminated with blood.
- Disinfection will not be effective in the presence of dirt, blood, or other bioburden.
- In that case, a ministry approved tuberculocidal agent with specific label claims for (HBV) and (HIV) should be used.
- One accepted disinfectant for blood contaminated environmental surfaces is 500–600 parts per million [ppm] free chlorine.
- For convenience, consider selecting and routinely using hospital disinfectants that are tuberculocidal or have label claims of activity against (HBV) and (HIV),to perform routine and intermediate-level disinfection.
- In case of blood and body fluid spillage such as dialysate, peritoneal dialysis fluid or vomitus refer to (Appendix 8) for full details.
- In addition to cleaning functions, typically performed by housekeeping staff in dialysis facilities, there are certain tasks which are recommended to optimize environmental cleaning in dialysis facilities. These are typically performed by the dialysis nurse which include cleaning all frequently touched or "high touch" surfaces in the "patient zone" between patient treatments. Some of these high touch surfaces may be right outside the patient zone (e.g., computer stations), and must also be cleaned between patient treatments.
- Follow these instructions:
  - ✓ Perform hand hygiene before and after cleaning the patient station.
  - ✓ Don gloves when using cleaner/disinfectants.
  - ✓ Use one set of cleaning cloths or disposable germicidal wipes for each patient station.
  - ✓ Use microfiber cloths and mops if possible (more effective cleaning products than regular cotton cleaning cloths).
  - ✓ Clean the top of an object first and work down to avoid soiling surfaces just cleaned.
  - ✓ If using cleaning cloths instead of disposable germicidal wipes:
    - ▪ A wadded cloth does not clean efficiently.
    - ▪ Fold the cleaning cloth in a series of squares to provide a number of potential cleaning surfaces.

Recommended Practices for Prevention and Control of Infections in Dialysis Settings

- Replace cloth as needed.
- More than one cloth may be required for a dialysis station.
- Never use the same cleaning cloth for more than one dialysis station.
- When using a disinfectant cleaner, wet the surface, use friction to clean, and allow to air dry.
- Never re-dip used cloth into clean disinfectant solution.
- Store cleaner/disinfectant separately from skin antiseptics/patient supplies (separate shelves to avoid potential contamination).

5.16.2 Disposal of Peritoneal Dialysis (PD) Effluent/ Dialysate and Haemodialysis (HD) Fluid

- All HCWs should follow the proper handling of these fluids with great caution to avoid splashing.
- PD and HD fluid should be disposed directly into a drain or by pouring carefully into a sluice.
- Disposable gloves should be worn when handling any PD fluid, and the fluid should enter the sewer system in such a manner that no splashing occurs.
- The tubing from the PD bag should be placed below into the drain or below the surface of the water to prevent splashing while the bag drains.
- The sink, drain, and any inadvertent spills or splashes should be disinfected with 1:10 dilution household bleach or an appropriately ministry approved disinfectant.
- All contaminated material including PD bags should be placed in heavy tightly sealed plastic bags for disposal.
- Waste PD fluid from HBsAg-positive patients can be disposed of into a sanitary sewer if handled with proper aseptic technique.

5.16.3 MDRO Cleaning and Disinfection

- HCWs in dialysis facilities should clean the environment of the MDRO patient as they would for any patient.
- The wet contact time of the germicide (according the manufacturer's guideline) on the surface helps kill or inactivate any remaining microorganisms.
- The exception is Clostridium difficile, which requires removal by friction and is not inactivated by any surface disinfectant except sodium hypochlorite.

5.17 Medical Equipment

5.17.1. Equipment Cleaning/Disinfection

Key principles related to equipment cleaning/disinfection that should be adhered to in order to reduce the risk of cross-contamination in dialysis settings are as follow:

- Any equipment or item used for the patient must not be shared from patient to patient without prior cleaning and disinfection.
- Items taken into an individual dialysis patient station should be disposed of after use, dedicated for use on a single patient, or cleaned and disinfected before being taken to a common clean area or used on another patient.
- Non-disposable items that cannot be comprehensively cleaned and disinfected (e.g., adhesive tape, cloth covered blood pressure cuffs) should be dedicated for use on a single patient.
- External venous and arterial pressure transducer filters/protectors should be changed after each patient treatment, and should not be reused.
- Internal transducer filters do not need to be changed routinely between patients.
- When reprocessing or disposing of dialyzers, dialyzer ports should be capped and tubing clamped. The used dialyzer should be placed in a leak proof container for transport from the patient station to the reprocessing area.
- All equipment, including the front of the dialysis machine, should be considered contaminated after a patient dialysis session.
- Non-disposable instruments (scissors, hemostats, clamps, etc.) which have no contact with sterile tissue or mucous membranes may become contaminated during the procedure. To facilitate thorough cleaning of the hinges and joints, these instruments should be first submerged and cleaned, with enzymatic detergent, rinsed thoroughly, then disinfected according manufacturer's instructions— typically low level disinfectant unless visibly contaminated with blood—then tuberculocidal disinfection.
- Wiping with a cloth saturated with disinfectant is not adequate to thoroughly clean hinged or jointed instruments.

5.17.2 Exterior Cleaning and Disinfection of Dialysis Machine

- Exterior (surface) cleaning and disinfection of dialysis machine can be accomplished between each treatment using any ministry of health approved detergent and disinfectant.
- In a typical dialysis setting, nurses generally perform the process of cleaning of the patient station between dialysis sessions.

