

2013

INFECTION PREVENTION AND CONTROL MANUAL

GEORGETOWN PUBLIC HOSPITAL CORPORATION



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Ministry of Health

Republic of Guyana

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PREFACE

Health care-associated infection remains a major issue of patient safety. It complicates a significant proportion of patient care deliveries, adds to the burden of resource use, and contributes to unexpected deaths. Early infection control pioneers showed that surveillance and prevention programs can be successful and have set the scene for today's infection control activities. Parameters for success include those to recognize and explain healthcare-associated infections and implement interventions to decrease infection rates and limit antimicrobial resistance spread.

We at the Georgetown Public Hospital Corporation have a commitment to provide the safest and highest level of healthcare to our patients and to do everything possible to prevent the spread of infection at our facility. This manual will contribute to the implementation of evidence-based interventions to prevent healthcare-associated infection at the GPH.

Today, the field of infection prevention is rapidly changing. This manual has been written by a number of GPHC professionals to reflect the current national standards of practice and national guidelines for infection prevention. We encourage all the staff working at the GPHC be aware of current guidelines and regulations for infection prevention, since the compliance with current guidelines and regulations will create the basis of our infection prevention program at the GPHC.

With this manual, the GPHC begins enforcing the implementation of prevention practices¹. The most important conditions include having written policies and procedures that minimize communicable infections and maintaining contact with a trained infection prevention individual².

Furthermore, we are strengthening our first line of defense. Infection prevention begins with our staff. Hand hygiene and employee health are the first steps in assembling a successful infection prevention program. We recommend our staff to begin each day with a hand scrub and strictly follow the recommendations stated in the chapter 5, “Hand hygiene”.

Our infection prevention manual has been designed with adaptability in mind. Regulations and guidelines are not static and once we implement a standardized program we may need to adjust the program tailored for our needs. We will have a means of evaluating and following up on our infection control policies, and revise them when indicated. Manuals are not carved in stone and actually, as things evolve there has to be a policy to ensure that all stakeholders have an input in their review and revision.

Infection control professionals should never forget the lessons from the past. Surveillance³ remains the primary

¹ Chapters 8-12: Prevention of Surgical Site Infections, Prevention of Lower Respiratory Tract Infections, Prevention of Catheter-Associated Urinary Tract Infections, and Prevention of Intravascular Device-Associated Infections

² Chapter 2. Organization for Infection Prevention and Control

³ Chapter 3. Surveillance of Healthcare Associated Infections.

tool of prevention; its impact needs to be more explicitly assessed. The primary objective of surveillance is to drive the conduct of interventions that reduce infection rates and control resistance spread and outbreaks. The active implementation of prevention strategies by infection control programs is essential.

Antibiotic control is mandatory in the hospital as well as in the community and might require culture changes. Successful infection control controls infection and contributes to cost savings to the institution and the health care system. There are new challenges almost daily in infection control, which includes adapting to the moving trends of health care systems. For this reason, infection prevention and control deserve a specific attention in the GPHC Strategic Plan 2013-2018.

In conclusion, we trust that this infection control manual clearly describes protocols and procedures to be implemented at the GPHC. This workbook is aimed at standardizing the clinical procedures with respect to infection prevention, assisting in training new staff, and having information readily available for the hospital staff. We will provide all the necessary support for the dissemination and adequate use of this manual in the context of a patient safety culture.

Mr. Michael Khan
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May 2013



FOREWORD

The mission of the Pan American Health Organization/World Health Organization (PAHO/WHO) Infection Prevention and Control in Health Care initiative is to undertake technical cooperation with Member States to reduce dissemination of infections associated with health care. A key strategy for doing so involves the assessment, planning, implementation, and evaluation of national infection control policies.

From a public health perspective, the development of a cross-cutting coordinated strategy for infection control in health care is of utmost importance to harmonize and strengthen infection prevention and control and preparedness and response to outbreaks. This is one of the core capacities for implementation of the International Health Regulations, IHR (2005). Health care settings are in the front line of containment and response strategies; hospital-based and public health surveillance systems must be formally and efficiently linked to ensure early notice of events of possible public health importance.

In this context, the Georgetown Public Hospital Corporation (GPHC) has made an extraordinary effort to implement the national guidelines for infection prevention and control. Safe patient care, including infection prevention, is a priority in all health care settings. A patient safety culture guides the attitudes, norms, and behaviors of individuals and organizations. In a safe culture of care, all staff and leaders assume responsibility for the well-being of patients, while paying attention to their

own well-being. Patient safety requires teamwork, collaboration, communication, and measurement, as well as techniques such as human factors engineering.

The PAHO/WHO Guyana team congratulates the leadership and staff of the GPHC for the publication of this Manual, and expresses its satisfaction at having contributed to the collaboration between the relevant specialists and experts in Guyana. PAHO/WHO anticipates that the Manual will achieve its ultimate goal: to promote high quality health care which is safe for patients, health care workers, and others in the health care setting and the environment, in a cost-effective manner.

Dr. Beverley Barnett
PAHO/WHO Representative
Georgetown
Guyana
May 2013

ACRONYMS

ABHR	Alcohol-based hand rubs
CAUTI	Catheter-associated urinary tract infection
CLABSI	Central line-associated bloodstream infections
CVC	Central Vascular Catheter
EMS	Emergency Medical Services
HIV	human immunodeficiency virus
HAI	Healthcare-associated Infection
HLD	High-level disinfection
ICU	Intensive care unit
ICC	Infection Control Committee
ICT	Infection Control Team
ICO	Infection Control Officer
ICN	Infection Control Nurse
ILD	Intermediate-level disinfection
IPC	Infection Prevention and Control
MSB	Maximum sterile barrier
LLD	Low-level disinfection
PICC	peripherally inserted central catheter
PPE	Personnel Protective Equipment
RSV	Respiratory Syncytial Virus
SARS	Severe Acute Respiratory Syndrome
UTI	Urinary tract infection
VAP	Ventilator-associated Pneumonia

1. INTRODUCTION

Healthcare associated infections (HAIs) are increasingly recognized as one of the main issues affecting the mortality and morbidity of hospitalized patients. In developed countries, it is estimated that between 5 and 10% of the hospitalized patients will develop a HAI. In developing countries, this proportion has been estimated around 25%. The risk of serious complications due to HAIs is particularly high for patients requiring intensive care. A number of factors likely contribute to this problem, including increasing rates of antimicrobial resistance, the development of progressively more-complex medical procedures and invasive medical technology that place patients at risk for procedure-or device-related infections, and an increasingly elderly and immunocompromised patient population. Many of these factors are already happening in the Georgetown Public Hospital Corporation (GPHC) in Guyana.

Many of the recommendations and procedures described in this manual have been implemented for many decades to decrease the burden of HAIs. Thus, hospital-based infection surveillance, prevention, and control programs have been in place for many decades to monitor the occurrence of HAIs and to control the spread of hospital acquired infections through internal quality improvement efforts.

The current edition of the manual has been written to reflect the current international standards of practice and national guidelines for infection prevention. Guidelines and standards change frequently as new research

is done and new information becomes available. The objective of the manual is to provide clear guidance and operational procedures to decrease the risk of health-care associated infections. A number of health care professionals can use and implement the recommendations set in this manual.

The Infection Prevention Committee should meet on a regular basis and as part of the agenda, review and revise infection prevention policies and procedures. e

This manual builds upon and makes possible the implementation of the National Plan for Infection Prevention and Control, recently launched by the Ministry of Health.

The GPHC was established as a Corporation by Order No. 3 of 1999; since then, the hospital was considered a semi-autonomous institution governed by a Board of Directors and managed by a Chief Executive Officer with a Directorate of six namely, Administrative Services, Medical & Professional Services, Nursing Services, Financial & General Services, Facilities Management, and Internal Audit. Currently, the GPHC patient capacity is maintained at 450 beds.

Within the last decade and a half, the Georgetown Public Hospital Corporation (GPHC) has been undergoing massive infrastructural development. The first major renewal project was the Ambulatory Care and Diagnostic Centre (ACDC) building. This building is home to the Medical, Surgical, Pediatric, Ear, Nose and Throat, Audiology, Acupuncture, Dermatology and Ophthalmology Clinics as well as the Intensive Care Unit, High Dependency Unit, Pediatric Units (Medical and Surgical), Burn Care Unit and including the Operating Theatre, Central Sterilization and Supply Unit,

Biomedical Department, Medical Laboratory, Imaging Department, Pharmacy Department, Orthopedic Department and the Accident and Emergency Department. Other services with direct impact in infection prevention are the new Reference Testing Laboratory, and the National Blood Transfusion Services.

The GPHC offers almost high level quality services as comprehensive chemotherapy for cancer patients, which was expanded to include treatment of children with leukemia.

During 2013, the GPHC will develop its Strategic Plan 2013-2017, and Infection Prevention and Control will be considered as one of the pillars of Quality of Care.

This manual is intended for local use at the GPHC and cannot represent national requirements. All local doctors, nurses and auxiliary professionals would benefit from this manual, as well as the international experts from China, Cuba or other countries who complement the GPHC services.

The contents of this manual are based on the best available evidence as at the end of 2012, and should be updated as new research and evidences will come to the light.

This manual includes updated references, and it is encouraged to access these references and become familiar with them.

The Infection Officer should be familiar with the contents of the manual in order to determine the policies and procedures are feasible and applicable to specific facilities. If so, implement them and monitor for compliance. If they are not feasible or applicable for the facility, he/she can adapt them to make them more pertinent to the specific services or facilities.

2. ORGANIZATION FOR INFECTION PREVENTION AND CONTROL

An effective infection control program needs a designated leader supported by a team with special competencies.

In order to prevent and control healthcare-associated infections, The Georgetown Public Hospital Corporation counts on the leadership of the Infection Control Officer and the Infection Control Committee. The Infection Control Committee will provide support and implement the standards and protocols in the hospital.

Infection Control Officer (ICO)

The ICO is responsible for the day-to-day running of Infection, Prevention and Control (IPC) programs. The IC must ensure that an effective IPC program has been planned, coordinate its implementation, and evaluate its impact. The ICO should have frequent communication with the key clinical services of the hospital.

The ICO must have the following training and working conditions:

- a) Formal training in infection control,
- b) Time assigned according to the tasks – full time professionals,
- c) Authority to perform the needed infection prevention and control tasks, and

d) Direct reporting to the Director of Nursing.

The number of infection control professionals is related with the number of beds, and complexity of the health services provided by the hospital. Ideally, one infection control nurse should be allocated by 250 beds.

Tasks of the Infection Control Officer/Team

- To develop an annual IPC plan with clearly defined objectives.
- To develop written policies and procedures, including regular evaluation and updates.
- To prepare an action plan for implementation of the IPC program with approval from the Infection Control Committee (ICC).
- To monitor and evaluate daily practices of patient care designed to prevent infection.
- To identify problems in the implementation of IPC activities which need to be solved or addressed by the ICC.
- To organize epidemiological surveillance for Health-care-associated infections (HAIs) (particularly in high risk areas to detect outbreaks early).
- To investigate outbreaks and provide data (and expert advice) that should be evaluated to allow for any change in practice or allocation of resources.
- To educate all grades of staff in IPC policy, practice, and procedures relevant to their own areas.

- To provide advice to all grades of staff on all aspects of IPC on a day to-day basis.
- To develop an annual training plan for healthcare workers and implement IPC training activities.
- To ensure availability of supplies and equipment needed for IPC.
- To have a scientific and technical support role in purchasing and monitoring of equipment and supplies, and in evaluation and checking the efficacy of sterilization and disinfection measures.
- To collaborate with the pharmacy and antibiotic committees in developing a program for supervising antibiotic use.
- To support and participate in research and assessment programs.
- To participate in audit activities.
- To obtain program approval from the ICC.
- To submit monthly reports on activities to the ICC.

Infection Control Committee (ICC)

The ICC is responsible for the planning, implementation, prioritization, and resource allocation of all matters relating to IPC. The ICC must report directly to medical director. The committee acts as a liaison between departments responsible for patient care and support services. It includes:

- Chief Executive/Administrator or his/her nominated representative.
- Infection Control Officer.
- Infectious Disease Physician.
- Director of Nursing or his/her representatives.
- Occupational Health Physician
- Microbiologist.
- Representatives from the major clinical specialties.
- Representatives of other departments (pharmacy, central supply, sterilization unit, maintenance, housekeeping, training services, etc.) may be invited when necessary.

The chairperson should be designated among the ICC members.

Tasks of the infection control committee

- To review and approve the annual plan for IPC.
- To review and approve IPC policies.
- To support the ICT and direct resources to address problems as identified.

- To ensure availability of appropriate supplies needed for IPC.
- To review epidemiological surveillance data and identify areas for intervention.
- To assess and promote improved practice at all levels of the facility.
- To ensure staff training in IPC and safety.
- To review infectious risks associated with new technologies and monitor risks of new devices and products, prior to their approval for use.
- To review and provide input into an outbreak investigation.
- To review and approve construction/renovation projects regarding infection prevention.
- To communicate and cooperate with other committees with common interests, such as the Antibiotic Committee, Occupational Health Committee, etc.

Functioning of the Infection Control Committee

The Infection Control Committee should hold monthly meetings and as considered necessary with minutes. A copy of the minutes must be sent to the Director of the Hospital and the facility's Management Board as well as to departments directly involved in the subjects discussed during the meeting. It should produce an annual report and an annual business plan for IPC.

The Committee will schedule meetings with specific problems that are considered relevant in the hospital.

An achievable goal is to discuss one or two problems and make decisions on one or two subjects at each meeting. Committee members will receive in advance a summary of the situation to be discussed at the meeting (one or two pages). At the end of the meeting will propose possible solutions and make decisions. The following is a suggested format of minutes:

1. Date and time of opening of the meeting.
2. Date and time of ending of the meeting.

Participants

Epidemiological report (rates of Healthcare-associated infections, outbreaks investigations).

3. Report on activities during the period.
4. Problem 1: possible solutions, decisions made, assigned responsibilities and implementation deadlines.
5. Problem 2: possible solutions, decisions made, assigned responsibilities and implementation deadlines.

Duties and Responsibilities of the ICC Main Members

Infection Control Officer

The ICO could be a medical microbiologist, an epidemiologist, or an infectious diseases physician. In the GHPC, this role also can be accomplished by a Registered Nurse (BSN) with an academic education and practical training

relating to IPC. The ICO is a full-time practitioner on the ICT and therefore takes the key role in day-to-day IPC activities.

The role and responsibilities of the ICO are summarized as follows:

- Should be an active member of the ICC and may act as its Chair.
- Assists the ICC in reviewing annual plans, policies, and long-term programs for the prevention and control of infection.
- Advises the Chief Executive/Director of Nursing Services directly on all aspects of IPC and on the implementation of policies and procedures.
- Participates in the preparation of tender documents for support services and advises on IPC aspects.
- Must be involved in setting quality standards, surveillance, and audit with regard to infection prevention. Contributes to the development and implementation of policies and procedures, participates in audits, and monitors tools related to IPC and infectious diseases.
- Provides specialist-nursing input in the identification, prevention, monitoring, and control of infection.
- Participates in surveillance and outbreak investigation activities.
- Identifies, investigates and monitors infections, hazardous practices and procedures.
- Participates in preparing documents relating to service specifications and quality standards.

2. Organization for Infection Prevention and Control

- Participates in training and educational programs and in membership on relevant committees where IPC input is required.
- Conducts HAI surveillance, analyses data and elaborates reports.

Microbiologist

The hospital must designate a microbiologist who will work with the infection control officer, and all other professionals engaged in surveillance. To fulfill these functions, must be trained in basic epidemiology, statistics, surveillance, prevention, and infection control.

The role and responsibilities of the microbiologist are summarized as follows:

- Handling patient and staff specimens to maximize the likelihood of a microbiological diagnosis.
- Developing guidelines for appropriate collection, transport, and handling of specimens.
- Ensuring laboratory practices meet appropriate standards.
- Ensuring safe laboratory practice to prevent infections in staff.
- Performing antimicrobial susceptibility testing following internationally recognized methods, and providing summary reports of prevalence of resistance.
- Monitoring sterilization, disinfection and the environment where necessary.

- Timely communication of results to the Infection Control Committee or the Infection Control officer.
- Epidemiological typing of hospital microorganisms where necessary.

Chief Executive Officer/Director Medical & Professional Services

The administration and/or medical management of the hospital must provide leadership by supporting the hospital infection programme. He is responsible for:

- Establishing a multidisciplinary Infection Control Committee.
- Identifying appropriate resources for a programme to monitor infections and apply the most appropriate methods for preventing infection.
- Ensuring education and training of all staff through support of programmes on the prevention of infection in disinfection and sterilization techniques.
- Reviewing, approving, and implementing policies approved by the Infection Control Committee.
- Ensuring the infection control team has authority to facilitate appropriate programme function.

3. SURVEILLANCE OF HEALTHCARE ASSOCIATED INFECTIONS

Regarding surveillance of HAI, the principal duties of the GPHC are to document the state of healthcare associated infections (HAI) and processes related to their prevention and control in the hospital. Through the ICC, the hospital will define institutional objectives for surveillance that align with national objectives; establish priorities for surveillance according to the scope of care provided by the facility; determine what data must be collected; apply existing national definitions and methods; detect outbreaks and coordinate an appropriate response; promote practices for the prevention and control of health care associated infections and related aspects of organizational culture without retaliation; and produce and disseminate information on health-care-associated infections and other related events to local stakeholders and health authorities.

In this chapter, the main objectives and methodology for surveillance of prioritized HAIs is described.

The responsibilities of the ICO are to detect cases (numerators) and identify the exposed population (denominators), keep records, and consolidate and analyze collected data. The detailed list of his /her responsibilities are in Box 1.

BOX 1 List of the responsibilities of staff dedicated to the monitoring and control of HAIs.

1. Review the charts of patients with exposure factors in order to detect infections.
2. In the event that an infection is suspected, use case definition criteria to classify it as such, if appropriate.
3. Record infection information for all confirmed cases (numerators): pneumonia, urinary tract infection, or bloodstream infection (dates and etiologic agents).
4. For patients with confirmed HAI record epidemiological information in order to establish numerators: patient identification, name, hospital identification, bed, primary underlying disease, sex, age, date of ICU admission, date of ICU discharge, reason for discharge, and length of exposure to mechanical ventilation, indwelling urinary catheter, or central venous catheter. Keep information for later consolidation.

The professional in charge of surveillance should have the time necessary to perform tasks and receive training. There is no universal, precise ratio of minutes per patient. However, experience has shown that 15 to 20 minutes per inpatient per week, with at least two weekly rounds, may be required. In other words, a 10- bed ICU could require between 150 and 200 dedicated minutes per week.

As a first step in the planning of a surveillance system, it is a recommended practice that health care settings assess:

3. Surveillance of Healthcare Associated Infections

- the types of patients/residents that it serves;
- the key medical interventions and procedures that they undergo; and
- the types of infections for which they are most at risk.

Based upon this preliminary assessment, the GPHC will consider the following infections subject to surveillance:

1. Mechanical ventilator-associated pneumonia.
2. Indwelling urinary catheter-associated symptomatic urinary tract infection.
3. Central venous catheter-associated, laboratory-confirmed bloodstream infection.

General Concepts and Glossary

The surveillance of device-associated infections in intensive care units should be active, selective, prospective, and patient-based.

Case-finding: A properly trained infection prevention and control professional will identify patients suspected of having a device-associated infection and collect the corresponding denominator data.

Numerator: The infection prevention and control professional will find infections incurred during the patient's stay using different sources, including: temperature charts, antibiotic use, cultures performed, physician' instructions, and the suspicion of attending clinicians. Monitoring of any HA I is no longer required after the patient is discharged from the ICU.

Case confirmation: In patients suspected of having a device-associated infection, the infection prevention and control professional will confirm the infection based on case definition criteria using: records from the laboratory, pharmacy, patient admission, discharge, and transfer, and radiology (imaging); pathological anatomy databases and patient charts, including interviews, physical exam notes, and notes taken by physicians and nurses (4). Laboratory surveillance data should not be used in isolation, unless all possible criteria for diagnosing an infection are determined by laboratory evidence alone.

The collection of data on the infection should be completed for all confirmed cases (numerators) — pneumonia, urinary tract infection, or bloodstream infection (dates and etiologic agents).

Denominator: The infection prevention and control professional will record the device-day counting the number of patient with mechanical ventilation, indwelling urinary catheter, or central venous catheter at ICU.

Devices inserted outside the unit under surveillance: Infections that develop within 48 hours of a patient's arrival and that are related to devices inserted outside the intensive care unit will NOT be counted in the numerator. Retrospective chart reviews should be used only when patients have been discharged before all necessary information can be obtained.

Frequency of surveillance: It is recommended that surveillance be carried out in intensive care units at least twice a week. Data should be consolidated monthly for the hospital's use, and forwarded to the Ministry of Health.

3. Surveillance of Healthcare Associated Infections

Objectives

- a) Describing the status of Healthcare-associated infections (i.e. incidence and/or prevalence, type, etiology, severity, attributable burden of disease).
- b) Identification of high-risk populations, procedures and exposures.
- c) Early detection of outbreaks.
- d) Assessment of the impact of interventions.

Phases of Surveillance

To perform an epidemiological surveillance to provide useful and consistent information must comply with the following phases:

- I) Definition of events
- II) Data Collection
- III) Consolidation and data analysis
- IV) Dissemination of results.
- V) Definition of events

I) Definition of events

Healthcare-associated infections (HAI): A health-care-associated infection (also known as a nosocomial infection) is an infection that is not present or incubating at the time of admission to a healthcare setting, but which is observed during the patient's hospital stay or after the patient's time of discharge.

Operationally for surveillance purposes is to be defined Healthcare-associated infection as follows: *Infection which is acquired after 48 hours of stay in the hospital and the patient did not carry on admission.*

Mechanical ventilator-associated pneumonia

Pneumonia is diagnosed through a combination of radiologic, clinical, and laboratory criteria. Box 2 includes the various assessment criteria that will be used for meeting the surveillance definition of nosocomial pneumonia.

BOX 2 Pneumonia case definition for surveillance

- a) Radiological data: Two or more serial chest x-rays with at least one of the following:
 - New or progressive and persistent infiltrate
 - Consolidation
 - Cavitation, **and**
- b) At least **one** of the following signs or symptoms:
 - Fever ($>38^{\circ}\text{C}$) with no other recognized known cause
 - Leukopenia ($<4000\text{ WBC/mm}^3$) or leukocytosis ($>12,000\text{ WBC/mm}^3$)
 - For adults >70 years old, altered mental status with no other recognized cause, **and**
- c) At least **two** of the following:
 - New onset of purulent sputum, or change in character of sputum, or increased respiratory secretions, or increased suctioning requirements
 - New onset or worsening cough, or dyspnea, or tachypnea
 - Rales or bronchial breath sounds
 - Worsening gas exchange [e.g. O_2 desaturations (e.g. $\text{PaO}_2/\text{FiO}_2 < 240$), increased oxygen requirements, or increased mechanical ventilator demand]

For cases of ventilator-associated pneumonia, a patient has to be intubated and ventilated at the time of onset of symptoms, or have been ventilated up to 48 hours prior to the onset of infection. Ventilator-associated pneumonia should be so designated when reporting data.

Indwelling urinary catheter-associated symptomatic urinary tract infection

Urinary tract infections are diagnosed through a combination of clinical and laboratory criteria. UT Is will be counted only for patients with an indwelling urinary catheter or an infection related to its use; in other words, the patient had a urinary catheter inserted at the time of, or within seven days before, the onset of infection. In Box 3, the criteria for case definition are described.

