

**POLICY AND GUIDELINES FOR  
INFECTION PREVENTION AND CONTROL  
IN  
HEALTH CARE FACILITIES**

**MINISTRY OF HEALTH  
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## **PREFACE**

Infection prevention and control refers to measures, practices, protocols and procedures aimed at preventing and controlling infections and transmission of infections in health care settings. Such infections may be pre-existing on admission or may be acquired in a health care facility (nosocomial).

The development of this policy and guidelines document on infection prevention and control (IPC) by the Ministry of Health was necessitated by heightened concerns about unacceptable IPC practices in health care facilities in the country.

The document lays down the broad guidelines required for the practice of a nationally acceptable standard of IPC in health care facilities and other service delivery points.

I am confident that the document will be valuable in improving quality of services not only because it was developed after extensive review relevant literature and consultation with experts, professional groupings and other stakeholders, but also because its contents are realistic, practical and designed to meet local needs.

I recommend that it be used as a reference document for the planning and establishment of IPC systems so as to promote good and safe practices.

**THE MINISTER OF HEALTH**

# TABLE OF CONTENTS

ACKNOWLEDGEMENTS .....	I
PREFACE .....	II
TABLE OF CONTENTS.....	III
LIST OF FIGURES .....	VIII
LIST OF TABLES .....	IX
ACRONYMS.....	X
DEFINITIONS.....	XII
THE POLICY .....	1
SECTION 1.....	2
INTRODUCTION .....	2
<b>1.1 POLICY STATEMENT</b> .....	2
<b>1.2 PURPOSE OF THE POLICY</b> .....	3
<b>1.3 OBJECTIVES OF THE DOCUMENT</b> .....	3
<b>1.4 GUIDING PRINCIPLES</b> .....	3
<b>1.5 SCOPE OF APPLICATION</b> .....	3
<b>1.6 REGULATORY AND POLICY FRAMEWORK</b> .....	3
<b>1.7 NON-COMPLIANCE</b> .....	4
SECTION 2.....	5
GOVERNANCE, ORGANISATION AND MANAGEMENT OF INFECTION PREVENTION AND CONTROL....	5
2.1 <i>National level</i> .....	5
2.2 <i>Regional and district health administration levels</i> .....	6
2.3 <i>Hospitals</i> .....	6
2.4 <i>Polyclinics, Clinics, and Health centres</i> .....	8
2.5 <i>Community level</i> .....	8
2.6 <i>Relationship between IPC and QA programmes</i> .....	9
2.7 <i>Purchasing and introduction of IPC equipment and logistics.</i> .....	9
2.8 <i>Financial responsibilities for the management of patients with nosocomial infections</i> .....	9
2.9 <i>Partnerships</i> .....	9
2.10 <i>Research</i> .....	9
2.11 <i>Monitoring and evaluation of the programme</i> .....	9
2.12 <i>Evaluation or policy review</i> .....	10
2.13 <i>Human resource development for infection prevention and control</i> .....	10
SECTION 3.....	11
<b>IMPLEMENTING IPC</b> .....	11
TECHNICAL GUIDELINES .....	12
SECTION 4.....	13
STANDARD PRECAUTIONS AND EXPANDED OR ADDITIONAL PRECAUTIONS.....	13
<b>4.1 STANDARD PRECAUTIONS</b> .....	13
<b>4.2 ADDITIONAL / EXPANDED / TRANSMISSION BASED PRECAUTIONS</b> .....	13
SECTION 5.....	14
<b>HAND HYGIENE</b> .....	14
<b>5.1 INTRODUCTION</b> .....	14
<b>5.2 TYPES OF HAND HYGIENE</b> .....	14
<b>5.3 HAND DRYING</b> .....	21
<b>5.4 OTHER HAND HYGIENE CONSIDERATIONS</b> .....	24

5.5	IMPROVING COMPLIANCE TO HAND WASHING .....	24
SECTION 6	.....	25
PERSONAL PROTECTIVE EQUIPMENT/CLOTHING (PPE)	.....	25
6.1	GLOVES .....	25
6.2	GOWNS .....	31
6.3	FACE AND EYE PROTECTION.....	33
6.5	COATS .....	37
6.6	OVERALL .....	38
6.7	HEADGEAR .....	38
6.8	LEG PROTECTIONS LIKE BOOTS/SHOES/OVERSHOES .....	38
SECTION 7	.....	42
PATIENT PLACEMENT AND TRANSPORTATION	.....	42
7.1	PATIENT PLACEMENT .....	42
7.2	TRANSPORTATION OF PATIENTS WITH INFECTIOUS DISEASES .....	42
SECTION 8	.....	43
PATIENT CARE EQUIPMENT	.....	43
8.1	STEPS IN PROCESSING USED MEDICAL DEVICES INCLUDING INSTRUMENTS .....	44
8.2	DECONTAMINATION OF INSTRUMENTS .....	46
8.2.1	<i>Storage of disinfectants</i> .....	47
8.2.2	<i>Preventing contamination of the decontamination solution</i> .....	47
8.3	CLEANING OF INSTRUMENTS .....	47
8.4	DISINFECTION .....	48
-	DIGUANIDES, .....	49
8.5	THE ROLE OF THE PHARMACY UNIT IN THE MANAGEMENT OF DISINFECTANTS AND ANTISEPTICS.....	49
8.6	DISINFECTION OF INSTRUMENTS .....	50
8.6.1	<i>High-level disinfection of instruments</i> .....	50
8.6.1.1	<i>Methods of High-Level Disinfection of instruments</i> .....	51
8.7	STERILISATION.....	54
SECTION 9	.....	56
ENVIRONMENTAL MANAGEMENT OR CONTROLS	.....	56
9.1	GENERAL CLEANING GUIDELINES .....	56
9.2	CLEANING PATIENT-CARE AREAS .....	57
9.4	CLEANING NON-PATIENT-CARE AREAS.....	58
9.5	TERMINAL CLEANING/CLEANING AFTER DISCHARGE .....	58
9.6	TYPES OF CLEANING SOLUTIONS.....	58
SECTION 10	.....	60
HANDLING LINEN, FOOD AND DRINKS	.....	60
10.1	PROCESSING LINEN .....	60
10.1.1	<i>Laundry procedures</i> .....	61
10.1.2	<i>Protection of laundry workers</i> .....	63
10.2	HANDLING FOOD AND DRINKS .....	63
SECTION 11	.....	65
INJECTION SAFETY AND HANDLING OF SHARPS	.....	65
11.1	GENERAL GUIDELINES FOR HANDLING USED SYRINGES AND NEEDLES.....	65
11.2	PASSING SHARPS .....	65
11.3	RECAPPING: THE "ONE-HAND" TECHNIQUE.....	66
SECTION 12	.....	68

HEALTH CARE WASTE MANAGEMENT .....	68
<b>12.1</b> <b>INTRODUCTION</b> .....	68
<b>12.2</b> <b>CLASSIFICATION OF HEALTHCARE WASTE</b> .....	68
<b>12.3</b> <b>PRINCIPLES OF HEALTH CARE WASTE MANAGEMENT</b> .....	69
<b>12.4</b> <b>COMPONENTS OF HEALTH CARE WASTE MANAGEMENT</b> .....	69
12.4.1 <i>Collection and Segregation</i> .....	69
12.4.2 <i>Storage</i> .....	70
12.4.3 <i>Transportation</i> .....	71
12.4.4 <i>Treatment</i> .....	71
12.4.5 <i>Final disposal</i> .....	72
SECTION 13.....	74
SAFE INJECTION PRACTICES .....	74
<b>13.1</b> <b>INJECTION SAFETY GUIDELINES</b> .....	74
13.1.1 <i>Medication</i> .....	74
13.1.2 <i>Multi-dose ampoules</i> .....	75
SECTION 14.....	76
OCCUPATIONAL HEALTH AND SAFETY .....	76
<b>14.1</b> <b>INTRODUCTION</b> .....	76
<b>14.2</b> <b>RISK ASSESSMENT AND MANAGEMENT</b> .....	76
SECTION 15.....	78
LABORATORY BIOSAFETY .....	78
<b>15.1</b> <b>GENERAL LABORATORY GUIDELINES</b> .....	78
<b>15.2</b> <b>HANDLING CLINICAL SPECIMEN</b> .....	79
<b>15.3</b> <b>GENERAL PRINCIPLES FOR THE COLLECTION OF SPECIMENS</b> .....	80
15.3.1 <i>Time for collection</i> .....	80
15.3.2 <i>Precautions for the collection of microbiological specimens</i> .....	80
15.3.3 <i>The Request form and Labelling of Specimens</i> .....	81
15.3.4 <i>Transportation of specimens</i> .....	81
15.3.5 <i>Mailing /dispatch of clinical specimens</i> .....	81
15.3.6 <i>Storage of microbiological specimens</i> .....	82
<b>15.4</b> <b>STANDARD PRECAUTIONS AND DANGERS INVOLVED IN HANDLING SPECIMENS</b> .....	82
SECTION 16.....	83
ADDITIONAL PRECAUTIONS .....	83
<b>16.1</b> <b>CONTACT PRECAUTIONS</b> .....	83
<b>16.2</b> <b>DROPLET PRECAUTIONS</b> .....	84
<b>16.3</b> <b>AIRBORNE PRECAUTIONS</b> .....	84
16.3.1 <i>Precautions for aerosol-generating procedures when airborne precautions is indicated</i> ..	85
16.3.2 <i>Respiratory hygiene/ cough etiquette</i> .....	85
SECTION 17.....	87
ISOLATION .....	87
<b>17.1</b> <b>CATEGORIES OF ISOLATION</b> .....	87
17.1.1 <i>Category 'A' isolation:</i> .....	87
17.1.2 <i>Category 'B'- Isolation (Strict isolation)</i> .....	88
17.1.3 <i>Category 'C' isolation (Protective isolation)</i> .....	88
<b>17.2</b> <b>GENERAL ISOLATION GUIDELINES</b> .....	88
SECTION 18.....	91
ASEPSIS AND ASEPTIC TECHNIQUES IN CLINICAL PROCEDURES .....	91

