State of Kuwait
Ministry of Health
Infection Control Directorate

DISINFECTION POLICY

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List of Abbreviations

AER	Automated endoscope reprocessor
EO	Ethylene oxide
EPA	Environmental Protection Agency
FDA	Food and drug administration
OPIM	Other potentially infectious materials
PPE	Personal Protective Equipment

DISINFECTION POLICY

AIM

The aim of this policy is to implement safe systems of work to protect patients and staff from the transmission of infection from medical equipment and devices, and to provide a guide for the use of disinfectants and cleaning agents required to decontaminate equipment and environment

INTRODUCTION

Any equipment used in the treatment, diagnosis and care of patients, or any article which comes into contact with patients and their bodily fluids may be contaminated by micro-organisms, therefore posing a risk of cross infection.
Effective decontamination of medical devices is essential in reducing the risk of cross infection. The whole process of decontamination should begin at purchasing and acquisition of health care equipment. It is essential to establish methods of decontamination at the earliest stage of acquisition. Suppliers have a responsibility to provide information on safe decontamination methods and chemical compatibility.

DEFINITION OF TERMS

Cleaning	The physical removal of dirt, grease and organic matter that reduces the number of micro-organisms present. It is an essential pre-requisite for any device prior to disinfection and/or sterilization.
Disinfection	The process of killing or removing pathogenic micro-organisms, except for bacterial spores and prions.
Sterilization	The process of rendering an article completely free from all living micro-organisms.
Antisepsis	The reduction of the number of living microorganisms on living tissue, by means of a chemical product, with the purpose of preventing infection of that tissue and/or underlying tissues.
Antiseptic	A chemical agent used to achieve antisepsis.
Chemical disinfection	Disinfection by means of a chemical product.
Preservatives	Chemical agents that can be added to a product to prevent decay.
Disinfectant	A chemical product which can be used for disinfection and which is at least capable of irreversibly inactivating vegetative bacteria within the prescribed preconditions.
Thermal disinfection	Disinfection by means of water at a temperature of 60 to 100°C or with steam.

METHODS OF DECONTAMINATION

All equipment must be adequately decontaminated between use and between patient uses. The method recommended will depend on the risk assessment and the item being used.(Table 1)

Table 1: Classification of risk of infection (Spaulding classification)

Class	Use	Instruments/Equipment	Reprocessing
Critical items	Enters body cavities, tissues and vascular system, in contact with break in the skin or mucous membranes.	Surgical instruments, needles, catheters (cardiac and urinary) and prosthetic implants, intra-uterine devices cardiac devices (e.g., heart valves)	cleaning followed by sterilization heat-based methods of sterilization (e.g., autoclave)laparoscopic or arthroscopic telescopes (optic portions of the endoscopic set) should be subjected to a sterilization procedure before each use; if this is not feasible, they should receive high-level disinfection. Heat stable accessories to the endoscopic set (e.g., trocars, operative instruments) should be sterilized by heat-based methods . Heat-sensitive objects can be treated with EO, hydrogen peroxide gas plasma; or if other methods are unsuitable, by liquid chemical sterilants.
Semicritical items	In contact with intact mucous membranes or non-intact skin.	• Endoscopes, cystoscopes , respiratory equipment including laryngoscope and blade, endotracheal, tracheosotomy tubes, oropharyngeal and nasal airways, thermometers, anorectal manometry catheters, and diaphragm fitting rings.	Cleaning followed by high-level disinfection or sterilization
Non-critical items	In contact with intact skin but not mucous membranes	**Non critical equipment:** Stethoscopes, blood pressure apparatus, bedpans, urinals, washing bowls ,toilets and linen. **Non-critical environmental surfaces** include: bed rails, some food utensils, bedside tables, patient furniture and floors	Decontamination, cleaning followed by low level disinfection

FACTORS AFFECTING THE EFFICACY OF DISINFECTION AND STERILIZATION

1-Number and Location of Microorganisms

Provided that all other conditions remain constant, the larger the number of microbes, the more time a germicide needs to destroy all of them. Reducing the number of microorganisms that must be inactivated through meticulous cleaning, increases the margin of safety when the germicide is used according to the labeling and shortens the exposure time required to kill the entire microbial load.

Medical instruments with multiple pieces must be disassembled and equipment such as endoscopes that have crevices, joints, and channels are more difficult to disinfect than are flat- surface equipment because penetration of the disinfectant of all parts of the equipment is more difficult. Only surfaces that directly contact the germicide will be disinfected, so there must be no air pockets and the equipment must be completely immersed for the entire exposure period.

2-Innate Resistance of Microorganisms

Microorganisms vary greatly in their resistance to chemical germicides and sterilization processes (Figure 1).

Figure 1. Decreasing order of resistance of microorganisms to disinfection and sterilization and the level of disinfection or sterilization.

Resistant	Level
Prions (Creutzfeldt-Jakob Disease)	Prion reprocessing
Bacterial spores (*Bacillus atrophaeus*)	Sterilization
Coccidia (*Cryptosporidium*)	
Mycobacteria (*M. tuberculosis, M. terrae*)	High
Nonlipid or small viruses (polio, coxsackie)	Intermediate
Fungi (*Aspergillus, Candida*)	
Vegetative bacteria (*S. aureus, P. aeruginosa*)	Low
Lipid or medium-sized viruses (HIV, herpes, hepatitis B)	

Modified from Russell and Favero (2001)

3-Concentration and Potency of Disinfectants

With other variables constant, and with some exception (iodophors), the more concentrated the disinfectant, the greater its efficacy and the shorter the time necessary to achieve microbial kill.

4-Physical and Chemical Factors

Several physical and chemical factors also influence disinfectant procedures: temperature, pH, relative humidity, and water hardness.

- The activity of most disinfectants increases as the temperature increases, but some exceptions exist. Furthermore, too great an increase in temperature causes the disinfectant to degrade and weakens its germicidal activity and thus might produce a potential health hazard.

- An increase in pH improves the antimicrobial activity of some disinfectants (e.g., glutaraldehyde, quaternary ammonium compounds) but decreases the antimicrobial activity of others (e.g., phenols, hypochlorites, and iodine). The pH influences the antimicrobial activity by altering the disinfectant molecule or the cell surface.

- Relative humidity is the single most important factor influencing the activity of gaseous disinfectants/sterilants, such as EO, chlorine dioxide, and formaldehyde.

- Water hardness (i.e., high concentration of divalent cations) reduces the rate of kill of certain disinfectants because divalent cations (e.g., magnesium, calcium) in the hard water interact with the disinfectant to form insoluble precipitates.

5-Organic and Inorganic Matter

Organic matter in the form of serum, blood, pus, or fecal or lubricant material and inorganic matter(salt crystals) can interfere with the antimicrobial activity of disinfectants This further emphasizes the importance of meticulous cleaning of medical devices before any sterilization or disinfection procedure because both organic and inorganic soils are easily removed by washing.

6-Duration of Exposure

Items must be exposed to the germicide for the appropriate minimum contact time. All lumens and channels of endoscopic instruments must contact the disinfectant. Air pockets interfere with the disinfection process, and items that float on the disinfectant will not be disinfected. The disinfectant must be introduced reliably into the internal channels of the device. In general, longer contact times are more effective than shorter contact times.

7-Biofilms

Biofilms are microbial communities that are tightly attached to surfaces and cannot be easly removed. Some enzymes and detergents can degrade biofilms or reduce numbers of viable bacteria within a biofilm, but no products are EPA-registered or FDA-cleared for this purpose.