BOX 3 Indwelling urinary catheter-associated symptomatic urinary tract infection case definition for surveillance

- a) At least two of the following signs or symptoms with no other recognized cause:
 - Fever ($>38^{\circ}\text{C}$),
 - urgency (urinary)
 - increased urinary frequency
 - dysuria or suprapubic tenderness, and
- b) At least one of the following:
 - Positive urine culture (i.e. $>10^5$ microorganisms/ cm^3 of urine with no more than two species of microorganisms) **OR at least one of the following:**

continues

BOX 3 (cont.)

- ❑ Positive dipstick for leukocyte esterase or nitrate
- ❑ pyuria (urine specimen with >10 leukocytes/ mm^3 or >3 leukocytes/high-power field of unspun urine)
- ❑ organisms seen on Gram stain of unspun urine
- ❑ $\leq 10^5$ colonies/ml of a single uropathogen (Gram-negative bacteria or *S. saprophyticus*) in a patient being treated with an effective antimicrobial agent for a urinary tract infection
- ❑ physician diagnosis of a urinary tract infection
- ❑ physician institutes treatment for a urinary tract infection.

Central venous catheter-associated, laboratory-confirmed bloodstream infection

Bloodstream infections are classified according to clinical and laboratory criteria, either as laboratory-confirmed bacteremia or clinical sepsis. A bloodstream infection is considered either primary or secondary depending on whether it is caused by an infection at another site. For surveillance, only laboratory-confirmed, primary, intravascular catheter-associated bacteremia will be recorded.

BOX 4 Central venous catheter-associated, laboratory-confirmed bloodstream infection case definition for surveillance.

Laboratory-confirmed bacteremia must meet at least one of the following criteria:

Criterion 1:

- a) A pathogen was identified in one or more blood cultures of the patient, except for common skin contaminant microorganisms (see Criterion 2 below), and
- b) The microorganism cultured from the blood is not related to infections at other sites.

Criterion 2:

- a) Clinical data: patient has at least one of the following signs or symptoms with no other recognized cause:
 - fever ($>38^{\circ}\text{C}$)
 - chills
 - hypotension, and
- b) Positive laboratory results are not related to an infection at another site, and
- c) The following laboratory criterion: common skin contaminant (e.g. diphtheroids [*Corynebacterium* spp.], *Bacillus* [not *B. anthracis*] spp., *Propionibacterium* spp., coagulase-negative staphylococci [including *S. epidermidis*], viridans group *Streptococci*, *Aerococcus* spp., *Micrococcus* spp.) cultured from two or more blood samples drawn on separate occasions.

II) Data collection

The epidemiological surveillance system of Health-care-associated infections in The Georgetown Public Hospital Corporation is active and selective. It is active because the data collection is based on the detection of HAI in clinical and laboratory services by trained personnel and with enough time to spend to the search HAIs. It is selective for only selected patients being monitored by having factors risk for HAIs.

The GPHC will implement incidence surveillance, where patients are monitored over a period of time for the presence or absence of HAIs. The incidence of HAI is the number of new cases of disease that occur in the defined population during a specified time period. The incidence rate is the number of new cases of HAI that appear in the population at risk during the specific time period.

The tools for data collection can be found in Annex 2.

III) Consolidation and data analysis

Data should be consolidated monthly for the hospital's use, and forwarded quarterly to the Ministry of Health following its analysis. The indicators for calculating ICU Healthcare-associated Infections rates are:

Indicator	Numerator	Denominator
Incidence of ventilator-associated pneumonia	# of cases of pneumonia in patients with mechanical ventilation	# of mechanical ventilator-days x 1000
Incidence of indwelling urinary catheter associated urinary tract infections	# of urinary tract infections in patients with indwelling urinary catheters	# of IUC-days x 1000
Incidence of central venous catheter associated bloodstream infections	# of bloodstream infections in patients with central venous catheter	# of central venous catheter-days x 1000

IV) Dissemination of results

The information of the surveillance system of HAI should be provided and discussed monthly to the monitored services. A monthly report should be prepared and discussed during the ICC meetings.

4. OUTBREAK MANAGEMENT

Outbreak investigation is a priority for the hospital because in general it is often preventable infections are associated with high rates of hospital morbidity and mortality. Hospital outbreak is an unusual increase above the expected level (rates from the pre epidemic) of incidence rate of an infectious disease, usually in a short period of time, in a single group of patients that is produced by a microorganism. In the absence of previous studies is sometimes difficult to determine the expected level. The characteristics that define the group of affected patients often become apparent when the study is advanced. In many cases the detection of an outbreak depends on previous experience of staff in charge of surveillance. In principle, any accumulation of infections in a specific service, produced by the same microorganism must be investigated.

The outbreak investigation should be led by the Infection Control Officer with the support of the Infection Control Committee and the Chief of Service or Department affected. These professionals should meet and prepare a preliminary plan to support the outbreak investigation. The investigation of an epidemic requires implementation of a series of activities that can be performed sequentially or simultaneously. These activities are described briefly following:

1. Verification of diagnosis

Check if the clinical and laboratory diagnosis truly correspond to the situation that has motivated the outbreak investigation.

2. Confirmation of outbreak

This requires demonstrate that the epidemic rates are significantly higher than pre-epidemic rates.

3. Definition of the case

Building the definition to characterize the cases in relation to person, time, location, clinical and laboratory features. This definition should be written and may change during the investigation. It is sometimes convenient to make a case definition of probable and definite case, so as to maintain a sufficiently long data record to include or remove each patient as part of the epidemic.

4. Active search of cases using these definitions

It may be necessary to review the records of other patients (review of current surveillance data, medical records of other patients at risk, and microbiological results) to determine if there have been other cases of infection. Prepare a list of cases to include: date of admission, date of onset of infection, culture results affected sites and services.

5. Description of the outbreak

Develop a preliminary statistical description of the data, construct an epidemic curve, attack rates and lethality. Describe symptoms of illness, complications observed and conditions associated with patient deaths.

6. Preliminary analysis of data obtained

To get an impression of the nature of the outbreak, magnitude and severity, formulate tentative hypotheses regarding sources or reservoirs of microorganism, mode of transmission and other risk factors that

are contributing to the outbreak and determine the need to perform more complex investigations or request the participation of experts.

7. Preparation of a written preliminary report

8. Adoption of immediate control measures

These measures are determined by the Infection Control Officer with the Infection Control Committee and implemented in an attempt to stop the spread of infection. Include among others: Isolation, Suspension of certain elective procedures, removal of possible sources of infection, and immediate training about infection control techniques. Refer to table 1 for a summary of suggested immediate actions in function of the suspected or confirmed type of transmission.

9. Reporting of results

A final written report of the investigation, describing the findings, activities, conclusions and recommendations should be prepared by the Infection Control Officer and sent to the Infection Control Committee and Director of the hospital. The analysis of the causes of an outbreak and procedures allows defining areas requiring special attention.

During an outbreak, the hospital image can be damaged by the media. Adequate and timely risk communication is key to ensure a transparent and ensure the confidence on the health care professionals and the institution. In case of an outbreak, the Director of the Hospital will designate a spoken person to communicate with the media.

Table 1. Immediate control measures for outbreak management

Type of Transmission	Suggested action
Contact	Improve hand hygiene Contact precautions, including barrier precautions (gloves and aprons) Cohorting or single room
Airborne (droplets)	Improve hand hygiene Airborne precautions (mask if contact with patients less than 1 meter) Patient isolation or cohorting with appropriate ventilation
IV fluids	Check IV preparation process Block the IV solution
Other	Check the related process

5. HAND HYGIENE

Recognizing that hand hygiene is considered the leading measure to reduce the transmission of nosocomial pathogens in the hospital, and that its impact on infectious and resistant organisms' cross transmission is recognized, the GHPC promotes the implementation of international guidelines for hand hygiene developed by WHO.

1. Indications for Hand Hygiene

- A. Wash hands with soap and water when visibly dirty or visibly soiled with blood or other body fluids or after using the toilet.
- B. If exposure to potential spore-forming pathogens is strongly suspected or proven, including outbreaks of *Clostridium difficile*, hand washing with soap and water is the preferred means.
- C. Use an alcohol-based handrub as the preferred means for routine hand antisepsis in all other clinical situations described in items D(a) to D(f) listed below, if hands are not visibly soiled. If alcohol-based handrub is not obtainable, wash hands with soap and water.
- D. Perform hand hygiene:
 - a. before and after touching the patient ;
 - b. before handling an invasive device for patient care, regardless of whether or not gloves are used;

- c. after contact with body fluids or excretions, mucous membranes, non-intact skin, or wound dressings;
 - d. if moving from a contaminated body site to another body site during care of the same patient;
 - e. after contact with inanimate surfaces and objects (including medical equipment) in the immediate vicinity of the patient;
 - f. after removing sterile or non-sterile gloves.
- E. Before handling medication or preparing food perform hand hygiene using an alcohol-based handrub or wash hands with either plain or antimicrobial soap and water.
- F. Soap and alcohol-based handrub should not be used concomitantly.

2. Hand Hygiene Technique

- A. When washing hands with soap and water, wet hands with water and apply the amount of product necessary to cover all surfaces. Rinse hands with water and dry thoroughly with a single-use towel. Use clean, running water whenever possible. Avoid using hot water, as repeated exposure to hot water may increase the risk of dermatitis. Use towel to turn off tap/faucet. Dry hands thoroughly using a method that does not recontaminate hands. Make sure towels are not used multiple times or by multiple people (The technique for handwashing is illustrated in Figure 1).

- B. Apply a palmful of alcohol-based handrub and cover all surfaces of the hands. Rub hands until dry (The technique for handrubbing is illustrated in Figure 2).
- C. Liquid, bar, leaf or powdered forms of soap are acceptable. When bar soap is used, small bars of soap in racks that facilitate drainage should be used to allow the bars to dry.

3. Recommendations for Surgical Hand Preparation

- A. Remove rings, wrist-watch, and bracelets before beginning surgical hand preparation. Artificial nails are prohibited.
- B. Sinks should be designed to reduce the risk of splashes.
- C. If hands are visibly soiled, wash hands with plain soap before surgical hand preparation. Remove debris from underneath fingernails using a nail cleaner, preferably under running water.
- D. Brushes are not recommended for surgical hand preparation.
- E. Surgical hand antisepsis should be performed using either a suitable antimicrobial soap or suitable alcohol-based handrub, preferably with a product ensuring sustained activity, before donning sterile gloves.
- F. If quality of water is not assured in the operating theatre; surgical hand antisepsis using an alcohol-based handrub is recommended before donning sterile gloves when performing surgical procedures.

- G. When performing surgical hand antisepsis using an antimicrobial soap, scrub hands and forearms for the length of time recommended by the manufacturer, typically 2–5 minutes. Long scrub times (e.g. 10 minutes) are not necessary.
- H. When using an alcohol-based surgical handrub product with sustained activity, follow the manufacturer's instructions for application times. Apply the product to dry hands only. Do not combine surgical hand scrub and surgical handrub with alcohol-based products sequentially.
- I. When using an alcohol-based handrub, use sufficient product to keep hands and forearms wet with the handrub throughout the surgical hand preparation procedure (The technique for surgical hand preparation using alcohol-based handrubs is illustrated in Figure 3)
- J. After application of the alcohol-based handrub as recommended, allow hands and forearms to dry thoroughly before donning sterile gloves.

4. Selection and Handling of Hand Hygiene Agents

- A. Provide HCWs with efficacious hand hygiene products that have low irritancy potential.
- B. To maximize acceptance of hand hygiene products by HCWs, solicit their input regarding the skin tolerance, feel, and fragrance of any products under consideration.

5. Hand Hygiene

C. When selecting hand hygiene products:

- a. determine any known interaction between products used to clean hands, skin care products, and the types of glove used in the institution;
- b. solicit information from manufacturers about the risk of product contamination;
- c. ensure that dispensers are accessible at the point of care;
- d. ensure that dispensers function adequately and reliably and deliver an appropriate volume of the product;
- e. ensure that the dispenser system for alcohol-based handrubs is approved for flammable materials;
- f. solicit and evaluate information from manufacturers regarding any effect that hand lotions, creams, or alcohol-based handrubs may have on the effects of antimicrobial soaps being used in the institution;
- g. cost comparisons should only be made for products that meet requirements for efficacy, skin tolerance, and acceptability.

D. Do not add soap or alcohol-based formulations to a partially empty soap dispenser. If soap dispensers are reused, follow recommended procedures for cleansing.

5. Skin care

- A. Include information regarding hand-care practices designed to reduce the risk of irritant contact dermatitis and other skin damage in education programmes for HCWs.
- B. Provide alternative hand hygiene products for HCWs with confirmed allergies or adverse reactions to standard products used in the health-care setting.
- C. Provide HCWs with hand lotions or creams to minimize the occurrence of irritant contact dermatitis associated with hand antisepsis or handwashing.
- D. When alcohol-based handrub is available in the health-care facility for hygienic hand antisepsis, the use of antimicrobial soap is not recommended.
- E. Soap and alcohol-based handrub should not be used concomitantly.

6. Use of gloves

- A. The use of gloves does not replace the need for hand hygiene by either handrubbing or handwashing.
- B. Wear gloves when it can be reasonably anticipated that contact with blood or other potentially infectious materials, mucous membranes, or non-intact skin will occur.
- C. Remove gloves after caring for a patient. Do not wear the same pair of gloves for the care of more than one patient.

- D. When wearing gloves, change or remove gloves during patient care if moving from a contaminated body site to either another body site (including non-intact skin, mucous membrane or medical device) within the same patient or the environment.
- E. The reuse of gloves is not recommended

7. Other aspects of hand hygiene

- A. Do not wear artificial fingernails or extenders when having direct contact with patients 54
- B. Keep natural nails short (tips less than 0.5 cm long or approximately ¼ inch)

8. Educational and motivational programmes for health-care workers

- A. Educate HCWs about the type of patient-care activities that can result in hand contamination and about the advantages and disadvantages of various methods used to clean their hands.
- B. Monitor HCWs' adherence to recommended hand hygiene practices and provide them with performance feedback
- C. Encourage partnerships between patients, their families, and HCWs to promote hand hygiene in health care settings.

9. Governmental and Institutional Responsibilities for Healthcare Administrators

- Provide HCWs with access to a safe, continuous water supply at all outlets and access to the necessary facilities to perform hand washing.
- Provide HCWs with a readily accessible alcohol-based hand rub at the point of patient care.
- Make improved hand hygiene adherence (compliance) an institutional priority and provide appropriate leadership, administrative support, financial resources, and support for hand hygiene and other infection prevention and control activities.
- Ensure HCWs have dedicated time for infection control training, including sessions on hand hygiene.
- With regard to hand hygiene, ensure that the water supply is physically separated from drainage and sewerage within the health-care setting, and provide routine system monitoring and management.
- Provide strong leadership and support for hand hygiene and other infection prevention and control activities.

BOX 5. Highlighted recommendations.

- Soap and alcohol-based hand rub should not be used concomitantly.
- Do not add soap or alcohol-based formulations to a partially empty soap dispenser. If soap dispensers are reused, follow recommended procedures for cleansing.
- Do not wear artificial fingernails or extenders when having direct contact with patients ⁵⁴
- The use of gloves does not replace the need for hand hygiene by either handrubbing or hand-washing.
- The reuse of gloves is not recommended

Hand Hygiene/Glove Use Observation Tool

INSTRUCTIONS: Observe practice. Include a variety of disciplines. **NOTE:** Hand Hygiene refers to use of alcohol foam hand rub or washing hands with soap and water for at least 15 seconds.

Staff Title	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
HAND HYGIENE																
Before clean and aseptic procedures, including medication prep and prior to prep, gown & glove for sterile procedures.																
After contact with blood, body fluids, secretions or excretions, mucous membranes, non-intact skin.																
After handling objects and devices such as soiled linen, trash, equipment.																

Staff Title	Yes	No		Yes	No		Yes	No		Yes	No		Yes	No		Yes	No
After removing gloves or other PPE used for contact with body substances.																	
Before patient contact. *																	
After patient contact upon exiting patient's room. *																	
Upon entering patient's room before equipment contact. **																	
After equipment contact upon exiting patient's room. **																	

NOTES: * Use of hand-hygiene between patients (as on rounds) is acceptable if no other activity intervenes (e.g. use of a telephone.) **Hand-hygiene is recommended before entering and upon exiting a patient's room even if the only contact is with equipment in the room (CDC Level II). It is NOT necessary to repeat hand-hygiene when moving between the patient and equipment WITHIN the same patient's room (e.g. patient to computer to ventilator to monitor to patient).

Figure 1. Hand hygiene technique with soap and water.

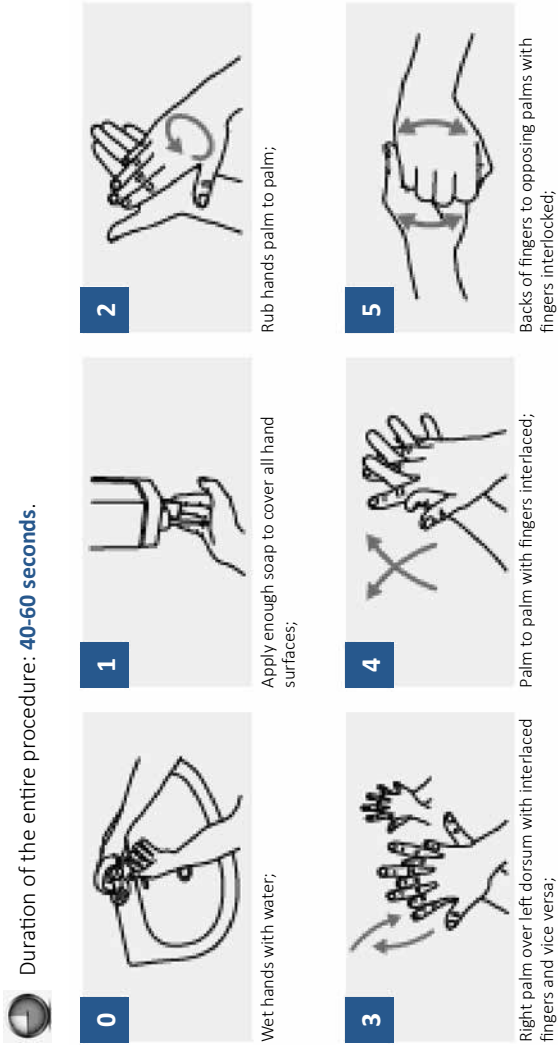
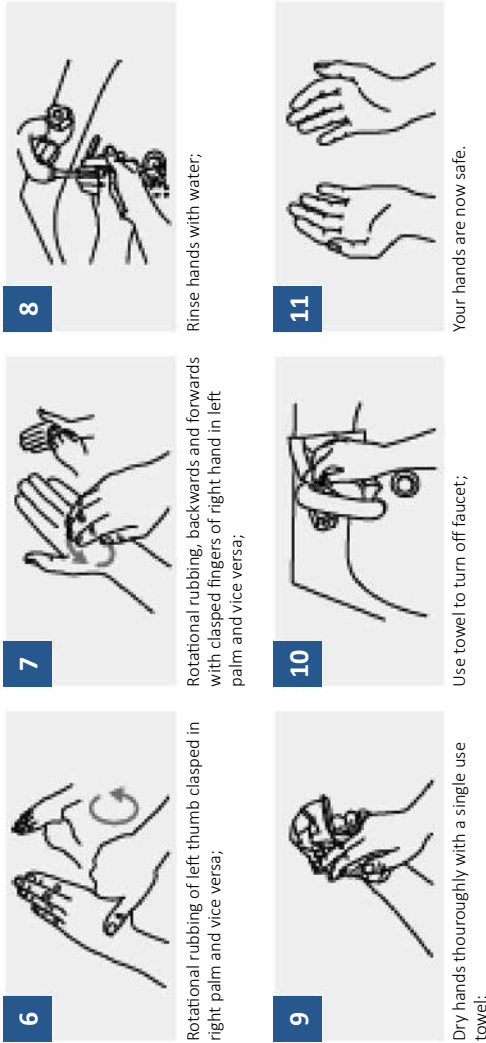


Figure 1. (cont.)



Source: WHO Guidelines on Hand Hygiene in Health Care, 2009.

Figure 2. Hand hygiene technique with alcohol-based formulation.



Duration of the entire procedure: **20-30 seconds**.

1a



1b



2



Apply a palmful of the product in a cupped hand, covering all surfaces;

Rub hands palm to palm;

3



4



5



Right palm over left dorsum with interlaced fingers and vice versa;

Palm to palm with fingers interlaced;

Backs of fingers to opposing palms with fingers interlocked;

6



7



8



Rotational rubbing of left thumb clasped in right palm and vice versa;

Rotational rubbing, backwards and forwards with clasped fingers or right hand in left palm and vice versa;

Once dry, your hands are safe.

Source: WHO Guidelines on Hand Hygiene in Health Care, 2009.

5. Hand Hygiene

Figure 3. Surgical hand preparation technique with an alcohol-based handrub formulation.

The handrubbing technique for surgical hand preparation must be performed on perfectly clean, dry hands. On arrival in the operating theatre and after having donned theater clothing (cap/hat/bonnet and mask), hands must be washed with soap and water.

After the operation when removing gloves, hands must be rubbed with alcohol-based formulation or washed with soap and water if any residual talc or biological fluids are present (ie.g. the glove is punctured).

Surgical procedures may be carried out one after the other without the need for handwashing, provided that the handrubbing technique for surgical hand preparation is followed (images 1 to 9).



1

Put approximately 5ml (3 doses) of alcohol-based handrub in the palm of your left hand, using the elbow of your other arm to operate the dispenser.



2

Dip the fingertips of your right hand in the handrub to decontaminate under the nails (5 seconds).



3

Images 3–7: Smear the handrub on the right forearm up to the elbow. Ensure that the whole skin area is covered by using circular movements around the forearm until the handrub has fully evaporated (10-15 seconds).



4

See legend for image 3.



5

See legend for image 3.



6

See legend for image 3.



7

See legend for image 3.



8

Put approximately 5ml (3 doses) of alcohol-based handrub in the palm of your right hand, using the elbow of your other arm to operate the dispenser.



9

Dip the fingers of your left hand in the handrub to decontaminate under the nails (5 seconds).

6. ISOLATION PRECAUTIONS

1. Mode of Transmission of HAIs

Transmission of infectious agents within a health-care setting requires three elements: a source (or reservoir) of infectious agents, a susceptible host with an entry point for the agent, and a mode of transmission for the agent.

Several types of pathogens can cause infection, including bacteria, viruses, fungi, parasites, and prions. The modes of transmission vary by type of organism and some infectious agents may be transmitted by more than one route: some are transmitted primarily by direct or indirect contact, (e.g., *Herpes simplex* virus [HSV], respiratory syncytial virus, *Staphylococcus aureus*), others by droplets, (e.g., influenza virus, *Bordetella pertussis*) or airborne routes (e.g., *M. tuberculosis* or measles).

Airborne transmission

Occurs by dissemination of either airborne droplet nuclei or small particles in the respirable size range containing infectious agents that remain infective over time and distance (under 5 microns) (e.g., spores of *Aspergillus* spp, and *Mycobacterium tuberculosis*). Microorganisms carried in this manner may be dispersed over long distances by air currents and may be inhaled by susceptible individuals who have not had face-to-face contact with (or been in the same room with) the infectious individual.