<b>18.1</b>	<b>COMPONENTS OF ASEPTIC TECHNIQUE</b> .....	91
<b>18.2</b>	<b>SKIN AND MUCOUS MEMBRANE PREPARATION FOR CLINICAL PROCEDURES</b> .....	91
<b>18.3</b>	<b>MAINTAINING ASEPSIS IN SPECIFIC CLINICAL PROCEDURES</b> .....	91
18.3.1	<i>Intravascular device insertion</i> .....	91
18.3.2	<i>Principles for the prevention of infections in urinary tract catheterization</i> .....	92
<b>18.4</b>	<b>MAINTAINING SAFER ENVIRONMENT IN THE SURGICAL/PROCEDURE AREA</b> .....	94
18.4.1	<i>Principles for the prevention of infections in post-operative wound</i> .....	94
18.4.2	<i>Peri-operative care</i> .....	94
18.4.3	<i>Operating theatre ventilation</i> .....	94
18.4.4	<i>Surgical ward</i> .....	95
18.4.5	<i>Creating and maintaining sterile field</i> .....	95
18.4.6	<i>Maintaining the sterile field</i> .....	95
SECTION 19.....		96
INFECTION PREVENTION AND CONTROL IN SELECTED SITUATIONS.....		96
<b>19.1</b>	<b>HUMAN IMMUNODEFICIENCY VIRUS (HIV)</b> .....	96
19.1.1	<i>INTRODUCTION</i> .....	96
19.1.2	<i>HIV Post Exposure Prophylaxis</i> .....	96
<b>19.2</b>	<b>TUBERCULOSIS</b> .....	98
19.2.1	<i>Introduction</i> .....	98
19.2.2	<i>TB specific administrative controls</i> .....	98
19.2.3	<i>TB-specific environmental controls</i> .....	98
19.2.4	<i>Personal protective measures for TB care</i> .....	99
<b>19.3</b>	<b>VIRAL HEPATITIS</b> .....	100
	<i>Procedure for post- hepatitis B exposure prophylaxis</i> .....	100
<b>19.4</b>	<b>VIRAL HAEMORRHAGIC FEVER</b> .....	101
19.4.1	<i>Infection Prevention and Control Precautions for VHF</i> .....	101
19.4.2	<i>Other special consideration in VHF</i> .....	101
<b>19.5</b>	<b>ACUTE RESPIRATORY DISEASES (ARD)</b> .....	102
<b>19.5.1</b>	<b>AVIAN INFLUENZA</b> .....	102
19.5.1.1	<i>Surveillance and Monitoring of Healthcare Workers</i> .....	103
19.5.1.2	<i>Vaccination of Healthcare Workers against Human Influenza</i> .....	103
<b>19.5.2</b>	<b>SEVERE ACUTE RESPIRATORY SYNDROME (SARS)</b> .....	103
SECTION 20.....		105
IPC CONSIDERATIONS IN THE USE OF ANTIBIOTICS .....		105
SECTION 21.....		106
ENVIRONMENTAL AND ENGINEERING CONSIDERATIONS FOR IPC (FACILITY DESIGN) .....		106
<b>21.1</b>	<b>INTRODUCTION</b> .....	106
<b>21.2</b>	<b>WORK AREAS</b> .....	106
<b>21.3</b>	<b>VENTILATION</b> .....	106
<b>21.4</b>	<b>SURFACES</b> .....	107
<b>21.5</b>	<b>TRAFFIC PATTERN IN THE FACILITY</b> .....	107
<b>21.6</b>	<b>POSITIONING/SITING OF SINKS FOR HAND WASHING</b> .....	107
<b>21.7</b>	<b>SUPPLIES AND EQUIPMENT</b> .....	108
<b>21.8</b>	<b>STORAGE OF FOOD AND DRINKS</b> .....	108
<b>21.9</b>	<b>WATER SUPPLY SYSTEM</b> .....	108
SECTION 22.....		109
SURVEILLANCE AND MONITORING .....		109
<b>22.1</b>	<b>INTRODUCTION</b> .....	109
<b>22.2</b>	<b>IPC SURVEILLANCE AND MONITORING RESPONSIBILITY AT NATIONAL LEVEL</b> .....	109
<b>22.3</b>	<b>IPC SURVEILLANCE AND MONITORING RESPONSIBILITY AT FACILITY LEVEL</b> .....	110

<b>22.4</b>	<b>GENERAL GUIDELINES ON COLLECTION, ANALYSIS AND DISSEMINATION OF SURVEILLANCE AND MONITORING INFORMATION</b>	110
<u>22.4.1</u>	<u>Data collection, analysis and dissemination</u>	110
<u>22.4.2</u>	<u>Outbreak</u>	110
<u>22.4.3</u>	<u>Guidelines on investigation and response to surveillance reports on infections</u>	110
<u>22.4.3</u>	<u>Procedure for Investigating Outbreaks in health facilities</u>	111
SECTION 23		113
CARE OF THE DECEASED		113
<b>23.1</b>	<b>RECOMMENDED PPE FOR HEALTH CARE WORKERS (HCWs) HANDLING DEAD BODIES</b>	113
<b>23.2</b>	<b>PACKING AND TRANSPORT OF DEAD BODY TO MORTUARY, CREMATORIUM AND BURIAL</b>	113
<b>23.3</b>	<b>MORTUARY CARE</b>	113
<b>23.4</b>	<b>POST MORTEM EXAMINATION</b>	113
<b>23.6</b>	<b>SUGGESTED METHODS TO REDUCE AEROSOL GENERATION DURING AUTOPSY</b>	114
REFERENCES		115
APPENDIX		116
<b>APPENDIX 1</b>	<b>CONTENTS OF TRAINING PROGRAMMES ON IPC</b>	117
<b>APPENDIX 2</b>	<b>HOW TO PREPARE 0.5% CHLORINE SOLUTION</b>	118
<b>APPENDIX 3</b>	<b>EXAMPLES OF COMMONLY USED DISINFECTANTS AND ANTISEPTICS</b>	119
<b>APPENDIX 4:</b>	<b>REPORTING FORMATS FOR WORKPLACE EXPOSURES / INJURIES</b>	120
<b>APPENDIX 5:</b>	<b>TB SCREENING QUESTIONNAIRE</b>	121
<b>APPENDIX 6:</b>	<b>CATEGORISATION OF HUMAN CASES OF AVIAN INFLUENZA (H5N1) CASE</b>	122
<b>APPENDIX 7:</b>	<b>WEEKLY NOTIFIABLE DISEASE REPORTING FORM</b>	123
<b>APPENDIX 8</b>	<b>CLASSIFICATION OF NOSOCOMIAL INFECTIONS</b>	125



## LIST OF FIGURES

<b>Figure</b>	<b>Page</b>
5.1 Hand washing protocol	16
5.2 Veronica bucket system	17
5.3 Guidelines on use of alcohol hand rub	19
5.4 Procedure for carrying out surgical hand wash	21
5.5 Procedure for hand drying after social/hygienic hand washing	22
6.1 Types of protective equipment/clothing	25
6.2 The different types of utility gloves	26
6.3 Proper way to wear headgear and surgical mask	34
6.4 Sequence of wearing particulate respirator and doing seal check	36
6.5 Suggested sequence for putting on PPE	40
6.6 Suggested sequence for taking of PPE	41
8.1 Steps in decontamination, disinfecting and sterilising instruments and other medical items	45
10.1 Examples of linen bags	61
11.1 Recapping of needles	66
12.1 Colour-coded bins	70
15.1 Biohazard symbol	82
18.1 Possible sites of contamination in using urinary catheters	93
22.1 Suggested route of disseminating surveillance information	112

## LIST OF TABLES

<b>Table</b>	<b>Item</b>	<b>Page</b>
Table 1	Agents for hand hygiene	23
Table 2	Gloves requirements for examples of medical and surgical procedures	31
Table 3	Areas/items and sample of disinfectants and antiseptics that could be used	49
Table 4	Procedures for disinfecting/sterilising endoscopes using glutaraldehyde	54
Table 5	Guidelines for washing linen	62
Table 6	Colour-coding of health care waste containers	70

## ACRONYMS

AIDS	-	Acquired Immune Deficiency Syndrome
ARD	-	Acute Respiratory Diseases
ARDs	-	Acute Respiratory Diseases
CBOs	-	Community Based Organisations
CC	-	Comprehensive Care
CDC	-	Communicable Disease Control
CHOs	-	Community Health Officers
CSSD	-	Central Sterile Supply Department
EOD	-	Environmental and Occupational Health
GHS	-	Ghana Health Service
HBV	-	Hepatitis B Virus
HCV	-	Hepatitis C Virus
HCWs	-	Health Care Workers
HDV	-	Hepatitis D Virus
HIV	-	Human Immunodeficiency Virus
HLD	-	High Level Disinfection
HPV	-	Human Papilloma Virus
ICD	-	Institutional Care Division
ICU	-	Intensive Care Unit
IPC	-	Infection Prevention and Control
IPCN	-	Infection Prevention and Control Nurse
IV	-	Intravenous
LI	-	Legislative Instrument
MDR-TB	-	Multi Drug Resistance Tuberculosis
MDR-TB	-	Multidrug-Resistant TB
MOH	-	Ministry of Health
MRSA	-	Methicillin Resistant Staphylococcus aureas
NRCD	-	National Redemption Council Decree
NGOs	-	Non-Governmental Organisations
NHIA	-	National Health Insurance Authority
NIPCP	-	National Infection Prevention and Control Programme
NIPCP	-	National Infection Prevention and Control Programme
NTC	-	National Technical Committee
OPD	-	Out Patients Department
PCR	-	Polymerase Chain Reaction
PEP	-	Post Exposure Prophylaxis
PLHIV	-	People Living with HIV
PPE	-	Personal Protective Equipment
QA	-	Quality Assurance
QHP	-	Quality Health Partners
SARS	-	Severe Acute Respiratory Syndrome

SSI	-	Surgical Site Infection
STI	-	Sexually Transmitted Infections
TB	-	Tuberculosis
TBP	-	Transmission Based Precautions
TOTs	-	Trainer of Trainers
UTI	-	Urinary Tract Infection
VHF	-	Viral Haemorrhagic Fever
WHO	-	World Health Organisation
XDR-TB	-	Extremely Drug-Resistant TB

FINAL DRAFT

## DEFINITIONS

- Asepsis** - Literally means without microorganisms.
- Aseptic technique** - Refers to practices that help reduce the risk of post-procedure infections in patients/clients by decreasing the likelihood of microorganisms entering the body during clinical procedures. It also reduces the service provider's risk of exposure to potentially infectious blood and blood products, other body fluids and tissues during clinical procedures.
- Cleaning –** - It is the second step in processing instruments and other medical devices. It removes foreign materials, which may contain micro-organisms from an instrument.
- Decontamination** - It is a process that involves the removal or destruction of most micro-organisms to render a surface or object safe to handle.
- Disinfection** - Refers to the use of chemical or physical agents to eliminate virtually all disease-causing micro-organisms but not bacteria spores on objects and surfaces to a level that is not normally harmful.
- Detergents** - (Liquid or powder) are composed of a hydrophilic (water-seeking) component and a lipophilic (fat-seeking) component and can be divided into four types: anionic, cationic, amphoteric, and nonionic detergents.
- Health care facility** - Includes all categories of hospitals, clinics, health centres, CHPS compounds, residential nursing home/care settings, outreaches, emergency services, dental units and all other health care service delivery points.
- High-level disinfection** - This kills all micro-organisms except bacteria spores through the process of boiling, steaming or using acids (e.g. peracetic acids) and halogens (e.g. chlorine).
- Intermediate level disinfection** - This kills mycobacteria, most viruses and bacteria through the process of boiling for about 10 minutes, using alcohols (70%) and bleach (0.1%) for about 10 minutes.
- Isolation** - Is the process of separating patients with certain communicable diseases (source) from uninfected persons and separating immuno-compromised patients from others (preventive).