DISINFECTION

There are three levels of disinfection: high, intermediate, and low.(Table 2)

- High-level disinfection kills all organisms, except high levels of bacterial spores, and is effected with a chemical germicide cleared for marketing as a sterilant by the Food and Drug Administration.
- Intermediate-level disinfection kills mycobacteria, most viruses, and bacteria with a chemical germicide registered as a "tuberculocide".
- Low-level disinfection kills some viruses and bacteria with a chemical germicide registered as a hospital disinfectant.

Many disinfectants are used alone or in combinations (e.g., hydrogen peroxide and peracetic acid) in the health-care setting. These include alcohols, chlorine and chlorine compounds, formaldehyde, glutaraldehyde, ortho-phthalaldehyde, hydrogen peroxide, iodophors, peracetic acid, phenolics, and quaternary ammonium compounds. Commercial formulations based on these chemicals are considered unique products and must be registered with local authority.

In healthcare settings, objects preferably are disinfected by wet pasteurization (thermal disinfection). Liquid chemicals are used only if heat treatment is impractical or may cause damage to the equipment.

Table 2: Levels of Germicidal Action

Efficacy against						
	Bacteria			**Fungi** [a]	**Viruses**	
Action Level	Vegetative Bacteria	Tubercle bacillus	Spores		Lipid and Medium Sizes	Nonlipid and Small
High	+ [b]	+	+ [c]	+	+	+
Intermediate	+	+	+ [d]	+	+	+ [e]
low	+	-	-	+/-	+	-

a- Includes asexual spores but not necessarily chlamydospores or sexual spores.
b- (+) Killing effect can be expected when the normal-use concentrations of chemical disinfectants or pasteurization are properly employed;
(-) little or no killing effect.
c-.Only with extended exposure times are high-level disinfectants capable of actual sterilization.
d Some intermediate-level disinfectants, e.g., iodophors, formaldehyde, tincture of iodine, and chlorine compounds, can be expected to exhibit some sporicidal action.
e- Some intermediate-level disinfectants, e.g., alcohols and phenolic compounds, may have limited virucidal activity.

Properties of an ideal disinfectant.

- Broad spectrum: should have a wide antimicrobial spectrum.
- Fast acting: should produce a rapid kill.
- Not affected by environmental factors: should b active in the presence of organic matter (e.g., blood, sputum, feces) and compatible with soaps, detergents, and other chemicals encountered in use.
- Nontoxic: should not be harmful to the user or patient
- Surface compatibility: should not corrode instruments and metallic surfaces and should not cause the deterioration of cloth, rubber, plastics, and other materials
- Residual effect on treated surfaces: should leave an antimicrobial film on the treated surface
- Easy to use with clear label directions
- Odorless: should have a pleasant odor or no odor to facilitate its routine use
- Economical: should not be prohibitively high in cost
- Solubility: should be soluble in water
- Stability: should be stable in concentrate and use-dilution
- Cleaner: should have good cleaning properties
- Environmentally friendly: should not damage the environment on disposal.

Microbial Contamination of Disinfectants

Institute the following control measures to reduce the occurrence of contaminated disinfectants:

- prepare the disinfectant correctly to achieve the manufacturer's recommended use-dilution
- prevent common sources of extrinsic contamination of germicides (e.g., container contamination or surface contamination of the healthcare environment where the germicide are prepared and/or used).

Table 3: Formulae for Preparation of Sodium Hypochlorite Solution :

Volume of Bleach	Volume of Water	Dilution Ratio	Sodium Hypochlorite (%)	Available Chlorine (mg/L)
Undiluted	0	1:1	5.25	52,500 ppm
1	9	1:10	0.5	5,000
1	99	1:100	0.05	500

Disinfectant solutions should be disposed of after use and a fresh solution prepared for each use.

Table 4: Disinfectants used for environment:

Disinfectant	Usage	Advantages	Disadvantages	Comments
Chlorine and chlorine compounds	**Low level disinfection: >100 ppm available chlorine** Disinfect environmental surfaces **Intermediate-level disinfectant:** ♦ For decontamination of small spills of blood (i.e < 10 ml) of potentially infectious materials on noncritical surfaces, the area can be disinfected with a 1:100 dilution of 5.25%-6.15% sodium hypochlorite (500 ppm) ♦ Effective disinfectant following large blood or potentially infectious materials spills: or a culture spill in the laboratory, use a 1:10 dilution (5000ppm) for the first application of hypochlorite solution before cleaning in order to reduce the risk of infection during the cleaning process ♦ Dichloroisocyanurate powder sprinkled directly on d spills for decontamination and subsequent cleanup	♦ Low cost ♦ Fast acting ♦ Readily available in non-hospital settings and easy to use. ♦ Unaffected by water hardness. ♦ Effective deodorizer and disinfectant. ♦ Does not leave toxic residues. ♦ Bactericidal activity increases with temperature ♦ has broad spectrum antimicrobial activities ♦ Remove dried or fixed organisms and biofilms from surfaces.	♦ Corrosive to metals in concentration > 5oo ppm ♦ Inactivated by organic matter (dirt, blood, excrements). ♦ Irritant to skin and mucous membranes. ♦ Unstable when diluted to usable state (1:10 dilution). ♦ Use in well ventilated areas. ♦ Shelf life shortens when diluted. ♦ Discolouring or bleaching of fabrics can occur. ♦ Requires pre-cleaning of surface prior to disinfection. ♦ Highly toxic when mixed with ammonia due to release of chlorine gas	♦ Use with extreme care if used for instrument disinfection because of corrosive activity. ♦ Wide range of in-use dilutions recommended for different situations therefore ensures dilution is correct for particular use and that it is made up correctly.

Disinfectant	Usage	Advantages	Disadvantages	Comments
Phenolics	• **Low-/intermediate-level disinfectant:** ♦ For floors, walls and furnishings. ♦ For hard surfaces and equipment that does not touch mucous membranes (e.g. IV poles, wheelchairs, beds, call bells)	♦ Leaves residual film on environmental surfaces. ♦ Commercially available with added detergents to provide one step cleaning and disinfecting	♦ Couldn't be used in nurseries. ♦ Not recommended for use on food contact surfaces. ♦ May be absorbed through skin or by rubber. ♦ Some synthetic flooring may become sticky with repetitive use.	♦ Relatively broad spectrum. ♦ Suitable for low-level environmental disinfection only. ♦ Useful against mycobacteria but cannot be used if HI or HBV are present
Quaternary ammonium compounds	• **Low-level disinfectant:** ♦ For floors, wall and furnishings	♦ Generally nonirritating to hands. ♦ Non-corrosive ♦ Usually have detergent properties.	♦ Limited use as disinfectant because of narrow microbicidal spectrum. ♦ Weak solutions can be easily contaminated by Gram negative bacteria	♦ DO NOT use to disinfect instruments.
Alcohols: Ethyl or isopropyl alcohol (70-90%)	♦ Intermediate-level ♦ disinfectant: ♦ Disinfect hard surfaces (not used for disinfection of large surfaces)	♦ Fast acting ♦ No residue ♦ Non-staining	♦ Volatile ♦ Evaporation may diminish concentration ♦ Inactivated by organic material ♦ May harden rubber or cause deterioration of glues	♦ Isoprophyl alcohol slightly more effective than ethyl alcohol. ♦ 70% alcohol more effective than 90%.