Droplet transmission

Droplet transmission is, technically, a form of contact transmission, and some infectious agents transmitted by the droplet route also may be transmitted by the direct and indirect contact routes. However, in contrast to contact transmission, respiratory droplets carrying infectious pathogens transmit infection when they travel directly from the respiratory tract of the infectious individual to susceptible mucosal surfaces of the recipient, generally over short distances, necessitating facial protection. Respiratory droplets (5-10 microns) are generated when an infected person coughs, sneezes, or talks or during procedures such as suctioning, endotracheal intubation, cough induction by chest physiotherapy and cardiopulmonary resuscitation. Some clinical procedures can generate aerosols, which allow airborne transmission.

Contact transmission

It is divided into two subgroups: direct contact and indirect contact:

- a) Direct contact transmission, occurs when microorganisms are transferred from one infected person to another person without a contaminated intermediate object or person.
- b) Indirect transmission involves the transfer of an infectious agent through a contaminated intermediate object or person. The contaminated hands of health-care personnel are important contributors to indirect contact transmission.

2. Standard Precautions

Standard precautions are based on the principle that all patient blood and body fluids are considered potentially infectious, and standard precautions will be used for all patients.

Standard Precautions include a group of infection prevention practices that apply to all patients, regardless of suspected or confirmed infection status, in any setting in which healthcare is delivered (Table 2). These include: hand hygiene; use of gloves, gown, mask, eye protection, or face shield, depending on the anticipated exposure; and safe injection practices. Also, equipment or items in the patient environment likely to have been contaminated with infectious body fluids must be handled in a manner to prevent transmission of infectious agents. (See Annex 3 for the WHO healthcare facility recommendations for standard precautions).

The application of Standard Precautions during patient care is determined by the nature of the HCW-patient interaction and the extent of anticipated blood, body fluid, or pathogen exposure. For some interactions (e.g., performing venipuncture), only gloves may be needed; during other interactions (e.g., intubation), use of gloves, gown, and face shield or mask and goggles is necessary.

Table 2. Recommendations for application of standard precautions for the care of all patients in all healthcare settings.

Component	Recommendations
Hand hygiene	After touching blood, secretions, excretions, contaminated items; immediately after removing gloves; between patient contacts.
Personal protective equipment (PPE)	
Gloves	For touching blood, secretions, excretions, contaminated items; for touching mucous membranes and nonintact skin.
Gown	During procedures and patient-care activities when contact of clothing/exposed skin with blood/body fluids, secretions, and excretion is anticipated.
Mask, eye protection (goggles), face shield	During procedures and patient-care activities likely to generate splashes or sprays of blood, body fluids, secretions, especially suctioning, endotracheal intubation.
Soiled patient-care equipment	Handle in a manner that prevents transfer of microorganisms to others and to the environment; wear gloves if visibly contaminated; perform hand hygiene.
Environmental control	Develop procedures for routine care, cleaning, and disinfection of environmental surfaces, especially frequently touched surfaces in patient-care areas.
Textiles and laundry	Handle in a manner that prevents transfer of microorganisms to others and to the environment.

Table 2. (cont.)

Needles and other sharps	Do not recap, bend, break, or hand-manipulate used needles; if recapping is required, use a one-handed scoop technique only; use safety features when available; place used sharps in puncture-resistant container.
Patient resuscitation	Use mouthpiece, resuscitating bag, other ventilation devices to prevent contact with mouth and other secretions.
Patient placement	Prioritize for single-patient room if patient is at increased risk of transmission, is likely to contaminate the environment, does not maintain appropriate hygiene, or is at increased risk of acquiring infection or developing adverse outcome following infection.
Respiratory hygiene/ cough etiquette (source contaminant of infectious respiratory secretions in symptomatic patients, beginning at initial point of encounter e.g., triage and reception areas in emergency departments and physician offices)	Instruct symptomatic persons to cover mouth/nose when sneezing/coughing; use tissues and dispense in no-touch receptacle; observe hand hygiene after soiling of hands with respiratory secretions; wear surgical mask if tolerated or maintain spatial separation, >3 feet if possible.

From: Siegel JD, Rhinehart E, Jackson M, Chiarello L, and the Healthcare Infection Control Practices Advisory Committee, 2007 Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings, June 2007

3. Transmission-based Precautions

Airborne precautions

The following is required:

- a) Individual room with adequate ventilation; this includes, where possible, negative pressure; door closed; at least six air exchanges per hour; exhaust to outside away from intake ducts.
- b) Staff wearing high-efficiency masks in room.
- c) Patient to stay in room.

Droplet precautions

The following procedures are required:

- a) Individual room for the patient, if available.
- b) Surgical mask for health care workers.
- c) Restricted circulation for the patient; patient wears a surgical mask if leaving the room.

Contact precautions

- a) Individual room for the patient if available; cohorting of patients if possible.
- b) Staff wear gloves on entering the room; a gown for patient contact or contact with contaminated surfaces or material.
- c) Restrict patient movement outside the room.

4. Recommendations

Personal protective equipment (PPE) ***(see Annexes 4, 5, 6, 7)***

Observe the following principles of use:

- a) Wear PPE, when the nature of the anticipated patient interaction indicates that contact with blood or body fluids may occur.
- b) Prevent contamination of clothing and skin during the process of removing PPE.
- c) Before leaving the patient's room or cubicle, remove and discard PPE.

Gloves

- a) Wear gloves when it can be reasonably anticipated that contact with blood or other potentially infectious materials, mucous membranes, no intact skin, or potentially contaminated intact skin (e.g., of a patient incontinent of stool or urine) could occur. Wear gloves with fit and durability appropriate to the task.
 - i. Wear disposable medical examination gloves for providing direct patient care.
 - ii. Wear disposable medical examination gloves or reusable utility gloves for cleaning the environment or medical equipment.
- b) Remove gloves after contact with a patient and/or the surrounding environment (including medical equipment) using proper technique to prevent hand contamination. Do not wear the same pair of gloves

for the care of more than one patient. Do not wash gloves for the purpose of reuse since this practice has been associated with transmission of pathogens.

- c) Change gloves during patient care if the hands will move from a contaminated body-site (e.g., perineal area) to a clean body-site (e.g., face).

Gowns

- a) Wear a gown, that is appropriate to the task, to protect skin and prevent soiling or contamination of clothing during procedures and patient-care activities when contact with blood, body fluids, secretions, or excretions is anticipated.
 - i. Wear a gown for direct patient contact if the patient has uncontained secretions or excretions.
 - ii. Remove gown and perform hand hygiene before leaving the patient's environment.
- b) Do not reuse gowns, even for repeated contacts with the same patient.
- c) Routine donning of gowns upon entrance into a high risk unit (e.g., ICU, NICU unit) is not indicated.

Mouth, nose, eye protection

- a) Use PPE to protect the mucous membranes of the eyes, nose and mouth during procedures and patient-care activities that are likely to generate splashes or sprays of blood, body fluids, secretions and excretions. Select masks, goggles, face shields, and combinations of each according to the need anticipated by the task performed.

6. Isolation Precautions

- b) During aerosol-generating procedures (e.g., bronchoscopy, suctioning of the respiratory tract [if not using in-line suction catheters], endotracheal intubation) in patients who are not suspected of being infected with an agent for which respiratory protection is otherwise recommended (e.g., *M. tuberculosis*, SARS or hemorrhagic fever viruses), wear one of the following: a face shield that fully covers the front and sides of the face, a mask with attached shield, or a mask and goggles (in addition to gloves and gown).

Respiratory Hygiene/Cough Etiquette

1. Educate healthcare personnel on the importance of source control measures to contain respiratory secretions to prevent droplet and fomite transmission of respiratory pathogens, especially during seasonal outbreaks of viral respiratory tract infections (e.g., influenza, RSV, adenovirus, parainfluenza virus) in communities.
2. Implement the following measures to contain respiratory secretions in patients and accompanying individuals who have signs and symptoms of a respiratory infection, beginning at the point of initial encounter in a healthcare setting (e.g., triage, reception and waiting areas in emergency departments, outpatient clinics and physician offices).
 - i. Post signs at entrances and in strategic places (e.g., elevators, cafeterias) within ambulatory and inpatient settings with instructions to patients and other persons with symptoms of a respiratory infection to cover their mouths/noses when coughing or sneezing, use and dispose of tissues,

and perform hand hygiene after hands have been in contact with respiratory secretions.

- ii. Provide tissues and no-touch receptacles (e.g., foot-pedaloperated lid or open, plastic-lined waste basket) for disposal of tissues.
- iii. Provide resources and instructions for performing hand hygiene in or near waiting areas in ambulatory and inpatient settings; provide conveniently-located dispensers of alcohol-based hand rubs and, where sinks are available, supplies for hand washing.
- iv. During periods of increased prevalence of respiratory infections in the community (e.g., as indicated by increased school absenteeism, increased number of patients seeking care for a respiratory infection), offer masks to coughing patients and other symptomatic persons (e.g., persons who accompany ill patients) upon entry into the facility or medical office and encourage them to maintain special separation, ideally a distance of at least 3 feet, from others in common waiting areas.

Patient placement

- a) Include the potential for transmission of infectious agents in patient placement decisions. Place patients who pose a risk for transmission to others (e.g., uncontained secretions, excretions or wound drainage; infants with suspected viral respiratory or gastrointestinal infections) in a single-patient room when available.
- b) Determine patient placement based on the following principles:

6. Isolation Precautions

- Route(s) of transmission of the known or suspected infectious agent
- Risk factors for transmission in the infected patient
- Risk factors for adverse outcomes resulting from an HAI in other patients in the area or room being considered for patient placement
- Availability of single-patient rooms
- Patient options for room-sharing (e.g., cohorting patients with the same infection)

Patient-care equipment and instruments/devices

- a) Remove organic material from critical and semi-critical instrument/devices, using recommended cleaning agents before high level disinfection and sterilization to enable effective disinfection and sterilization processes.
- b) Wear PPE (e.g., gloves, gown), according to the level of anticipated contamination, when handling patient-care equipment and instruments/devices that is visibly soiled or may have been in contact with blood or body fluids.

Care of the environment

- a) Clean and disinfect surfaces that are likely to be contaminated with pathogens, including those that are in close proximity to the patient (e.g., bed rails, over bed tables) and frequently-touched surfaces in the patient care environment (e.g., door knobs, surfaces in and surrounding toilets in patients' rooms) on a more frequent schedule compared to that for other surfaces (e.g., horizontal surfaces in waiting rooms).

- b) Use disinfectants that have microbiocidal (i.e., killing) activity against the pathogens most likely to contaminate the patient-care environment. Use in accordance with manufacturer's instructions.
- Review the efficacy of in-use disinfectants when evidence of continuing transmission of an infectious agent (e.g., rotavirus, *C. difficile*, norovirus) may indicate resistance to the in-use product and change to a more effective disinfectant as indicated.
- c) In facilities that provide health care to pediatric patients or have waiting areas with child play toys (e.g., obstetric/gynecology offices and clinics), establish policies and procedures for cleaning and disinfecting toys at regular intervals. *Category 1B*. Use the following principles in developing this policy and procedures:
- Select play toys that can be easily cleaned and disinfected
 - Do not permit use of stuffed furry toys if they will be shared
 - Clean and disinfect large stationary toys (e.g., climbing equipment) at least weekly and whenever visibly soiled
 - If toys are likely to be mouthed, rinse with water after disinfection; alternatively wash in a dishwasher
 - When a toy requires cleaning and disinfection, do so immediately or store in a designated labeled container separate from toys that are clean and ready for use

6. Isolation Precautions

Textiles and laundry

- a) Handle used textiles and fabrics with minimum agitation to avoid contamination of air, surfaces and persons.

Safe injection practices

The following recommendations apply to the use of needles, cannulas that replace needles, and, where applicable intravenous delivery systems

- a) Use aseptic technique to avoid contamination of sterile injection equipment.
- b) Do not administer medications from a syringe to multiple patients, even if the needle or cannula on the syringe is changed. Needles, cannulae and syringes are sterile, single-use items; they should not be reused for another patient nor to access a medication or solution that might be used for a subsequent patient.
- c) Use fluid infusion and administration sets (i.e., intravenous bags, tubing and connectors) for one patient only and dispose appropriately after use. Consider a syringe or needle/cannula contaminated once it has been used to enter or connect to a patient's intravenous infusion bag or administration set.
- d) Use single-dose vials for parenteral medications whenever possible.
- e) Do not administer medications from single-dose vials or ampules to multiple patients or combine leftover contents for later use.
- f) If multidose vials must be used, both the needle or cannula and syringe used to access the multidose vial

must be sterile.

- g) Do not keep multidose vials in the immediate patient treatment area and store in accordance with the manufacturer's recommendations; discard if sterility is compromised or questionable.
- h) Do not use bags or bottles of intravenous solution as a common source of supply for multiple patients.

Infection control practices for special lumbar puncture procedures

Wear a surgical mask when placing a catheter or injecting material into the spinal canal or subdural space (i.e., during myelograms, lumbar puncture and spinal or epidural anesthesia.

The specific indications for standard and isolation precautions are described in Table 3.

Table 3. Indications for standard and isolation precautions.

Precaution Category	Condition
Standard	ALL the patients
Contact	(Risk of) colonization or infection with multi-resistant bacteria, <i>C. difficile</i> infection, acute diarrhea in incontinent patient, RSV infection, croup or bronchiolitis in young children, skin infections like impetigo, major abscess, cellulitis or decubitus, staphylococcal furunculosis, pediculosis, scabies, or cutaneous infections with <i>C. diphtheriae</i> , Herpes simplex virus, zoster and hemorrhagic fever such as Ebola, Lassa, and Malburg.
Droplet	Meningitis, (suspected) invasive infection with H. influenza type B, or <i>N. meningitidis</i> , diphtheria, <i>M. pneumoniae</i> , pertussis, influenza, adenovirus, mumps, Parvovirus B19, rubella, streptococcus pharyngitis, pneumonia, scarlet fever in young children, plague.
Airborne	Pulmonary or laryngeal (suspected) tuberculosis, measles, varicella, disseminated zoster.

Source: Adapted from Wenzel, Bearman, Brewer, and Butzler, editors. A Guide to Infection Control at the Hospital. 4th Edition, USA, 2008.

7. CLEANING, DISINFECTION AND STERILIZATION

1. Cleaning of Materials

Cleaning of every material that is used in the hospital should be carried out prior to the disinfection or sterilization process. Cleaning is an essential component in the reprocessing of medical devices and sterilization can never be achieved without a complete cleaning.

BOX 6. Steps in the process for cleaning materials

- a) Reception
- b) Classification
- c) Prewashing or soaking
- d) Manual washing and rinsing with water
- e) Rinsing with alcohol
- f) Drying
- g) Lubrication

a) Reception

This is carried out in the dirty (decontamination) area or red area. Using a pass thru window, the materials and instruments should be confirmed in terms of number, state in which received and point of origin, and recorded in the respective registry. Their entry will be recorded manually (in notebooks or forms) or through computerized systems. During reception, personnel should use PPE (thick gloves, plastic apron, etc.) and use great caution to avoid dropping or spills.

b) Classification

After carrying out the reception of the material, it will be classified according to type of material, which can be:

- metal (ideally stainless steel)
- polyethylene
- rubber
- plastic
- glass.

c) Prewashing or soaking

Classification is followed by prewashing or decontamination. This is known as a physical process or method designed to reduce the number of microorganisms (bioburden) of an inanimate object in order to make it safe for handling. It is important to mention that prewashing or decontamination is one of the principal tasks within the cleaning of articles and *precedes any other related task*.

This process is carried out by submerging the material in a tray or container that is perforated with an enzymatic detergent (according to the time recommended by the manufacturer) and then passing the material under a stream of running water.

Prior to every cleaning, materials should be completely disassembled. The next step is the manual prewashing of the instrument or device, through submersion in a solution of enzymatic detergent 0.8% (see manufacturer recommendations) in running water whose temperature is

not higher than 45 °C. Then soak the device until all of the organic matter is dissolved and has been eliminated. At *least 1 minute* of soaking is recommended and the soaking time should be extended for devices with adhered organic matter. Materials that are non-stainless steel or carbon steel, and chromium plated materials that have lost their integrity (even if they have minimal erosion), *should not* be exposed to the enzymatic detergent for more than 5 minutes in order to prevent corrosion.

d) Manual washing and rinsing with water

Washing of metal materials

Cuvettes, drum trays, kidney trays, sinks, etc. Any remnants of adhesive tape should be removed.

The materials should be placed in the sink with enzymatic detergent for the amount of time and at the dilution specified on the product's instructions. They should be rinsed with abundant water, eliminating all residues from the detergent solution. A final rinse should be carried out. The corresponding brushing should be carried out if necessary. The materials should be dried with a clean cloth.

Washing of surgical instruments

Tweezers, scissors, etc. Before proceeding to wash the instruments, it is necessary to thoroughly check the instrument received according to its description (number of parts and state of conservation of each part). It is sometimes necessary to open and disassemble tweezers. The instruments should be placed in order at the bottom of the container made of metal or perforated plastic, starting with the heaviest one. To carry out

decontamination, place the instruments in a perforated tray and submerge them in a container with enzymatic detergent. This container should be located in the wash sink. Then put the container under the stream of water to eliminate the maximum amount possible of bioburden. Proceed with brushing, placing special emphasis on the toothed bars and internal spaces of the tweezers. Rinse with abundant water, eliminating all residues from the detergent solution. Carry out a final rinse. Dry the materials with a clean cloth.

Washing polyethylene, rubber, plastic and latex material

When washing polyethylene, rubber, plastic and latex material we should follow the following steps: During washing, it is important to have cuvettes, trays, or perforated containers. Remove any remnants of adhesive tape that are stuck to the surfaces (for example, adhesive tape) using cotton impregnated with white benzine. Then submerge the material in an enzymatic detergent.

In the case of tubular-shaped material, use a 60 cc. syringe with a cone point to fill the entire lumen with the solution. Remove and rinse with abundant water. If possible, use high pressure water guns or specialized cone-shaped pressurized water pipes to pressure in different sizes or diameters to wash the lumen of catheters, extension tubes, connector tubes, corrugated tubes, etc. Carry out the final rinse of the material with water. Let it drain into the environment and then dry. If it is possible, use compressed air (less expensive) or drying chambers for corrugated materials that contain filtered air. It is important to note that there are currently washing machines that are specially designed

for washing material or devices with lumens such as endoscopes, bronchoscopes, etc. The cleaning process for latex gloves is not recommended or mentioned since in recent years, various cost-effectiveness studies have demonstrated a high reprocessing cost. Moreover, mechanical reprocessing is difficult and this material is not made to be reused.

Washing of glass material, jars and syringes

Submerge the material in a solution with enzymatic detergent. It should be taken into account that when cleaning the interior of the jar, the type of brush that is used with feeding bottles or swabs should be used according to the required size. Rinse repeatedly under a stream of running water. Dry the outside with a cloth, but never dry the inside with a cloth, in order to avoid the introduction of foreign bodies like lint.

e) Rinsing with alcohol

After exhaustive rinsing with water, rinsing the material with pure alcohol (96%) is recommended, especially hollow, tubular, corrugated, etc. devices. The purpose of this rinse is to increase the drying speed.

f) Drying

Drying instruments, devices and other hospital use articles constitutes a fundamental part of the cleaning process. It is very important to dry the instruments immediately after rinsing, in order to prevent later contamination. When drying materials, it is necessary to take into account the degree of moisture of the articles, since it could interfere in the disinfection or sterilization

process. Drying can be manual and automatic. Manual drying should be carried out with a cloth or compressed air. Dry the devices well by hand with soft cloths made from very absorbent material or cellulose fiber. Make sure that lint or fibers do not remain on the surface or interior of the materials.

g) Lubrication

Following cleaning, instruments can become rigid and difficult to manage and present stains or other imperfections. This is why lubrication after cleaning and before sterilization is important. This is only carried out for surgical instruments. The lubricant solution utilized should be water soluble and made specifically for sterilization. Mineral, silicone or machine oils should not be used since they do not allow the sterilizing agents to fully penetrate and as a result, microorganisms are not destroyed. There are lubricants that contain an oxide inhibitor that is useful for preventing the electrolysis of the ends and edges. The use of lubricant is the first step in the preventive maintenance of instruments.

2. Preparing and Packaging Materials

Packaging should be selected according to the sterilization method and the article to be prepared.

Every package should have an exposure control and an identification or label of the content, service, lot number, expiration date, and initials of the operator. This stage includes:

7. Cleaning, Disinfection and Sterilization

a) Inspection and verification of the articles

The visual inspection of each article should be carried out by observing deficiencies in the cleaning process, corrosion and other damage like cracks. The functional inspection of each article should also be carried out, confirming that scissors are able to cut, confirming the fit of the teeth in dissecting forceps, and confirming the catch system for the toothed bars of hemostatic forceps. Their lubrication conditions should also be verified. Articles not ready for use will be withdrawn and replaced in the shortest amount of time possible.

b) Selection of the packaging, (see Annex 8)

The principal purpose of any packaging material is to hold the objects, maintain the sterility of the content, and provide an aseptic presentation. At the same time, it should be economically effective and cost-saving for the institution.

Sterilization packaging is classified according to its origin or manufacturing as medical grade, non-medical grade and rigid container materials. Within these different types, there are materials that are disposable and others that are reusable. The term ***medical grade*** is used by the sterilization packaging industry to designate materials that are specially designed for packaging and whose preparation is standardized. This type of packaging has a controlled porosity no higher than 0.5 microns and water repellency.

Surgical grade or medical grade paper

This is the ideal paper for the sterilization process. Its porosity of 0.1 micras is controlled. It should have no

less than 55% long fibers (the rest are short fibers) made of pure cellulose (British Standards 6255:1989). Optical bleaches are not added during the preparation of this paper. The

grammage is 60 to 65 g/m², its pH is neutral and it is highly resistant to tearing. This paper does not release lint, but it does release fibers if the paper is broken by the hand during opening. A grammage of 60 to 80 g/m² guarantees mechanical resistance. Thicker paper guarantees protection against the entry of bacteria. During sterilization, especially by steam, the structure of the paper fibers undergoes strong pressures. This paper is safe and blocks bacteria following one sterilization, but its capacity for protection decreases in successive sterilization processes.

Instructions for use: It can be used for steam and ethylene oxide. It should not be reused.

Rigid containers

There are a wide range of containers on the market with different characteristics and compatible with different sterilization methods. They should be used according to manufacturer instructions.

They can be made from aluminum, stainless steel, plastic, or plastic-metal combinations. Some contain bacterial filters and others have valves that provide a biobarrier. They are very effective since they do not break, do not release fibers, do not become contaminated, and are easily transported.

c) Packaging of the article

Elements and packing material:

- Adhesive tape with external chemical control according to the sterilization
- method to be used.
- Adhesive tape for identification of the package (masking tape).
- Internal chemical indicator or integrator.
- Gauze or protectors for sharp, pointed instruments.
- Sealer in the case of mixed or polyethylene packaging.

Packaging models:

- Envelope type
- Rectangular type
- Paper bags
- Pouch or window package

Size of the package

For sterilization by steam (autoclave):

The size of the packages should not be larger than: 28 x 28 x 47 cm. If packages of 25 x 25 x 20 cm are used, exposure and drying times can be reduced. The weight should not exceed 4 to 5 kg.

Techniques or procedures for preparing packages

Envelope type

- Position the material diagonally in the center of the packaging.
- Place the internal chemical indicator or integrator in the center of the package.

- Fold the end facing the person who is preparing the package in such a way that it reaches the center of the package and covers the article.
- Then make a fold with the point facing outward.
- Fold the sides into the center of the package in the form of an envelope, always making a fold at the point. Carry out the same procedure on the other side so that they both cover the article.
- Complete the package by lifting the fourth and final point toward the center of the package and seal the entire package with process indicator tape.
- The control tape should not measure less than 5 cm.