**Low-level disinfection**

- This kills some viruses and bacteria, but not mycobacteria through the use of agents such as Cetrimide, Savlon and soap (liquid or cake) or bleach 0.01% for about 10 minutes.

**Nosocomial infections\***

- Also called health care associated infections or hospital acquired infections. It is an infection that is not present or incubating at the time the patient comes to the health care facility

**Sterilization**

- It is the destruction of all microorganisms including bacteria spores. This is achieved principally by autoclaving.

**Standard precautions**

- Are work practices required for basic level IPC, and are based on the principle that all blood, body fluids, secretions, excretions (except sweat), non-intact skin and mucous membranes may contain transmissible infectious agents

FINAL DRAFT

# **THE POLICY**

FINAL DRAFT

## **SECTION 1**

### **INTRODUCTION**

An effective infection prevention and control (IPC) programme is fundamental to quality of healthcare. This is because; it has potential benefits of reducing the disease burden on patients, health institutions and the nation as a whole. In the last two decades, healthcare associated infections have been recognised as a significant problem in terms of quality of care and cost to patients/clients, healthcare facilities and governments. This is because of increasing realisation of healthcare associated infections as a potential indicator of quality of health care. Consequently, many healthcare organisations are taking steps to improve the prevention and control of these infections.

Improving environmental sanitation and other hygienic measures in healthcare facilities is a concern of the Ministry of Health (MOH). Over the years, several initiatives have been carried out in the health sector to promote safe environment and efficient and effective infection prevention and control practices in health facilities. These include the development of procedure manuals, guidelines and other training materials; and training programmes in various aspects of healthcare

Despite these efforts, the 2005 baseline assessment document on infection prevention of the Institutional Care Division provides evidence that compliance with infection prevention and control (IPC) guidelines by health personnel is not very encouraging. This is evident in modes of disinfection and sterilisation in facilities, and practices regarding cleaning, healthcare waste management and other aseptic procedures. Similarly, knowledge and skills on infection prevention and control among health personnel is inadequate.

A major challenge with the first edition (2003) of the IPC policy was inadequate dissemination and a lack of concerted effort to support its implementation. As such, IPC measures were carried out in an uncoordinated manner. The document also had deficiencies in the area of airborne infection prevention and control. .

This document is for all private and public health care facilities in Ghana. It is more comprehensive and addresses emerging issues in IPC. It also provides guidelines for mortuary services and the prevention and control of airborne diseases. It contains a section on monitoring and evaluation of the policy.

#### **1.1 POLICY STATEMENT**

The policy and guidelines shall ensure excellence in client-centred care and maximize protection against infections for all categories of health staff, patients/clients and communities. The Ministry of Health (MOH) shall ensure that comprehensive Infection Prevention and Control systems are developed and maintained at all levels within the healthcare delivery system.



## **1.2 PURPOSE OF THE POLICY**

The primary purpose of the Infection Prevention and Control policy and guidelines is to give direction to health personnel and clients in the prevention and control of infections within healthcare settings so as to ensure patient safety and the protection of health workers.

## **1.3 OBJECTIVES OF THE DOCUMENT**

The objectives are to:

- define the policy framework within which Infection Prevention and Control measures shall be practised by all health workers in all health care facilities and service delivery points.
- provide acceptable standards for the practice of Infection Prevention and Control.
- outline strategies that shall make Infection Prevention and Control practices routine in all aspects of health care.

## **1.4 GUIDING PRINCIPLES**

The guiding principles of IPC in Ghana shall be:

- safety
- client-centred care
- cost-effectiveness
- efficiency
- team work
- standardisation

## **1.5 SCOPE OF APPLICATION**

This policy and guidelines shall be applied in all health care facilities and service delivery points (both curative and preventive) in Ghana.

## **1.6 REGULATORY AND POLICY FRAMEWORK**

- The development and implementation of this policy and guidelines bear relevance to the following Laws / Acts / Policies and their relevant regulations:
- Act 525 (1996)
- Factories, Offices and Shops Act, 1970
- HIV/AIDS Workplace Policy 2004
- Labour Act 2003
- Medical and Dental Decree (1972) NRCD 91)
- National Health Insurance Act 650 (2003)
- National Health Policy, 2007
- Nurses and Midwives Decree -NRC Decree 117 and LI 683, (1967)
- Occupational Safety and Health Convention, 1981 (No. 155)

- The 1992 Constitution of the Republic of Ghana
- The Code of Ethics, 2002
- The Criminal Code, 1960 (Act 29)
- The Ghana Health Service and Teaching Hospitals', 1996 (Act 525)
- The National HIV/AIDS and STI Policy 2004
- The Ghana Health Service Patients' Charter, 2002
- Workmen's Compensation Law, 1987
- All other relevant Acts and Laws

## **1.7 NON-COMPLIANCE**

Failure to comply with the infection prevention and control policies and guidelines may result in:

- increased morbidity and mortality
- litigation against the Ministry of Health, the health care facility or the individual health worker for damages suffered by patients or their families.
- disciplinary action by professional councils or regulatory bodies against individuals where their proven negligence caused harm to patients.
- loss of public confidence in the health institution in question.
- loss of revenue
- non-accreditation by the National Health Insurance Authority

## **SECTION 2**

### **GOVERNANCE, ORGANISATION AND MANAGEMENT OF INFECTION PREVENTION AND CONTROL**

The IPC programme shall be an integral part of any health service delivery system in Ghana. As much as possible, existing structures within the health sector (formal and informal) shall be used for the effective implementation of Infection Prevention and Control (IPC) programme within the health sector.

#### **2.1 National level**

At the national level, the MOH shall have ultimate responsibility and authority for ensuring the availability and utilization of infection prevention and control policies and guidelines. There shall be a national IPC programme called the National Infection Prevention and Control Programme (NIPCP), with a management unit and a designated programme manager located in the Institutional Care Division of the Ghana Health Service. A technical committee called the National Infection Prevention and Control Technical Committee herein after, referred to as the National Technical Committee (NTC) shall support and advice the programme management unit.

The roles and responsibilities of the programme management unit shall be to:

- formulate policies, strategies and set standards for IPC.
- provide technical support to IPC teams in the respective regions.
- advise the MOH on issues relating to IPC.
- develop systems for effective IPC practices in all health facilities.
- ensure that standards are adhered to, in the design and construction of health facilities.
- liaise with procurement unit and end users in the purchasing of equipment and supplies for IPC.
- liaise with Human Resource Directorate on training programmes for IPC.
- provide information, education and communication on IPC.
- monitor and evaluate the implementation of IPC activities at all levels of the service delivery.
- conduct research relevant to IPC.
- encourage health care facilities to budget for IPC in their annual plans.
- play advocacy and resource mobilisation roles for IPC activities.
- perform any other functions related to IPC.

Membership of the NTC shall include:

- Medical Microbiologist
- Clinician
- Public Health Specialist
- Senior Nurse with expertise in IPC
- Bio-Medical Engineer
- Mechanical Engineer/Architect
- Pharmacist
- The IPC Programme Manager
- Representative from Human Resources Directorate

- Health Service Administrator
- Representatives from Teaching Hospitals and other MOH agencies
- Co-opt other members as and when required.

## **2.2 Regional and district health administration levels**

At the Regional level, the Deputy Director Clinical Care shall oversee the implementation of the IPC programme and designate a focal person in consultation with the Regional Director of Health Service. At the district level, the Medical Superintendent of the District Hospital shall be responsible for the implementation of IPC and shall designate a focal person in consultation with the District Director of Health Service. The focal persons shall work with an IPC team at the regional and district levels in implementing the IPC programme.

Representatives from the Quality Assurance (QA), HIV and TB management teams and all other relevant groups shall constitute part of the IPC implementation team.

The team shall:

- ensure the implementation of IPC programmes and policies.
- provide technical support to IPC teams in their respective region and districts;
- collaborate with regional and district training units on IPC training programmes;
- conduct research.
- monitor and evaluate IPC activities at the regional and district levels.
- disseminate information on IPC programmes.
- advise on procurement of equipment and consumables for IPC.
- encourage health care facilities budget for IPC in their annual plans.
- play advocacy and resource mobilisation roles for IPC activities.
- perform any other function(s) related to IPC.

Membership of the team shall include:

- The IPC focal person
- Bio-medical Engineer/Equipment Technologist
- Biomedical scientist
- Clinician/Medical Officer
- Disease Control Officer
- Health Services Administrator
- HIV and TB programme coordinators
- Nurse with expertise in IPC
- Pharmacist
- Public Health Practitioner

## **2.3 Hospitals**

Facility-based infection prevention and control programmes shall be integrated with other relevant programmes such as Quality Assurance, Environmental and

Occupational Health, the TB programme, Comprehensive Care, and Communicable Disease Control

The Medical Director of hospitals and polyclinics shall be responsible for IPC and shall establish committees for IPC. The QA, HIV and TB coordinators shall be members of the IPC committee. The IPC committee shall ensure the implementation of IPC policies and strategies in the facility.

The roles and responsibilities of the committee shall be to:

- ensure the implementation of policies on IPC.
- advise on procurement of equipment and consumables for IPC.
- ensure the maintenance of IPC equipment.
- monitor, supervise and evaluate IPC activities.
- liaise with in-service training coordinators on training programme(s) in IPC at the facility.
- provide advice on IPC and related matters.
- disseminate information on IPC.
- play advocacy and resource mobilisation roles for IPC activities
- encourage the health care facility to budget for IPC in annual plans.
- perform any other functions related to IPC.

Membership of the committee shall include the following:

- Medical Superintendent or representative
- Health Service Administrator;
- Biomedical Scientist;
- Representative of Nurses;
- Public Health Practitioner/Disease Surveillance Officer;
- Infection Prevention and Control Nurse;
- Infection Prevention and Control Coordinator;
- Pharmacist;
- Bio-medical Engineer/Equipment Technologist; and
- Environmental Health Officer
- Head of Catering Services.
- Co-opt other member as necessary

NB: The Infection Prevention and Control Coordinator and the Infection Prevention and Control Nurse shall form a team to see to the day-to-day activities of IPC. The IPC nurse shall be full-time or have dedicated time to carry out IPC activities. WHO recommends that there must be a full-time IPC nurse to oversee every 250 beds in a health facility.

### **2.3.1 Infection Prevention and Control Team**

The IPC coordinator shall be a microbiologist or medically qualified person or a senior health professional with knowledge and interest in IPC to advise on all aspects of infection prevention and control.