5.17.3 Interior Disinfection of Dialysis Machine

- Disinfection of the internal pathways of the dialysis machine between patient uses is not required, since cross contamination of dialysis machines is unlikely with the blood and dialysate segregation feature in the machine. Despite this fact, perform disinfection as recommended by HD machine manufacturers.
- Cross-contamination can occur only if a blood leak event occurs. In that case, internal disinfection before the dialysis machine is used on a successive patient is a must.

Recommended Practices for Prevention and Control of Infections in Dialysis Settings

- There are two methods of disinfecting the internal dialysate pathways of the HD machine: heat and/or chemical.
- Chemical disinfection can be accomplished using a variety of solutions including sodium hypochlorite and peroxyacetic acid (compound comprised of peracetic acid and hydrogen peroxide).
- In setting where dialysis may not be performed on a daily basis, inactive machines must be chemically disinfected prior to patient use.

5.17.4 Monitoring Dialysis Machine Disinfection

- The effectiveness of disinfection for the internal pathways of the dialysis machine can be validated by routine bacteriologic and endotoxin analysis. Testing of HD machine dialysate and reverse osmosis (RO) water (a central system) for bacteria and endotoxin assay are required at least monthly.

5.17.5 Auxiliary Equipment

- All disposable equipment is to be used for only one patient and then must be discarded.
- Auxiliary equipment in an HD setting can include: equipment for acid concentrate, equipment for sodium bicarbonate concentrate, and the transducer protector (disposable).

A. Acid concentrate and sodium bicarbonate concentrate
- It can be delivered to the dialysis machine via a distribution loop similar to the RO water loop.
- Acid, because of its high salt concentration and low pH, is not conducive to bacterial growth and therefore this system would not require routine bacterial control strategies.
- Sodium bicarbonate can support bacterial growth, and this system (which includes the mixing tank, distribution tank, pipe loop, and outlet connectors) must be disinfected at least weekly, using the same process as that used for the RO loop.

B. Transducers
- Internal transducer filters do not need to be changed routinely between patients.
- External transducer protectors need to be changed after each dialysis session.
- During the dialysis session, if the external transducer protector filter becomes wet with blood or fluid, it must be replaced immediately and the transducer inspected.
- If blood or fluid is visible on the side of the filter that connects to the machine, inspection of the internal hardware of the dialysis machine must be performed prior to use on subsequent patients.
- The external and internal hardware should be inspected for blood or fluid intrusion. If the equipment has been contaminated with either blood or fluid, the internal lines and filter must be replaced and the external machine connector port disinfected with an intermediate-level disinfectant such as 1:100 sodium hypochlorite solution.

Recommended Practices for Prevention and Control of Infections in Dialysis Settings

5.17.6 Reprocessing and Reuse of Hemodialyzer

- Single use dialyzers are recommended.

- Multi use dialyzers for the same patient can be approved provided that instructions for cleaning, rinsing, disinfecting, and testing the dialyzer as well as instructions for preparation before use (priming) are available.

5.18 Water Treatment and Testing

- The total viable microbial count of dialysate should be lower than 100 CFU/mL.

- The action level for dialysate bacteria is 50 CFU/mL.

- The endotoxin concentration dialysate should be lower than 0.25 endotoxin unit (EU)/mL.

- The action level for dialysate endotoxin is 0.125 endotoxin unit (EU)/mL.

Table 4: Testing requirements and interpretation of results for renal dialysis fluid and water used for the preparation of dialysis fluid

	Hazard/Hygiene Indicator	Frequency of Testing	Result	Interpretation	Action
Dialysis Fluid and Water used for the preparation	Aerobic Colony Count	Monthly (or more frequently if necessary)	>100 / ml	Unsatisfactory	Take out of use until corrective action implemented
			>50 ≤100/ml	Borderline	Investigate cause and put corrective action in place
			0 ≤50 / ml	Satisfactory	N/A
	Endotoxin /ml		>0.25 EU/ml	Unsatisfactory	Take out of use until corrective action implemented
			>0.125 - ≤0.25 EU/ml	Borderline	Investigate cause and put corrective action in place
			<0.125EU/ml	Satisfactory	N/A
Ultra Pure Fluid and Water used for the preparation	Aerobic Colony Count	Monthly (or more frequently if necessary)	≥10 in 100 ml	Unsatisfactory	Investigate cause and put corrective action in place
			<10 in 100 ml	Satisfactory	N/A
	Endotoxin /ml		>0.03 IU/ml	Unsatisfactory	Investigate cause and put corrective action in place
			≤0.03 IU/ml	Satisfactory	N/A

5.19 Dialysis Audit and Checklists Tools

- The audit tools and checklists are intended to promote recommended practices for infection prevention in dialysis settings.

Recommended Practices for Prevention and Control of Infections in Dialysis Settings

- The audit tools and checklists can be used by individuals when assessing HCWs practices and can be used by facility staff themselves to help guide their practices.

5.19.1 Dialysis Audit Tools

- The following dialysis audit tools shall be targeting all functioning dialysis facilities with the requested minimum number for each audit tool.

Table (5): Frequency of Dialysis Audit Tools

Audit tool	Number/month/facility
1. Hand hygiene observation	30
2. Catheter connection and disconnection	10
3. Catheter exit site care	5
4. Arteriovenous fistula and graft cannulation	10
5. Injectable medication preparation	5
6. Injectable medication administration	5
7. Routine disinfection of dialysis station	10

- The dialysis audit tools should be performed by well trained senior nurses.
- The infection control office in each hospital is responsible to analyze the data and submit feedback to the unit on a monthly basis.
- An annual report based on all these observation should be issued from the infection control office regarding the actions and procedures.
- The dialysis station routine disinfection observation will be performed by the infection control nurses.
- The infection control nurses will observe the hand hygiene compliance using the WHO compliance format.
- See Appendix 9A , B ,C ,D ,E ,F ,G and H.