Justification for Use of Disinfectants for Noncritical Environmental Surfaces

- Surfaces may contribute to transmission of epidemiologically important microbes (e.g., vancomycin-resistant Enterococci, methicillin-resistant *S. aureus*, viruses).
- Disinfectants are needed for surfaces contaminated by blood and other potentially infective material.
- Disinfectants are more effective than detergents in reducing microbial load on floors.
- Detergents become contaminated and result in seeding the patient's environment with bacteria.
- Disinfection of noncritical equipment and surfaces is recommended for patients on isolation precautions .
- Advantage of using a single product for decontamination of noncritical surfaces, both floors and equipment.
- Some newer disinfectants have persistent antimicrobial activity.

Justification for Using a Detergent on Noncritical Environmental Surfaces

- Noncritical surfaces contribute minimally to endemic healthcare-associated infections
- No difference in healthcare-associated infection rates when floors are cleaned with detergent versus disinfectant
- No environmental impact (aquatic or earthly) issues with disposal
- No occupational health exposure issues
- Lower costs
- Use of antiseptics/disinfectants selects for antibiotic-resistant bacteria .
- More aesthetically pleasing floor

Do	Don't
Take care to measure your disinfectant correctly	Use a disinfectant for sterilization
Add the disinfectant to the right amount of water to make a solution of use	Add detergent to disinfectant ; this may inactivate both
Use clean ,dry container for the solution	Store instruments or cleaning tools in a disinfectant.
Wash away dirt, where you can before using the disinfectant	Top up solution
Remember that if the disinfectants are used carelessly they may grow microbes	Use two disinfectants together unless one of them is alcohol.
Check expiry date**s,** make up a fresh one when expiry time reached	Bring in your own disinfectant to the hospital
Give adequate time to disinfectant to work	Disinfect if cleaning is sufficient

Table 5: Disinfectants used for equipment:

Disinfectant	Usage	Advantages	Disadvantages
Alcohols: Ethyl or isopropyl alcohol (70-90%)	**Intermediate-level disinfectant:** ♦ used effectively to disinfect oral and rectal thermometers, hospital pagers , scissors , and stethoscopes . ♦ Alcohol towelettes used to disinfect small surfaces such as rubber stoppers of multiple-dose medication vials or vaccine bottles. alcohol occasionally is used to disinfect external surfaces of equipment e.g., stethoscopes, ventilators, manual ventilation bags, CPR manikins, ultrasound instruments) or medication preparation areas. ♦ Equipment used for home health care. ♦ Isoprophyl alcohol slightly more effective than ethyl alcohol. ♦ 70% alcohol more effective than 90%.	♦ Fast acting ♦ No residue ♦ Non-staining	♦ Volatile. Evaporation may diminish concentration ♦ Inactivated by organic material ♦ May harden rubber or cause deterioration of glues.

Disinfectant	Usage	Advantages	Disadvantages
Chlorines	**Intermediate-level disinfectant**: ♦ Disinfect hydrotherapy tanks, dialysis equipment, cardiopulmonary training manikins. ♦ Equipment used for home health care.	♦ Low cost ♦ Fast acting ♦ Readily available in non-hospital settings and easy to use. ♦ Unaffected by water hardness. ♦ Effective deodorizer and disinfectant. ♦ Does not leave toxic residues. ♦ Bactericidal activity increases with temperature ♦ Wide range of in-use dilutions recommended for different situations therefore ensures dilution is correct for particular use and that it is made up correctly (table3)	♦ Corrosive to metals. ♦ Inactivated by organic matter (dirt, blood, excrements). ♦ Irritant to skin and mucous membranes. ♦ Unstable when diluted to usable state (1:10 dilution). ♦ Use in well ventilated areas. ♦ Shelf life shortens when diluted. ♦ Discolouring or bleaching of fabrics can occur. ♦ Requires pre-cleaning of surface prior to disinfection. ♦ Highly toxic when mixed with ammonia. ♦ Use with extreme care if used for instrument disinfection because of corrosive activity

Disinfectant	Usage	Advantages	Disadvantages
Hydrogen Peroxide/ Peracetic Acid (7.35%/ 0.23%)	**High level disinfection** ♦ Disinfection of hemodializers ♦ Disinfection of endoscopes	♦ No activation required ♦ Odor or irritation not significant	♦ Materials compatibility concerns (lead, brass, copper, zinc) both cosmetic and functional ♦ Limited clinical experience ♦ Potential for eye and skin damage
Glutaraldehydes ≥2%	**high-level disinfection** ♦ For heat sensitive equipment. ♦ Most commonly used for endoscopes, respiratory therapy equipment and anaesthesia equipment. ♦ Effective against viruses, fungi and bacteria including *Mycobacterium tuberculosis*.	♦ Relatively inexpensive ♦ Excellent materials compatibility ♦ Non-corrosive to metal. ♦ Active in presence of organic material. ♦ Compatible with lensed instruments. ♦ Sterilization may be accomplished in 10 hours at 20-25 ºC	♦ Extremely irritating to skin and mucous membranes. ♦ Shelf life shortens when diluted (effective for 14–30 days depending on formulation). ♦ Monitor concentration in reusable solutions. ♦ Relatively slow mycobactericidal activity ♦ Coagulates blood and fixes tissue to surfaces so prior cleaning is essential. ♦ Allergic contact dermatitis ♦ Glutaraldehyde vapor monitoring recommended ♦ Toxic, therefore use under conditions that minimize exposure

Disinfectant	Usage	Advantages	Disadvantages
Hydrogen peroxide 7.5%	**high-level disinfectant:** • Effective for high level disinfection of flexible endoscopes • Foot care equipment • Disinfection of soft contact lenses •High concentrations used as chemisterilants in specially designed machines for decontamination of heat sensitive medical devices.	♦ No activation required ♦ May enhance removal of organic matter and organisms ♦ No disposal issues ♦ No odor or irritation issues ♦ Does not coagulate blood or fix tissues to surfaces ♦ Inactivates Cryptosporidium	♦ Material compatibility concerns (brass, zinc, copper, and nickel/silver plating) both cosmetic and functional ♦ Serious eye damage with contact
Ortho-phthalaldehyde **0.55 %**	**High level disinfection** <u>Endoscopes</u> -in an automated endoscope reprocessor with an FDA-cleared capability to maintain solution temperatures at 25ºC, the contact time for OPA is 5 minutes. -in manual 20ºC for 12 minutes.	♦ Fast acting high-level disinfectant ♦ No activation required ♦ Odor not significant ♦ Excellent materials compatibility claimed ♦ Does not coagulate blood or fix tissues to surfaces claimed	♦ Stains skin, mucous membranes, clothing, and environmental surfaces ♦ Repeated exposure may result in hypersensitivity in some patients with bladder cancer ♦ More expensive than glutaraldehyde ♦ Eye irritation with contact ♦ Slow sporicidal activity

Disinfectant	Usage	Advantages	Disadvantages
Peracetic Acid 0.2%	**High-level disinfectant or sterilant for heat sensitive equipment.** ♦ Higher concentrations used as chemisterilants in specially designed machines for decontamination of heat sensitive medical devices.	♦ Rapid sterilization cycle time (30-45 minutes) ♦ Low temperature (50-55oC) liquid immersion sterilization ♦ Environmental friendly by-products (acetic acid, O2, H20) ♦ Fully automated ♦ Single-use system eliminates need for concentration testing ♦ Standardized cycle ♦ May enhance removal of organic material and endotoxin ♦ No adverse health effects to operators under normal operating conditions ♦ Compatible with many materials and instruments ♦ Does not coagulate blood or fix tissues to surfaces ♦ Sterilant flows through scope facilitating salt, protein, and microbe removal ♦ Rapidly sporicidal ♦ Provides procedure standardization (constant dilution, perfusion of channel, temperatures, exposure)	♦ Potential material incompatibility (e.g., aluminum anodized coating becomes dull) ♦ Used for immersible instruments only ♦ Biological indicator may not be suitable for routine monitoring ♦ One scope or a small number of instruments can be processed in a cycle ♦ More expensive (endoscope repairs, operating costs, purchase costs) than high-level disinfection ♦ Serious eye and skin damage (concentrated solution) with contact ♦ Point-of-use system, no sterile storage

Table 6: Comparison of the characteristics of selected chemicals used as high-level disinfectants or chemical sterilants.