A Nurse trained in IPC shall be nominated as the IPC Nurse (IPCN). The nurse shall work closely with the IPC coordinator.

The roles and responsibilities of the team shall be to:

- ensure the implementation of policies by educating health staff in the facility;
- coordinate IPC activities among clinical and non-clinical staff in the facility;
- advise on all aspects of IPC activities at the hospital or polyclinic;
- educate and ensure the day-to-day implementation of IPC policies on the wards and units;
- provide suggestions on changes in practices and ward procedures on IPC and related matters;
- collect and collate data on surveillance on infections for documentation
- play advocacy for IPC; and
- initiate research activities.

#### **2.4 Polyclinics, Clinics, and Health centres**

The management teams of Polyclinics, Clinics and Health centres shall be responsible for IPC and shall establish a team for IPC. The Quality Assurance and the IPC teams shall liaise with the facility management team to oversee the establishment and implementation of IPC programmes.

The roles and responsibilities of the team shall be to:

- ensure the implementation of policies on IPC;
- advise on procurement of equipment and consumables for IPC;
- ensure the maintenance of IPC equipment;
- monitor, supervise and evaluate IPC activities;
- liaise with district in-service training coordinators on training programme(s) in IPC at the facility;
- provide advice on IPC and related matters;
- disseminate information on IPC
- perform any other functions related to IPC.

Membership of the team shall include the following:

- The Head of the facility;
- IPC focal person, preferably a nurse or midwife; and
- Disease control officer.

#### **2.5 Community level**

Community representatives— Community Volunteers, Non-governmental Organisations (NGOs) and Community Based Organisations (CBOs) have a role to play in IPC. The Head of the District Health Management Team and Community Health Officers shall initiate, support and monitor the activities of these community groups.

## **2.6 Relationship between IPC and QA programmes**

Infection prevention and control policies and guidelines have great impact on all aspects of patient care. IPC measures should be in congruence with QA standards. The IPC Officer or Nurse should serve as a member on the QA Committee, assisting with the definition of IPC standards. He/she shall conduct and report monitoring/surveillance activities and outcomes related to nosocomial and other infection rates, adherence with IPC practices and employees' health and safety.

## **2.7 Purchasing and introduction of IPC equipment and logistics.**

The IPC focal person shall be consulted in the procurement IPC equipment and consumables. Other equipment and patient care articles for IPC shall be purchased in consultation with experts at the Bio-Medical Engineering Unit.

## **2.8 Financial responsibilities for the management of patients with nosocomial infections**

If an infection is proven (by a medical board) to be a health care associated infection, the health care facility should provide support for the care of the patient. Health care facilities shall make arrangements to ensure the availability of funds to cater for such situations.

## **2.9 Partnerships**

The MOH should facilitate the establishment of strong partnerships with government departments and other stakeholders. Public-Private Partnerships with all key stakeholders should be encouraged.

## **2.10 Research**

Research studies should be conducted to determine the status of implementation of practices, skills and knowledge on IPC and the effectiveness of the monitoring and evaluation systems. The MOH research agenda shall include priority areas on IPC. The outcome of these studies should determine priorities to be addressed by the national, regional and district IPC structures.

## **2.11 Monitoring and evaluation of the programme**

At the national level, the MOH, in collaboration with other relevant stakeholders shall develop a general framework for monitoring IPC. A national surveillance system for health care associated infections shall also be developed. At the minimum, the surveillance system shall generate data on health care associated infections and antibiotic resistant organisms. Regular audits in health care facilities should include health care associated infections. The relevant IPC structures in each region and

health care facility shall be responsible for monitoring the implementation of the policy.

## **2.12 Evaluation or policy review**

2.12a. This policy is subject to review every five years.

2.12b. Notwithstanding 2.12a, mid-term evaluation is encouraged.

## **2.13 Human resource development for infection prevention and control**

To enable appropriate human resource development for IPC, there shall be continuous education and training on IPC for all categories of healthcare staff in the health sector. Training shall be designed to meet the needs of the different categories of health staff and shall be done through:

- Pre-service: The MOH shall ensure that its health training institutions, the Statutory Bodies and other agencies develop and / or update their curriculum on IPC regularly.
- In-service training: IPC shall be included in the structured in-service training programme of all facilities.
- Post-basic: The MOH shall liaise with post-basic health training institutions to develop specialty programmes in IPC.
- Health personnel will also be encouraged to specialise in IPC.

In addition, the MOH shall:

- develop training and learning materials such as flyers, brochures and posters on IPC for all categories of health workers.
- train a pool of health workers to champion the implementation of IPC at the various levels of service delivery.
- ensure that all new staff and students on attachment undergo orientation on IPC practices when they are recruited into the Service. (Refer to Appendix 1 for proposed content of orientation programmes).
- ensure that educational programmes are organised for staff and patients/clients to sensitize and create awareness on IPC issues.
- identify health care facilities and set them up as centres of excellence for IPC



### **SECTION 3**

#### **IMPLEMENTING IPC**

An IPC programme is a set of coordinated activities that seeks to prevent or minimise the risk of infections among health care workers, patients, visitors and communities in health care settings. The principal activities of Infection Prevention and Control programme include but not limited to:

- ensuring the practice of basic IPC measures such as standard and expanded precautions;
- education and training of health care workers;
- education of patients and their relatives on their condition;
- protection of health care workers, e.g. medical screening and immunization;
- identification of hazards and minimizing risks;
- routine practices such as aseptic techniques in clinical procedures
- rational use of antibiotics;
- effective work practices and procedures, such as environmental management practices including management of hospital/clinical waste, support services (e.g., food, linen) and use of therapeutic devices;
- surveillance;
- incident monitoring;
- outbreak investigation;
- infection control in specific situations;
- advocacy, communication, social mobilisation and resource mobilisation; and
- research.

In addition to implementing basic measures for IPC all health care facilities should prioritize their infection control needs and design their programmes accordingly.

# **TECHNICAL GUIDELINES**

FINAL DRAFT

## **SECTION 4**

### **STANDARD PRECAUTIONS AND EXPANDED OR ADDITIONAL PRECAUTIONS**

#### **4.1 Standard precautions**

Standard precautions are work practices required for basic level IPC, and are based on the principle that all blood, body fluids, secretions, excretions (except sweat), non-intact skin and mucous membranes may contain transmissible infectious agents. Standard precautions shall be applied during all patient-healthcare worker interactions that are likely to involve exposure to blood, body fluids and pathogens. Standard precautions are recommended for the treatment and care of all patients/clients irrespective of their perceived infectious status. The components of standard precautions are:

1. hand hygiene including skin care.
2. appropriate use of personal protective equipment (PPE): gloves, gowns/plastic aprons, masks, goggles, face shields, eye protectors etc.
3. proper patient placement and transportation.
4. care of shared patient care equipment.
5. environmental control – Cleaning and disinfection (housekeeping, handling food and drinks, dishes and utensils).
6. handling and disposal of sharps.
7. health care waste management – solid and liquid.
8. safe injection practices.
9. occupational health and safety.
10. handling textiles and laundry.
11. collection, handling and transport of clinical specimen.
12. respiratory hygiene/ cough etiquette.

The details of the components of each of the standard precautions are presented in the respective sections.

#### **4.2 Additional / Expanded / Transmission based precautions**

Transmission based precautions are used when the route(s) of transmission is (are) not completely interrupted using standard precautions alone. For some diseases with multiple routes of transmission e.g. SARS more than one transmission based precautions category may be used. When used either singly or in combination they are always used in addition to standard precautions

There are 3 categories of transmission based precautions (TBP)

- Contact precautions;
- Droplet precautions; and
- Air borne precautions.

Details of these precautions are in Section 15

## **SECTION 5**

### **HAND HYGIENE**

Hand hygiene is a general term that applies to routine hand washing, antiseptic hand wash, antiseptic hand rub, or surgical hand antisepsis.

#### **5.1 Introduction**

The hand is the commonest vehicle for transmitting infections. Hand washing is thus the single most effective method used in preventing the spread of infections. In spite of this fact, health workers often do not pay much attention to this practice. Proper hand hygiene reduces the number of potentially infection-causing microorganisms on the hands, and decreases the incidence of infection transmission in the health facility. There are two sources of micro-organisms found on the hand.

- **Resident microorganisms** that live on and within the skin and are difficult to remove; and
- **Transient microorganisms** that are acquired during daily activities and can be removed easily.

#### **5.2 Types of hand hygiene**

There are three major types of hand hygiene. These are:

- a. Social/routine hand washing.
- b. Hygienic hand washing or hand antisepsis.
- c. Surgical hand wash/scrub.

##### ***a. Social/routine hand washing***

This is hand washing with plain soap and running water for at least 10 seconds to remove most transient microorganisms (e.g. *E. coli*) and soil from the hands. Social hand washing shall be done:

- before and after handling or eating food.
- after visiting the toilet.
- before and after attending to patients in situations such as bathing and feeding;
- when hands are soiled.
- on arrival to work and after.