5.19.2 Dialysis Checklists

- The following checklists will be used:

1. Haemodialysis catheter connection
2. Haemodialysis catheter disconnection
3. Haemodialysis catheter exit site care
4. Arteriovenous fistula/ graft decannulation
5. Arteriovenous fistula/ graft cannulation
6. Dialysis injectable medication preparation

Recommended Practices for Prevention and Control of Infections in Dialysis Settings

7. Dialysis injectable medication administration

- All the previous checklists will be used for every patient undergoing dialysis.
- The assigned nurse to every patient will fill up the checklists and attach it to the patient's chart.
- The infection control nurse will check on the filled checklist regularly minimum once a week to evaluate the dialysis nurses compliance and adherence to all the infection control instructions in the checklists.
- See appendix 5.

Recommended Practices for Prevention and Control of Infections in Dialysis Settings

6.   References

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Recommended Practices for Prevention and Control of Infections in Dialysis Settings

Appendix (1) Core Interventions for Dialysis Bloodstream Infection (BSI) Prevention

1. Surveillance and feedback using KNHSS
Conduct monthly surveillance for BSIs and other dialysis events using Kuwait National Healthcare- associated Infections Surveillance System (KNHSS). Calculate facility rates and compare to rates in other facilities. Actively share results with front-line clinical staff.

2. Hand hygiene observations
Perform observations of hand hygiene opportunities monthly and share results with clinical staff.

3. Catheter/vascular access care observations
Perform observations of vascular access care and catheter accessing quarterly. Assess staff adherence to aseptic technique when connecting and disconnecting catheters and during dressing changes. Share results with clinical staff.

4. Staff education and competency
Train staff on infection control topics, including access care and aseptic technique. Perform competency evaluation for skills such as catheter care and accessing every 6-12 months and upon hire.

5. Patient education/engagement
Provide standardized education to all patients on infection prevention topics including vascular access care, hand hygiene, risks related to catheter use, recognizing signs of infection, and instructions for access management when away from the dialysis unit.

6. Catheter reduction
Incorporate efforts (e.g., through patient education, vascular access coordinator) to reduce catheters. By identifying and addressing barriers to permanent vascular access placement and catheter removal.

7. Chlorhexidine for skin antisepsis
Use an alcohol-based chlorhexidine (>0.5%) solution as the first line skin antiseptic agent for central line insertion and during dressing changes.*

8. Catheter hub disinfection
Scrub catheter hubs with an appropriate antiseptic after cap is removed and before accessing. Perform every time catheter is accessed or disconnected.**

9. Antimicrobial ointment
Apply antibiotic ointment or povidone-iodine ointment to catheter exit sites during dressing change.***

* Povidone-iodine (preferably with alcohol) or 70% alcohol are alternatives for patients with chlorhexidine intolerance.
** If closed needleless connector device is used, disinfect device per manufacturer's instructions.
*** See information on selecting an antimicrobial ointment for haemodialysis catheter exit sites on CDC's Dialysis Safety website (http://www.cdc.gov/dialysis/prevention-tools/core-interventions.html#sites). Use of chlorhexidine-impregnated sponge dressing might be an alternative.

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Appendix (2) Six Tips to Prevent Dialysis Infections

Patients with Fistulas or Grafts

6 TIPS to prevent Dialysis Infections

U.S. Department of Health and Human Services
Centers for Disease Control and Prevention

www.cdc.gov/ckd   www.cdc.gov/dialysis/patient

TIP 1 Take care of your dialysis access site at home. Avoid scratching or picking it.

TIP 2 Wash your hands often, especially before and after dialysis treatment.

TIP 3 Wash or cleanse your dialysis access site prior to treatment.

TIP 4 Know the steps your healthcare providers should take when using your dialysis access for treatment.

TIP 5 Know the signs and symptoms of infection and what to do if you think you might have an infection.

TIP 6 Know what to do if you have any problem with your dialysis access site.

Patients with Catheters

6 TIPS to prevent Dialysis Infections

U.S. Department of Health and Human Services
Centers for Disease Control and Prevention

www.cdc.gov/ckd   www.cdc.gov/dialysis/patient

TIP 1 Catheters have a higher risk of infection. Ask your doctor about getting a fistula or graft instead.

TIP 2 Learn how to take care of the catheter at home. Do not get it wet.

TIP 3 Wash your hands often, especially before and after dialysis treatment.

TIP 4 Know the steps your healthcare providers should take when using the catheter for treatment.

TIP 5 Know the signs and symptoms of infection and what to do if you think you might have an infection.

TIP 6 Know what to do if you have any problem with the catheter.

Recommended Practices for Prevention and Control of Infections in Dialysis Settings

Appendix (3) Peritoneal Dialysis Access Care At Home Setting

- The patient's and/or carer's hands must be washed and dried (with a clean towel) completely before initiating the exchange.
- The location for exchanges must be clean, with avoidance of animal hair, dust-laden air, and fans.
- Personal hygiene products including towels, soap and dressing materials, should not be shared between patients and household contacts/family members.
- Tub baths are not recommended for patients with PD catheters.
- Refilling liquid soap/transferring liquid soap between containers should be avoided.
- Bar soap should not be used.
- All PD patients must be taught what contamination is and the proper response to contamination (e.g. presentation to dialysis unit for review if the tubing is contaminated).