	HP (7.5%)	PA (0.2%)	Glut (≥2.0%)	OPA (0.55%)	HP/PA (7.35%/0.23%)
HLD Claim	30 m @ 20°C	NA	20-90 m @ 20°-25°C	12 m @ 20°C, 5 m @ 25°C in AER	15m @ 20°C
Sterilization Claim	6 h @ 20°	12m @ 50-56°C	10 h @ 20°-25°C	None	3 h @ 20°C
Activation	No	No	Yes (alkaline glut)	No	No
Reuse Life[1]	21d	Single use	14-30 d	14d	14d
Shelf Life Stability[2]	2 y	6 mo	2 y	2 y	2 y
Disposal Restrictions	None	None	Local[3]	Local[3]	None
Materials Compatibility	Good	Good	Excellent	Excellent	No data
Monitor MEC[4]	Yes (6%)	No	Yes (1.5% or higher)	Yes (0.3% OPA)	No
Safety	Serious eye damage (safety glasses)	Serious eye and skin damage (conc soln)[5]	Respiratory	Eye irritant, stains skin	Eye damage
Processing	Manual or automated	Automated	Manual or automated	Manual or automated	Manual
Organic material resistance	Yes	Yes	Yes	Yes	Yes
OSHA exposure limit	1 ppm TWA	None	None[6]	None	HP-1 ppm TWA
Cost profile (per cycle)[7]	+ (manual), ++ (automated)	+++++ (automated)	+ (manual), ++ (automated)	++ (manual)	++ (manual)

Modified from Rutala

Abbreviations: HLD=high-level disinfectant; HP=hydrogen peroxide; PA=peracetic acid; glut=glutaraldehyde; PA/HP=peracetic acid and hydrogen peroxide; OPA =ortho-phthalaldehyde (FDA cleared as a high-level disinfectant, included for comparison to other chemical agents used for high-level disinfection); m=minutes; h=hours; NA=not applicable; TWA=time-weighted average for a conventional 8-hour workday.

[1]number of days a product can be reused as determined by re-use protocol

[2]time a product can remain in storage (unused)

[3]no U.S. EPA regulations but some states and local authorities have additional restrictions

[4]MEC=minimum effective concentration is the lowest concentration of active ingredients at which the product is still effective

[5]Conc soln=concentrated solution

[6]The ceiling limit recommended by the American Conference of Governmental Industrial Hygienists is 0.05 ppm.

[7]per cycle cost profile considers cost of the processing solution (suggested list price to healthcare facilities in August 2001) and assumes maximum use life (e.g., 21 days for hydrogen peroxide, 14 days for glutaraldehyde), 5 reprocessing cycles per day, 1-gallon basin for manual processing, and 4-gallon tank for automated processing. + = least expensive; +++++ = most expensive

Recommended disinfectants approved in Kuwait Health Care Settings:

- Chlorine and Chlorine compounds
- Phenolics
- Alcohol (ethyl or isopropyl 70-90%)
- Peracetic acid (0.2%)
- Hydrogen peroxide/ peracetic acid (7.35 %/ 0.23%).
- Hydrogen peroxide (7.5%)
- Orthophthaldehyde(0.55%)

Disinfection of Endoscopes

Physicians use endoscopes to diagnose and treat numerous medical disorders. Even though endoscopes represent a valuable diagnostic and therapeutic tool in modern medicine and the incidence of infection associated with their use reportedly is very low (about 1 in 1.8 million procedures), more healthcare–associated outbreaks have been linked to contaminated endoscopes than to any other medical device. To prevent the spread of health-care–associated infections, all heat-sensitive endoscopes (e.g., gastrointestinal endoscopes, bronchoscopes, nasopharygoscopes) must be properly cleaned and, at a minimum, subjected to high-level disinfection after each use.

a. To detect damaged endoscopes, test each flexible endoscope for leaks as part of each reprocessing cycle. Remove from clinical use any instrument that fails the leak test, and repair this instrument

b. Immediately after use, meticulously clean the endoscope with an enzymatic cleaner that is compatible with the endoscope. Cleaning is necessary before both automated and manual disinfection

c. Disconnect and disassemble endoscopic components (e.g., suction valves) as completely as possible and completely immerse all components in the enzymatic cleaner. Steam sterilize these components if they are heat stable.

d. Flush and brush all accessible channels to remove all organic (e.g., blood, tissue) and other residue. Clean the external surfaces and accessories of the devices by using a soft cloth or sponge or brushes. Continue brushing until no debris appears on the brush.

e. Use cleaning brushes appropriate for the size of the endoscope channel or port (e.g., bristles should contact surfaces). Cleaning items (e.g., brushes, cloth) should be disposable or, if they are not disposable, they should be thoroughly cleaned and either high-level disinfected or sterilized after each use.

f. Discard enzymatic cleaners (or detergents) after each use because they are not microbicidal and, therefore, will not retard microbial growth.

g. Process endoscopes (e.g., arthroscopes, cystoscope, laparoscopes) that pass through normally sterile tissues using a sterilization procedure before each use; if this is not feasible, provide at least high-level disinfection. High-level disinfection of arthroscopes, laparoscopes, and cytoscopes should be followed by a sterile water rinse.

h. Phase out endoscopes that are critical items (e.g., arthroscopes, laparoscopes) but cannot be steam sterilized. Replace these endoscopes with steam sterilizable instruments when feasible..

i. Mechanically clean reusable accessories inserted into endoscopes (e.g., biopsy forceps or other cutting instruments) that break the mucosal barrier (e.g., ultrasonically clean biopsy forceps) and then sterilize these items between each patient.

j. Use ultrasonic cleaning of reusable endoscopic accessories to remove soil and organic material from hard-to-clean areas.

k. Process endoscopes and accessories that contact mucous membranes as semicritical items, and use at least high-level disinfection after use on each patient.

l. Use an FDA-cleared sterilant or high-level disinfectant for sterilization or high-level disinfection. After cleaning, use formulations containing glutaraldehyde, glutaraldehyde with phenol/phenate, ortho-phthalaldehyde, hydrogen peroxide, and both hydrogen peroxide and peracetic acid to achieve high-level disinfection followed by rinsing and drying

n. Extend exposure times beyond the minimum effective time for disinfecting semicritical patient-care equipment cautiously and conservatively because extended exposure to a high-level disinfectant is more likely to damage delicate and intricate instruments such as flexible endoscopes. The exposure times vary among the FDA-cleared high-level disinfectants

o. Regulations are to follow the FDA-cleared label claim for high-level disinfectants. The FDA-cleared labels for high-level disinfection with >2% glutaraldehyde at 25ºC range from 20-90 minutes, depending upon the product based on three tier testing which includes sporicidal tests, simulated use testing with mycobacterial and in-use testing..