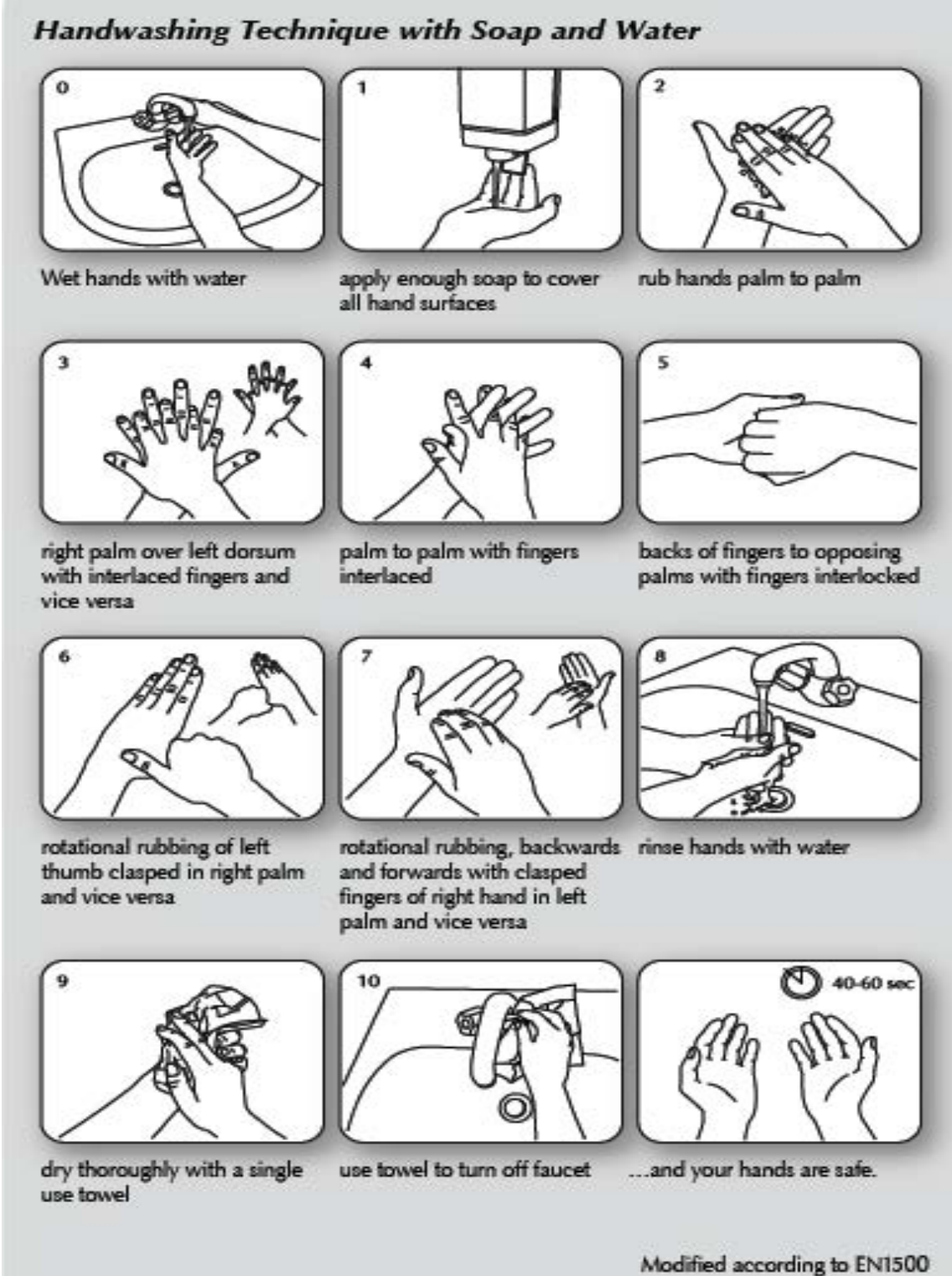
*MAKE SURE you and your colleagues are fully trained in the very best hand washing and drying techniques. It may sound simple, but by following a strict procedure, you will be making a direct impact in the minimisation of cross contamination.*

##### ***Procedure for social hand washing (Figure 5.1)***

- Wet hands under a stream of running water and apply a recommended amount of hand-wash agent to the palms and hands. Recommended agents for hand hygiene are presented in Table 1. Liquid, bar/cake, leaflet or powdered forms of plain soap are acceptable. When bar/cake soap is used, cut it into smaller pieces and keep in a rack that facilitates drainage of water.
- Rub to make lather.
- Rub the hands together i.e. palm to palm, palm to dorsum and then cup them among each other to massage the finger tips, the thumbs and the web of the fingers.
- Wash the wrists and the back of the hands;

- Rinse thoroughly under running water, and keep hands down to avoid water running down the forearm. Avoid using hot water as repeated exposure to hot water may increase the risk of dermatitis.
- Dry thoroughly with recommended drying material (refer to recommended material in page 21).
- Use single use hand towel or paper to turn off the faucet.

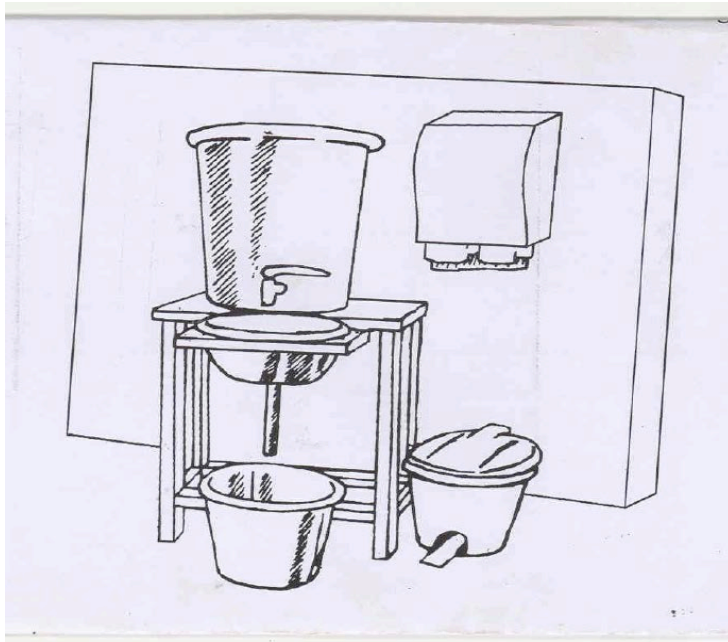
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**Figure 5.1:** Hand-washing protocol  
 (Copied from WHO guidelines on hand hygiene in health care 2005)

When running water is not available, use one of the following:

- Veronica bucket system (Figure 5.2) or other tap fitted water storage containers such as polytank.



**Figure 5.2:** “Veronica Bucket” system

**Note:**

*Microorganisms grow and multiply in standing water. Therefore avoid dipping or washing your hands in a basin that contains standing water, even if an antiseptic solution is added.*

*Hand washing using plain soap and water removes microorganisms on the hand. It does not kill the microorganisms*

**b. Hygienic hand washing or hand antisepsis**

This involves the use of antiseptic detergents to wash hands for about 10-15 seconds or the use of alcohol based agents to disinfect hands. Hygienic hand washing or hand antisepsis removes transient micro-organisms and soil and kills or inhibits the growth of resident micro-organisms.

This type of hand hygiene is required:

- before performing invasive procedures such as setting intravenous lines, lumbar puncture, catheterisation;
- before and after sterile wearing gloves;
- after contact with blood, body secretions or following situations in which microbial contamination is likely to occur; and
- before caring for susceptible (immunocompromised) patients.

**Hand antisepsis with alcohol hand rub**

Alcohol hand rub is only one kind of antiseptic hand rub. It kills or inhibits the growth of transient and resident microorganisms but does not remove microorganisms or soil.

This method can be used when hand washing with antiseptic and running water is not possible or practical as long as hands are not visibly soiled with dirt, blood or other organic materials. If hands are dirty, wash with soap and running water.

To use alcohol hand rub solution:

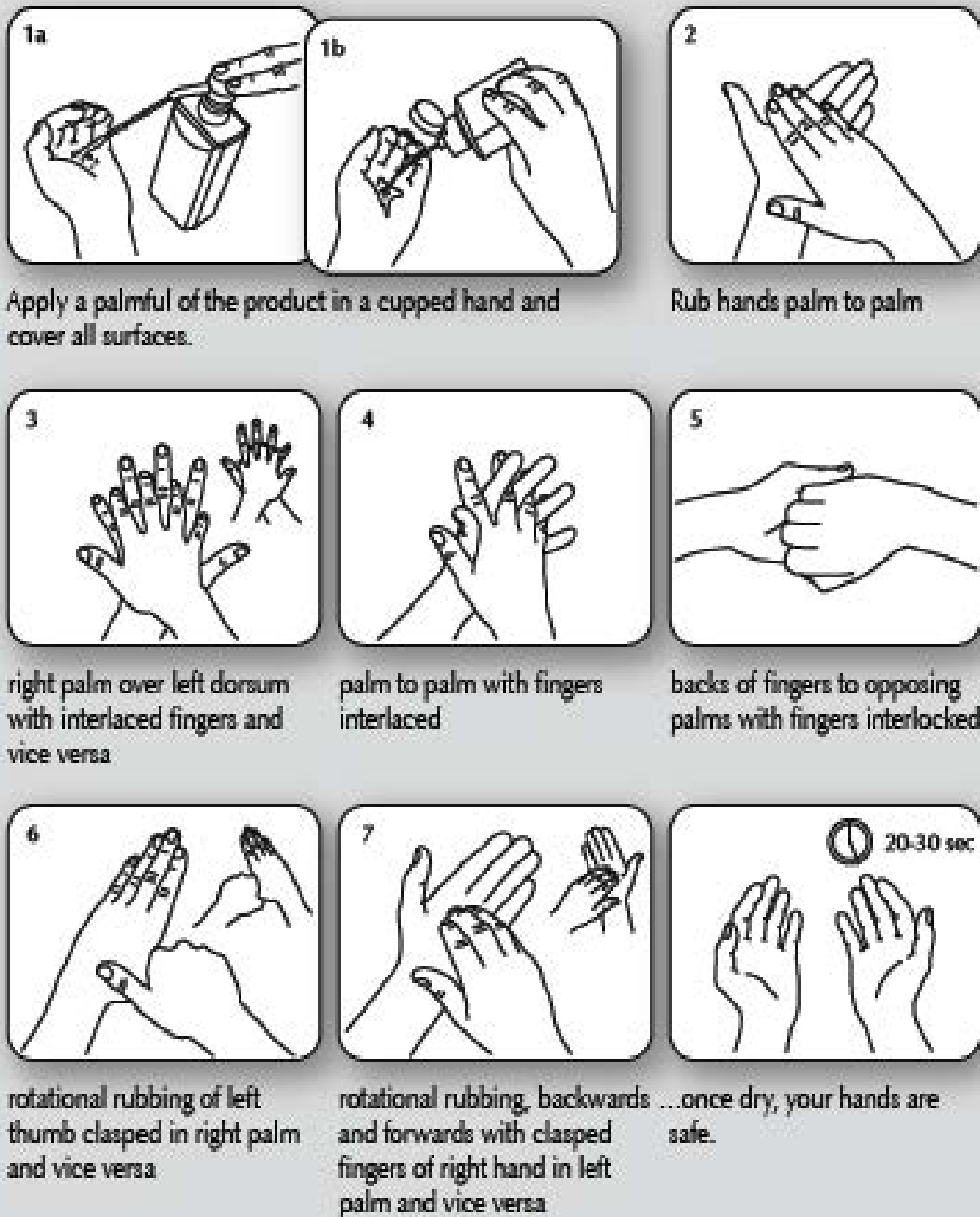
- pour not less than 5 mls of alcohol hand rub into the palm of your hand and cover all surfaces of the hands.
- rub hands together until they are dry.

It is recommended that after 6-10 applications of alcohol rub a social hand wash must be done (Figure 5.3).

FINAL DRAFT



## Hand Hygiene Technique with Alcohol-Based Formulation



Modified according to EN1500

**Figure 5.3:** Guidelines on use of alcohol based hand rub

**Note:**

*Alcohol hand rub should be used only when hands are not physically dirty or soiled.*

**Preparation of alcohol hand rub**

- Add 2mls glycerin to 100mls 60-90% of alcohol solution

- Put in a dispenser and label.

**c. Surgical hand wash/scrub**

This involves the use of antiseptic detergents to wash hands for 3-5 minutes. Hands must be washed from the fingers to the elbows. If an alcoholic preparation is used, two applications are recommended. Surgical hand washing should be done before all surgical procedures.