Recommended Practices for Prevention and Control of Infections in Dialysis Settings

Appendix (4) Bathing Instructions Prior to Surgery

- If you are going to wash your hair, wash as usual with your normal shampoo. Rinse your hair and body thoroughly afterward to remove the residue.
- Do not shave the area of your body where your surgery will be performed. Any new cut, abrasion or rash on surgical extremity will need to be evaluated and may cause a delay in your procedure.
- Turn water off before applying CHG soap to prevent rinsing it off too soon. Apply the soap to your entire body from the jaw down, using a clean washcloth or your hands.
- Do not use CHG near your eyes, ears, nose or mouth. Wash thoroughly for five minutes, paying special attention to the area where your surgery will be performed. Do not scrub your skin too hard. Do not wash with your regular soap after using CHG. Turn the water back on and rinse your body well.
- Pat yourself dry with a fresh, clean, soft towel after each shower. Put on clean clothes or pajamas. Use freshly laundered bed linens for the first night.
- Do not apply any lotions, perfumes, or powders after use.

Recommended Practices for Prevention and Control of Infections in Dialysis Settings

Appendix (5) Dialysis Checklists and instructions

Dialysis checklist instructions:

- The following checklist will be used for every patient undergoing dialysis.
- All checklist compliance will be supervised by the senior staff.
- The assigned nurse to every patient will fill up the checklists and attach it to the patient's chart.
- The infection control nurse will check on the filled checklist regularly minimum once a week to evaluate the dialysis nurses compliance and adherence to all the infection control instructions in the checklists.

Checklist: Haemodialysis catheter connection	
	1. Wear mask (if required)
	2. Perform hand hygiene
	3. Put on new, clean gloves
	4. Clamp the catheter and remove caps
	5. Scrub catheter hub with antiseptic
	6. Allow hub antiseptic to dry
	7. Connect catheter to blood lines aseptically
	8. Remove gloves
	9. Perform hand hygiene

Checklist: Haemodialysis catheter disconnection	
	1. Wear mask (if required)
	2. Perform hand hygiene
	3. Put on new, clean gloves
	4. Clamp the catheter
	5. Disconnect catheter from blood lines
	6. Aseptically
	7. Scrub catheter hub with antiseptic
	8. Allow hub antiseptic to dry
	9. Attach new caps aseptically
	10. Remove gloves
	11. Perform hand hygiene

Checklist: Haemodialysis catheter exit site care	
	1. Wear mask (if required) and remove dressing
	2. Perform hand hygiene
	3. Put on new, clean gloves
	4. Apply skin antiseptic
	5. Allow skin antiseptic to dry
	6. Do not contact exit site (after antisepsis)
	7. Apply antimicrobial ointment
	8. Apply dressing aseptically
	9. Remove gloves
	10. Perform hand hygiene

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	Checklist: Arteriovenous fistula/ graft cannulation
	1. Clean site with soap and water
	2. Perform hand hygiene (staff)
	3. Put on new, clean gloves
	4. Apply skin antiseptic and allow it to dry
	5. Do not contact site (after antisepsis)
	6. Insert needles aseptically
	7. Connect to blood lines aseptically
	8. Remove gloves
	9. Perform hand hygiene

	Checklist: Arteriovenous fistula/ graft decannulation
	1. Perform hand hygiene (staff)
	2. Put on new, clean gloves
	3. Disconnect from blood lines aseptically
	4. Remove needles aseptically and activate
	5. needle retraction device
	6. Clean gloves worn (patient and/or staff)
	7. to compress site
	8. Apply clean gauze/bandage to site
	9. Remove gloves (staff and/or patient)
	10.Perform hand hygiene (staff and/or patient)

	Checklist: Dialysis injectable medication preparation
	1. Ensure medication preparation area is clean
	2. Inspect medication vial and discard if sterility is questionable
	3. Perform hand hygiene
	4. Prepare medication aseptically
	5. Disinfect rubber septum of vial with alcohol
	6. Withdraw medication using a new needle and new syringe
	7. Connect to blood lines aseptically
	8. Remove gloves
	9. Discard single dose vials and store multidose vials appropriately

	Checklist: Dialysis injectable medication administration
	1. Perform hand hygiene
	2. Put on new, clean gloves
	3. Scrub injection port with antiseptic
	4. Attach syringe and administer medication aseptically
	5. Discard syringe
	6. Remove gloves
	7. Perform hand hygiene

Recommended Practices for Prevention and Control of Infections in Dialysis Settings