Rectangular type of surgical clothing

- For quality implementation of surgical activities, it is important that the surgical textile material be prepared in packages that contain the quantity of articles that are necessary for the type of intervention to be performed.
- Taking into account that the sheets, compresses and scrubs are dense enough to serve as a barrier to penetration by steam, it is advisable to wrap these elements in packages that do not exceed 30 x 30 x 50 cm. Otherwise, they should be wrapped separately.
- If the packages are larger, they run the risk of blocking the flow of the sterilizing agent inside the autoclave, preventing elimination of air and sterilization of the packages.

Pouch or window package

- These packages should only be filled to $\frac{3}{4}$ of their

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capacity. Otherwise, effective sealing cannot be carried out and the container will be at risk of bursting.

- Regardless of the sterilization method used, recall that when adjusting the pouches or packages in the sterilization chamber, each polymer side should be placed against another polymer side, since the exchange of air, steam, or gases happens only through the paper.
- One precaution related to sealing is that in the case of a very high resistance by the sealing cord, there can be problems opening the bag and possible bursting of the package. Do not forget to always confirm the sealing cord and reduce its resistance by lowering the temperature of the seal.

d) Sealing

Paper bags will be folded twice and then sealed with adhesive tape, which will be applied vertically at the closure. Boxes (metal or plastic) should not be sealed with any type of adhesive tape.

The sealing should permit later opening that is aseptic and allows the use of an easy technique that prevents dropping or breakage of the material. Sealing can be carried out according to the following techniques:

- With adhesive tapes
- Bundled with strings or cotton thread
- Manual folding
- Heat-sealed

e) Labeling of the package

Manual labeling should be done on self-adhesive labels or on the fold or flap of the package, making sure *not to perforate* the package and that the writing ink *does not stain* the medical use device. The medical use product should be identified with the following information:

- Name of the material
- Destination (in the event that it is needed)
- Preparation and/or sterilization date
- Code of the person responsible
- Lot number
- Any other clarification that is considered necessary (expiration date)

f) Evaluation of the package

Packages should undergo continuous evaluation in order to confirm the following:

- Integrity of the external layer of the material
- Integrity of the seals
- Correct identification
- Gauge of the chemical indicator
- Reading of the expiration date

3. Disinfection

In 1968, Earl Spaulding established the first criterion for disinfection with the objective of rationalizing guidelines for processing materials and instruments. Spaulding considered the level of infection risk that the utilization of these articles would represent and classified them in the following way:

Critical articles: Critical articles are instruments that come into contact with cavities or sterile tissues, including the vascular system. These articles pose a high risk of infection if they are contaminated with any microorganism, which means that they should ***always*** be ***sterile***. This includes, for example, surgical instruments, cardiac probes, catheters and prostheses.

Semi-critical articles: Semi-critical articles are instruments that come into contact with the mucous membrane of the respiratory, genital and urinary tracts and with skin that is not intact. Although mucous membranes are usually resistant to infections by bacterial spores, they can present infection when they are contaminated with other microbial forms. For this reason, they should be ***sterile***, or at the least, they should be submitted to ***high-level disinfection*** (HLD). This includes, for example, respiratory assistance devices, anesthesia and endoscopic devices.

Non-critical articles: Non-critical articles refer to all instruments that only come into contact with intact skin. In this case, healthy skin acts as an effective barrier to keep out the majority of microorganisms. As a result, the level of disinfection needed is lower. In general, only adequate cleaning and drying are required,

with the need for ***intermediate- or low-level level disinfection*** on some occasions. Some examples of this type of instruments are sphygmomanometers, bedclothes, incubators, mattresses and furniture.

Disinfection is the physical or chemical process that eliminates vegetative microorganisms from inanimate objects without ensuring the elimination of bacterial spores. Every semi-critical article that cannot be sterilized should be disinfected according to the guideline criteria and the validated protocol.

Levels of disinfection: These levels are based on the microbicidal effect of the chemical agents on the microorganisms and can be:

High-level disinfection (HLD): This is carried out with liquid chemical agents that eliminate all of the microorganisms. Examples are orthophthaldehyde, glutaraldehyde, peracetic acid, chlorine dioxide, hydrogen peroxide and formaldehyde, among others.

Intermediate-level disinfection (ILD): This is carried out using chemical agents that eliminate vegetative bacteria and some bacterial spores. This includes the phenol group, sodium hypochlorite, cetrimide and benzalkonium chloride.

Low-level disinfection (LLD): This is carried out by chemical agents that eliminate vegetative bacteria, fungi and some viruses within a short period of time (less than 10 minutes). One example is the group of quaternary ammoniums.

Disinfection methods

Disinfection is one of the oldest procedures in the hos-

pital environment. It was originally used to eliminate microorganisms from the environment and to sanitize hands. There are two disinfection methods: *physical* and *chemical*.

Physical methods: pasteurization

This method was originally used by the French Louis Pasteur. This process is used to carry out HLD, by bringing water to 77 °C for approximately 30 minutes. This destroys all microorganisms except bacterial spores.

Liquid chemical methods (see Annex 10)

This is the most frequently utilized method in our hospital system and multiple germicidal agents exist in liquid form. This method requires many controls during execution. Since it is a method that is carried out for the most part manually, all stages of the protocol recommended by the manufacturer and validated should be followed closely. Deficiencies in the disinfection process can result in serious infectious or inflammatory complications in patients who come into contact with these articles. The principal disinfectants used in the hospital area are: orthophthaldehyde, glutaraldehyde, chlorine and chlorinated compounds, formaldehyde, hydrogen peroxide, peracetic acid, phenols and quaternary ammoniums.(see Annex)

Glutaraldehyde

This is an aldehyde compound that is presented as aqueous, acidic and alkaline solutions. The acidic solutions are not sporicidal, but when an alkalinizing agent is used as activator, this product becomes sporicidal. Once activated, it has an alkaline pH, which is drastically reduced starting 14 days post-activation. There are also formulations that allow a longer shelf life of 28 days. *Mechanism of action:* Its

action is the result of the alkylation of cellular components that alters the protein synthesis of DNA and RNA acids.

Spectrum: It is a bactericide, fungicide, viricide, mycobactericide and sporicide.

Advantages and disadvantages: It is not corrosive. For HLD (45 minutes) at room temperature, it has germicidal activity in the presence of organic matter. The great disadvantage of glutaraldehyde is its toxicity: once activated, it tends to produce vapors that irritate the mucous membranes, respiratory system and skin. Therefore, it should be used in highly ventilated environments and with personal protective equipment. There are currently workspaces for HLD that protect the operator.

Instructions for use: It is indicated for the HLD of endoscopes when sterilization is not possible. It is also indicated for the use of metal articles or materials such as speculums, ear, nose and throat and dental instruments, and the slides for laryngoscopes.

Concentrations for use: In our environment we have a 2% solution. A time of 45 minutes is required to carry out HLD at a temperature of 20 °C. There are other formulations of glutaraldehyde in concentrations that range from 2.4% to 3.4%.

Chlorine and chlorated compounds

Chlorine-based disinfectants are usually available in liquid form as sodium hypochlorite (bleach) or in solid form as calcium hypochlorite (sodium dichloroisocyanurate).

Mechanism of action: It produces the inhibition of enzymatic reactions, denaturation of proteins and inactivation of nucleic acids.

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Spectrum: It is a viricide, fungicide and bactericide (mycobactericide).

Advantages and disadvantages: Its action is fast, low-cost and easy to manage. It has deodorizing properties and microbicidal activity attributable to the undissociated hypochlorous acid. The dissociation of this acid, and consequently the smaller activity, depends on the pH. Its efficiency diminishes with an increase in pH. It has corrosive activity, becomes inactive in the presence of organic matter, produces irritation of the mucous membranes, is polymerized by sun rays, and needs to be protected in opaque containers. Chlorine solutions should not be conserved in uncovered containers for more than 12 hours due to the evaporation of the active product. Evaporation causes the concentrations of available chlorine to decline from 40% to 50%.

Concentrations for use: The minimum concentration to eliminate mycobacteria is 1,000 ppm (0.1%) for 10 minutes. Objects should not be submerged for more than 30 minutes due to the element's corrosive activity. Abundant rinsing is also recommended to prevent chemical irritation from possible waste. It is important to point out that there are many factors that affect the stability of chlorine, such as the presence of heavy ions, the pH of the solution, the temperature of the solution, the presence of biofilms, the presence of organic matter, and ultraviolet radiation.

Concentrations for use in the hospital area:

10,000 ppm = 1% = Concentration for disinfection of spills, following cleaning.

5,000 ppm = 0.5% = Disinfection of materials, following cleaning.

1,000 ppm = 0.1% = Disinfection of critical areas, following cleaning.

100 to 500 ppm = 0.01 to 0.05% = Disinfection of non-critical areas.

Quaternary ammoniums

The compounds most commonly used in hospital establishments are alkyl-dimethyl-benzyl-ammonium chloride, alkyl-didecyl-dimethyl-ammonium chloride and dialkyl- dimethyl-ammonium chloride.

Mechanism of action: They produce the inactivation of energy-producing enzymes, denaturation of cellular proteins and rupture of the cellular membrane.

Spectrum: They are fungicides, bactericides and viricides against only lipophilic viruses. They are not sporicides or mycobactericides and cannot act against hydrophilic viruses.

Advantages and disadvantages: These elements are good cleaning agents due to their low toxicity. Gauze and cotton remnants can affect their action.

Instructions for use: Due to their low toxicity, they can be used to disinfect surfaces and furniture.

Concentrations for use: The concentrations for use vary according to the combination of quaternary ammonium compounds in each commercial formulation.

Disinfection process for endoscopes

The recommendations for the cleaning and disinfection of endoscopes are summarized in the following table.

Table 4. Cleaning and disinfection of endoscopes.

What to do	How to implement
1. Clean	Immediately after the procedure, submerge and review the external surfaces and internal channels with brushes, a water solution and enzymatic soap.
2. Rinse	Rinse the exterior and all channels with abundant water and with adequate syringes. Subsequently drain the water.
3. Dry	After cleaning and before disinfection, treat the internal channels with forced air and exterior with a clean compress.
4. Disinfect	Submerge the endoscope in a high-level disinfectant, making sure that it penetrates through the channels of air, water, suction, and biopsy. Leave it for 20 minutes.
5. Rinse	Rinse the endoscope and channels with sterile water. Of this is not possible, use faucet water, followed by an alcohol rinse.
6. Dry	After disinfection and prior to storage, treat the internal channels with forced air and the exterior with a clean compress.
7. Store	The endoscope should be stored in a place that prevents recontamination

Source: PAHO/WHO, Sterilization Manual for Health Centers. Washington D.C., 2009.

4. Sterilization

Sterilization refers to the set of operations that are developed to eliminate or kill all forms of living beings that are contained in an object or substance. Every critical article should undergo some type of sterilization method according to its compatibility. Every heat-resistant material that is compatible with moisture should be autoclaved.

Sterilization methods

Physical methods: dry heat and moist heat.

Chemical methods: liquids and gases (ethylene oxide).

Physical-chemical methods: low-temperature steam (formaldehyde) and gas plasma (hydrogen peroxide).

Steam sterilization

Steam sterilization is the most common sterilization procedure (except for materials that cannot resist heat and moisture). The equipment used is called an autoclave. The action mechanism for moist heat is the denaturation of proteins. This method should be considered as the top choice whenever the materials permit it. It has the advantages of rapidly producing elevated temperatures, having short sterilization times, and not leaving toxic waste in the material.

General control parameters for autoclaves

The control parameters are: *steam pressure, time and temperature*.

Steam pressure: Saturated steam with a degree of 0.95 (95% steam and 5% condensed water) and free of impurities, using soft or treated water.

Time and temperature: These will have a direct relationship with the thickness or type of packaging, defined according to the standards established by international agencies.

Refer to Table 5 for time and temperature setting in gravitational and pre-vacuum autoclaves, where the material is protected with simple packaging.

Table 5. Time and temperature for different types of load and sterilizer

Type of sterilizer	Type of load	Temperature (°C)	Time (minutes)
Gravitational	Porous or non-porous surface	121	30
		134	25
	Liquid	134	30
Pre-vacuum	Porous or non-porous surface	121	15
		134	4
	Liquid	134	30

8. PREVENTION OF SURGICAL SITE INFECTIONS (SSI)

Appropriate skin preparation and antimicrobial prophylaxis can decrease the incidence of both superficial and deep surgical site infections.

The development of a SSI involve a complex relationship among the following factors:

- a) Microbial characteristics (eg, degree of contamination and virulence of pathogen)
- b) Patient characteristics (eg, immune status and comorbid conditions)
- c) Surgical characteristics (eg, type of procedure, introduction of foreign material, and amount of damage to tissues)

The risk factors for SSI can be separated into intrinsic, patient-related characteristics and extrinsic, procedure related characteristics.

1. Preoperative

a. Preparation of the patient

- 1. Whenever possible, identify and treat all infections remote to the surgical site before elective operation and postpone elective operations on patients with remote site infections until the infection has resolved.
- 2. Do not remove hair preoperatively unless the hair at or around the incision site will interfere with the oper-

ation. If hair is removed, remove immediately before the operation, preferably with electric clippers.

3. Adequately control serum blood glucose levels in all diabetic patients and particularly avoid hyperglycemia perioperatively.
4. Encourage tobacco cessation. At minimum, instruct patients to abstain for at least 30 days before elective operation from smoking cigarettes, cigars, pipes, or any other form of tobacco consumption (e.g., chewing/dipping).
5. Do not withhold necessary blood products from surgical patients as a means to prevent SSI.
6. Require patients to shower or bathe with an antiseptic agent on at least the night before the operative day.
7. Thoroughly wash and clean at and around the incision site to remove gross contamination before performing antiseptic skin preparation.
8. Use an appropriate antiseptic agent for skin preparation.

b. Hand/forearm antisepsis for surgical team members

1. Keep nails short and do not wear artificial nails.
2. Perform a preoperative surgical scrub for at least 2 to 5 minutes using an appropriate antiseptic. Scrub the hands and forearms up to the elbows.
3. After performing the surgical scrub, keep hands up and away from the body (elbows in flexed position) so that water runs from the tips of the fingers toward

8. Prevention of Surgical Site Infections (SSI)

the elbows. Dry hands with a sterile towel and don a sterile gown and gloves.

Refer to figure 3 in chapter 5 for the adequate surgical hand washing technique.

c. Management of infected or colonized surgical personnel

1. Educate and encourage surgical personnel who have signs and symptoms of a transmissible infectious illness to report conditions promptly to their supervisory and occupational health service personnel.
2. Develop well-defined policies concerning patient care responsibilities when personnel have potentially transmissible infectious conditions. These policies should govern
 - a) personnel responsibility in using the health service and reporting illness,
 - b) work restrictions, and
 - c) clearance to resume work after an illness that required work restriction. The policies also should identify persons who have the authority to remove personnel from duty.
3. Obtain appropriate cultures from, and exclude from duty, surgical personnel who have draining skin lesions until infection has been ruled out or personnel have received adequate therapy and infection has resolved
4. Do not routinely exclude surgical personnel who are colonized with organisms such as *S. aureus* (nose,

hands, or other body site) or group A Streptococcus, unless such personnel have been linked epidemiologically to dissemination of the organism in the healthcare setting.

d. Antimicrobial prophylaxis

1. Administer a prophylactic antimicrobial agent only when indicated, and select it based on its efficacy against the most common pathogens causing SSI for a specific operation and published recommendations.
2. Administer by the intravenous route the initial dose of prophylactic antimicrobial agent, timed such that a bactericidal concentration of the drug is established in serum and tissues when the incision is made. Maintain therapeutic levels of the agent in serum and tissues throughout the operation and until, at most, a few hours after the incision is closed in the operating room.
3. Before elective colorectal operations in addition to d2 above, mechanically prepare the colon by use of enemas and cathartic agents. Administer non absorbable oral antimicrobial agents in divided doses on the day before the operation.
4. For high-risk cesarean section, administer the prophylactic antimicrobial agent immediately after the umbilical cord is clamped.
5. Do not routinely use vancomycin for antimicrobial prophylaxis.

2. Intraoperative

a. Ventilation

1. Maintain positive-pressure ventilation in the operating room with respect to the corridors and adjacent areas. Maintain a minimum of 15 air changes per hour, of which at least 3 should be fresh air.
2. Introduce all air at the ceiling, and exhaust near the floor.
5. Do not use UV radiation in the operating room to prevent SSI.
6. Keep operating room doors closed except as needed for passage of equipment, personnel, and the patient.

b. Cleaning and disinfection of environmental surfaces

1. When visible soiling or contamination with blood or other body fluids of surfaces or equipment occurs during an operation, use an approved hospital disinfectant to clean the affected areas before the next operation.
2. Do not perform special cleaning or closing of operating rooms after contaminated or dirty operations.
3. Do not use tacky mats at the entrance to the operating room suite or individual operating rooms for infection control.

c. Microbiologic sampling

1. Do not perform routine environmental sampling of the operating room. Perform microbiologic sampling of operating room environmental surfaces or air only as part of an epidemiologic investigation.

d. Sterilization of surgical instruments

1. Sterilize all surgical instruments according to the GPHC guidelines.
2. Minimize the use of flash sterilization. Perform flash sterilization only for patient care items that will be used immediately (e.g., to reprocess an inadvertently dropped instrument).

e. Surgical attire and drapes

1. Wear a surgical mask that fully covers the mouth and nose when entering the operating room if an operation is about to begin or already under way, or if sterile instruments are exposed. Wear the mask throughout the operation.
2. Wear a cap or hood to fully cover hair on the head and face when entering the operating room.
3. Do not wear shoe covers for the prevention of SSI.
4. Wear sterile gloves if a scrubbed surgical team member. Put on gloves after donning a sterile gown.
5. Use surgical gowns and drapes that are effective barriers when wet (i.e., materials that resist liquid penetration).
6. Change scrub suits that are visibly soiled, contaminated, and/or penetrated by blood or other potentially infectious materials.

f. Asepsis and surgical technique

1. Adhere to principles of asepsis when placing intravascular devices (e.g., central venous catheters), spinal

8. Prevention of Surgical Site Infections (SSI)

or epidural anesthesia catheters, or when dispensing and administering intravenous drugs.

2. Handle tissue gently, maintain effective hemostasis, minimize devitalized tissue and foreign bodies (i.e., sutures, charred tissues, necrotic debris), and eradicate dead space at the surgical site.
3. Use delayed primary skin closure or leave an incision open to heal by second intention if the surgeon considers the surgical site to be heavily contaminated)
4. If drainage is necessary, use a closed suction drain. Place a drain through a separate incision distant from the operative incision. Remove the drain as soon as possible.

3. Postoperative incision care

The purpose is to insure appropriate technique in doing dressing changes. Regarding surgical wounds:

- a) Until wound edges are sealed and healing begins (about 24 hours after surgery for most wounds) the incision should remain covered with sterile dressings to reduce the risk of contamination.
- b) Persons taking care of wounds can reduce risks by washing hands and using instruments to handle dressings. If touching the wound is necessary, wear sterile gloves.
- c) When dressings are changed, wounds should be evaluated for signs of infection. Any purulent drainage should be cultured.
- d) Documentation of assessment of the wound must be done.

- e) Standard precautions should be followed with all patients.

SPECIAL SITUATION: CLEANING OF DECUBITUS AND STASIS ULCERS

- a) Since chronic wounds are already highly contaminated with microorganisms, clean technique is used instead of sterile technique.
- b) Documentation of the wound's description and progress toward healing will be done.

9. PREVENTION OF LOWER RESPIRATORY TRACT INFECTIONS

The ventilator association pneumonia (VAP) arises when there is bacterial invasion of the pulmonary parenchyma in a patient receiving mechanical ventilation. The pathogenesis is based on the inoculation of the formerly sterile lower respiratory tract typically arises from aspiration of secretions, colonization of the aero-digestive tract, or use of contaminated equipment or medications. The risk factors for VAP include prolonged intubation, enteral feeding, witnessed aspiration, paralytic agents, underlying illness, and extremes of age.

General strategies that have been found to influence the risk of VAP

a) General strategies

- i. Conduct active surveillance for VAP (chapter 3).
- ii. Adhere to hand-hygiene guidelines (chapter 5).
- iii. Use noninvasive ventilation whenever possible.
- iv. Minimize the duration of ventilation.
- v. Perform daily assessments of readiness to wean and use weaning protocols.
- vi. Educate healthcare personnel who care for patients undergoing ventilation about VAP.

b. Strategies to prevent aspiration

- i. Maintain patients in a semi-recumbent position (30-45° elevation of the head of the bed) unless there are contraindications.⁴
- ii. Avoid gastric overdistention.
- iii. Avoid unplanned extubation and reintubation.
- iv. Use a cuffed endotracheal tube with in-line or subglottic suctioning.
- v. Maintain an endotracheal cuff pressure of at least 20 cm H₂O.

c. Strategies to reduce colonization of the aerodigestive tract

- i. Orotracheal intubation is preferable to nasotracheal intubation.
- ii. Avoid histamine receptor 2 (H₂)-blocking agents and proton pump inhibitors for patients who are not at high risk for developing a stress ulcer or stress gastritis.⁵

⁴ Experimental trials have demonstrated that backrest elevation is associated with a reduced risk of pulmonary aspiration. Multivariable analysis of risk factors associated with VAP found up to a 67% reduction in VAP among patients maintained in semirecumbency during the first 24 hours of mechanical ventilation. The impact of semirecumbency was confirmed in an observational study and a randomized trial. However, recent studies indicate that semirecumbent positioning is rarely maintained and may not be associated with a reduced rate of tracheal colonization or VAP.

⁵ Acid-suppressive therapy may increase the colonization density of the aerodigestive tract with potentially pathogenic organisms. Seven meta-analyses have yielded inconsistent results regarding the magnitude of risk associated with the colonization of the aerodigestive tract. Currently, the preferential use of sucralfate or H₂-blocking agents as an unresolved issue.

- iii. Perform regular oral care with an antiseptic solution. The optimal frequency for oral care is unresolved.

d) Strategies to minimize contamination of equipment used to care for patients receiving mechanical ventilation.

- i. Use sterile water to rinse reusable respiratory equipment.
- ii. Remove condensate from ventilatory circuits. Keep the ventilatory circuit closed during condensate removal.
- iii. Change the ventilatory circuit only when visibly soiled or malfunctioning.
- iv. Store and disinfect respiratory therapy equipment properly. (See Box 7).

Prevention of Postoperative Pneumonia

1. Instruct preoperative patients, especially those at high risk for contracting pneumonia, about taking deep breaths and ambulating as soon as medically indicated in the postoperative period. Patients at high-risk include those who will have abdominal aortic aneurysm repair, thoracic surgery, or emergency surgery; those who will receive general anesthesia; those who are aged >60 years; those with totally dependent functional status; those who have had a weight loss >10%; those using steroids for chronic conditions; those with recent history of alcohol use, history of COPD, or smoking during the preceding year; those with impaired sensorium, a history of cerebrovascular accident with residual neurologic

BOX 7. Sterilization, disinfection, and maintenance of respiratory equipment.**1. General measures**

- a. Thoroughly clean all respiratory equipment to be sterilized or disinfected.
- b. Whenever possible, use steam sterilization or highlevel disinfection by wet heat pasteurization at temperatures higher than 70° C (158° F) for 30 minutes for reprocessing semicritical equipment or devices (ie, items that come into direct or indirect contact with mucous membranes of the lower respiratory tract). Use low-temperature sterilization methods for equipment or devices that are heat or moisture sensitive. After disinfection, proceed with appropriate rinsing, drying, and packaging, taking care not to contaminate the disinfected items.
- c. Preferentially use sterile water to rinse reusable semicritical respiratory equipment and devices when rinsing is needed after chemical disinfection. If this is not feasible, rinse the device with filtered water (ie, water that has been through a 0.2-mm filter) or tap water, and then rinse with isopropyl alcohol and dry with forced air or in a drying cabinet.