p. Several scientific studies and professional organizations support the efficacy of >2% glutaraldehyde for 20 minutes at 20ºC; that efficacy assumes adequate cleaning prior to disinfection, whereas the FDA-cleared label claim incorporates an added margin of safety to accommodate possible lapses in cleaning practices.

q. When using FDA-cleared high-level disinfectants, use manufacturers' recommended exposure conditions. Certain products may require a shorter exposure time (e.g., 0.55% ortho-phthalaldehyde for 12 minutes at 20ºC, 7.35% hydrogen peroxide plus 0.23% peracetic acid for 15 minutes at 20ºC) than glutaraldehyde at room temperature because of their rapid inactivation of mycobacteria or reduced exposure time because of increased mycobactericidal activity at elevated temperature (e.g., 2.5% glutaraldehyde at 5 minutes at 35ºC).

r. Select a disinfectant or chemical sterilant that is compatible with the device that is being reprocessed. Avoid using reprocessing chemicals on an endoscope if the endoscope manufacturer warns against using these chemicals because of functional damage (with or without cosmetic damage).

s. Completely immerse the endoscope in the high-level disinfectant, and ensure all channels are perfused. As soon as is feasible, phase out non-immersible endoscopes.

t. After high-level disinfection, rinse endoscopes and flush channels with sterile water or filtered water, to prevent adverse effects on patients associated with disinfectant retained in the endoscope (e.g., disinfectant induced colitis). Follow this water rinse with a rinse with 70% - 90% ethyl or isopropyl alcohol.

u. After flushing all channels with alcohol, purge the channels using forced air to reduce the likelihood of contamination of the endoscope by waterborne pathogens and to facilitate drying.

v. Hang endoscopes in a vertical position to facilitate drying.

w. Store endoscopes in a manner that will protect them from damage or contamination.

x. Sterilize or high-level disinfect both the water bottle used to provide intraprocedural flush solution and its connecting tube at least once daily. After sterilizing or high-level disinfecting the water bottle, fill it with sterile water.

y. Maintain a log for each procedure and record the following: patient's name and medical record number (if available), procedure, date, endoscopist, system used to reprocess the endoscope (if more than one system could be used in the reprocessing area), and serial number or other identifier of the endoscope used.

z. Design facilities where endoscopes are used and disinfected to provide a safe environment for healthcare workers and patients. Use air-exchange equipment (e.g., the ventilation system, out-exhaust ducts) to minimize exposure of all persons to potentially toxic vapors (e.g,. glutaraldehyde vapor). Do not exceed the allowable limits of the vapor concentration of the chemical sterilant or high-level disinfectant .

- Routinely test the liquid sterilant/high-level disinfectant to ensure minimal effective concentration of the active ingredient. Check the solution each day of use (or more frequently) using the appropriate chemical indicator (e.g., glutaraldehyde chemical indicator to test minimal effective concentration of glutaraldehyde) and document the results of this testing. Discard the solution if the chemical indicator shows the concentration is less than the minimum effective concentration. Do not use the liquid sterilant/high-level disinfectant beyond the reuse-life recommended by the manufacturer (e.g., 14 days for ortho-phthalaldehyde).

- Provide personnel assigned to reprocess endoscopes with device-specific reprocessing instructions to ensure proper cleaning and high-level disinfection or sterilization. Require competency testing on a regular basis (e.g., beginning of employment, annually) of all personnel who reprocess endoscopes.

- Educate all personnel who use chemicals about the possible biologic, chemical, and environmental hazards of performing procedures that require disinfectants.

- Make PPE(e.g., gloves, gowns, eyewear, face mask or shields, respiratory protection devices) available and use these items appropriately to protect workers from exposure to both chemicals and microorganisms (e.g., HBV).

- If using an automated endoscope reprocessor (AER), place the endoscope in the reprocessor and attach all channel connectors according to the AER manufacturer's instructions to ensure exposure of all internal surfaces to the high-level disinfectant/chemical sterilant.

- If using an AER, ensure the endoscope can be effectively reprocessed in the AER. Also, ensure any required manual cleaning/disinfecting steps are performed (e.g., elevator wire channel of duodenoscopes might not be effectively disinfected by most AERs).

- Review the FDA advisories and the scientific literature for reports of deficiencies that can lead to infection because design flaws and improper operation and practices have compromised the effectiveness of AERs

- Develop protocols to ensure that users can readily identify an endoscope that has been properly processed and is ready for patient use

- Do not use the carrying case designed to transport clean and reprocessed endoscopes outside of the healthcare environment to store an endoscope or to transport the instrument within the healthcare environment.

- No recommendation is made about routinely performing microbiologic testing of either endoscopes or rinse water for quality assurance purposes.

- If environmental microbiologic testing is conducted, use standard microbiologic techniques.

- If a cluster of endoscopy-related infections occurs, investigate potential routes of transmission (e.g., person-to-person, common source) and reservoirs.

- Report outbreaks of endoscope-related infections to persons responsible for institutional infection control.

- No recommendation is made regarding the reprocessing of an endoscope again immediately before use if that endoscope has been processed after use according to the recommendations in this guideline.

- Compare the reprocessing instructions provided by both the endoscope's and the AER's manufacturer's instructions and resolve any conflicting recommendations

Processing Patient-Care Equipment Contaminated with Bloodborne Pathogens

Pathogens (HBV, Hepatitis C Virus, HIV), Antibiotic-Resistant Bacteria (e.g., Vancomycin-Resistant Enterococci, Methicillin-Resistant *Staphylococcus aureus*,

Multidrug Resistant Tuberculosis), or Emerging Pathogens (e.g., Cryptosporidium, *Helicobacter pylori, Escherichia coli* O157:H7, *Clostridium difficile, Mycobacterium tuberculosis*, Severe Acute Respiratory Syndrome Coronavirus), or Bioterrorist Agents

- Use standard sterilization and disinfection procedures for patient-care equipment (as recommended in this guideline), because these procedures are adequate to sterilize or disinfect instruments or devices contaminated with blood or other body fluids from persons infected with bloodborne pathogens or emerging pathogens, with the exception of prions. No changes in these procedures for cleaning, disinfecting, or sterilizing are necessary for removing bloodborne and emerging pathogens other than prions..

Management of Equipment and Surfaces in Dentistry

a. Dental instruments that penetrate soft tissue or bone (e.g., extraction forceps, scalpel blades, bone chisels, periodontal scalers, and surgical burs) are classified as critical and should be sterilized after each use or discarded. In addition, after each use, sterilize dental instruments that are not intended to penetrate oral soft tissue or bone (e.g., amalgam condensers, air-water syringes) but that might contact oral tissues and are heat-tolerant, although classified as semicritical. Clean and, at a minimum, high-level disinfect heat-sensitive semicritical items.
b. Noncritical clinical contact surfaces, such as uncovered operatory surfaces (e.g., countertops, switches, light handles), should be barrier-protected or disinfected between patients with an intermediate-disinfectant (i.e., registered hospital disinfectant with a tuberculocidal claim) or low-level disinfectant (i.e., registered hospital disinfectant with HIV and HBV claim).
c. Barrier protective coverings can be used for noncritical clinical contact surfaces that are touched frequently with gloved hands during the delivery of patient care, that are likely to become contaminated with blood or body substances, or that are difficult to clean. Change these coverings when they are visibly soiled, when they become damaged, and on a routine basis (e.g., between patients). Disinfect protected surfaces at the end of the day or if visibly soiled.