Appendix (6) Haemodialysis Central Venous Catheter Scrub-the-Hub Protocol

Catheter Connection Steps	Catheter Disconnection Steps
1. Perform hand hygiene and don new clean gloves.	1. Perform hand hygiene and don new clean gloves.
2. Clamp the catheter. Always clamp the catheter before removing the cap. Never leave an uncapped catheter unattended).	2. Clamp the catheter. Always clamp the catheter before removing the cap. Never leave an uncapped catheter unattended).
3. Disinfect the hub with caps removed using an appropriate antiseptic a. (*Optional*) Prior to cap removal, disinfect the caps and the part of the hub that is accessible and discard the antiseptic pad (i.e., use a separate antiseptic pad for the next step). b. Remove the caps and disinfect the hub with a new antiseptic pad for each hub. Scrub the sides (threads) and end of the hub thoroughly with friction, making sure to remove any residue (e.g., blood). c. Using the same antiseptic pad, apply antiseptic with friction to the catheter, moving from the hub at least several centimeters towards the body. Hold the limb while allowing the antiseptic to dry. 4. d. Use a separate antiseptic pad for each hub/ catheter limb. Leave hubs "open" (i.e., uncapped and disconnected) for the shortest time possible.	3. Disinfect the catheter hub before applying the new cap using an appropriate antiseptic (*see notes*). a. (*Optional*) Disinfect the connection prior to disconnection. If this is done, use a separate antiseptic pad for the subsequent disinfection of the hub. b. Disconnect the blood line from the catheter and disinfect the hub with a new antiseptic pad. Scrub the sides (threads) and end of the hub thoroughly with friction, making sure to remove any residue (e.g., blood). 4. c. Use a separate antiseptic pad for each hub. Leave hubs "open" (i.e., uncapped and disconnected) for the shortest time possible.
5. Always handle the catheter hubs aseptically. Once disinfected, do not allow the catheter hubs to touch nonsterile surfaces.	5. Always handle the catheter hubs aseptically. Once disinfected, do not allow the catheter hubs to touch nonsterile surfaces. Hold the catheter until the antiseptic has dried.
6. Attach sterile syringe, unclamp the catheter, withdraw blood, and flush per facility protocol.	6. Attach the new sterile caps to the catheter aseptically. Use caution if tape is used to secure caps to the catheter.
7. Repeat for other limb (this might occur in parallel).	7. Ensure that catheter is still clamped.
8. Connect the ends of the blood lines to the catheter aseptically.	8. Remove gloves and perform hand hygiene.
9. Remove gloves and perform hand hygiene.	

Recommended Practices for Prevention and Control of Infections in Dialysis Settings

Antiseptic Use and Selection

Prior to accessing the catheter hub it should be disinfected with an appropriate antiseptic (greater than 0.5% chlorhexidine with alcohol, 70% alcohol, or 10% povidone-iodine). Generally, antiseptics should be allowed to dry for maximal effect.

If using 70% alcohol, sterile antiseptic pads should be used. For practical reasons, pads might be preferred over other forms (e.g., swabsticks) as they are malleable and allow for vigorous cleaning of small spaces.

If using an antiseptic that leaves residue(e.g., CHG), avoid allowing large amounts of antiseptic to enter the lumen of the catheter to avoid potential toxicity. Remove all blood residues to maximize the effect of the antiseptic.

Handling Catheter Hubs

Catheter hubs should always be handled aseptically. Once disinfected, the catheter hubs should not be allowed to touch nonsterile surfaces. This might be performed by holding them until antiseptic dries. During this time, HCWs should ensure that the catheter remains clamped. When disinfecting catheter hubs, clean, nonsterile gloves can be used if aseptic technique is maintained.

Bloodline Disinfection

When accessing the line, disinfecting the ends of sterile blood lines is not required if care has been taken not to contaminate the ends of the blood lines (i.e., through careful aseptic technique). Blood lines can become contaminated during connections and disconnections, as well as during the priming process. Contact with contaminated prime waste or through backflow from waste handling ports must be avoided.

Disconnection and Line Reversals

Catheter hubs should be disinfected again after disconnecting from bloodlines and before replacing a new cap at the end of a treatment. This should be done in a manner similar to that used when disinfecting the hub prior to accessing. Disinfecting the catheter hub and the end of the extracorporeal blood line should also be performed if, during a treatment, a patient must be disconnected and their blood is re-circulated. Anytime a patient's circuit is disconnected this should be done aseptically and the number of times a patient's catheter is disconnected from the blood lines should be minimized to the extent possible.

Securing Caps with Tape

Caution should be used if taping caps on to hubs between treatments. Tape can leave residue on the hubs that might make disinfecting them more difficult.

Aseptic Technique

This includes practices that prevent the contamination of clean/sterile items, surfaces and gloves when touching dirty surfaces (e.g., positioning patient, using computer keyboard).

Personal Protective Equipment (PPE)

Proper PPE including masks should always be worn by staff to avoid exposure to potentially infectious blood and body fluids when connecting/disconnecting catheters.

Recommended Practices for Prevention and Control of Infections in Dialysis Settings

Appendix (7) MDRO screening protocol

Screening Frequency	Screening Site	Screening Method
***Staphylococcus aureus* including MRSA**		
Before or on admission or readmission to the dialysis service/program or the first dialysis treatment This should include patients transferring from another unit/service (including those dialysed outside the country). Re-test regularly, e.g. six-monthly intervals	Anterior nares (nostrils) The collection of specimens from other sites (e.g. groin, throat, wounds), has been shown to improve sensitivity, and should be considered in consultation with microbiology/ infectious diseases staff	Use dry swabs or moisten the swab with sterile normal saline, and insert into one nostril 1-2 cm and gently rotate swab on all surfaces of the anterior (or forward), internal part of the nasal mucosa for about 3 seconds and remove. Using the same swab, repeat the procedure in the other nostril. Be careful not to touch the external areas of the nose with the swab.
Vancomycin Resistant Enterococci (VRE)		
Before or on admission or readmission to the dialysis service/program or the first dialysis treatment. Re-screen every three months	Stool specimens, rectal or perianal swabs.	To obtain a rectal swab, use dry swabs or moisten the swab with sterile normal saline, and insert into the rectum approximately 2.5cm, gently rotate against bowel wall, remove and place in transport medium. If the patient has a faecal ostomy obtain swab from the stoma. If the patient refuses a rectal swab collect a stool specimen.
ESBL-producing gram-negative bacteria		
As for MRSA	Groin, perirectal or rectal swab	To collect a groin swab, use a dry swab or moisten the swab with sterile normal saline, and roll or rub the tip over the skin in the groin area. Using the same swab, repeat the procedure on the other groin. If collecting a rectal swab, refer to VRE section. To obtain a perirectal swab, use a dry swab or moisten the swab with sterile normal saline, and swab around anus, do not insert swab.
Carbapenem Resistant Acinetobacter (CRAB)		
As for MRSA	Groin, perirectal or rectal swab	If collecting a groin or perirectal swab, refer to ESBL-producing gram-negative bacteria section. If collecting a rectal swab, refer to VRE section.