2. Mechanical ventilators

- a. Do not routinely sterilize or disinfect the internal machinery of mechanical ventilators.

continues

BOX 7. (cont)**3. Breathing circuits, humidifiers, and heat-moisture exchangers**

- a. Do not, on the basis of duration of use, routinely change the breathing circuit (ie, ventilator tubing and exhalation valve and the attached humidifier) that is in use by an individual patient. Change the circuit when it is visibly soiled or mechanically malfunctioning.
- b. Periodically drain and discard any condensate that collects in the tubing of a mechanical ventilator, taking precautions not to allow condensate to drain toward the patient.
- c. Wear gloves to perform the above procedure or handle the fluid.
- d. Decontaminate hands with soap and water (if hands are visibly soiled) or with an alcohol-based hand rub, after performing the procedure or handling the fluid.
- e. Use sterile (not distilled nonsterile) water to fill bubbling humidifiers.
- f. Change a heat-moisture exchanger that is in use by a patient when it malfunctions mechanically or becomes visibly soiled.
- g. Do not routinely change more frequently than every 48 hours a heat-moisture exchanger that is in use by a patient.

deficit, or low ($<8\text{mg/dL}$) or high ($>22\text{ mg/dL}$) blood urea nitrogen level; and those who will have received more than 4 units of blood before surgery.

2. Encourage all postoperative patients to take deep breaths, move about the bed, and ambulate unless these are medically contraindicated.
3. Use incentive spirometry on postoperative patients at high risk for developing pneumonia.

10. PREVENTION OF CATHETER-ASSOCIATED URINARY TRACT INFECTIONS (CAUTI)

Urinary tract infection is the most important adverse outcome of urinary catheter use. Bacteremia and sepsis may occur in a small proportion of infected patients. Catheter use is also associated with negative outcomes other than infection, including non-bacterial urethral inflammation, urethral strictures, and mechanical trauma. The risk factors for development of CAUTI are the duration of catheterization.⁶ Additional risk factors include female sex, older age, and not maintaining a closed drainage system.

1. Appropriate Urinary Catheter Use

- a) Insert catheters only for appropriate indications (see Box 8 for guidance), and leave in place only as long as needed.
 - i. Minimize urinary catheter use and duration of use in all patients, particularly those at higher risk for CAUTI or mortality from catheterization such as women, the elderly, and patients with impaired immunity.

⁶ The duration of the catheterization is the most important risk factor for development of infection. Limiting catheter use and, when a catheter is indicated, minimizing the duration the catheter remains in situ are primary strategies for CAUTI prevention.

BOX 8. Appropriate indications for indwelling urethral catheter use.

Patient has acute urinary retention or bladder outlet obstruction
Need for accurate measurements of urinary output in critically ill patients
Perioperative use for selected surgical procedures: <ul style="list-style-type: none">• Patients undergoing urologic surgery or other surgery on contiguous structures of the genitourinary tract• Anticipated prolonged duration of surgery (catheters inserted for this reason should be removed in the post anesthesia care unit)• Patients anticipated to receive large-volume infusions or diuretics during surgery• Need for intraoperative monitoring of urinary output
To assist in healing of open sacral or perineal wounds in incontinent patients
Patient requires prolonged immobilization
To improve comfort for end of life care if needed

- ii. Avoid use of urinary catheters in patients and nursing home residents for management of incontinence.
- iii. Use urinary catheters in operative patients only as necessary, rather than routinely.
- iv. For operative patients who have an indication for an indwelling catheter, remove the catheter as soon as possible postoperatively, preferably within 24 hours, unless there are appropriate indications for continued use.

2. Proper Techniques for Urinary Catheter Insertion

- a) Perform hand hygiene immediately before and after insertion or any manipulation of the catheter device or site.
- b) Ensure that only properly trained persons who know the correct technique of aseptic catheter insertion and maintenance are given this responsibility.
 - In the acute care hospital setting, insert urinary catheters using aseptic technique and sterile equipment.
 - i. Use sterile gloves, drape, sponges, an appropriate antiseptic or sterile solution for periurethral cleaning, and a single-use packet of lubricant jelly for insertion.
 - Properly secure indwelling catheters after insertion to prevent movement and urethral traction.
 - If intermittent catheterization is used, perform it at regular intervals to prevent bladder overdistension.

3. Proper Techniques for Urinary Catheter Maintenance

- a) Following aseptic insertion of the urinary catheter, maintain a closed drainage system
 - i. If breaks in aseptic technique, disconnection, or leakage occur, replace the catheter and collecting system using aseptic technique and sterile equipment.

- b) Maintain unobstructed urine flow.
 - i. Keep the catheter and collecting tube free from kinking.
 - ii. Keep the collecting bag below the level of the bladder at all times. Do not rest the bag on the floor.
 - iii. Empty the collecting bag regularly using a separate, clean collecting container for each patient; avoid splashing, and prevent contact of the drainage spigot with the nonsterile collecting container.
- c) Use Standard Precautions, including the use of gloves and gown as appropriate, during any manipulation of the catheter or collecting system.
- d) Unless clinical indications exist (e.g., in patients with bacteriuria upon catheter removal post urologic surgery), do not use systemic antimicrobials routinely to prevent CAUTI in patients requiring either short or long-term catheterization.
- e) Do not clean the periurethral area with antiseptics to prevent CAUTI while the catheter is in place. Routine hygiene (e.g., cleansing of the meatal surface during daily bathing or showering) is appropriate.

4. Specimen Collection

- a) Obtain urine samples aseptically.
- b) If a small volume of fresh urine is needed for examination (i.e., urinalysis or culture), aspirate the urine from the needleless sampling port with a sterile syringe/cannula adapter after cleansing the port with a disinfectant.
- c) Obtain large volumes of urine for special analyses (not culture) aseptically from the drainage bag.

10. Prevention of Character-Associated Urinary Tract Infections

11. PREVENTION OF INTRAVASCULAR DEVICE-ASSOCIATED INFECTIONS

Most of the recommendations in this chapter are related with central line catheters; in Box 9 it can be found the criteria for selection of catheters and sites.

BOX 9. Selection of Catheters and Sites

Peripheral Catheters and Midline Catheters

1. Select catheters on the basis of the intended purpose and duration of use, known infectious and non-infectious complications (e.g., phlebitis and infiltration), and experience of individual catheter operators.
2. Remove peripheral venous catheters if the patient develops signs of phlebitis (warmth, tenderness, erythema or palpable venous cord), infection, or a malfunctioning catheter.

Central Venous Catheters

1. Weigh the risks and benefits of placing a central venous device at a recommended site to reduce infectious complications against the risk for mechanical complications (e.g., pneumothorax, subclavian artery puncture, subclavian vein laceration, subclavian vein stenosis, hemothorax, thrombosis, air embolism, and catheter misplacement).

continues

BOX 9. (cont.)

2. Avoid using the femoral vein for central venous access in adult patients.
3. Use a subclavian site, rather than a jugular or a femoral site, in adult patients to minimize infection risk for nontunneled CVC placement.
4. Avoid the subclavian site in hemodialysis patients and patients with advanced kidney disease, to avoid subclavian vein stenosis.
5. Use a fistula or graft in patients with chronic renal failure instead of a CVC for permanent access for dialysis.
6. Use a CVC with the minimum number of ports or lumens essential for the management of the patient.
7. Promptly remove any intravascular catheter that is no longer essential.
8. When adherence to aseptic technique cannot be ensured (i.e catheters inserted during a medical emergency), replace the catheter as soon as possible, i.e, within 48 hours.

The risk of central line Central Line–Associated Blood-stream Infections (CLABSI) in ICU patients is high. Reasons for this include the frequent insertion of multiple catheters, the use of specific types of catheters that are almost exclusively inserted in ICU patients and associated with substantial risk (eg, arterial catheters), and the fact that catheters are frequently placed in emergency circumstances, repeatedly accessed each day, and often needed for extended periods. Although the

11. Prevention of Intravascular Device-Associated Infections

primary focus of attention over the past 2 decades has been the ICU setting, recent data suggest that the greatest numbers of patients with central lines are in hospital units outside the ICU, where there is a substantial risk of CLABSI

1. Before Insertion

Educate healthcare personnel involved in the insertion, care, and maintenance of central vascular catheters (CVCs) about CLABSI prevention.

- a) Include the indications for catheter use, appropriate insertion and maintenance, the risk of CLABSI, and general infection prevention strategies.
- b) Ensure that all healthcare personnel involved in catheter insertion and maintenance complete an educational program regarding basic practices to prevent CLABSI before performing these duties.
- c) Periodically assess healthcare personnel knowledge of and adherence to preventive measures.
- d) Ensure that any healthcare professional who inserts a CVC undergoes a credentialing process (as established by the individual healthcare institution) to ensure their competency before they independently insert a CVC.

2. At Insertion

1. Use a catheter checklist to ensure adherence to infection prevention practices at the time of CVC insertion. This checklist should be developed by a

multidisciplinary team, and will be adapted to the practices at the GPCH.

- a) Use a checklist to ensure and document compliance with aseptic technique.
 - b) CVC insertion should be observed by a nurse, physician, or other healthcare personnel who has received appropriate education (see above), to ensure that aseptic technique is maintained.
 - c) These healthcare personnel should be empowered to stop the procedure if breaches in aseptic technique are observed.
2. Perform hand hygiene before catheter insertion or manipulation.
 - a) Use an alcohol-based waterless product or antiseptic soap and water.

Use of gloves does not obviate hand hygiene.

3. Avoid using the femoral vein for central venous access in adult patients.
 - a) Use of the femoral access site is associated with greater risk of infection and deep venous thrombosis in adults.
 - i. Increased risk of infection with femoral catheters may be limited to overweight adult patients with a body mass index higher than 28.4.
 - ii. Femoral vein catheterization can be done without general anesthesia in children and has not been associated with an increased risk of infection in children.

- b) Several nonrandomized studies show that the subclavian vein site is associated with a lower risk of CLABSI than is the internal jugular vein, but the risks and benefits in light of potential infectious and noninfectious complications must be considered on an individual basis when determining which insertion site to use.
- c) The use of peripherally inserted CVCs is not an evidence-based strategy to reduce the risk of CLABSI.

The risk of infection with peripherally inserted CVCs in ICU patients approaches that with CVCs placed in the subclavian or internal jugular veins.

4. Use an all-inclusive catheter cart or kit.

- a) A catheter cart or kit that contains all necessary components for aseptic catheter insertion is to be available and easily accessible in all units where CVCs are inserted.

5. Use maximal sterile barrier precautions during CVC insertion

- a) Use maximal sterile barrier precautions.
 - i. A mask, cap, sterile gown, and sterile gloves are to be worn by all healthcare personnel involved in the catheter insertion procedure.
 - ii. The patient is to be covered with a large sterile drape during catheter insertion.
- b) These measures must also be followed when exchanging a catheter over a guidewire.

6. Use a chlorhexidine-based antiseptic for skin preparation in patients older than 2 months of age.
 - a) Before catheter insertion, apply an alcoholic chlorhexidine solution containing a concentration of chlorhexidine gluconate greater than 0.5% to the insertion site.
 - i. The antiseptic solution must be allowed to dry before making the skin puncture.
 - ii. Chlorhexidine products are not approved for children younger than 2 months of age; povidone-iodine can be used for children in this age group.

3. After Insertion

1. Disinfect catheter hubs, needleless connectors, and injection ports before accessing the catheter.
 - a) Before accessing catheter hubs or injection ports, clean them with an alcoholic chlorhexidine preparation or 70% alcohol to reduce contamination.
2. Remove nonessential catheters
 - a) Assess the need for continued intravascular access on a daily basis during multidisciplinary rounds. Remove catheters not required for patient care.
3. For nontunneled CVCs in adults and adolescents, change transparent dressings and perform site care with a chlorhexidine-based antiseptic every 5-7 days or more frequently if the dressing is soiled, loose, or damp; change gauze dressings every 2 days or more frequently if the dressing is soiled, loose, or damp.

11. Prevention of Intravascular Device-Associated Infections

4. Replace administration sets not used for blood, blood products, or lipids at intervals not longer than 96 hours.
5. Perform surveillance for CLABSI, as per Chapter 3.
6. Use antimicrobial ointments for hemodialysis catheter insertion sites.
 - a) Povidone iodine or polysporin ointment should be applied to hemodialysis catheter insertion sites in patients with a history of recurrent *Staphylococcus aureus* CLABSI.

Mupirocin ointment should not be applied to the catheter insertion site due to the risks of mupirocin resistance and damage to polyurethane catheters.

4. Replacement of Catheters and Administration Sets

Replacement of Peripheral and Midline Catheters

1. There is no need to replace peripheral catheters more frequently than every 72-96 hours to reduce risk of infection and phlebitis in adults.
2. Replace peripheral catheters in children only when clinically indicated.

Replacement of CVCs, and Hemodialysis Catheters

1. Do not routinely replace CVCs, hemodialysis catheters, or pulmonary artery catheters to prevent catheter-related infections.
2. Do not use guidewire exchanges routinely for non-tunneled catheters to prevent infection.

3. Do not use guidewire exchanges to replace a non-tunneled catheter suspected of infection.
4. Use a guidewire exchange to replace a malfunctioning non-tunneled catheter if no evidence of infection is present.
5. Cleanse the umbilical insertion site with an antiseptic before catheter insertion. Avoid tincture of iodine because of the potential effect on the neonatal thyroid. Other iodine-containing products (e.g., povidone iodine) can be used.
6. Do not use topical antibiotic ointment or creams on umbilical catheter insertion sites because of the potential to promote fungal infections and antimicrobial resistance
7. Add low-doses of heparin (0.25—1.0 U/ml) to the fluid infused through umbilical arterial catheters.

Replacement of Administration Sets

1. In patients not receiving blood, blood products or fat emulsions, replace administration sets that are continuously used, including secondary sets and add-on devices, no more frequently than at 96-hour intervals, but at least every 7 days.
2. Replace tubing used to administer blood, blood products, or fat emulsions (those combined with amino acids and glucose in a 3-in-1 admixture or infused separately) within 24 hours of initiating the infusion.

12. THE HOSPITAL ENVIRONMENT

The patient environment harbors potential reservoir for pathogens. It is also known from that the patients need a clean environment for their uncomplicated recovery. However, with the exception of immunocompromised patients, the healthcare facility environment is rarely involved in disease transmission.

1. Housekeeping

Housekeeping refers to general cleaning of baths, sinks, wash basins, beds, tables, floors, walls, and other surfaces.

For routine cleaning, the aim is to achieve a clean environment with regular and conscientious general housekeeping. High-level disinfectants and sterilization are **not** used in housekeeping activities. Visible dust and dirt should be removed routinely with water and detergent and/or vacuuming.

Microbiological control of the health care facility environment relies on maintenance of smooth, dry, and intact surfaces, prompt cleaning of spillage of blood, body fluids, secretions and excretions, and prompt removal of these substances from patient treatment areas.

Cleaning and maintenance prevent the build-up of soil, dust or other foreign material that can harbor pathogens and support their growth.

Cleaning is accomplished with water, detergents and mechanical action. Cleaning reduces or eliminates the reservoirs of potential pathogenic micro-organism.

The method of required cleaning is determined by:

- Type of surface to be cleaned
- Amount and kind of soil present
- Purpose of the area

Warm, soapy water is adequate for cleaning areas not directly involved in patient care, e.g., offices, duty rooms. A disinfectant is required when cleaning areas with a large number of pathogens, e.g., isolation areas, toilets, surfaces contaminated by infected body fluids spillages or areas where particularly susceptible patients are housed, e.g., operating theatre, neonatal unit, ICU, burns unit.

2. Policy Statements

a) Routine cleaning

1. Health care facilities shall determine a schedule for cleaning and maintaining ducts, fans, and air conditioning systems.
2. Routine cleaning of environmental surfaces and non-critical patient care items shall be performed according to a predetermined schedule and shall be sufficient to keep surfaces clean and dust free. Surfaces that are frequently touched by the hands of health care workers and patients, such as call bells, surfaces of medical equipment and knobs for adjustment or opening, require frequent cleaning.

3. The frequency of cleaning and disinfection of the health care facility environment varies according to the:
 - Type of surface to be cleaned
 - The number of people in the area
 - Amount of activity in the area
 - The risk to patients
 - Amount of soiling
4. Damp rather than dry dusting or sweeping shall be performed.
5. Vacuum cleaners shall be used on carpeted areas. Expelled air from vacuum cleaners shall be diffused so that it does not aerosolize dust from uncleaned surfaces.
6. A routine shall be established to prevent re-distribution of micro-organisms during wet cleaning. This shall be accomplished by cleaning less heavily contaminated areas first and changing cleaning solutions and cloths/mops frequently.
7. Wet mopping is most commonly done with a double bucket technique, which extends the life of the solutions because fewer changes are required. When a single bucket is used, the solutions shall be changed more frequently because of increased bioload.
8. Tools used for cleaning and disinfecting shall be cleaned, disinfected and dried between uses.
9. Cleaning agents: a detergent is acceptable for surface cleaning of most areas (Table 14). A low or

intermediate grade disinfectant, often called a germicidal, may be preferable for cleaning in nurseries, paediatric settings, critical care unit, burns unit, emergency rooms, operating theaters, bone marrow transplantations facilities, and surfaces of dialysis machines.

10. Cleaning and disinfecting agents shall be mixed and used according to manufacturers' recommendations.
11. Protective apparatus: household utility gloves shall be worn during cleaning and disinfecting procedures.
12. Disinfectant fogging shall not be done.
13. Pest control shall be carried out in accordance with health department/health care facility policies and guidelines.
14. An education programme for housekeeping staff to assist them in understanding the effective methods of cleaning and the importance of their work shall be implemented.

b) Special cleaning

1. Special organisms of epidemiological significance

- Except during outbreaks, no special environment cleaning techniques are advocated for organism such as *Clostridium difficile*, methicillin-resistant *Staphylococcus aureus* or diarrheal diseases. During an outbreak, thorough environmental cleaning and disinfection with a disinfectant that has demonstrated

effectiveness against the specific organism may be required.

2. Blood spills

- Appropriate personal protective equipment shall be worn for cleaning up a blood spill.
- Gloves shall be worn during the cleaning and disinfecting procedures.
- The worker shall wear a face shield and plastic apron, if the possibility of splashing exists.
- Overalls or aprons, as well as boots or shoe covers shall be worn for large blood spills.
- Personal protective equipment shall be changed if torn or soiled, and always removed before leaving the location of the spill, and then hands washed.
- The blood spill area shall be decontaminated and cleaned of obvious organic material before applying a disinfectant. Blood and other material substantially inactivate sodium hypochlorite and other disinfectants.
- 0.5 % (1:10) sodium hypochlorite is recommended for disinfecting spills.
- Excess blood and body fluids capable of transmitting infection shall be removed with disposable towels. Discard the towels in a plastic-lined waste receptacle.
- After cleaning, the area shall be disinfected for 10 minutes with an intermediate-level chemical disinfectant such as sodium hypochlorite household bleach.
- Concentrations ranging from approximately 1:10 dilution of household bleach are effective, depend-

ing on the amount of organic material, (e.g., blood or mucus) present on the surface to be cleaned and disinfected, as well as the nature of the surface.

- A 1:100 dilution (0.05%) sodium hypochlorite may be sufficient if the surface is hard and smooth, and has been adequately cleaned.
- Disposable items shall be discarded immediately after use in a plastic lined waste receptacle.
- Care shall be taken to avoid splashing or generating aerosols during the clean up.
- Hands shall be thoroughly washed and dried after gloves are removed.
- For blood spills in clinical, public health or research laboratories, refer to Section X: Risk Management.

3. Surgical settings

Surgical settings include operating theaters, ambulatory surgical units, physicians' offices where invasive procedures are done, intravascular catheterization laboratories, endoscopy rooms and all other areas where invasive procedures may be performed.

- Cleaning procedures shall be completed on a scheduled basis, usually daily.
- Areas outside the sterile field contaminated by organic debris shall be cleaned as spills or splashed occur.
- Surgical lights and horizontal surfaces, equipment, furniture and patient transport vehicles shall be cleaned between patients with a clean cloth and low-level disinfectant.

12. The Hospital Environment

- Floors shall be cleaned with a low-level disinfectant/detergent, preferably using a wet vacuum system between patients or, depending on type of procedures carried out, at the end of the day.
- Counter tops and surfaces that have been contaminated with blood or body fluids capable of transmitting infection shall be cleaned with disposable toweling, using an appropriate cleaning agent and water as necessary, (e.g., after each procedure, end of day, etc.), the surfaces then disinfected with low-level chemical disinfectant or sodium hypochlorite. Loose or cracked work surfaces should be replaced.
- All other areas and equipment in the surgical practice setting (e.g. air conditioning grills and/or filters, cabinets, shelves, walls, ceilings, lounges and locker rooms) shall be cleaned according to an established routine. See table 14 for details of cleaning schedule.
- Before any piece of portable equipment enters or leaves the operating theatre, it shall be wiped with the approved disinfectant.

c) Terminal cleaning

1. Upon discharge of patient, the room, cubicle or bed-space, bed, bedside equipment and environmental surfaces shall be thoroughly cleaned before another patient is admitted.
- Terminal cleaning shall primarily be directed toward those items that have been in direct contact with the patient or in contact with the patient's excretions, secretions, blood, or body fluids.

- Housekeeping personnel shall use the same precautions to protect themselves during terminal cleaning that they would use for routine cleaning. Masks are not needed unless the room was occupied by a patient for whom there were airborne precautions and insufficient time has elapsed to allow clearing of the air of potential airborne organisms.
- All disposable items shall be discarded immediately in the appropriate receptacle.
- Reusable items that have been in direct contact with the patient or with the patient's excretions, secretions, blood, or body fluids shall be reprocessed as appropriate to the item.
- Bedside tablets, bed rails, commodes, mattress covers, and all horizontal surfaces in the room shall be cleaned.
- Routine washing of walls, blinds, and curtains is not indicated. These shall be cleaned if visibly soiled.
- Cubicle curtains shall be changed every two months or when visibly soiled.
- Disinfectant fogging is not a satisfactory method of decontaminating air and surfaces and shall not be used.
- In general, no special cleaning techniques are required for rooms that have housed patients for whom additional precautions were in place.
- Special terminal cleaning procedures may be indicated for certain organisms, e.g. *Clostridium difficile* or diarrheal outbreaks. In such cases, thorough cleaning and disinfection with a disinfectant known to be effective against the micro-organism in question

12. The Hospital Environment

should be performed. Attention should be paid to frequently touched surfaces such as door knobs, call bell pulls, taps, and wall surfaces, which have been frequently touched by the patient.

- Local public health authorities shall be consulted about cleaning the room of a patient who has Severe Acute Respiratory Syndrome (SARS), Avian Influenza, and viral haemorrhagic fevers (Lassa, Ebola, Marburg).

d) Terminal

- **Beds, lockers and tables:** clean with 0.5% (1:10) sodium hypochlorite solution/alcohol 70 %/phenol.
- **Linen:** Place in appropriate bag. If soiled, decontaminate, remove soil, rinse and place in appropriate bag.
- **Equipment:** Soak in 0.5% sodium hypochlorite for 10-30 minutes. Wash in warm soapy water, rinse and dry.