**Procedures for surgical hand wash / scrub (Figure 5.4)**

**Step 1**

Remove all jewellery on your hands and wrists.

**Step 2**

Wet your hands and forearms thoroughly.

**Step 3**

Holding your hands up above the level of your elbow, apply the antiseptic.

**Step 4**

Clean under each fingernail with a nail brush. It is important for all surgical staff to keep their fingernails short. Using a circular motion, begin at the fingertips of one hand and lather and wash between the fingers, continuing from fingertip to elbow. Repeat this for the second hand and arm. Continue washing in this way for 3-5 minutes.

**Step 5**

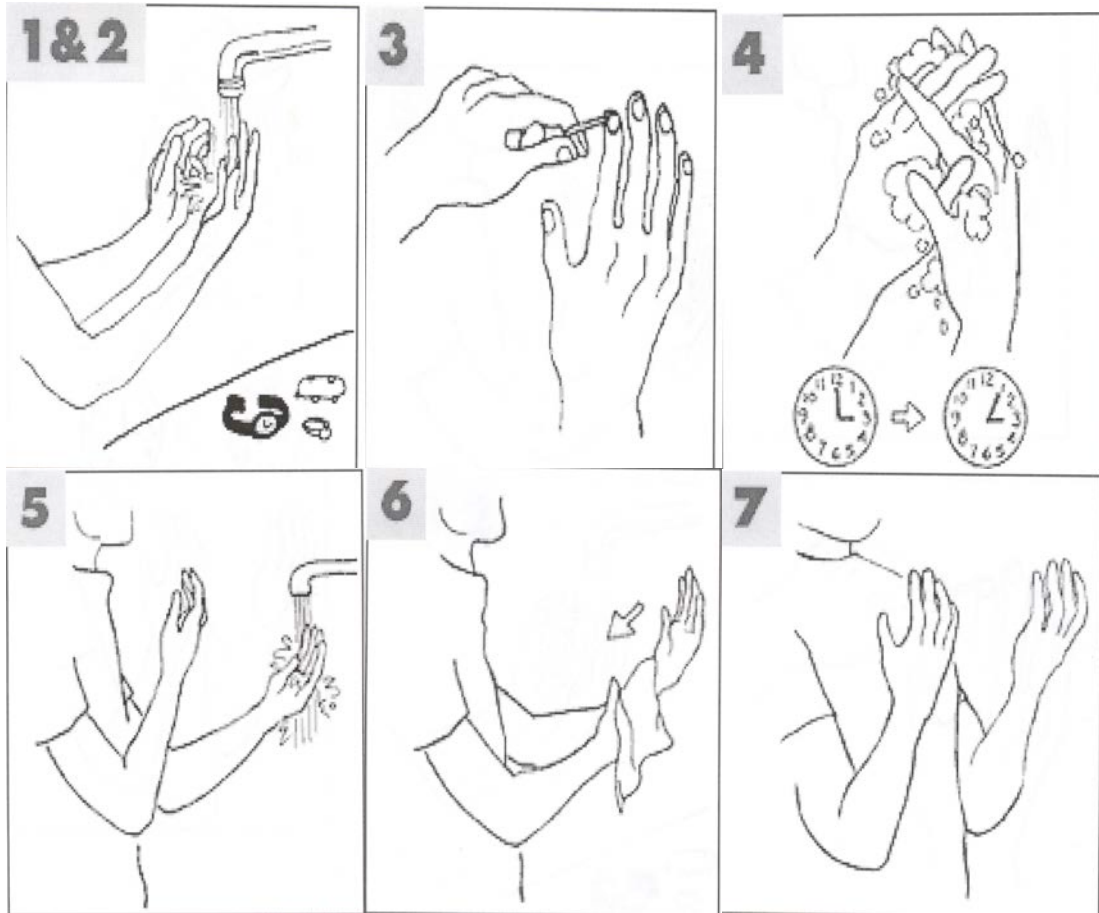
Rinse each arm separately, fingertips first, holding your hands above the level of your elbow.

**Step 6**

Using a sterile towel, dry your arms – from fingertips to elbow – using a different side of the towel on each arm.

**Step 7**

Keep your hands above the level of your waist and do not touch anything before putting on sterile surgical gloves.



**Figure 5.4:** Procedure for carrying out surgical hand wash

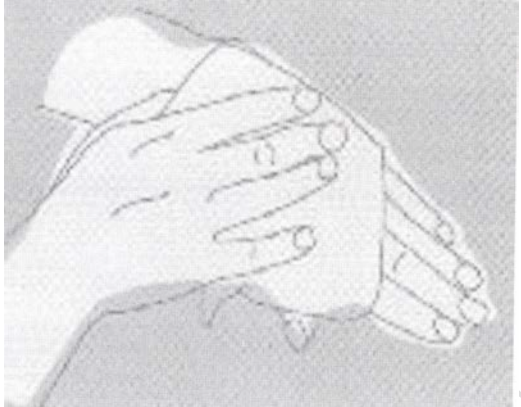
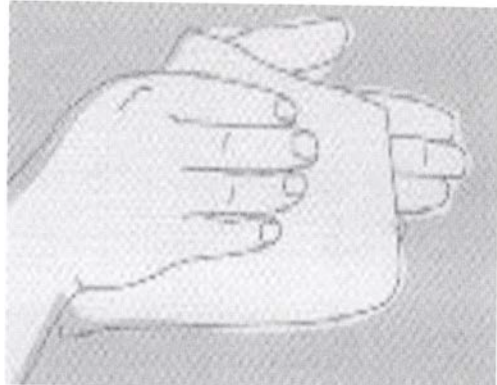

### 5.3 Hand drying

It is important that the hands are dried after washing with any of the following:

- absorbent paper towels
- single use cotton towels
- air hand dryers

Figure 5.5 demonstrates the procedure for hand drying

**Note:** Absorbent paper towels are the best. Shared towels can become contaminated quickly and must be avoided.

<p>Wipe back of each hand thoroughly with towel, working down from wrist to fingertips.</p>	
<p>Rub palm to palm</p>	
<p>Twist around each finger and both thumbs making sure the whole finger from base to tip is dried and dispose in disposable container</p>	

**Figure 5.5:** Procedure for hand drying after social / hygienic hand wash

**Table 1: Agents for hand hygiene**

Products	Indications	Special Consideration
<p>Plain cake or bar soap, liquid soap</p> <p>Clean running water</p>	<p>For routine care of patients.</p> <p>For washing hands soiled with dirt, blood or other organic material.</p>	<p>May contain very low concentration of microbial agents to prevent microbe contamination and growth in the soap.</p> <p>Cake or bar soap should be on rack to allow water to drain; Small piece of cake/bar soap that can be changed frequently are safest.</p>
<p><b>Antiseptic/Anti-microbial agents:</b> Chlorhexidine gluconate scrub strengths: 2% aqueous foam or 4% liquid preparation (hibitane) ,</p> <p>0.5% chlorhexidine + povidone-iodine (betadine)</p> <p>Povidone-iodine scrub strengths - 10%, 7.5%, 2%, 0.5%</p>	<p>May be chosen for hand scrubs prior to performance of invasive procedures (e.g. placing intravascular lines or devices).</p> <p>When caring for severely immunocompromised patients.</p> <p>Critical care areas.</p> <p>Based on risk of transmission (e.g., specific micro-organisms).</p> <p>Intensive care nurseries.</p> <p>Operating theatre hand scrub.</p> <p>When caring for individuals with antimicrobial resistant organisms.</p>	<p>Antiseptic agents may be chosen for important to reduce the number of flora or when the level of microbial contamination is high.</p> <p>For use in high risk areas such as neonatal units, operating theatre, delivery rooms, isolation areas, kidney and dialysis units, for invasive procedures.</p> <p>Antiseptic agents should be chosen for persistent antimicrobial activity if this is desired. They are usually available in liquid formulations.</p> <p>Antiseptic agents differ in activity and characteristics.</p>
<p><b>Waterless antiseptic agents:</b></p> <ul style="list-style-type: none"> <li>• Alcohol rinses</li> <li>• Alcohol foams</li> <li>• Alcohol wipes</li> <li>• Alcohol towellettes</li> <li>• Germicidal hand rinse (Hibistat)</li> </ul>	<p>Demonstrated alternative to conventional agents.</p> <p>For use where hand washing facilities are inadequate, impractical or inaccessible (e.g. ambulances, home care, mass immunization, OPD, antenatal clinic, etc).</p> <p>For situations in which the water supply is interrupted (e.g. planned disruptions, natural disasters).</p>	<p>Not effective if hands are soiled or heavily contaminated with blood or organic material.</p> <p>Follow manufacturer's recommendation for use.</p> <p>Efficacy affected by concentration in product. Alcohol is most effective at 70% concentration.</p> <p>Lotions should be readily available to protect skin integrity.</p>

Source: Canada Communicable Disease Report, Vol. 24S8. Infection control guidelines: Hand washing, cleaning, disinfection and sterilization in health care. Health Canada, Ottawa, 1998. p. 3 (modified).

#### **5.4 Other hand hygiene considerations**

- Intact skin is a major defence from infection. Hand hygiene and gloving can irritate skin.
- Hand hygiene cannot reduce the bacterial counts of personnel with dermatitis.
- Health care providers with dermatitis carry high numbers of micro-organisms and may be at increased risk of exposure to blood borne pathogens.
- Workers with chapped or abraded skin must contact their supervisor before initiating work with potentially infectious materials.
- Staff responsible for processing instruments who have open sores or cuts on their hands or forearms should not clean instruments until the lesions are healed or should apply water-proof adhesive and wear double gloves.

#### **5.5 Improving compliance to hand washing**

Generally, it has been shown that health workers wash their hands only about half as often as they should but they tend to overestimate how often and how well they wash. Inadequate supply of water, soap or antiseptics can play a major role in non-compliance to hand hygiene guidelines. Management involvement in and commitment to hand washing improves compliance. This includes demonstration of appropriate hand hygiene behaviour by respected individuals (role models) and encouragement of other staff to do same.