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Appendix (8) Cleaning Spills of Blood and Body Fluids

Procedures for dealing with small spillages eg, splashes and droplets (<10 ml)
1. Gloves and a plastic apron must be worn
2. The area should be wiped thoroughly using disposable paper roll / towels.
3. The areas should be cleaned using a neutral detergent and warm water.
4. Recommended concentration of sodium hypochlorite in a concentration of 525-615 ppm chlorine to decontaminate surfaces.
5. Used the gloves, apron / towels should be dispose in to yellow waste bag.
6. Wash hands.

Procedure for dealing with large spills (>10 ml):
- Large blood spills in a 'wet' area e.g. a bathroom or toilet area:
1. Where large spills have occurred in a 'wet' area, such as a bathroom or toilet area, the spill should be carefully washed off into the sewerage system using copious amounts of water and the area flushed with warm water and detergent.
2. The area must then be disinfected using a chlorine releasing agent. Use a 1:100 dilution (e.g., 1:100 dilution of a 5.25-6.15% sodium hypochlorite provides 525-615 ppm available chlorine)

- Large blood spills in 'dry' areas (such as clinical areas)
1. Where possible, isolate spill area
2. Where a spillage of potentially infectious material has occurred the area must be vacated for at least 30 minutes for aerosol particles to be dispersed.
3. Wear protective equipment like disposable cleaning gloves, eyewear, mask and plastic apron
4. Cover the spill with paper towels or absorbent granules, depending on the size of the spill, to absorb the bulk of the blood or body fluid/substance. Use disposable (for example, cardboard) scraper and pan to scoop up absorbent, paper towel and any unabsorbed blood or body substances
5. Place all contaminated items into yellow plastic bag or in sharp container for disposal .
6. Pour 5,000 ppm chlorine solution and allow 10 minutes to react then wipe up making sure that you don't allow it to come into contact with your skin or clothing and discard in biohazard waste.
7. Decontaminated areas should then be cleaned thoroughly with warm water and neutral detergent
8. Follow this decontamination process with a terminal disinfection. Use a 1:100 dilution (525–615 ppm available chlorine)
9. Discard contaminated materials (absorbent toweling, cleaning cloths, disposable gloves and plastic apron).
10. Wash hands
11. Clean and disinfect bucket and mop. Dry and store appropriately

Procedure for dealing with spilled Urine, feces, sputum and vomit:
1. Single use gloves and a plastic apron must be worn.
2. The spillage should be covered with disposable paper towel to absorb the spilled material. These should then be gathered up and placed in a yellow waste bag. The area must then be cleaned thoroughly using detergent and hot water and dried.
3. The area must then be disinfected using a chlorine releasing agent. Use a 1:100 dilution (e.g., 1:100 dilution of a 5.25-6.15% sodium hypochlorite provides 525-615 ppm available chlorine)
4. Protective clothing and paper must be discarded into the yellow waste bag.
5. Wash hands.
N.B.
   – **Urine and vomit spillages:** Chlorine releasing agents must never be poured directly onto urine or vomit as this causes chlorine gas to be released.
   – **Dilution of the chlorine releasing agent** should be according to the manufacturer instruction to get the recommended concentrations**.**

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Appendix (9) Dialysis Audit Tools- Instructions

Dialysis audit tools instructions:
- The following dialysis audit tools shall be targeting all functioning dialysis facilities with the requested minimum number for each audit tool.

Audit tool	Number/month/facility
Hand hygiene observation	30
Catheter connection and disconnection	10
Catheter exit site care	5
Arteriovenous fistula and graft cannulation	10
Injectable medication preparation	5
Injectable medication administration	5
Routine disinfection of dialysis station	10

- The dialysis audit tools should be performed by well trained senior nurses.
- The audit tools will be rotatory between the male ward, female ward and pediatric ward all through the year to ensure equity.
- The nurses in charge of each audit tool should ensure that his/her observation covered all shifts and alternating groups of dialysis patients.
- The head nurse of the ward is responsible to submit the audit tools not after the first week of the following month.
- The infection control office in each hospital is responsible to analyze the data and submit feedback to the unit on a monthly basis.
- All applicable actions within a row must have "√" for the procedure to be counted as successful.
- Any observed missed/inaccurate action of the tool should be corrected on the spot, however the documentation in the audit should not be modified.
- Percentage calculation of each action in each audit tool will be done by dividing the number of total proper actions performed over the total opportunity. (Calculation by column).
- Percentage calculation of each procedure in each audit tool will be done by dividing the number of total proper procedures performed over the total opportunity. (Calculation by row).
- An annual report based on all these observation should be issued from the infection control office regarding the actions and procedures.
- The dialysis station routine disinfection observation will be performed by the infection control nurses.
- The dialysis station routine disinfection observation is applied when there is no visible soil on surfaces at the dialysis station. If visible blood or other soil is present, surfaces must be cleaned prior to disinfection.
- The infection control nurses will observe the hand hygiene compliance using the WHO compliance format.
- The hand hygiene opportunities in dialysis setting are described as follow:

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Hand hygiene opportunity category	Specific examples
1. Before touching a patient	- Prior to entering station to provide care to patient - Prior to contact with vascular access site - Prior to adjusting or removing cannulation needles
2. Before clean/aseptic procedures	- Prior to cannulation or accessing catheter - Prior to performing catheter site care - Prior to parenteral medication preparation - Prior to administering IV medications or infusions
3. After body fluid exposure risk	- After exposure to any blood or body fluids - After contact with other contaminated fluids (e.g., spent dialysate) - After handling used dialyzers, blood tubing, or prime buckets - After performing wound care or dressing changes
4. After touching a patient	- When leaving station after performing patient care - After removing gloves
5. After touching patient surroundings	- After touching dialysis machine - After touching other items within dialysis station - After using chairside computers for charting - When leaving station - After removing gloves

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Appendix 9.A   **Audit of Catheter Connection and Disconnection**

Facility name: Date (MM/YYYY):

Location within Unit: Observer:

(Use a "√" if action performed correctly, a "**X**" if not performed. If not observed, leave blank)

Date	Shift	Duration	Procedure observed, C=connect D=disconnect	Discipline	Mask worn properly (if required)	Hand Hygiene Performed	New, Clean gloves worn	Catheter removed from blood line aseptically (disconnection only)	Catheter hub scrubbed*	Hub antiseptic allowed to dry	Catheter connected to blood lines aseptically (connection only)	New caps attached aseptically (after disconnecting)	Gloves removed	Hand hygiene performed	Comments	Feedback given
		Total														

Discipline: **P**=physician, **N**=nurse, **T**=technician, **S**=student, **O**=other   Duration of observation period =   minutes

Number of procedures performed correctly =   Total number of procedures observed during audit =

*If using 70% alcohol, sterile antiseptic pads should be used. If using chlorhexidine, removing all blood residue is particularly important to maximize the effect of the antiseptic and avoid allowing large amounts of antiseptic to enter the lumen of the catheter to avoid potential toxicities to the patient.

ADDITIONAL COMMENTS/OBSERVATIONS:

Recommended Practices for Prevention and Control of Infections in Dialysis Settings

Appendix 9.B   **Audit of Catheter Exit Site Care**

Facility name: Date (MM/YYYY):

Location within Unit: Observer:

(Use a "√" if action performed correctly, a "**X**" if not performed. If not observed, leave blank)

Date	Shift	Duration	Discipline	Mask worn properly (if required)	Hand Hygiene Performed	New, Clean gloves worn	Skin antisepsis applied appropriately	Skin antisepsis allowed to dry	No contact with exit site (after antisepsis)	Antimicrobial ointment applied	Dressing applied aseptically	Gloves removed	Hand hygiene performed	Comments	Feedback given
	Total														

Discipline: **P**=physician, **N**=nurse, **T**=technician, **S**=student, **O**=other   Duration of observation period =   minutes

Number of procedures performed correctly =   Total number of procedures observed during audit =

ADDITIONAL COMMENTS/OBSERVATIONS:

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Appendix 9.C　　　　　　　　**Audit of Arteriovenous Fistula/Graft Cannulation**

Facility name:　　　　　　　　　　　　　　　　　　　Date (MM/YYYY):
Location within Unit:　　　　　　　　　　　　　　　　Observer:
(Use a "√" if action performed correctly, a "**X**" if not performed. If not observed, leave blank)

Date	Shift	Duration	Discipline	Site cleaned with soap and water	Hand Hygiene Performed (Staff)	New, Clean gloves worn	Skin antiseptic applied appropriately	Skin antiseptic allowed to dry	No contact with fistula/ graft site (after antisepsis)	Cannulation performed aseptically	Connect to blood lines aseptically	Gloves removed	Hand hygiene performed	Comments	Feedback given
	Total														

Discipline: **P**=physician, **N**=nurse, **T**=technician, **S**=student, **O**=other　　　Duration of observation period = 　　　　minutes
Number of procedures performed correctly = 　　　　　　　　Total number of procedures observed during audit =
ADDITIONAL COMMENTS/OBSERVATIONS:

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Appendix 9.D   **Audit of Arteriovenous Fistula/Graft Decannulation**

Facility name: Date (MM/YYYY):
Location within Unit: Observer:
(Use a "√" if action performed correctly, a "**X**" if not performed. If not observed, leave blank)

Date	Shift	Duration	Discipline	Hand Hygiene Performed (Staff)	New, Clean gloves worn	Disconnect from blood line aseptically	Needles removed aseptically	Clean gloves worn by (patient/staff) to compress the site	Clean gauze/bandage applied to site	If other activities performed between needle removals, hand hygiene is performed and new, clean gloves are worn	Staff gloves removed	Staff hand hygiene performed	Patient gloves removed and hand hygiene performed (if applicable)	Comments	Feedback given
	Total														

Discipline: **P**=physician, **N**=nurse, **T**=technician, **S**=student, **O**=other   Duration of observation period =   minutes
Number of procedures performed correctly =   Total number of procedures observed during audit =
ADDITIONAL COMMENTS/OBSERVATIONS:

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Appendix 9.E   **Audit of Dialysis Injectable Medication Preparation**

Facility name: Date (MM/YYYY):
Location within Unit: Observer:
(Use a "√" if action performed correctly, a "**X**" if not performed. If not observed, leave blank)

Date	Shift	Duration	Discipline	Medication preparation done in designated area	Medication preparation area is clean*	All vials are inspected**	Hand hygiene performed	Septum of all vials are disinfected	All vials entered with new needle and new syringe	Medication preparation done aseptically	New caps attached aseptically (after disconnecting)	All single dose vials discarded	All multidose vials discarded or stored properly	Comments	Feedback given
	Total														

Discipline: **P**=physician, **N**=nurse, **T**=technician, **S**=student, **O**=other   Duration of observation period =   minutes
Number of procedures performed correctly =   Total number of procedures observed during audit =
 *Preparation of injectable medications must be performed in a designated clean area that is free of obvious contamination sources (e.g., blood, body fluids, contaminated equipment, tap water).
**Vial should be discarded if sterility is questionable, or expiration date or beyond use date has been exceeded. If a multidose vial will not be immediately discarded after use, the vial should be labeled upon opening to indicate the beyond use date.