Disinfection by Healthcare Personnel in Ambulatory Care and Home Care
a. Follow the same classification scheme described above (i.e., that critical devices require sterilization, semicritical devices require high-level disinfection, and noncritical equipment equires low-level disinfection) in the ambulatory-care (outpatient medical/surgical facilities) setting because risk for infection in this setting is similar to that in the hospital setting
b. When performing care in the home, clean and disinfect reusable objects that touch mucous membranes (e.g., tracheostomy tubes) by immersing these objects in a 1:50 dilution of 5.25%-6.15% sodium hypochlorite (household bleach) (3 minutes), 70% isopropyl alcohol (5 minutes), or 3% hydrogen peroxide (30 minutes) because the home environment is, in most instances, safer than either hospital or ambulatory care settings because person-to-person transmission is less likely.
c. Clean noncritical items that would not be shared between patients (e.g., crutches, blood pressure cuffs) in the home setting with a detergent or commercial household disinfectant.

Recommendations for Cleaning and Disinfecting Environmental Surfaces in Healthcare Facilities
a. Clean housekeeping surfaces (e.g., floors, tabletops) on a regular basis, when spills occur, clean and disinfect when these surfaces are visibly soiled.

b. Clean environmental surfaces on a regular basis (e.g., daily, three times per week) and when surfaces are visibly soiled.
c. Follow manufacturers' instructions for proper use of disinfecting (or detergent) products --- such as recommended use-dilution, material compatibility, storage, shelf-life, and safe use and disposal.

Clean walls, blinds, and window curtains in patient-care areas when these surfaces are visibly contaminated or soiled.

e. Prepare disinfecting (or detergent) solutions as needed and replace these with fresh solution frequently (e.g., replace floor mopping solution every three patient rooms, change no less often than at 60-minute intervals), according to the facility's policy.

f. Decontaminate mop heads and cleaning cloths regularly to prevent contamination (e.g., launder and dry at least daily).

g. Use a one-step process and a registered hospital disinfectant designed for housekeeping purposes in patient care areas where 1) uncertainty exists about the nature of the soil on the surfaces (e.g., blood or body fluid contamination versus routine dust or dirt); or 2) uncertainty exists about the presence of multidrug resistant organisms on such surfaces. See recommendations requiring cleaning and disinfecting blood-contaminated surfaces.

h. Detergent and water are adequate for cleaning surfaces in nonpatient-care areas (e.g., administrative offices).

i. Do not use high-level disinfectants/liquid chemical sterilants for disinfection of non-critical surfaces.

j. Wet-dust horizontal surfaces regularly (e.g., daily, three times per week) using clean cloths moistened with a registered hospital disinfectant (or detergent). Prepare the disinfectant (or detergent) as recommended by the manufacturer.

k. Disinfect noncritical surfaces with a registered hospital disinfectant according to the label's safety precautions and use directions. The user must follow all applicable label instructions on the registered products.

l. Promptly clean and decontaminate spills of blood and other potentially infectious materials. Discard blood-contaminated items in compliance with local regulations.

m. For site decontamination of spills of blood or other potentially infectious materials (OPIM), implement the following procedures. Use protective gloves and other PPE (e.g., when sharps are involved use forceps to pick up sharps, and discard these items in a puncture-resistant container) appropriate for this task. Disinfect areas contaminated with blood spills using a registered tuberculocidal and virucidal (against HIV / HBV) agents or freshly prepared chlorine releasing agents. If sodium hypochlorite solutions are selected use a 1:100 dilution (e.g., 1:100 dilution of a 5.25-6.15% sodium hypochlorite provides 525-615 ppm available chlorine) to decontaminate nonporous surfaces after a small spill (e.g., <10 mL) of either blood or OPIM. If a spill involves large amounts (e.g., >10 mL) of blood or OPIM, or involves a culture spill in the laboratory, use a 1:10 dilution for the first application of hypochlorite solution before cleaning in order to reduce the risk of infection during the cleaning process in the event of a sharp injury. Follow this decontamination process with a terminal disinfection, using a 1:100 dilution of sodium hypochlorite.

n. If the spill contains large amounts of blood or body fluids, clean the visible matter with disposable absorbent material, and discard the contaminated materials in appropriate, labeled containment.

o. Use protective gloves and other PPE appropriate for this task.

p. In units with high rates of endemic *Clostridium difficile* infection or in an outbreak setting, use dilute solutions of 5.25%–6.15% sodium hypochlorite (e.g., 1:10 dilution of household bleach) for routine environmental disinfection. Currently, no products are registered specifically for inactivating *C. difficile* spores.

q. A registered sodium hypochlorite product is preferred, but if such products are not available, generic versions of sodium hypochlorite solutions (e.g., household chlorine bleach) can be used.

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Manufacture's guidelines must always be checked prior to carrying out decontamination. Protective clothing should be worn to reduce the risk of cross contamination and exposure to chemicals		
Equipment/ Item	**Method**	**Remarks**
Airways and Endotracheal tubes	Use disposable ones. Discard after each use	
Ambu bag	Disposable ,single patient use if applicable or otherwise follow manufacturer instruction for cleaning and disinfection. Wash and send to CSSD for further processing.	
Ampoules	Swab ampoule neck with alcohol wipe	
Arthroscopes	Sterilization procedure ;if not feasible provide at least high-level disinfection followed by a sterile water rinse.	Reusable accessories, mechanically clean then sterilize these items between each patient.
Auroscope ear pieces	Single use/ disposable. Discard disposables after use.	
Baby scales	Protect from soiling with paper roll. Clean with detergent and water if soiled. Always refer to the manufacturer's instructions	If contaminated with blood or body fluid or following use by an identified infected patient (see below**)
Baby feeding bottles/ teats.	Wash in a washer disinfector and send to CSSD. Use disposable teats.	Use disposable feeding bottles if possible
Baths, hand basins and showers	Clean using neutral detergent, hot water and a disposable cloth. Rinse and dry .	If contaminated with blood or body fluid or following use by an identified infected patient (see below**)
Bed frame	Clean using neutral detergent, hot water and a disposable cloth, rinse and dry .	If contaminated with blood or body fluid or following use by an identified infected patient (see below**)

Manufacture' s guidelines must always be checked prior to carrying out decontamination. Protective clothing should be worn to reduce the risk of cross contamination and exposure to chemicals		
Equipment/ Item	**Method**	**Remarks**
Bedpans and urinals	Disinfect in a bedpan washer at 93°c for 1minute. If bedpan washers are not available, empty bedpans and urinals and wash with detergent and hot water , rinse and soak for 10 min in 2% clear phenolic disinfectant. rinse again and dry. Hang on approved hangers.	When a particular gastro-intestinal infection is suspected ,add 5 % phenolic disinfectant to the content of bedpan and leave for 5 min before emptying.
Bins	Clean with detergent and water.	
Blood pressure cuffs	Check manufacturer's instructions. Remove rubber inner. Water-proof cover: clean using neutral detergent, hot water and a disposable cloth. Rinse and dry. Fabric cover: to be laundered.	If the water proof cover is contaminated with blood or body fluid or following use by an identified infected patient, clean and disinfect with70% alcohol
Bowls (Surgical)	Send to CSSD for reprocessing	
Bowls (Washing)	-Individual bowls should be used. Wash and disinfect in washer disinfector . Avoid stacking inside each other. -Manual wash only in case of unavailability of washer disinfectant	In manual wash,if contaminated with blood or body fluid or following use by an identified infected patient (see below**)
Breast pump equipment	Breast pump motor: wipe external surfaces with detergent between patients. Breast Funnel: single patient use. Between patients: send to CSSD. Tubing: if reusable, send to CSSD. Always check for manufacturer instructions.	
Bronchoscope	Clean with enzymatic detergent. Disinfect in high level disinfectant solution, rinse and dry.	At the beginning of each list and in between each patient
Buckets	Wash with hot water and detergent. Dry and store upside down.	