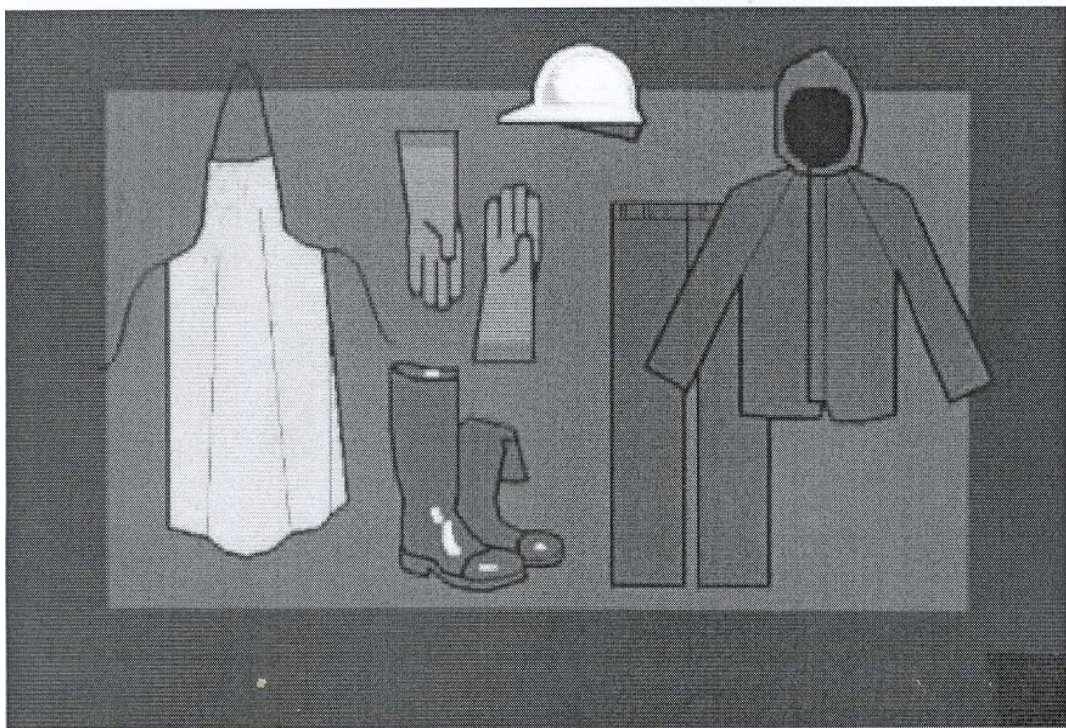
It is therefore important for:

- supervisors and managers to make water, soap and antiseptics available at all times;
- supervisors and managers to support and model good hand washing behaviour;
- health care facilities to provide educational activities and aids to make sure all staff are aware of the importance of good hand washing practices; and
- management to provide posters or signs listing the steps and times for hand washing to be displayed at vantage points (rest rooms, eating areas, toilets) to help staff become aware of appropriate hand washing practices.

## SECTION 6 PERSONAL PROTECTIVE EQUIPMENT/CLOTHING (PPE)

Personal Protective Equipment/clothing (PPE) or (barrier protection items) are used to prevent blood and other potentially infectious materials from coming into direct contact with clothing and the body of health staff, patients and relatives. There are different types of personal protective equipment/clothing (Figure 6.1) and the use of each type depends on the task to be performed and the anticipated exposure. They include:

- Gloves
- Gowns
- Masks, face shields and goggles
- Headgears
- Helmets,
- Leg protections (e.g. boots). and many others



**Figure 6.1:** *Types of personal protective equipment/clothing*

### 6.1 Gloves

*Gloves protect both clients and staff by acting as a barrier against infectious micro-organisms. Health staff must always select the appropriate gloves and size for the right procedure. The most common types of gloves are:*

#### **Sterile Surgical gloves:**

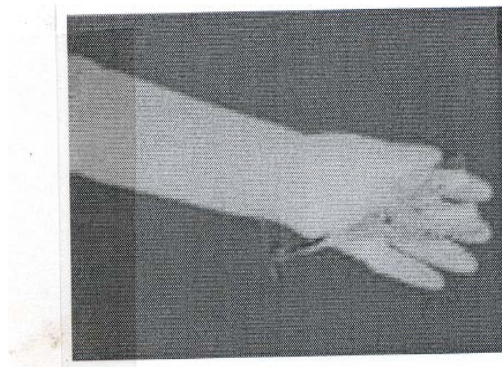
These are sterile and shall always be used for procedures that involve contact with blood and normally sterile areas of the body.

**Single-use examination gloves:**

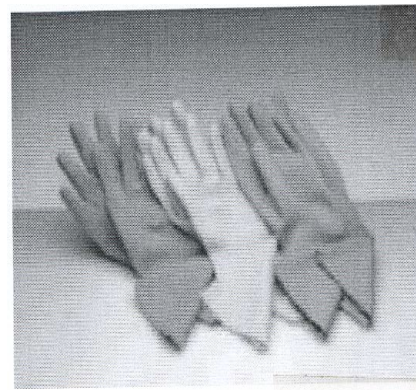
These are non-sterile disposable gloves and shall be used for procedures involving contact with intact mucous membranes (unless otherwise indicated) and also for other patient care procedures that do not require the use of sterile gloves.

**Utility or Heavy-duty household gloves:**

These shall be used when handling contaminated items and when performing housekeeping activities. Figure 6.2 shows the different types of utility gloves



*Elbow length utility glove*



*Wrist level utility glove*



*Heavy duty utility glove for better grip*

*Figure 6.2: The different types of utility gloves*

**6.1.1 Guidelines for using all types of gloves**

The following are guidelines for using all types of gloves:

- Gloves shall be worn as an additional measure, not as substitute for hand hygiene
- Gloves are not required for routine care activities in which contact is limited to a patient's intact skin.
- Wash hands before wearing gloves;
- Wear gloves on both hands before touching blood and body fluids, mucous membranes, or non-intact skin of all patients;



- Do not use gloves if they are peeling, cracked or discoloured, or if they have punctures, tears, or other evidence of deterioration;
- Change gloves immediately when patient blood or secretions come directly into contact with the hand even if the procedure is not completed;
- Change gloves and wash hands in between patients;
- Never reuse disposable gloves;
- Remove gloves before leaving the examination/patient's room, dirty utility areas or other work areas;
- Decontaminate all utility gloves before taking them off; and
- Wash hands after removing any type of glove.

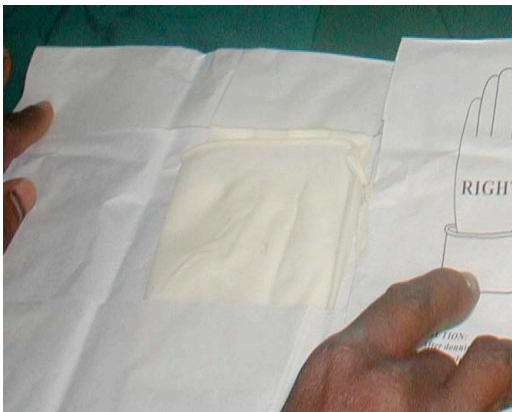
### Procedure for wearing gloves

#### A). Clean technique

- Slip the gloves onto the right hand first and then the left, making sure they fit securely over the cuffs of the gown if applicable.
- An extra glove should be handy just in case the original pair tears or becomes soiled.

#### B).Sterile technique

- Remove all jewellery on the hands, including rings.
- Wash hand thoroughly with an antiseptic and dry them with a sterile material.



- Open the package containing the sterile gloves.
- Carefully open the inner wrapper, maintaining aseptic technique, being careful not to contaminate the gloves by touching them (See figures below)
- Grasp the folded edge (inside surface) of the right glove's cuff with the left hand (see diagram below)



- Slip the right hand inside the glove. To avoid contamination, the fingers on the left hand should touch only the inside of the glove. If the glove becomes contaminated discard it and use a new one.



Slip the fingers of the gloved hand under the cuff (touching only the outer surfaces) of the glove. Insert the left hand into the glove and pull the glove on the right hand. Avoid touching the skin with the gloved hand. Keep the thumb up and back.

- Adjust the gloves so they fit properly. Make sure no gaps exist between the fingertips and the ends of the gloves.





- Inspect the gloves for tears before and during the procedure.

### **Procedure for removal of surgical gloves**








Avoid allowing the outside surface of the gloves to come in contact with your skin and do not let the gloves snap, as this may cause contaminants to splash into eyes, mouth, skin or other areas. Remove used gloves before touching anything. There are two schools of thought regarding the removal of gloves. Any of them is acceptable so long as the principles are followed.

#### **First approach when removing surgical gloves**

	<p><b>Step 1</b> Grasp one of the gloves near the cuff and pull it partway off. The glove will turn inside out. It is important to keep the first glove partially on your hand before removing the second glove to protect you from touching the outside surface of either glove with your bare hands.</p> <p><b>Step 2</b> Leaving the first glove over fingers, grasp the second glove near the cuff and pull it part of the way off. The glove will turn inside out. It is important to keep the second glove partially on your hand to protect you from touching the outside surfaces of the first glove with your bare hand</p>
	<p><b>Step 3</b> Pull off the two gloves at the same time, being careful to touch only the inside surfaces of the gloves with your bare hands.</p> <p><b>Step 4</b> If the gloves are disposable or are not intact, dispose of them properly. If they are to be processed for reuse, e.g. industrial gloves, place them in a container of decontamination solution. Wash hands immediately gloves are removed.</p>

*Courtesy Komfo-Anokye Teaching Hospital*

Second approach when removing surgical gloves

	<p>Pull one glove near your wrist towards your finger tips until the glove folds over</p>
	<p>Carefully grab the fold and pull towards your finger tips. As you pull you are turning the inside of the glove outwards.</p>
	<p>Pull the fold until the glove is almost off.</p>
	<p>To avoid contamination of your environment, continue to hold the removed glove. Completely remove your hand from the glove.</p>
	<p>Slide your finger from you glove free hand under the remaining glove. Continue to slide your finger towards your finger tips until almost half of your finger is under the glove.</p>
	<p>Turn you finger 180 degrees and pull the glove outwards and towards your finger tips. As you do this, the first glove will be encased in the second glove. The inside of the second glove will also be turned outwards</p>
	<p>Grab the gloves firmly, by the uncontaminated surface (the side that was originally touching your hand). Release your grasp of the first glove you removed. Pull your second hand free from its glove. Dispose of the gloves properly.</p>

*\*Courtesy Pen State Environmental Health and Safety Guidelines on Standard Practices for Laboratory Glove Removal*

Table 2 Outlines procedures and the type of gloves to use.