3. Guidelines

Housekeeping areas are divided into:

1. Low-risk – administration and waiting rooms.
2. High-risk – areas where contamination is expected, e.g., laboratory, operating, theatres, labour and delivery rooms, wards, toilets, areas where blood, body fluids, secretions, excretions spill.

Cleaning Routine

1. Low-Risk Areas

Walls and ceilings

- Clean with water and detergent using a damp cloth
- Ensure routine damp dusting
- Always keep surfaces dry
- Wipe chairs, lamps, tabletops and counters with a damp cloth, water and detergent.

Floors

- Clean regularly when needed to keep areas clean using detergent and water
- Do not use dry brooms to avoid dust

2. High-Risk Areas

Sinks

- Use a disinfectant cleaning solution with a cloth or brush
- Rinse with clean water

Toilets

- Wear utility gloves and rubber boots
- Use a disinfectant cleaning solution, scrub daily or as required with a separate cloth or brush

Waste containers

- Wear rubber gloves
- Use a detergent solution, scrub to remove soil and organic material

IMPORTANT POINTS TO REMEMBER!

Always use frictional cleaning/scrubbing, the most important way to remove dirt and microbes, for all environmental cleaning procedures.

In order to avoid soiling clean areas in the process of cleaning dirty ones, always:

- Treat the cleaning cloths/material as per recommendations (see Table 14).
- Change cleaning disinfectant solution after 24 hours OR as per manufacturer's direction whichever is the sooner OR when obviously dirty.
- Use separate equipment for cleaning contaminated areas, e.g., toilets, isolation rooms.
- Wash walls from top to bottom.
- Change the cleaning solution and wash the equipment between areas or cubicles or when dirty.
- Dilute the disinfectant to the correct, prescribed concentration.
- Prepare and display simple clear routine house-keeping schedules for all personnel.

Cleaning Solutions

Three types of cleaning are used during housekeeping at a health care facility. It is essential that housekeeping staff understand the different types of cleaning agents and how each should be used.

1. Plain detergent and water

This is used for **low-risk** areas and general cleaning tasks. Detergents remove dirt and organic material and dissolve or suspend grease, oil and other matter so it can easily be removed by scrubbing.

2. Disinfectant solution (0.5% sodium hypochlorite solution – see Chapter 7: Disinfection and Sterilization)

Disinfectants rapidly kill or inactivate infectious micro-organisms during the cleaning process. Disinfectants are also used to decontaminate an area so that it is safer for staff to clean.

In most settings, a 0.5% sodium hypochlorite solution made from locally available bleach is the cheapest disinfectant, but alternatives include commercial disinfectants that contain 5% carbolic acid (such as Phenol or Lysol) or quaternary ammonium compounds.

3. Alcohol/Detergent cleaning solution

This solution contains a disinfectant and a detergent and water, and is used for leaning areas that may be contaminated with infectious materials (such as operating theatres, procedure rooms, toilets and sluice rooms). **The solution must contain both a disinfectant and a detergent.** Disinfectants rapidly kill or inactivate infectious micro-organisms during the cleaning process, while detergents remove dirt and organic material, which cannot be done by water or disinfectants alone.

13. EMPLOYEE HEALTH

1. Health Assessments

Health assessments are required for all staff to insure that staff is physically fit to perform the essential functions of the job and to determine that they are free of communicable diseases.

New employees are required to complete a health assessment prior to beginning work. As part of the assessment, the infectious disease and immunization history form will be completed.

Thereafter, patient care staff is required to have a health assessment annually. This assessment will be offered free of charge by the employee health department.

If at any time during employment, a physician indicates that an employee is unable to perform the essential functions of the job, or if there is reason to suspect the employee is putting others at risk due to a communicable disease, the employee will not be permitted to work in that position until further evaluation and determination has been made.

2. Management of Accidental Exposure to Communicable Diseases

In Table 7, it is summarized the methods of managing employee exposure to specific communicable diseases.

Table 7. Management of exposed susceptible personnel to communicable diseases

Communicable disease	Management of exposed susceptible personnel
AIDS/HIV infection	<ol style="list-style-type: none">1. Employee should promptly report exposure and receive counseling.2. Post-exposure HIV testing immediately and, if negative, at six weeks, 12 weeks, and six months.3. Administer or arrange for administration of prophylaxis per national guidelines and facility's policy.
Hepatitis B	<ol style="list-style-type: none">1. Designated health care professional is to be notified and consulted prior to prophylaxis. Vaccination of employees is strongly recommended. HBIG and vaccine may be used.
Hepatitis C	<ol style="list-style-type: none">1. Employee counseling regarding exposure. Baseline testing may be performed with follow-up after the exposure (anti-HCV and ALT activity).2. Prophylactic immune globulin is not effective.3. Anti-viral interferon therapy may be considered when begun early in the course of infection. Employee should be referred to a specialist for management.
Measles	<p>ISG 0.25 ml/kg body weight to be given preferably within six days. Documentation of immunity is an important tool in the prevention of healthcare-associated transmission.</p>

continues

Table 7. (cont.)

Communicable disease	Management of exposed susceptible personnel
Meningitis (<i>Neisseria meningitidis</i>)	<p>Treatment for exposure should be carried out for personnel having intimate contact with infected patients, such as suctioning, intubating or performing mouth-to-mouth ventilation. Treat with one of the following medications:</p> <ol style="list-style-type: none"> 1. Rifampin 600 mg bid for two days (This is the drug of first choice) 2. Adults may also be treated with a single dose of Ceftriaxone, 250 mg IM, or a single dose of Ciprofloxacin, 500 mg PO.
Mumps	<p>None.</p> <p>Mumps vaccine should be given to susceptible personnel.</p>
Pertussis	<p>Postexposure prophylaxis is indicated for personnel exposed to pertussis. A 14-day course of erythromycin (500 mg, 4x/day) or trimethoprim – sulfamethoxazole (1 tablet, 2x/day) are used.</p>
Rubella	<p>Ensuring immunity among healthcare personnel is the goal to prevent healthcare-associated spread of Rubella. A dose of MMR may be given to employees who do not have documentation of vaccine or laboratory evidence of immunity. In employees of childbearing age, serum should be obtained for rubella antibody titer immediately and repeated three weeks later. An employee in the first trimester of pregnancy shall have serum drawn for antibody titer and be referred to her obstetrician for evaluation. Follow-up titer will be drawn three weeks later unless contraindicated by obstetrician.</p>

Table 7. (cont.)

Communicable disease	Management of exposed susceptible personnel
Scabies	<ol style="list-style-type: none">1. Appropriate education of exposed individuals2. Treat prophylactically using 5% permethrin those who have had skin to skin contact with an infested individual.
Varicella zoster (Chickenpox)	<p>Vaccinate susceptible persons within three days of exposure. VZIG may be considered if employee is immunocompromised.</p> <p>Antiviral drugs (e.g. acyclovir) within seven days of exposure.</p> <p>Unvaccinated susceptible employees should be excluded from duty from the 10th day after exposure until day 21, or until all lesions are crusted if employee becomes infected.</p>

NOTE: Exposure management protocols change periodically. Please assure that the protocols used reflect current standards of practice.

3. Blood and Body Fluid Exposure Report

In case of blood or body fluid exposure, the employee will provide detailed information to the Occupational Health Nurse or Infection Control Officer or other designee on the blood and body fluid exposure.

- II) As soon as possible following an exposure, the employee shall report the exposure to the supervisor.

- III) The employee will see the Occupational Health Nurse or Infection Control Officer or other designee to complete the Blood and Body Fluid Exposure Form.
- IV) The form will be used to assist in evaluating the cause of the injury and for prevention of future similar injuries.

14. SPECIAL SITUATIONS

1. Obstetrics

Obstetrical patients will include those who are currently pregnant, or those who delivered or aborted in the previous 6 weeks. Patients with ectopic pregnancies or any pre-abortive process are considered obstetric patients

The delivery room functions to provide a controlled environment for the safe performance of obstetrical procedures. Obstetrical procedures include, but are not limited to:

- Vaginal deliveries
- Caesarian sections
- Episiotomy and laceration repairs
- Management of postpartum hemorrhage such as uterine packing, uterine artery ligation or hypogastric artery ligation
- Caesarian hysterectomy
- Cervical cerclage
- Suction dilatation cerclage and curettage of any abortive process.
- Postpartum tubal ligations.

Delivery room/operating room procedures are designed to provide maximum reduction of exogenous microorganisms, which could contaminate the perineum or

operative area. Personnel and their compliance with surgically acceptable procedures are a critical component in the prevention of postpartum infections.

OB personnel function in a unique situation within the hospital, in that while providing postpartum and intrapartum care, they must consider not only the health and well being of the mother, but also of the fetus and newborn. Therefore, it is important to remember to inform nursery and pediatric personnel about potential problems or complications, including infectious complications, as far in advance of the birth of an infant as possible.

Infection Control Practices

Staff

- Hands will be washed before and after patient contact and before performing any invasive procedures.
- All personnel will follow “Standard Precautions”, to prevent transmission of bloodborne pathogens.
- All personnel will participate in in-service education.
- Personal Protective Equipment (i.e., masks, gloves, goggles, and gowns) will be readily available and worn for protection when indicated.
- Personnel will report active infections, suspected communicable diseases, occupational injuries or infectious exposures to their immediate supervisor and report to Occupational Health to determine duty status and/or work restrictions.
- Personnel will adhere to good personal hygiene practices.

14. Special Situations

- Suspected trends or problems relating to Infection Control will be reported promptly to the Infection Control Department.

Employee health

- OB personnel should be free of transmittable infectious diseases.
- Personnel who have exudative skin lesions or weeping dermatitis should refrain from all direct patient care and should not handle patient care equipment until the condition resolves.
- Personnel who provide direct patient care must be immune to rubella, measles, mumps, and hepatitis B. Non-immune individuals will receive vaccine in accordance with hospital policy.
- Personnel should receive annual influenza vaccine.
- Varicella-immune status will be determined upon employment. Non-immune personnel will receive varicella vaccine in accordance with hospital policy.
- Needlestick/sharps/mucous membrane exposures must be reported immediately and referred to Occupational Health for evaluation and follow-up.

Handwashing

- Adherence to good handwashing is mandatory. Personnel will wash their hands before and after patient contact and before performing any invasive procedures.
- All others involved in deliveries (including fathers and coaches) will be instructed in and practice good handwashing.

- Standard surgical hand scrubs (following the operating room procedure) will be performed by all personnel in contact with the patient before deliveries or surgical procedures.
- Hands will be washed after gloves are removed.
- Personnel should remove rings, watches, and bracelets before washing hands and entering the OB or nursery areas. Jewelry is limited to wedding bands and watches.

Restrictions

- No food or drinks are allowed in the patient care areas.

Personal Protective Equipment (PPE)

- Personnel will wear a clean scrub suit or dress. Soiled scrubs will be changed as needed.
- Cover gowns or laboratory coats will be worn over scrubs when leaving the area.
- The patients coach, husband, or other support person attending births will change into scrubs or attire before entering the OR/delivery room suite. Masks, hats, and gowns are not required for the birthing rooms, except for the delivering physician.

Garb for personnel performing or assisting in deliveries:

- Splashing of blood and blood-tinged amniotic fluid is almost inevitable at delivery, therefore, gloves, gowns, a plastic apron, masks, and eye protection will be worn at all births for protection.
- Long-sleeved impervious gowns will be worn.

14. Special Situations

- Sterile gloves will be worn during deliveries and during all invasive procedures
- All healthcare workers who perform or assist with deliveries will wear gloves and gowns when handling the placenta or the infant until blood and amniotic fluid have been removed from the infants' skin.
- Shoe covers or boots that do not permit blood/body fluids to pass through to the employee's skin will be worn.

Garb for personnel performing C-sections:

- All standards for operating room suites will be applied to the C-section suite.
- Surgical scrubs will be worn for those in direct contact with the sterile field.
- Hair covering will be worn. All hair will be totally covered, a hood shall cover beards.
- Sterile gloves and impervious sterile, long-sleeved gown will be worn for personnel working within the sterile field.
- Shoe covers and boots that do not permit blood or body fluids to pass through or to reach the employee's skin will be worn.
- Eye protection (face shield or goggles) will be worn accordingly to the potential for splashing.
- All persons entering the room where there is a sterile field, will wear masks.
- For pediatricians walking up to obtain the infant from the sterile field, minimum requirements are hand-washing, sterile gloves, and a gown.

General Policies

- Disposable items are utilized as much as possible.
- Only disposable intra-uterine catheters and scalp electrodes are used. Check packaging integrity before use.
- Insert the intra-uterine pressure catheter and scalp electrodes carefully utilizing strict aseptic technique.
- Do not remove components of the monitoring system from sterile packages and setup until the system is actually needed.
- Sterile solutions and sterile equipment will be used for all fluid pathways in the pressure monitoring system. The system will be maintained as a closed system and extreme caution will be used to avoid contamination during calibration.
- External cables, fetal monitors, and accessories will be cleaned with soap and water after each patient use.
- Needles, syringes, and sharps will be disposed of uncapped and uncut into puncture-resistant sharps containers.
- Soiled linen will be placed in an impervious linen bag to contain used/soiled linen.
- Regulated medical waste will be disposed of in accordance with hospital policy.

Preparation of Obstetric Emergencies

- Surgical packs, solution, and other materials and supplies can be kept sealed, but conveniently arranged so that the instrument table can be ready immediately, for an obstetric emergency.

14. Special Situations

- A delivery pack and tray is opened and covered with sterile drape at all times. If unused within 12 hours, this setup is broken down.
- The caesarian packs are prepared in anticipation of an emergent procedure and are broken down if unused in one hour.
- A birthing delivery setup is broken down after 8 hours of being opened if not used.

Housekeeping

- The delivery/OR suite will strictly adhere to the GHPC cleaning procedures and standards. Refer to Chapter 12.
- in the Infection Control Manual.
- All patient care areas, floors, and other horizontal surfaces will be cleaned at least daily with an approved hospital grade disinfectant.
- All blood and body fluid spills will be cleaned promptly with a 1:10 bleach solution or an approved hospital disinfectant. Gloves and appropriate protective equipment will be worn.
- Birthing rooms are to be cleaned in the same fashion as the delivery rooms with the exception of the floor. Floors in the birthing rooms are scrubbed with a mop and disinfectant.

Traffic Control

- Only authorized personnel are allowed in the Labor and Delivery area. The patient may have only one person in attendance. This person will be instructed and dress in appropriate attire as per ward routine.

- Persons wishing to observe a patient in labor and delivery will be considered on an individual basis. Authorization must come from the patient care coordinator, charge nurse, or staff physician.
- Only one person is allowed in attendance for C-sections, if the patient is awake.

Isolation

- “Standard Precautions” will be followed on all patients, regardless of their diagnosis.
- Transmission based precautions (airborne, droplet, and contact) will be followed when indicated. Refer to the Infection Control Manual, Chapter 6 for specifics.
- A mother with a respiratory tract infection should be informed that such infections are easily transmitted on hands or by fomites, and will be instructed in careful handwashing techniques and appropriate handling of tissues or other items contaminated with infectious secretions. The mother may wear a surgical mask when with the newborn, to reduce the chance of droplet spread of infection.
- Management of maternal/infant contacts for mothers with active herpes lesions:
 - Educate the mother fully regarding the reasoning for following precautions.
 - Instruct mother in proper handwashing techniques.
 - Instruct mother to use gloves for direct contact with the infected area or with contaminated pads or dressings.

14. Special Situations

- ❑ Permit breast-feeding if no active lesions in breast area.
 - ❑ Instruct mother/visitors not to kiss/nuzzle infant if oral lesions are present.
 - ❑ Mother should wear a clean cover gown to hold infant.
 - ❑ Cover affected area as appropriate (i.e., Band-Aid, perineal pad, or other types of dressings), if oral herpes lesions cannot be covered, mother should wear a mask when touching her newborn.
- Mothers known to be HIV positive should be advised not to breast-feed.
 - If an OB patient is re-admitted to L & D, the recovery room, or OB ward, as a result of re-admission to the hospital or transfer from another ward “Standard Precautions” will be observed.
 - If a mother has a communicable disease that requires isolation precautions the infant will remain in the observation nursery until both the pediatric medical officer and the OB/GYN medical officer have determined that maternal-infant contact would no longer be detrimental.

2. Infection Hazards of Human Cadavers

Opinion differs among healthcare workers on the management of a body associated with an infection and the measures taken or advised to control the perceived hazards are often insensitively applied. The safety of all persons who may come in contact with a body associ-

ated with an infection must always be given high priority. There should be a balance though between what is required for safety and the sensitivity and dignity of the bereaved.

Not all cases of infection will have been identified before death and for this reason, it is strongly recommended that high standards are adopted for the handling of all bodies. All hospitals, primary care trusts, care homes and all undertakers' premises should have policy documents and codes of practice for their staff on the correct handling of bodies and especially those that have died with a known or suspected infection. These guidelines are not meant to replace such documents, but may be of help in ensuring that all aspects of the tasks are covered.

The body needs to be washed and dressed for hygienic reasons and, if necessary, enclosed in a leak-proof bag. Religious customs may dictate certain rites to be performed and relatives and friends to touch and kiss the face to complete the grieving process; there is no reason to discourage this in normal circumstances.

Spread of Infection

Organisms in a dead body are unlikely to infect healthy people with intact skin, but there are other ways they may be spread.

- Needlestick injuries with a contaminated instrument or sharp fragment of bone
- Intestinal pathogens from anal and oral orifices
- Through and from abrasions, wounds and sores on the skin

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- Contaminated aerosols from body openings or wounds e.g. tubercule bacilli when condensation could possibly be forced out through the mouth
- Splashes or aerosols onto the eyes
- The risks of infection are not high (and no more than in life) and are usually prevented by the use of standard precautions appropriate protective clothing and the observance of regulations.

Communication

If a person has died with a known or suspected infection, it is essential and a legal responsibility that all persons who may be involved in handling the body are informed of the potential risk of infection. They should be advised of the risks of infection, but the specific diagnosis remains **confidential, even after death**. The persons who need to know include:

In Hospital - Ward staff, mortuary staff, the bereaved relatives and the undertakers.

At Home - The nurse laying out, bereaved relatives and the undertakers.

Elsewhere - Emergency services staff will usually take the same standard precautions for handling all bodies.

The undertaker's personnel should be informed in writing of the potential risk of infection and the degree of risk, and given the names of the Hospital Control of Infection Officer whom they can consult for further advice.

Labels indicating a danger of infection must only be used for bodies which are suspected of containing hazard

group 3 (or 4) pathogens. Warning labels should be conspicuously placed on the body but accompanying clinical information should not be available to anyone other than mortuary staff.

Local rules must ensure that the senior pathology technician is informed of all deaths where a high-risk infection is thought to exist, before a body is delivered to a mortuary. Funeral directors, relatives, porters, etc., should also be informed if the body is in the high-risk category.

The undertakers should be willing to liaise with the relatives concerning any potential risks. It is important that good liaison is maintained between staff on the wards, microbiology and histopathology laboratories, portering and mortuary departments in the first instance, the undertaker and the bereaved next and the Consultant in Health Protection (CHP) at all levels. Communication between mortuary staff and undertakers is particularly important and every endeavour should be made to try and improve it. It means co-ordinating of viewing, hygienic and ritual body preparation and then bagging of the deceased in the ward, examination or storage in the mortuary and, finally, collection for disposal by the undertakers and any further hygienic preparation or embalming that is to be done.

Laying Out

Hygienic preparation of bodies usually involves washing the face and hands, closing the eyes and mouth, tidying the hair and possibly shaving the face. It may also involve plugging orifices to prevent discharges. Any wounds should also be covered.

In some cultures and religious groups, relatives expect to carry out the ritual preparation before burial and, in most cases, this can be permitted but where a risk of infection exists the hazard has to be assessed and appropriate advice given. This may mean only partial preparation and the use of gloves and protective clothing, and should be supervised. When the hygienic preparation is not done by nursing staff, funeral staff will do as much as they can and this often includes at least partial embalming.

Body Bags

Body bags should only be reserved for cases where a risk assessment makes it necessary.

Plastic body bags are used for cadavers thought to be infective to handlers, or likely to leak in transit, or otherwise offensive bodies. The bags are in many cases used inappropriately for bodies that are of minimal or no risk, and this causes problems to the staff of funeral parlours and unnecessary distress to relatives. Bodies cool more slowly inside a body bag, facilitating decomposition and making hygienic preparation more difficult. It may only be possible to display the head for viewing and this may cause additional distress to the bereaved. There are many types of body bag available, but it is recommended that **those made of polyvinyl chloride should not be used if the body is to be cremated** because of the risk of dangerous emissions of dioxins.

Where there is judged to be an appreciable risk, the black and yellow Biohazard labels should be attached to the shroud and the bag, in addition to the identification labels.

Hospital Ward Staff

The Consultant in charge of the case is responsible for issuing an appropriate warning when the death is associated with an infection. The ward doctor certifying death will, if necessary, consult with the Infection Control Officer for advice on the use of a body bag and will advise the nursing staff. Nursing staff performing the last offices should adopt the same standard routine protective precautions as when the patient was alive, disposable gloves and a disposable plastic apron when handling the deceased. Any surface contamination should be removed by washing. Orifices may be packed and any wounds or leaking openings should be covered with occlusive dressings. Care must be taken to avoid contamination of any wounds or skin lesions on the workers skin, and hands must be washed thoroughly at the end of the procedure.

Where appropriate the ward nurse will inform the relatives on any restrictions, emphasizing that the body may be enclosed in a bag once it leaves the ward. Relatives may be ignorant of the true nature of the infection and an **individual's right to confidentiality continues after death** but, nevertheless, the bereaved relatives must be advised on how to avoid risk of infection themselves. The certifying doctor should discuss the precautions that are advised with the relatives. If relatives wish to carry out ritual preparation of the body themselves, it should be done under supervision ensuring they observe the standard precautions advised.

The ward nurse should then cover the body in a disposable shroud and cover with a sheet. If appropriate, the body should then be placed in a leak-proof cadaver bag and labelled with "Biohazard – danger of infection"

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tape and identification labels attached to the ankle, the shroud and the bag. Porters transporting the deceased to the mortuary should conform to hospital policy when handling the body and the mortuary staff must be advised of the risk of infection.

Vaccination of Staff

Although vaccines can give good protection against polio virus, diphtheria, and hepatitis B, the protection is **not** 100% effective and there are other infections against which there are no vaccines e.g. HIV/AIDS and hepatitis C. The use of standard infection control precautions are therefore crucial in preventing cross infection. (Standard Precautions (*Annex 3*))

It is recommended that embalmers and mortuary staff be fully vaccinated for Hepatitis B and shown to be immune. Those **not** immune should be counselled and advised of continuing risk of infection and to seek occupational health advice.

Specific Infections

Very High Risk (Group A)

- Body bag must be used
- Viewing and touching prohibited*
- No embalming
- Hygienic preparation banned

Applies to:

- Anthrax
- Lassa, Ebola, Marburg and other viral haemorrhagic fevers

- Yellow fever
- Plague
- Rabies
- SARS* (For SARS 'WHO' guidance currently states that family may view the body if they wear personal protective equipment)
- Septicaemia due to invasive Group A streptococcal infection, if not had 24 hours of appropriate antibiotic therapy.
- Smallpox

High Risk (Group B)

- Body bag must be used for transmissible spongiform encephalopathies, and typhus, and considered for the others if there is leakage of body fluids
- Advised that embalming should not be done
- The bereaved should be warned of the potential infection risk. If they wish to carry out ritual washing or preparation of the body this should be done under supervision with advice about the use of standard precautions.