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Equipment/ Item	**Method**	**Remarks**
Chairs	Clean with detergent Rinse and dry thoroughly	If contaminated with blood or body fluid or following use by an identified infected patient (see below**)
Children's toys (absorbent)-	Better to be avoided .Dispose if heavily soiled or contaminated. Certain toys may be cleaned in a washing machine using a hot wash cycle.	-If contaminated with blood or body fluid or following use by an identified infected patient (see below**) - Should be followed with proper rinsing -Children known to be infected must not share toys. The toys must remain with that child during the admission then decontaminated after discharge)
Children's toys (non-absorbent)	Weekly: Clean with detergent and hot water. Rinse and dry thoroughly.	
Children's toys (Wooden, should be washable)	Weekly: Clean with detergent and hot water . Disinfect with alcohol wipe. Dispose of if damaged or chewed.	
Colonoscope	Clean with enzymatic detergent. Disinfect in high level disinfectant solution, rinse and dry	At the beginning of each list and in between each patient.
Commode seat and frame	After use/Daily Wash with warm water and detergent and dry. Remembering under sides and lower bars	If contaminated with blood or body fluid or following use by an identified infected patient (see below**)
Cot sides	Wash with detergent, dry, or Use detergent wipe -After each patient and when visibly contaminated.	-If contaminated with blood or body fluid or following use by an identified infected patient (see below**)
Cots	After each patient .Wash with detergent then dry .	-If contaminated with blood or body fluid or following use by an identified infected patient (see below**)

Manufacture' s guidelines must always be checked prior to carrying out decontamination. Protective clothing should be worn to reduce the risk of cross contamination and exposure to chemicals		
Equipment/ Item	Method	**Remarks**
Couch (e.g. treatment rooms)	Cover with paper roll between each patient use to minimize contamination. Avoid use of linen. Clean with detergent and water at end of clinic session	If contaminated with blood or body fluid or following use by an identified infected patient (see below**)
Crockery and cutlery	Machine wash with rinse temperature above 80°c, air dry. Or hand wash in hot water, using neutral detergent. Rinse and dry with a disposable paper towel.	
Curtain- cubicle	Weekly and after patient discharge	Change and launder if splashed with body fluid
Curtain rails-window	Domestic staff to clean using a high damp dusting mop	Care must be taken not to scatter the dust. Change the damp cloth for each bay
Curtains -window (in clinical/ward areas)	Periodically change and launder every 3 months.	Change and launder if splashed with body fluid or after discharge of isolated patient with MRSA, Group A Strep, *Clostridium difficile* or following a viral gastroenteritis outbreak
Cushions (including pressure relieving)	Clean using neutral detergent, hot water and a disposable cloth, rinse and dry. Cleaning should be between patients and when soiled.	
Cystoscope	Rigid: re-processing in CSSD required. Flexible: Sterilization procedure ,if not feasible provide at least high-level disinfection followed by a sterile water rinse.	At the beginning of each list and in between each patient

Manufacture' s guidelines must always be checked prior to carrying out decontamination. Protective clothing should be worn to reduce the risk of cross contamination and exposure to chemicals		
Equipment/ Item	**Method**	**Remarks**
Drains	Clean regularly. Do not use disinfectant unless instructed	
Disposables e.g., Endotracheal tubes, Foleys catheters, Feeding tubes, Suction tubes, Stomach tubes, Laboratory waste, Syringes, Scalpel blades, Dressings, etc., Gloves, Masks	Discard after use. • Handle with care • All sharps should be disposed in the sharps container • Sharps puncture-resistant containers and plastic bags should be incinerated	
Drip stands	After each use. Daily damp dust with warm water and detergent using a disposable cloth. Dry thoroughly.	Additional wiping with 70% alcohol if contaminated
Drug cupboards	Weekly wash with warm water and detergent and dry	
ECG equipment	Daily after use wipe with hot water and detergent. Dry.	
Electronic medical devices Monitor/leads	Follow manufacturer’s instructions. Switch off electrical supply .Wipe with a detergent and dry thoroughly	
ERCP scope	Clean with enzymatic detergent. Disinfect in high level disinfectant solution, rinse and dry	At the beginning of each list and in between each patient
Endoscopes	Clean with enzymatic detergent. Disinfect in high level disinfectant solution.	At the beginning of each list and in between each patient..

Manufacture' s guidelines must always be checked prior to carrying out decontamination. Protective clothing should be worn to reduce the risk of cross contamination and exposure to chemicals		
Equipment/ Item	**Method**	**Remarks**
Family planning Equipment, Vaginal speculae, trial size diaphragms, and intra-uterine fitting devices	Single use items where possible If re-usable, send to CSSD	
Floors	Ideally, all floors should be vacuumed using approved machines, whether carpeted or not to prevent dust being dispersed. Control dust on uncarpeted floors with an anti-static mop and clean with detergent and water daily or when soiled	Disinfection not routinely required. If necessary chlorine releasing agent ma may be used.
Furniture	Hard surfaces should be damp dusted with detergent and water. Disinfect if used by an infected patient	If contaminated with blood or body fluid or following use by an identified infected patient (see below**)
General refrigerator	Weekly, damp dust with warm water and detergent using a disposable cloth. Dry thoroughly. Wipe seals and doors/handles. All food must be named labeled and dated by the user	
Glucose monitoring devices	Follow manufacturer’s instructions for cleaning between uses. Use disposable lancets, platforms and devices.	
Gym equipment	After each use or daily, Damp dust with warm water and detergent using a disposable cloth. Dry thoroughly.	
Hand Blocks (physiotherapy)	Clean between patients with detergent and water and dry	
Hair clippers	-Only use with disposable heads -Hand held unit – clean after use	

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Equipment/ Item	**Method**	**Remarks**
Humidifiers	Daily. Use pre-filled disposable humidifiers where possible. Refill with sterile water. Humidifiers should never be topped up. Between patients, If non disposable, wear single use gloves and clean then send to CSSD	
Hysteroscope	Sterilization procedure ,if not feasible provide at least high-level disinfection followed by a sterile water rinse.	Reusable accessories, mechanically clean then sterilize these items between each patient.
Ice Making Machines	Locate the machine in a clean area such as the kitchen. The machine must be cleaned and maintained regularly, in accordance with the manufacturer's instructions	
Incubators	Refer to manufacturer's instructions Wash all removable parts and clean with detergent. If contaminated clean then use hypochlorite solution 125ppm. Do not use methylated spirit on Perspex plastic parts, it will discolour. Do not use phenolic disinfectants.	After each patient use or if patient stayed more than one week After infected patients.
Infusion pumps	After use, Clean using a detergent, wipe with at damp cloth and dry.	
Intravenous equipment e.g. pumps, syringe devices	To be wiped daily with detergent and in between each patient. Follow manufacturer's instructions for cleaning regime and method Ideally equipment to be wiped between patients with an alcohol impregnated swab .	
Jugs -measuring urine and body fluids	-Ideally, use disposable only. - if reusable wash in a flusher disinfector	