ADDITIONAL COMMENTS/OBSERVATIONS:

Recommended Practices for Prevention and Control of Infections in Dialysis Settings

Appendix 9.F   **Audit of Dialysis Injectable Medication Administration**

Facility name: Date (MM/YYYY):
Location within Unit: Observer:
(Use a "√" if action performed correctly, a "**X**" if not performed. If not observed, leave blank)

Date	Shift	Duration	Discipline	Medication properly transported to patient station*	Hand hygiene performed	Clean gloves worn	Injection port disinfected with antiseptic**	Medication administered aseptically	Syringe discarded at point of use	Gloves removed	Hand hygiene performed	Comments	Feedback given
		Total											

Discipline: **P**=physician, **N**=nurse, **T**=technician, **S**=student, **O**=other   Duration of observation period =   minutes
Number of procedures performed correctly =   Total number of procedures observed during audit =

* Medications should be transported directly from medication preparation area to individual patient. Medications should be prepared as close as possible to the time of medication administration. Medications that are not immediately administered by the person who prepared the medication must be labeled appropriately.
**Appropriate antiseptics are chlorhexidine, povidone iodine, tincture of iodine, and 70% alcohol.

ADDITIONAL COMMENTS/OBSERVATIONS:

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Appendix 9.G   **Audit of Dialysis Station Routine Disinfection**

Facility name: Date (MM/YYYY):
Location within Unit: Observer:

(Use a "√" if action performed correctly, a "**X**" if not performed. If not observed, leave blank)

Date	Shift	Duration	Discipline	All supplies removed from station and prime bucket emptied	Gloves removed, hand hygiene performed	Station is empty before disinfection initiated*	New clean gloves worn	Disinfectant applied to all surfaces and prime bucket**	All surfaces are wet with disinfectant	All surfaces allowed to dry	Gloves removed, hand hygiene performed	No supplies or patient brought to station until disinfection complete	Comment	Feedback given
	Total													

Discipline: **P**=physician, **N**=nurse, **T**=technician, **S**=student, **O**=other   Duration of observation period =   minutes
Number of procedures performed correctly =   Total number of procedures observed during audit =

* Ensure the patient has left the dialysis station before disinfection is initiated.

** Ensure that the disinfectant usage is per manufacturer guidelines

ADDITIONAL COMMENTS/OBSERVATIONS:

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Appendix 9.H   Audit of Hand Hygiene Compliance

Observation Form- Outpatient Setting

Hospital:		Date: (dd/mm/yy)	/ /	Start/End time: (hh:mm)	: /	Observer	
Departm ent:	☐ Internal medicine ☐ Surgery ☐ Mixed medical/surgical ☐ Obstetrics ☐ Paediatrics ☐ Physiotherapy ☐ Radiology ☐ Nuclear medicine ☐ Laboratory ☐ Other ambulatory care (specify) ………………….						

Prof.cat	Nurse		Prof.cat	Med doctor	Prof.cat	Auxilary	Prof.cat	Others
Total N°			Total N°		Total N°		Total N°	

Opp	Indication	HH Action	Opp	Indication	HH Action	Opp	Indication	HH Action	Opp	Indication	HH Action
1	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed	1	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed	1	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed	1	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed
2	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed	2	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed	2	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed	2	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed
3	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed	3	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed	3	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed	3	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed
4	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed	4	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed	4	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed	4	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed
5	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed	5	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed	5	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed	5	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed
6	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed	6	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed	6	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed	6	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed
7	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed	7	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed	7	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed	7	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed
8	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed	8	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed	8	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed	8	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ○ missed

HR: hand hygiene action by handrubbing with an alcohol-based formula
HW: hand hygiene action by handwashing with soap and water
Missed: no hand hygiene action performed
Prof.cat :   professional category (see instructions)
Opp(ortunity):   defined by one indication at least
Indication: bef.pat: before touching a patient---bef.asept: before clean/aseptic procedure---
                         aft.b.f: after body fluid exposure risk---aft.pat: after touching a patient---aft.p.surr:
                         after touching patient surroundings

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Hand Hygiene Observation Form – Compliance Calculation

Session	Prof.cat. Nurse			Prof.cat. Med doctor			Prof.cat. Auxiliary			Prof.cat. Others			Total per session		
	Opp (n)	HW (n)	HR (n)	Opp (n)	HW (n)	HR (n)	Opp (n)	HW (n)	HR (n)	Opp (n)	HW (n)	HR (n)	Opp (n)	HW (n)	HR (n)
1															
2															
3															
4															
5															
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14															
15															
16															
17															
18															
19															
20															
21															
22															
23															
Total															

Hospital: **Period:**   **Setting:**

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

Number of hand hygiene performed =
Total number of opportunities observed during audit =

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