Applies to:

- Transmissible spongiform encephalopathies
- Typhus

And for the following diseases only if there is seepage of body fluids:

- Hepatitis B

- Hepatitis C
- Other blood-borne Hepatitis' e.g. Hepatitis D
- HIV/AIDS

Bodies infected with HIV may be infected with other diseases, such as tuberculosis and cryptosporidiosis, that may be potentially more infectious than the HIV infection itself.

Medium Risk (Group C)

- Body bag is advised only if there is leakage of body fluids
- Hygienic preparation of the body is permitted
- Viewing and touching is allowed
- Embalming may be carried out
- Standard precautions still need to be taken

Applies to:

- Cholera
- Diphtheria
- Dysentery (amoebic or bacillary)
- Meningococcal disease (untreated)
- Typhoid and Paratyphoid fever
- Relapsing fever
- Scarlet fever
- Tuberculosis
- Brucellosis

- Salmonellosis

Low Risk (Group D)

- Body bag not required
- Hygienic preparation of the body is permitted
- Body can be handled – viewing and touching is allowed
- Embalming may be carried out
- As the presence of infectious agents is not suspected, notably hepatitis B and C, HIV/AIDS and tuberculosis, it is still important that the precautions specified in the Control of Substances Hazardous to Health should be followed for handling all bodies, but especially standard infection control procedures such as the use of appropriate protective clothing and the washing of hands is required.

Tuberculosis (Group C)

In patients with respiratory tuberculosis it is recommended that the face of the cadaver be covered with a disposable facemask when being handled to prevent any aerosol formation as air is expelled from the lungs. The risk of infection to undertakers and embalmers is probably small, but the risk to staff involved in post mortems is much greater because of the aerosols, particles and splashes that are generated, especially when power saws are used.

Septicaemia (Group D unless untreated Meningococcal or Group A Streptococcal)

Only the septicaemias caused by meningococcal or Group A streptococcal pose a risk, (unless they have

been treated with appropriate antibiotic therapy) and these should be handled with care. The blood and other body fluids are infectious and can infect those who handle the body or clean up contaminated surfaces, even through apparently trivial injuries or other breaks in the skin surface. Any accidents or tears in gloves must therefore be reported to a senior supervisor at once and, if necessary, the Health Protection Unit staff or the HCID should be consulted.

Hepatitis B (Group B)

Hepatitis B is a blood-borne virus and is extremely infectious if it gains entry into the body through skin penetration such as needlestick injuries. If there is leakage of body fluids, bodies suspected of being infected should be handled with great care by workers wearing full protective clothing and who are well trained in how to avoid infection. The bereaved should be warned of the potential risk of infection and advised on precautions that should be taken if they wish to touch the body. If they wish to carry out any ritual washing, they should be supervised and advised on the use of standard precautions. Embalmers and mortuary staff should be vaccinated routinely against hepatitis B and shown to be immune. Those who are not immune should be counselled and advised of continuing risk of infection and to seek occupational health advice.

Hepatitis C, D and G (Group B)

Hepatitis C, D and G are transmitted by the same routes as hepatitis B. No vaccine is yet available. Full precautions should be taken as for hepatitis B. Hepatitis D does not occur without hepatitis B.

HIV/AIDS (Group B)

In undertaker's premises and in mortuaries, HIV/AIDS would be transmitted by similar routes as hepatitis B, but is considerably less infectious. Standard protection should be adequate to prevent transmission. Other infections may also be present in these bodies and, in particular, tuberculosis and cryptosporidiosis must be considered.

Gastrointestinal Infections (Group C)

Leakage of faeces from bodies is common and all who handle them should use standard precautions. Cleaning up of all leakages and careful washing of hands is important. These infections include the dysenteries, salmonellosis and cryptosporidiosis.

MRSA (Group D)

This infection is **not** a problem, but can raise concern amongst embalmers and funeral directors. Standard precautions is all that is required. Methicillin-Resistant *Staphylococcus aureus* (MRSA) are strains of the bacterium *Staphylococcus aureus* (SA) that are resistant to some (not all) commonly used antibiotics. About one-third of the population carry SA harmlessly on their skin or in the nose and throat (colonisation) but it can cause infections of various kinds that are usually not serious and can be treated easily. However, certain vulnerable or debilitated individuals can get more serious infections that, although much less common, may cause life-threatening conditions. If the SA in these cases is also one of the MRSA strains, its significance is that it has restricted treatment options. About 80% of people who acquire MRSA carry it harmlessly on their skin and MRSA does not normally prove a threat to healthy people. No special precautions

are required for the laying out, handling or embalming of bodies that may be colonised or infected with MRSA. Normal hygienic measures are all that is necessary and there need be no restrictions on the bereaved family with regard to viewing, touching, kissing etc.

3. Emergency Medical Services and Receiving Areas

Emergency Medical Services (EMS) system responders deliver medical care in many unique and oftentimes dangerous environments. They render care to increasingly mobile populations who potentially have a higher likelihood of having an infectious or emerging disease. In addition to treating accident victims of every nature (vehicular, falls, cuts, burns, and more), they treat the homeless, nursing home patients, trauma victims, and the critically ill with multiple diseases and infections. They have unique concerns such as suspect searches, communal living arrangements, and the need to clean and disinfect their work equipment. Like many other healthcare professionals, they face ever-increasing exposures to infectious diseases.

Key concepts

- Many of the principles and practices that hospital ICOs employ for infection prevention can and should be used in EMS settings, whether it be a fire department, police agency, or public or private ambulance company.
- EMS system responders are exposed to all manners of infectious diseases and must be trained to recognize them and prevent their spread.

- EMS leadership must support infection prevention staff and the development of infection prevention programs in compliance with laws and regulations. Leadership support is critical to successful implementation of basic infection prevention strategies.

Infection prevention

Created in hospitals and clinics, infection prevention training has by necessity expanded to include EMS system responders and out of hospital emergency medical care agencies. Infection prevention programs are designed to prevent the transmission of infectious disease agents and to provide a safe work environment for healthcare personnel and their patients.

Key concepts

- Effective efforts to eliminate or reduce bloodborne and infectious disease exposures and transmission are guided by the epidemiology (causes and distribution) of those diseases.
- All EMS system responders report to work healthy. They must have a written plan in place outlining work restriction guidelines when EMS system responders contract and/or are exposed to an infectious disease.
- All EMS system responders have the necessary immunizations or written proof of immunity to protect them against infectious diseases.

Risk Factors / Risk Assessment in EMS

Awareness of hazards is an important part of protecting EMS system responders. Agencies can perform a hazard

14. Special Situations

risk assessment to obtain a baseline incidence, prevalence, and transmission of hazards. These include exposure to communicable diseases, hazardous materials, and sharps-related injuries. The hazard risk assessment guides development of a surveillance, prevention, and infection control program.

Key concepts

- Past and current agency-specific surveillance data is the focus of the risk assessment.
- Exposure and injury surveillance data includes demographic, geographic, and published EMS/Fire/Public Safety data on risk.
- Risk assessment should be continuously revised or updated when there is a change based on ongoing surveillance, when populations change, or when additional risks are identified.
- Information from the risk assessment drives education and improvement processes. Epidemiology is the foundation of the process.

EMS system responders face a wide variety of serious hazards due to the unpredictable nature of their jobs. There are exposure and injury risks at motor vehicle accidents, fires, hazardous materials (hazmat) incidents, and mass casualty incidents to name a few. EMS system responders are routinely exposed to situations that threaten their personal safety, including exposures to infectious diseases, hazardous materials, and sharps-related injuries.

Infectious disease and sharps injury risk factors

General risk factors for infectious diseases and sharps-related injuries are well documented in medical litera-

ture. Known risk factors include, but are not limited to:

- Exposure to patients with chronic diseases (HIV, hepatitis B and C)
- Exposure to blood and other potentially infectious fluids
- Exposure to patients with infectious diseases (MRSA, meningitis, influenza)
- Failure to use engineering controls such as self-sheathing IV catheters and needleless systems
- Failure to use appropriate sharps containers
- High-risk procedures such as intubation, IV starts, and bandaging
- Noncompliance with Standard Precautions
- Poor hand washing techniques
- Faulty, defective, or improperly used equipment
- Lack of preventative immunizations
- Failure to properly decontaminate equipment and other work surfaces
- Poorly lit work area
- Hazardous work areas including hazardous material or fire responses
- Combative patients with obvious blood exposure
- Inappropriate disposal of contaminated Sharps

Engineering and Work Practice Controls and Personal Protective Equipment

Engineering and work practice controls and PPE are key components to a comprehensive infection prevention program. They maximize protection against infectious diseases and sharps-related injuries for both EMS system responders and the public. The term engineering controls addresses redesign of equipment to ensure employee risk reduction, procedures that serve to reduce exposure such as cleaning equipment or areas that have been contaminated, and the use of barrier techniques to reduce direct contact with blood and other potentially infectious materials.

Key concepts

- Hand washing is the single most important means of preventing the spread of disease (see example of proper hand hygiene at the end of this section).
- Risk of exposure to infectious diseases and sharps-related injuries can be greatly reduced and eliminated by introducing and adhering to best practices.
- The word “personal” in PPE means EMS system responders are responsible to wear PPE for their own personal safety.
- The use of Standard Precautions and utilizing PPE for all patient contact is recommended to minimize infectious disease transmission to EMS system responders.
- Any body fluid containing **visible blood** and other potentially infectious materials pose increased risk.
- Effective environmental cleaning disinfection, and disposal of contaminated materials or equipment will reduce the risk of infectious disease transmission.

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16. ANNEXES

Annex 1: Example of a minimum data collection form for prevalence study

Date	(dd/mm/yy)	_____
Hospital		_____
Unit		_____
Unit specialty		_____
Patient		
Patient identification		_____
Age	(years)	_____
Gender	<input type="checkbox"/> male <input type="checkbox"/> female	_____
Date of admission in the hospital		(dd/mm/yy) _____
Patient exposure		
Surgical procedure (during the last month)	<input type="checkbox"/> Yes <input type="checkbox"/> No	_____
Urinary catheter	<input type="checkbox"/> Yes <input type="checkbox"/> No	_____
Mechanical ventilation	<input type="checkbox"/> Yes <input type="checkbox"/> No	_____
Intravascular catheter	<input type="checkbox"/> Yes <input type="checkbox"/> No	_____
Antibiotic	<input type="checkbox"/> Yes <input type="checkbox"/> No	_____
<i>If yes, prescription for</i>		
<input type="checkbox"/> Prophylaxis	<input type="checkbox"/> Therapy	<input type="checkbox"/> Other/unknown
Nosocomial infection		
	<input type="checkbox"/> Yes <input type="checkbox"/> No	_____
<i>If yes, fill the following items</i>		
Surgical site infection	<input type="checkbox"/> Yes <input type="checkbox"/> No	_____
Urinary tract infection	<input type="checkbox"/> Yes <input type="checkbox"/> No	_____
Bloodstream infection	<input type="checkbox"/> Yes <input type="checkbox"/> No	_____
Pneumonia	<input type="checkbox"/> Yes <input type="checkbox"/> No	_____
Other respiratory infection	<input type="checkbox"/> Yes <input type="checkbox"/> No	_____
Line-related infection	<input type="checkbox"/> Yes <input type="checkbox"/> No	_____
Other nosocomial infection	<input type="checkbox"/> Yes <input type="checkbox"/> No	_____

From: Prevention of hospital-acquired infections. A practical guide. 2nd edition. WHO/CDS/CSR/EPH/2002.12

Annex 2: Example of a data collection form for surgical site infection surveillance

Hospital	_____	_____
Unit	_____	_____
Patient		
Patient identification	_____	_____
Age (years)	_____	_____
Gender	<input type="checkbox"/> male <input type="checkbox"/> female	_____
Date of admission (in the hospital)	(dd/mm/yy)	_____
Date of discharge (from the unit)	(dd/mm/yy)	_____
Operation		
Date of operation	(dd/mm/yy)	_____
Main procedure	(code)	_____
Wound class	<input type="checkbox"/> Clean <input type="checkbox"/> Contaminated <input type="checkbox"/> Clean-contaminated <input type="checkbox"/> Dirty/infected	_____
ASA score	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5	_____
Duration of operation	(minutes)	_____
Urgent	<input type="checkbox"/> Yes <input type="checkbox"/> No	_____
Prosthesis/implant	<input type="checkbox"/> Yes <input type="checkbox"/> No	_____
Multiple procedures	<input type="checkbox"/> Yes <input type="checkbox"/> No	_____
Coelosurgery	<input type="checkbox"/> Yes <input type="checkbox"/> No	_____
Antibiotics		
Antimicrobial prophylaxis	<input type="checkbox"/> Yes <input type="checkbox"/> No	_____
Starting date	(dd/mm/yy)	_____
Duration	(days)	_____
Surgical site infection		
Surgical site infection	<input type="checkbox"/> Yes <input type="checkbox"/> No	_____
Date of infection	(dd/mm/yy)	_____
Infection site	<input type="checkbox"/> superficial <input type="checkbox"/> deep <input type="checkbox"/> organ/space	_____
Microorganism 1	_____	_____
Microorganism 2	_____	_____
Date of last contact	(dd/mm/yy)	_____

From: Prevention of hospital-acquired infections. A practical guide. 2nd edition. WHO/CDS/CSR/EPH/2002.12

Annex 3: Standard Precautions: Key elements

Health-care facility recommendations for standard precautions

KEY ELEMENTS AT A GLANCE

1. Hand hygiene¹

Summary technique:

- Hand washing (40–60 sec): wet hands and apply soap; rub all surfaces; rinse hands and dry thoroughly with a single use towel; use towel to turn off faucet.
- Hand rubbing (20–30 sec): apply enough product to cover all areas of the hands; rub hands until dry.

Summary indications:

- Before and after any direct patient contact and between patients, whether or not gloves are worn.
- Immediately after gloves are removed.
- Before handling an invasive device.
- After touching blood, body fluids, secretions, excretions, non-intact skin, and contaminated items, even if gloves are worn.

6. Respiratory hygiene and cough etiquette

Persons with respiratory symptoms should apply source control measures:

- cover their nose and mouth when coughing/sneezing with tissue or mask, dispose of used tissues and masks, and perform hand hygiene after contact with respiratory secretions

Health care facilities should:

- place acute febrile respiratory symptomatic patients at least 1 metre (3 feet) away from others in common waiting areas, if possible.
- post visual alerts at the entrance to health-care facilities instructing persons with respiratory symptoms to practise respiratory hygiene/cough etiquette
- consider making hand hygiene resources, tissues and masks available in common areas and areas used for the evaluation of patients with respiratory illnesses.

continues

<ul style="list-style-type: none">■ During patient care, when moving from a contaminated to a clean body site of the patient.■ After contact with inanimate objects in the immediate vicinity of the patient.	<p>7. Environmental cleaning</p> <ul style="list-style-type: none">■ Use adequate procedures for the routine cleaning and disinfection of environmental and other frequently touched surfaces.
<p>2. Gloves</p> <ul style="list-style-type: none">■ Wear when touching blood, body fluids, secretions, excretions, mucous membranes, nonintact skin.■ Change between tasks and procedures on the same patient after contact with potentially infectious material.■ Remove after use, before touching non-contaminated items and surfaces, and before going to another patient. Perform hand hygiene immediately after removal.	<p>8. Linens</p> <p>Handle, transport, and process used linen in a manner which:</p> <ul style="list-style-type: none">■ prevents skin and mucous membrane exposures and contamination of clothing■ avoids transfer of pathogens to other patients and or the environment.
<p>3. Facial protection (eyes, nose, and mouth)</p> <ul style="list-style-type: none">■ Wear a surgical or procedure mask and eye protection (face shield, goggles) to protect mucous membranes of the eyes, nose, and mouth during activities that are likely to generate splashes or sprays of blood, body fluids, secretions, and excretions.	<p>9. Waste disposal</p> <ul style="list-style-type: none">■ Ensure safe waste management.■ Treat waste contaminated with blood, body fluids, secretions and excretions as clinical waste, in accordance with local regulations.■ Human tissues and laboratory waste that is directly associated with specimen processing should also be treated as clinical waste.■ Discard single use items properly.
<p>4. Gown</p> <ul style="list-style-type: none">■ Wear to protect skin and prevent soiling of clothing during activities that are likely to generate splashes or sprays of blood, body fluids, secretions, or excretions.	

continues

Annex 3: Standard Precautions: Key elements (cont.)

<ul style="list-style-type: none">■ Remove soiled gown as soon as possible, and perform hand hygiene. <p>5. Prevention of needle stick injuries²</p> <p>Use care when:</p> <ul style="list-style-type: none">■ handling needles, scalpels, and other sharp instruments or devices■ cleaning used instruments■ disposing of used needles.	<p>10. Patient care equipment</p> <ul style="list-style-type: none">■ Handle equipment soiled with blood, body fluids, secretions, and excretions in a manner that prevents skin and mucous membrane exposures, contamination of clothing, and transfer of pathogens to other patients or the environment.■ Clean, disinfect, and reprocess reusable equipment appropriately before use with another patient.
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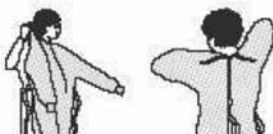
¹ For more details, see: WHO Guidelines on Hand Hygiene in Health Care (Advanced draft), at: http://www.who.int/patientsafety/information_centre/ghnadownload/index.html.

² The SIGN Alliance at: http://www.who.int/injection_safety/sign/en/

Annex 4: Example of Safe Donning and Removal of Personal Protective Equipment (PPE)

GOWN

- Fully cover torso from neck to knees, arms to end of wrist, and wrap around the back
- Fasten in back at neck and waist



MASK OR RESPIRATOR

- Secure ties or elastic band at middle of head and neck
- Fit flexible band to nose bridge
- Fit snug to face and below chin
- Fit-check respirator



GOGGLES/FACE SHIELD

- Put on face and adjust to fit



GLOVES

- Use non-sterile for isolation
- Select according to hand size
- Extend to cover wrist of isolation gown



SAFE WORK PRACTICES

- Keep hands away from face
- Work from clean to dirty
- Limit surfaces touched
- Change when torn or heavily contaminated
- Perform hand hygiene

From: Siegel JD, Rhinehart E, Jackson M, Chiarello L, and the Healthcare Infection Control Practices Advisory Committee, 2007 Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings, June 2007.

Annex 5: Removing PPE

Remove PPE at doorway before leaving patient room or in anteroom

GLOVES

- Outside of gloves are contaminated!
- Grasp outside of glove with opposite gloved hand; peel off
- Hold removed glove in gloved hand
- Slide fingers of ungloved hand under remaining glove at wrist



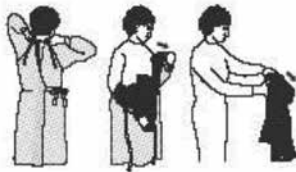
GOGGLES/FACE SHIELD

- Outside of goggles or face shield are contaminated!
- To remove, handle by "clean" head band or ear pieces
- Place in designated receptacle for reprocessing or in waste container



GOWN

- Gown front and sleeves are contaminated!
- Unfasten neck, then waist ties
- Remove gown using a peeling motion; pull gown from each shoulder toward the same hand
- Gown will turn inside out
- Hold removed gown away from body, roll into a bundle and discard into waste or linen receptacle



MASK OR RESPIRATOR

- Front of mask/respirator is contaminated – DO NOT TOUCH!
- Grasp ONLY bottom then top ties/elastics and remove
- Discard in waste container



HAND HYGIENE

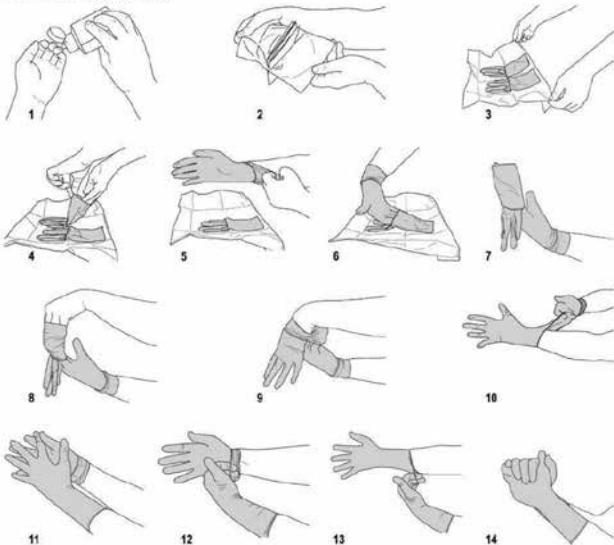
Perform hand hygiene immediately after removing all PPE!

From: Siegel JD, Rhinehart E, Jackson M, Chiarello L, and the Healthcare Infection Control Practices Advisory Committee, 2007 Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings, June 2007

Annex 6: How to don and remove non-sterile gloves

The purpose of this technique is to ensure maximum asepsis for the patient and to protect the health-care worker from the patient's body fluid(s). To achieve this goal, the skin of the health-care worker remains exclusively in contact with the inner surface of the glove and has no contact with the outer surface. Any error in the performance of this technique leads to a lack of asepsis requiring a change of gloves.

I. HOW TO DON STERILE GLOVES



1. Perform hand hygiene before an "aseptic procedure" by handrubbing or hand washing.
2. Check the package for integrity. Open the first non-sterile packaging by peeling it completely off the heat seal to expose the second sterile wrapper, but without touching it.
3. Place the second sterile package on a clean, dry surface without touching the surface. Open the package and fold it towards the bottom so as to unfold the paper and keep it open.
4. Using the thumb and index finger of one hand, carefully grasp the folded cuff edge of the glove.
5. Slip the other hand into the glove in a single movement, keeping the folded cuff at the wrist level.
- 6-7. Pick up the second glove by sliding the fingers of the gloved hand underneath the cuff of the glove.
- 8-10. In a single movement, slip the second glove on to the ungloved hand while avoiding any contact/resting of the gloved hand on surfaces other than the glove to be donned (contact/resting constitutes a lack of asepsis and requires a change of glove).
11. If necessary, after donning both gloves, adjust the fingers and interdigital spaces until the gloves fit comfortably.
- 12-13. Unfold the cuff of the first gloved hand by gently slipping the fingers of the other hand inside the fold, making sure to avoid any contact with a surface other than the outer surface of the glove (lack of asepsis requiring a change of gloves).
14. The hands are gloved and must touch exclusively sterile devices or the previously-disinfected patient's body area.

Annex 7 Health Care Facility Cleaning/Disinfection Policies

Adapted from the Infection Prevention and Control Manual of Trinidad and Tobago

Item/Task and Location	Frequency of Cleaning/Disinfection	Agent, Equipment and Supplies Needed	Procedure/Remarks
CLEANING EQUIPMENT			
Cleaning cloths	<ul style="list-style-type: none"> Daily after use 	<ul style="list-style-type: none"> Liquid detergent and water Sodium hypochlorite 0.5% Clean water Bucket 	<ul style="list-style-type: none"> Rinse in soapy water In high-risk areas disinfect after each use and at night Store dry Incinerate if heavily contaminated
Floor, mops, brooms, brushes	<ul style="list-style-type: none"> Clean and disinfect after use 	<ul style="list-style-type: none"> Liquid detergent and water Sodium hypochlorite 0.5% 	<ul style="list-style-type: none"> Wash thoroughly with detergent after each use Rinse in water Immerse in disinfectant for 30 minutes then dry Always colour code and confine use of each mop to its designated room, e.g. kitchen, toilet, ward, etc. DO NOT MIX MOPS Mops should be stored dry and upright with head up

CLEANING EQUIPMENT (cont.)