Manufacture' s guidelines must always be checked prior to carrying out decontamination. Protective clothing should be worn to reduce the risk of cross contamination and exposure to chemicals		
Equipment/ Item	**Method**	**Remarks**
Keyboards	Clean with damp cloth daily with warm water and detergent, then wipe with 70 % alcohol	
laparoscopes	Sterilization procedure ,if not feasible provide at least high-level disinfection followed by a sterile water rinse.	Reusable accessories, mechanically clean then sterilize these items between each patient.
Laryngoscopes: Blades Handles	Use disposable blade or return to CSSD for cleaning and autoclaving (remove bulb).Alternatively for non-autoclavable blades only, follow manufacturer's instructions Clean with detergent and water after removal of the battery	After each use After each use
Lifting equipment Patient Frame Sling Footplates	Damp dust with warm water and detergent using a disposable cloth Clean weekly .Damp dust with warm water and detergent using a disposable cloth. Check after each use. Launder weekly, damp dust with warm water and detergent using a disposable cloth. Weekly, damp dust with warm water and detergent using a disposable cloth.	
Lockers (Bedside)	Clean surfaces daily with detergent and water , Dry thoroughly	

Manufacture' s guidelines must always be checked prior to carrying out decontamination. Protective clothing should be worn to reduce the risk of cross contamination and exposure to chemicals		
Equipment/ Item	**Method**	**Remarks**
Mattresses	Refer to manufacturer's instructions for special mattresses or cover. Use detergent and hot water. Dry thoroughly	-Should be done after each patient use or prior to leaving ward area or following spillage, -Examine mattress in between patient for staining, cover integrity and moisture collection. -Renew mattress if cover is no longer impervious to body substances. -If contaminated with blood or body fluid or following use by an identified infected patient (see below**)
Medical gases cylinder	Daily and between uses. Damp dust with warm water and detergent using a disposable cloth. Dry thoroughly.	
Mop buckets	Detergent should be freshly prepared for each task. Buckets should be rinsed, cleaned and stored inverted to assist drying after use.	
Mop head	After each session, change and launder daily. Laundering in a machine with a heat disinfection cycle should be performed daily.	
Nail brushes	When indicated, it should be always single use	In catering service: no nail brushes to be used. Nail brushes for healthcare staff are used only in theatres for surgical scrub (single use). Do not leave on sink after use .
Nail clippers /scissors	Individualize where possible. Remove debris with warm soapy water. Soak in 70% alcohol for 10 minutes. Dry.	

Nasopharyngoscope	Clean with enzymatic detergent. Disinfect in high level disinfectant solution, rinse and dry.	At the beginning of each list and in between each patient
Nebulizer	Clean using neutral detergent, hot water and a disposable cloth then rinse and dry then wipe with70% alcohol. It is essential to store clean and thoroughly dry between uses some are single-use only. There is potential risk of legionella transmission from residual water in chamber after washing. Follow manufacturer's instructions re-washing and replacing nebulisers.Use single patient use tubing.	Use only sterile fluid for nebulization, and dispense the fluid into the nebulizer aseptically
Oxygen masks	Disposable single service user. In between specific service user use, clean with detergent and warm water.	
Patient wash bowls	Empty used water in sluice hopper not in hand wash basin. If washer disinfectors are not available ,wash in detergent and water and dry, then store inverted.	
Physiotherapy equipment	After use, clean using neutral detergent, hot water and a disposable cloth then rinse and dry.	If contaminated with blood or body fluid or following use by an identified infected patient (see below**)
Stethoscopes	Disinfect after each use by 70% alcohol swabs (if visibly clean) Remove ear pieces weekly. Wash them with warm water and detergent and dry using cotton buds.	Dedicated stethoscope for a patient in isolation
Suction machine	Clean the surface using a soapy cloth. Replace filters when wet and at appropriate intervals according to manufacturer's instructions	
Suction tubing	-For patiebt:Use disposable connecting tubing. A sterile catheter being used for each procedure. In line tubes: Rinse with sterile water between uses. Replace daily	
Suction Units	Disposable suction liners are recommended. Re-usable bottles: wear protective clothing, empty contents into a slop-hopper or toilet. Disinfect bottle using a washer disinfector.	
Telephones (ear/ mouth pieces)	Clean daily with warm water and detergent. then wipe with alcohol	

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Equipment/ Item	**Method**	**Remarks**
Thermometers	-Use disposable or electronic. If glass type use disposable sleeves or covers, wash and wipe with alcohol wipe. Store dry.	Do not store soaked in any solution
Tourniquets	Plastic tourniquets should be wiped with a detergent . Single patient use in isolation rooms. Discard when soiled.	
Traction equipment	Wipe over with detergent and water and dry thoroughly	
Tonometer	Use disposable tonometer heads if applicable. Follow the manufacturer recommendation. Wipe clean tonometer tips and then disinfect them by immersing for 5-10 minutes in either 5000 ppm chlorine or 70% ethyl alcohol. The tonometer should be thoroughly rinsed and air dried before use.	
Trolleys -Dressing trolley -Patient trolley	Washed with detergent and water daily and dried thoroughly. Wipe with 70% alcohol between patients . Clean with warm water and detergent. Dry with a disposable towel weekly or when soiled. Trolleys wheels should be cleaned weekly. Clean and disinfect after use for infected patient by wiping with alcohol 70% for the leather and detergent for metal part.	
Vacuum Cleaners	Filters which prevent dust contamination should be changed as per manufacturer's instructions. Wipe attachment tools with hot water and detergent when soiled or weekly.	

Manufacture' s guidelines must always be checked prior to carrying out decontamination. Protective clothing should be worn to reduce the risk of cross contamination and exposure to chemicals		
Remarks	**Remarks**	**Remarks**
Vaginal ultra sound probe	Clean then soak in disinfectant solution 0.55% Ortho-phthalaldehyde (Cidex OPA) for 12 minutes then use disposable plastic cover sheath.	
Ventilators	As per manufacturers instructions (See VAP policy)	
Vials	Swab top with alcohol wipes.	
Wheelchairs	Wipe with detergent and water and dry thoroughly.	If contaminated with blood or body fluid or following use by an identified infected patient (see below**)
X-ray equipment	After each use Damp dust with detergent solution (may be followed by alcohol), allow surface to dry before use. Manufacturer's instructions are to be followed for specialized equipment.	Clean and disinfect following the use on infected patient

-Ensure that the detergents or enzymatic cleaners selected are compatible with the metals and other materials used in medical instruments.

**For small spills of blood (i.e., drops of blood) on non-critical surfaces, the area can be disinfected with a 1:100 dilution of 5.25% - 6.15% sodium hypochlorite (500ppm)or a registered tuberculocidal disinfectant. Because hypochlorites and other germicides are substantially inactivated in the presence of blood.

**Large spills of blood require that the surface be cleaned before a registered disinfectant or a 1:10 (final concentration) 5000ppm solution of household bleach is applied. If a sharp injury is possible, the surface initially should be decontaminated then cleaned and disinfected (1:10 final concentration)

** After infected patient contact : 1:20 (final concentration) 100ppm solution of household bleach

NB. Chlorine-releasing agents readily inactivated by organic matter – may damage certain materials; some plastics, rubber, Metals & fabrics. **Must not be mixed with acids including acidic body Fluids such as urine**.