Plastic buckets for use during cleaning	<ul style="list-style-type: none"> • Daily after use or as required 	<ul style="list-style-type: none"> • Abrasive materials to clean • Liquid detergent and water Isolation areas: <ul style="list-style-type: none"> • Sodium hypochlorite 0.5% 	<ul style="list-style-type: none"> • Each area to have own bucket • General wards clean daily or as required with detergent and water Isolation areas: <ul style="list-style-type: none"> • Soak in sodium hypochlorite or POASB for 10 minutes • TB areas: • Soak for 20 minutes in sodium hypochlorite or phenolic disinfectant 2% • Rinse with tap water
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HEALTH CARE FACILITY CLEANING/DISINFECTION POLICIES**Ablution Facilities**

Ablution blocks: <ul style="list-style-type: none"> • Toilets • Toilet seats • Toilet cistern and urinal 	<ul style="list-style-type: none"> • Clean twice daily: morning & evening shifts • Clean when soiled • Clean between patients and after discharge • Disinfect seats 	<ul style="list-style-type: none"> • Liquid detergent and water • Sodium hypochlorite 0.05% • Deodorizer 	<ul style="list-style-type: none"> • Use a low-level disinfectant • Use deodorizer if necessary as per manufacturer's instructions • Soak in sodium hypochlorite
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Item/Task and Location	Frequency of Cleaning/Disinfection	Agent, Equipment and Supplies Needed	Procedure/Remarks
HEALTH CARE FACILITY CLEANING/DISINFECTION POLICIES (Cont.)			
Ablution Facilities			
Bedpans/urinals	<ul style="list-style-type: none"> Scrub with vim, soap and water daily 	<ul style="list-style-type: none"> Detergent and water In case of diarrhoeal disease: Sodium hypochlorite 0.5% (2,500 ppm) NaDCC powder Sterilization 	<p>Regardless of patients status of infection:</p> <ul style="list-style-type: none"> Empty bedpan/urinal/washing bowl down sewer. Clean with soapy water and use scouring powder if stained <p>In case of diarrhoeal disease:</p> <ul style="list-style-type: none"> Sprinkle disinfectant into receptacle then empty Otherwise fill with prepared disinfectant solution; leave 30 minutes then empty and wash again in freshly prepared solution Wash Rinse with clean water and dry Extra bedpans/urinals/sputum mugs not in use should be stored in cupboards Sputum mugs after washing, pour full strength disinfectants before dispatching to patients
Disposable sputum mugs	<ul style="list-style-type: none"> Discard after use 		

HEALTH CARE FACILITY CLEANING/DISINFECTION POLICIES (Cont.)

Ablution Facilities

			<ul style="list-style-type: none"> Cleaning equipment for toilets, e.g. mops, rags should not be used elsewhere <p>Used toilet brushes:</p> <ul style="list-style-type: none"> Soak in disinfectant for one hour, wash in warm soapy water, rinse and hang to dry If sterilizer not available, soak in 1% phenol for at least 1 hour after pouring contents in sluice Wash and leave to dry
Jugs (for measuring urine, emptying catheter bags)	<ul style="list-style-type: none"> Between use and daily 	<ul style="list-style-type: none"> Bedpan sterilization after use Store dry and inverted 	
Floors Walls	<ul style="list-style-type: none"> Scrub with scouring agent and water daily Clean spills as per policy Clean walls once a week or as necessary 	<ul style="list-style-type: none"> Liquid detergent and warm water <p>Spills:</p> <ul style="list-style-type: none"> Sodium hypochlorite 0.5% POASB 1% 	
Sluice rooms	<ul style="list-style-type: none"> Once a day and as required Disinfect after contamination 	<ul style="list-style-type: none"> Liquid detergent and warm water <p>Spills:</p> <ul style="list-style-type: none"> Sodium hypochlorite 0.5% POASB 1% 	<ul style="list-style-type: none"> Avoid splashing and spills on walls and surrounding area Pour contents of urinals and bedpans GENTLY down the sluice Disinfect surfaces after use and as necessary

Item/Task and Location	Frequency of Cleaning/Disinfection	Agent, Equipment and Supplies Needed	Procedure/Remarks
HEALTH CARE FACILITY CLEANING/DISINFECTION POLICIES (Cont.)			
Ablution Facilities			
Bathrooms: • Floors • Walls • Enamel baths and basins (bathtubs and sinks) • Washing bowls: autoclavable polypropylene	• Clean once a day as required • Clean spills as per policy • Clean once per week and as necessary • Clean and disinfect between patients	• Liquid detergent and warm water Spills: • Sodium hypochlorite 0.5% • POASB 1% • Liquid detergent to clean bath and sink • Disinfect with: • Sodium hypochlorite 0.5% • POASB 1%	• Scrub floors and walls to remove any residues • Clean and dry drainage hole • Clean walls from top to bottom • Do not use ammonia detergent and chlorine-based compound together because of release of toxic compounds • Rinse thoroughly to remove disinfectant • Do not use abrasive material to clean bath and sink, as it will damage the surface
Shower: • Floor and walls	• Disinfect before, in between and after each patient use	• Liquid detergent and warm water Spills: • Sodium hypochlorite 0.5% • POASB 1%	• Scrub floors and walls to remove any residues • Clean and dry drainage hole • Clean walls from top to bottom

HEALTH CARE FACILITY CLEANING/DISINFECTION POLICIES (Cont.)

Ablution Facilities

Pedal bin and container: • Without liner	<ul style="list-style-type: none"> • Empty daily and as required • Wash daily and as required with soapy water • Use scouring powder as necessary • Disinfect daily and as required • Wash weekly and as necessary • Disinfect when spills occur 	<ul style="list-style-type: none"> • Scouring powder • Liquid detergent and water Disinfect with: <ul style="list-style-type: none"> • Sodium hypochlorite 0.5% • POASB 1% 	<ul style="list-style-type: none"> • Damp dust daily and clean thoroughly once per week with detergent • Rinse and disinfect • Dispose liner when $\frac{3}{4}$ full and clean once per week
• With liner			
Drains	<ul style="list-style-type: none"> • Once per week and as necessary 	<ul style="list-style-type: none"> • Liquid detergent and water • Drain cleaner for unblocking 	<ul style="list-style-type: none"> • Pour hot soapy water down the drain. If blocked use plunger (colour-coded) • Use drain cleaner only if necessary

FURNITURE, FITTINGS AND EQUIPMENT

Beds (including frames)	<ul style="list-style-type: none"> • Daily damp cleaning • Disinfect on discharge or for spills 	<ul style="list-style-type: none"> • Liquid detergent and water • Spills and terminal disinfection (see pages 155, 157 & 158) 	<ul style="list-style-type: none"> • Scrub the bed with detergent and water • In between patients, take the mattress and the pillow(s) from the bed and place in the sun • Use washable mattress covers; change between patients • Never admit a patient into a bed that has not been disinfected
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Item/Task and Location	Frequency of Cleaning/Disinfection	Agent, Equipment and Supplies Needed	Procedure/Remarks
FURNITURE, FITTINGS AND EQUIPMENT (Cont.)			
Bedside lockers (General Ward)	<ul style="list-style-type: none"> Daily damp cleaning Thorough cleaning once per week and on discharge of patient 	<ul style="list-style-type: none"> Liquid detergent and water If splashed with blood and body fluids, wipe with 0.5% sodium hypochlorite Spills and terminal disinfection (see page 155, 157 & 158) 	<ul style="list-style-type: none"> Check lockers for pest control requirements
Bowls (dressing, surgical, vomit, kidney)	<ul style="list-style-type: none"> After each use 	<ul style="list-style-type: none"> Clean with detergent Autoclave at CSSD Store dry and inverted Individual bowl for each patient preferred For communal use, after thorough cleaning, wipe with sodium hypochlorite 0.5%. Empty, wash with detergent, hot water, rinse and store dry 	<ul style="list-style-type: none"> For infected patients use individual bowls Clean with phenolics for bacterial and hypochlorite for viral infections On discharge, autoclave or disinfect with hypochlorite 1% (10,000 ppm) For infected patients, treat as for washing bowls: Decontaminate, wash with detergent and water Rinse and dry
Couches <ul style="list-style-type: none"> Occupational, Physiotherapy and Radiography Departments 	<ul style="list-style-type: none"> Wipe daily or as necessary 	<ul style="list-style-type: none"> Liquid detergent and warm water 	

FURNITURE, FITTINGS AND EQUIPMENT (Cont.)

Dental equipment surfaces	<ul style="list-style-type: none"> Wipe at end of each day and as necessary 	<ul style="list-style-type: none"> Methylated spirit OR Sodium hypochlorite 0.5% 	
Bed curtains Window curtains	<ul style="list-style-type: none"> Every 3 months or when dirty 	<ul style="list-style-type: none"> Laundry detergent and water For infectious cases soak for 30 minutes in sodium hypochlorite 0.5% 	<ul style="list-style-type: none"> For infections cases avoid use of curtains Laundry after disinfection with sodium hypochlorite 0.5%
Electronic equipment	<ul style="list-style-type: none"> Wipe surfaces between patients 	<ul style="list-style-type: none"> 70% Alcohol 	
Fans	<ul style="list-style-type: none"> Routinely and on discharge of patient 	<ul style="list-style-type: none"> Liquid detergent and soapy warm water 	<ul style="list-style-type: none"> Damp wipe with clean cloth Dismantle the fan for terminal cleaning and when visible dirty
Furniture and fittings	<ul style="list-style-type: none"> Routine damp dusting If contaminated wipe with disinfectant and leave to dry 	<ul style="list-style-type: none"> Liquid detergent and warm water Spills: Alcohol spirit 	<ul style="list-style-type: none"> Damp dust with detergent soap solution If contaminated wipe with alcohol 70%
Hydrotherapy pool	<ul style="list-style-type: none"> Clean after each use 	<p>Water:</p> <ul style="list-style-type: none"> Chlorine-based compound Chlorine level in pool 1.4 to 2.0 ppm Tiled areas and floor area surrounding pool: Sodium hypochlorite 0.5% 	<ul style="list-style-type: none"> Check chlorine levels an pH of pool daily Bacteriological investigations of pool water to ensure level of disinfection is sufficient to cope with level of use

Item/Task and Location	Frequency of Cleaning/Disinfection	Agent, Equipment and Supplies Needed	Procedure/Remarks
FURNITURE, FITTINGS AND EQUIPMENT (Cont.)			
Flowers Vases/containers	<ul style="list-style-type: none"> Change water daily and wash vases/containers 	<ul style="list-style-type: none"> Liquid detergent and water 	<ul style="list-style-type: none"> Pour dirty water down sluice (not sink) Wash in hot water and detergent Store dry and inverted
Linens	<ul style="list-style-type: none"> Collect as per health care facility policy 	<ul style="list-style-type: none"> Laundry detergent and water If contaminated: Sodium hypochlorite 0.5% 	<ul style="list-style-type: none"> If not soiled put into laundry bin and send to laundry If soiled, remove solid soil and discard into sluice for flushing If contaminated soak in sodium hypochlorite 0.5% for 30 minutes, remove, wring, rinse, put in colour-coded container and send to laundry
Mattress, pillows: <ul style="list-style-type: none"> With plastic covering With mackintosh 	<ul style="list-style-type: none"> Wipe and disinfect when necessary and after each patient Wash mackintosh with liquid detergent and disinfect after each patient 	<ul style="list-style-type: none"> Laundry detergent and water Sodium hypochlorite 0.5% if contaminated 	<ul style="list-style-type: none"> All mattresses should be covered with soft impervious plastic
Stands for: <ul style="list-style-type: none"> IV sets Gas tanks Bedscreen 	<ul style="list-style-type: none"> Damp clean daily and as necessary 	<ul style="list-style-type: none"> Laundry detergent and water Disinfect spills Wipe with methylated spirit 	<ul style="list-style-type: none"> Methylated spirit should be used to disinfect spills in preference to chlorine-based disinfectant and POASB, as these are corrosive

FURNITURE, FITTINGS AND EQUIPMENT (Cont.)

Sinks: • Kitchen • Other	• Daily or as necessary	• Laundry detergent and warm water	
Safety cabinet (Pharmacy)	• Wipe at end of each procedure	• Sodium hypochlorite 0.5% • Treat spills as per policy	• Clean airflow and change filters as per manufacturer's instructions
Trolleys and Trays: • Procedures • Food	• Daily damp cleaning and as required • Disinfect before and after every use	• Liquid detergent and water Disinfectants: • Methylated spirit – 70% • 0.5% chlorhexidine in alcohol • Sodium hypochlorite 0.5%	Procedure trolleys and trays: • Wipe with methylated spirit or chlorhexidine before and after every use Food trolley: • Wipe daily with sodium hypochlorite or POASB
Glassware and other equipment: • Pharmacy	• As per requirements of Pharmacy	• Liquid detergent and warm water	
Image Intensifier	• Daily and after each use	• Liquid detergent and warm water OR • Methylated spirit	• Routinely damp dust • Wipe with alcohol
X-ray equipment	• Daily and after each use	• Liquid detergent and warm water	• Routinely damp dust • Allow to dry before use
Tooth mugs	• Wash daily or use disposable	• Detergent and hot water if reusable	• Disinfect with sodium hypochlorite 0.5%

Item/Task and Location	Frequency of Cleaning/Disinfection	Agent, Equipment and Supplies Needed	Procedure/Remarks
FURNITURE, FITTINGS AND EQUIPMENT (Cont.)			
Toys	<ul style="list-style-type: none"> After discharge or as required 	<ul style="list-style-type: none"> Wash, rinse and dry thoroughly Do not soak in disinfectant if contaminated, heat disinfect OR <ul style="list-style-type: none"> Wipe surface with 0.5% sodium hypochlorite or 70% methylated spirit 	<ul style="list-style-type: none"> For patients with infections, do not use communal toys, which cannot be easily disinfected Heavily contaminated toys should be destroyed
FLOORS, WALLS AND WINDOWS, ETC.			
Floors: <ul style="list-style-type: none"> General wards and areas Laundry Pharmacy Occupational Physiotherapy, Radiotherapy and Dental Departments 	<ul style="list-style-type: none"> Thorough damp cleaning daily Cleaning when soiled Cleaning between patients and after discharge (if single room accommodation) Damp mop Clean spills as per policy Wash 3 times per day or as necessary Once daily and as necessary 	<ul style="list-style-type: none"> Liquid detergent and warm water Spills: <ul style="list-style-type: none"> Sodium hypochlorite 0.5% Liquid detergent and warm water 	<ul style="list-style-type: none"> See section on floor mops, broom for care Use colour code mops to prevent cross-contamination between areas

FLOORS, WALLS AND WINDOWS, ETC. (Cont.)

<p>Floors – special areas:</p> <ul style="list-style-type: none"> • Operating Theatre • Renal Unit • Isolation Unit • ICU • Labour and Delivery Rooms • Neonatal Unit • Burns Unit • Kidney Unit 	<ul style="list-style-type: none"> • Daily damp cleaning and disinfection and as required the end of each operating list and as required • Clean spills as per policy <p>Operating Theatre:</p> <ul style="list-style-type: none"> • Damp clean and disinfect between each patient • Clean the total area at the end of each day 	<ul style="list-style-type: none"> • Detergent and warm soapy water <p>Disinfectant:</p> <ul style="list-style-type: none"> • Sodium hypochlorite 0.5% <p>Spills:</p> <ul style="list-style-type: none"> • Sodium hypochlorite 0.5% 	<ul style="list-style-type: none"> • Damp clean with hot soapy water • Wipe floor with disinfectant after cleaning and leave to dry
<p>Walls:</p> <ul style="list-style-type: none"> • General Wards • Laundry • Pharmacy • Occupational • Physiotherapy, Radiotherapy and Dental Departments 	<ul style="list-style-type: none"> • Thorough washing once every 3 months and when visibly dirty or splashes occur • High and low damp dusting as necessary • Disinfect spills as required • Wash once per week or as necessary • Damp dust daily and when necessary • Wash once weekly 	<ul style="list-style-type: none"> • Liquid detergent and warm water • Bucket • Clean cloth <p>Spills:</p> <ul style="list-style-type: none"> • Sodium hypochlorite 0.5% • Liquid detergent and warm water 	<ul style="list-style-type: none"> • Damp clean thoroughly with warm soapy water • Disinfect spills as per policy

Item/Task and Location	Frequency of Cleaning/Disinfection	Agent, Equipment and Supplies Needed	Procedure/Remarks
FLOORS, WALLS AND WINDOWS, ETC. (Cont.)			
Walls:			
• Operating Theatres	<ul style="list-style-type: none"> Daily disinfect and as necessary Disinfect spills as required 	<ul style="list-style-type: none"> Detergent and warm water Routine disinfectant: Sodium hypochlorite 0.5% Disinfect spills, see policy 	<ul style="list-style-type: none"> Damp clean with hot soapy water Treat spills as described in the policy
• Kitchen	<ul style="list-style-type: none"> Twice a week and as required 	<ul style="list-style-type: none"> Detergent and warm water 	<ul style="list-style-type: none"> Use kitchen mop
Walls (dusting and removal of cobwebs)	<ul style="list-style-type: none"> Clean when dirty and during terminal disinfection 	<ul style="list-style-type: none"> Long handled broom covered with a damp cloth 	<ul style="list-style-type: none"> Pay particular attention to corners
• Light fittings			
• Pelmets			
• Window screens, Insect wire	<ul style="list-style-type: none"> Damp clean daily 	<ul style="list-style-type: none"> Short mop or cloth Liquid detergent and hot water 	<ul style="list-style-type: none"> Do not use the short mop for floors Wash after use, disinfect and dry
• Window - glass	<ul style="list-style-type: none"> Clean when dirty and during terminal disinfection 	<ul style="list-style-type: none"> Liquid detergent and hot water Bucket 	<ul style="list-style-type: none"> Damp clean and dry
Windows:	<ul style="list-style-type: none"> Once every two weeks 	<ul style="list-style-type: none"> Liquid detergent and water 	
• Kitchen			
Rooms (terminal cleaning)	<ul style="list-style-type: none"> After discharge of patient 	<ul style="list-style-type: none"> Wash surfaces with detergent solution 	For infected patients: <ul style="list-style-type: none"> Wash surfaces with 1% phenol or hypochlorite solution as appropriate

SPECIAL PROCEDURES AND SURFACES

High-level decontamination of surfaces	<ul style="list-style-type: none"> As necessary 	<ul style="list-style-type: none"> Liquid detergent and water Methylated spirits Sodium hypochlorite 0.5% 	<ul style="list-style-type: none"> Pre-clean with detergent solution then wipe/mop with sodium hypochlorite disinfectant POASB does not require pre-cleaning of items
Kitchen: <ul style="list-style-type: none"> Food Pots, Pans Utensils, crockery, trays, feeding and medicine cups 	<ul style="list-style-type: none"> Cover to prevent contamination by flies, ants, cockroaches, dust after each use After each use rinse with warm water and dry on a rack 	<ul style="list-style-type: none"> Liquid detergent and hot soapy water Warm soapy water <p>For infectious cases:</p> <ul style="list-style-type: none"> Heat disinfect <p>OR</p> <ul style="list-style-type: none"> Sodium hypochlorite 0.5% Liquid detergent and warm water 	<p>Wash after use and daily with detergent, hot water and store dry</p> <ul style="list-style-type: none"> Dish towels (if used) to be used once for every dish wash: Hand or machine wash thoroughly at minimum temperature of 60oC with final rinse at 80oC Dry and store <p>In case of infectious cases, if dishwashers are not available:</p> <ul style="list-style-type: none"> Soak in sodium hypochlorite 0.5% for 10-15 minutes Rinse with clean water Repeat disinfection with fresh sodium hypochlorite 0.5% for 10-15 minutes Rinse with clean water, dry and store
<ul style="list-style-type: none"> Refrigerators Freezers 	<ul style="list-style-type: none"> Defrost every two weeks 	<ul style="list-style-type: none"> Liquid detergent and warm water 	

Item/Task and Location	Frequency of Cleaning/Disinfection	Agent, Equipment and Supplies Needed	Procedure/Remarks
SPECIAL PROCEDURES AND SURFACES (Cont.)			
• Cupboards	• Wash once weekly and rinse with clean water	• Liquid detergent and warm water	• Vector control if necessary • Clean 3 times a week with detergent and water or as necessary • Use grease remover to remove stubborn stain
• Stoves	• Scrub once weekly	• Vim or scouring powder or grease remover	
Routine damp wiping of surfaces in: • Neonatal Unit • ICU • Transplant unit • Burns unit	• Daily and when necessary	• Sodium hypochlorite 0.5%	• Damp clean with warm soapy water and wipe with disinfectant
• Operating Theatre tables	• After each use and at end of day	• Sodium hypochlorite 0.5%	• Wash with disinfectant in between patients and at end of day
Terminal cleaning of isolation rooms	• Soon after discharge or death of an infectious patient	• Liquid detergent and water • Disinfectant: • Sodium hypochlorite 0.5%	Wash thoroughly with detergents and warm water then disinfect: • All floors and walls • All mattresses and plastic covered pillows • Lockers and furniture • All plastic items

SPECIAL PROCEDURES AND SURFACES (Cont.)

Terminal cleaning of isolation rooms (cont.)			<ul style="list-style-type: none"> • Mop heads • Wash bedpans and urinals thoroughly with detergent, hot water and scouring power then boil for 30 minutes or soak in disinfectant or place in bedpan sterilizer • Change curtains and ventilate • Soak oxygen masks in disinfectant for 15-20 minutes (see Section VII: Disinfection and Sterilization)
Infected body fluid spillages	<ul style="list-style-type: none"> • As required 	<ul style="list-style-type: none"> • Sodium hypochlorite 0.5% (5000ppm) 	Small spillages and spots: <ul style="list-style-type: none"> • Cover spillages with powder or liquid disinfectant and allow to stand for 3 minutes • Use gloved hands to scrape powder or use paper towels to transfer spillage mixture into a safe receptacle for disposal • Wash and disinfect area with disinfectant 0.5% sodium hypochlorite Large spillages: <ul style="list-style-type: none"> • Liquid spills should be cleaned with paper towels and disinfectant 0.5% hypochlorite

Item/Task and Location	Frequency of Cleaning/Disinfection	Agent, Equipment and Supplies Needed	Procedure/Remarks
SPECIAL PROCEDURES AND SURFACES (Cont.)			
Ambulance: • Delicate equipment, e.g. radios, cardiac monitors • Oxygen masks, nebulizers	• After each patient and daily • After each patient and daily • Daily	• Liquid detergent and water Cleaning: • Liquid detergent and water Disinfectant: • Sodium hypochlorite 0.5%	• Wipe with soap and water • Wipe with disinfectant if contaminated • Wash in warm water with detergent • Rinse and dry • Soak in sodium hypochlorite for 30 minutes or 1% POASB for 10 minutes • Soak in aldehyde for 20 minutes
• Soiled Linen	• Daily	• Laundry detergent and water	• Transport in leakproof bags • Treat as per policy
Inside Ambulance: • Walls • Windows • Floors • Slats	• Weekly or after spills • Wash daily and as necessary	• Liquid detergent and water • Treat spills as per policy	• Wash daily and as necessary • See Section on floors and walls
Mortuary: • Trays	• Disinfect trays after every removal of body	Routine disinfection: • Sodium hypochlorite 0.5% OR • Deodorizer • Liquid detergent and water • Deodorizer	• Wipe trays thoroughly and mop floor • If there are excessive smells use deodorizer
• Floors	• Wash floors daily and as required		• Sweep first, then mop with detergent soap solution • Wipe and deodorize

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Ministry of Health

Republic of Guyana