**Table 2 Gloves requirements for examples of medical and surgical procedures**

Task or Activity	Gloves Needed	Examination Gloves <sup>1</sup>	Sterile Gloves
Measuring blood pressure	No	-	-
Measuring temperature	No	-	-
Giving an injection	No	-	-
Pelvic examination	Yes	Yes	No
Contact with vaginal secretions	Yes	Yes	No
IUD insertion	Yes	Yes	No
Norplant insertion and removal	Yes	Acceptable	Preferred
Surgery (minilaparotomy, laparoscopy, vasectomy)	Yes	Acceptable	Preferred
Emergency childbirth	Yes	Acceptable	Preferred
Blood drawing	Yes	Yes	No
Oral/nasal suctioning, manually cleaning airway	Yes	Yes	No
Handling and cleaning instruments with microbial contamination	Yes	No	No
Handling contaminated waste	Yes	No	No
Cleaning blood or body fluid spills	Yes	No	No
Dressing of wounds	Yes	Yes	Preferred
Performing lumbar puncture	Yes	Yes	Preferred
Changing soiled linen	Yes	Yes	No
Changing colostomy bag	Yes	Yes	No

*Note:*

- *Gloves **DO NOT** replace the need for hand hygiene*
- *Gloves **DO NOT** provide protection from needle sticks or other puncture wounds caused by sharp objects. Use extreme caution when handling needles, scalpels, etc.*
- ***DO NOT** wash or decontaminate gloves for reuse.*
- ***DO NOT** wear gloves away from the bedside or laboratory bench; at nursing stations to handle phones, charts; to handle clean linen, clean equipment or patient care supplies; in hallways or elevators.*

## 6.2 Gowns

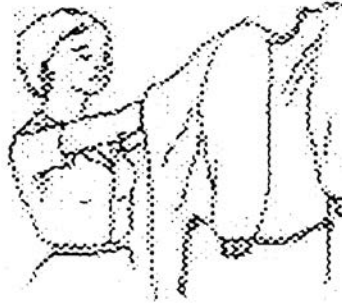
Gowns are recommended to prevent soiling of clothing when taking care of patients and also to prevent transmission of infection from clothing and body.

- Gowns and aprons shall be worn when splashes to the skin or clothing with body fluids are likely to occur.
- Gowns, including surgical gowns, shall be made of / or lined with impervious material to protect all areas of exposed skin.
- The gowns shall be large enough to cover the entire clothing of personnel and protect all areas of exposed skin.
- All Health care facilities shall ensure adequate supply of gowns.
- Gowns shall be worn only once and then discarded in an appropriate receptacle.

- Clean, freshly laundered gowns shall be worn all the time.
- In special cases, as with caring for patients with extreme burns or extensive wounds, sterile gowns shall be worn when changing dressings.
- Gowns shall never be worn outside the actual work area.

**Procedure for putting on a gown**

- Slide the gown over the hands and arms by holding arms forward and slightly above the head.



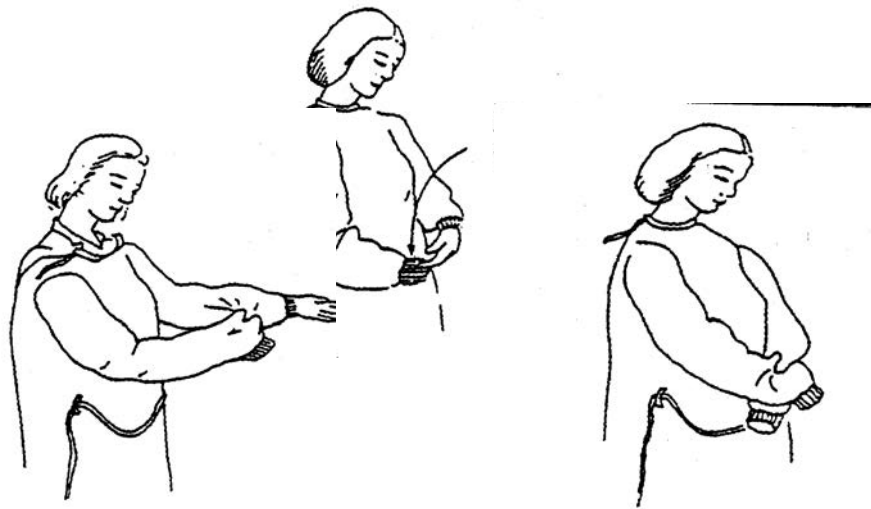
- Fasten the gown at the back of the neck; then grasp the gown at the waistline in the back and overlap the edges as much as possible. While holding the overlapping edge with one hand, grasp one end of the belt with the other hand and pull it around the back and fasten.



**Procedure for removing gowns**

- Remove glove if applicable, wash and dry hand using sink inside the room.

- Untie belt in the back of the gown and unfasten the neck of the gown and pull off the first sleeve by slipping the fingers under the cuff.



Do not touch outside surface of cuff, the outside is contaminated and the hands are now clean.

Remove the second sleeve by grasping it through the first sleeve like this:

- Without touching the outer surface of the gown, fold it with the outer contaminated surface together.
- Then, roll the gown into a ball, being careful to touch only the inner uncontaminated surface of the gown.
- If gown is non-disposable, place it into the patient's linen hamper.
- If gown is disposable, discard it into the patient's covered waste receptacle.
- Always remember to hold the contaminated gown away from the uniform.



- Wash hands before leaving room.

### 6.3 Face and eye protection

Face and Eye protections must be worn whenever there is the likelihood of splashes, spray, splatter or droplets of blood or other potentially infectious material getting into the eyes, nose, mouth or other facial areas. Use safety glasses or normal glasses with shields or goggles for eye protection

## Goggles

- These should be made of clear polycarbonate plastic with side and forehead shields. These should be optically clear, antifog and distortion-free.
- Disposable goggles are preferred but reusable ones can be used after proper processing.



Eye protection should be worn by securing it over the bridge of the nose and also over the mask.

## Surgical Masks and particulate respirators

Surgical masks protect the mucous membranes of the mouth and nose. These generally provide protection against droplets, splashes and sprays. Masks must cover both the nose and the mouth, and fit the face closely, so that air passes through the mask before being inhaled. Note that face masks have large pores and lacks air tight seal around edges.

Points to note about wearing a mask

- Wash hands before putting on a mask, and after taking one off.
- Follow the instructions given by the supplier.



**Figure 6.3:** Proper way to wear headgear and surgical mask

When wearing a surgical mask, ensure that the:

- mask fits snugly over the face:
- coloured side of the mask faces outwards, with the metallic strip uppermost;



- strings or elastic bands are positioned properly to keep the mask firmly in place.
- mask covers the nose, mouth and chin.
- metallic strip moulds to the bridge of the nose.

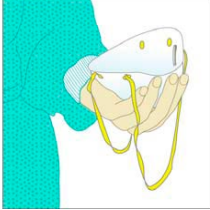



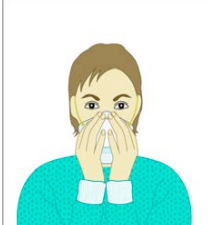
Try not to touch the mask once it is secured on your face as frequent handling may reduce its protection. If you must do so, wash your hands before and after touching the mask.

When taking off the mask, avoid touching the outside of the mask as this part may be covered with germs.

After taking off the mask, fold the mask outwards (i.e. the outside of the mask facing inwards) and put it into rubbish bin with a lid. A surgical mask should be discarded after use and under no circumstances should it be used for longer than a day. Replace the mask immediately if it is damaged or soiled.

### **Particulate respirators**

Respirators have only tiny pores which block droplet nuclei and rely on an air tight seal around the entire edge. Respirators can protect health care workers from inhaling microbes such as *M .tuberculosis* only if standard IPC work practices and environmental controls are in place. It must also be noted that respirators are expensive to purchase and require specialized equipment to determine proper fit. Their use should therefore be restricted to specific high risk areas in health care facilities such as rooms where spirometry or bronchoscopy are performed or specialized treatment centers for persons with MDR or XDR TB. **Figure 6.4** demonstrates the sequence of wearing an N95/FFP2 particulate respirators and doing the seal check.

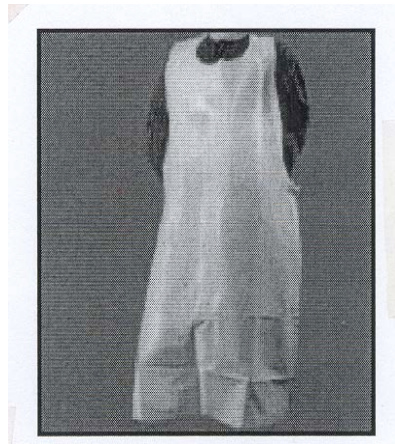
	<p><b>Step 1</b> Cup the respirator in your hand with the nosepiece at your fingertips allowing the headbands to hang freely</p>
	<p><b>Step 2</b> Position the respirator under your chin with the nosepiece. Pull the top strap over your head resting it high at the back of your head.</p>
	<p><b>Step 3</b> Pull the bottom strap over your head and position it around the neck below the ears</p>
	<p><b>Step 4</b> Place fingertips of both hands at the top of the metal nosepiece. Mould the nosepiece (USING TWO FINGERS OF EACH HAND) to the shape of your nose. Pinching the nosepiece using one hand may result in less effective respirator performance</p>
	<p><b>Step 5</b> Cover the front of the respirator with both hands, being careful not to disturb the position of respirator</p> <p><b>Positive seal check</b> Exhale sharply. A positive pressure inside the respirator = no leakage. If leakage, adjust position and/or tension straps. Retest the seal by repeating the steps until respirator is sealed properly</p> <p><b>Negative seal check</b> Inhale deeply. If no leakage, negative pressure will make respirator cling to your face. Leakage will result in loss of negative pressure in the respirator due to air entering</p>

**Figure 6.4:** Sequence of wearing a particulate respirator and doing a seal check

*Adapted from Infection prevention and control of epidemic- and pandemic-prone acute respiratory diseases in health care-WHO Interim Guidelines” available at [http://www.who.int/csr/resources/publications/WHO\\_CD\\_EPR\\_2007\\_6/en/index.html](http://www.who.int/csr/resources/publications/WHO_CD_EPR_2007_6/en/index.html)*

#### 6.4 Plastic aprons

Aprons prevent contact with infectious body fluids that may soak through cloths. These should be worn over outer garments.



##### **Aprons should have:**

- Hooks or ties that fasten around the neck.
- Have ties at the waist that reach around and tie at the back.
- Be long enough to cover the top of the boots and provide additional protection from spills running inside the boots.

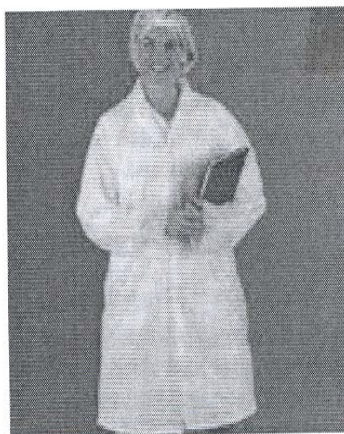
##### **Wearing an apron**

- Wash hands
- Ensure that the sleeves are rolled above the elbows before putting on the apron
- Wear apron over the outer garment and tie around the waist at the back.

##### **Removing an aprons**

- Wash hand and dry
- Remove the apron touching only the inside of the apron.
- Remove, folding the outside part in.
- Decontaminate or dispose according to the guidelines of the health facility.
- Wash hands.

#### 6.5 Coats



Coats can be used to protect street clothing against biological or chemical spills as well as for body protection. The specific hazard(s) and the degree of protection required must be assessed before selecting coats.

## 6.6 Overall



Overalls protect you and your clothing from dust and other non-hazardous materials. These should be worn to protect outer garments as and when indicated, especially, when spraying, painting and doing other messy jobs.

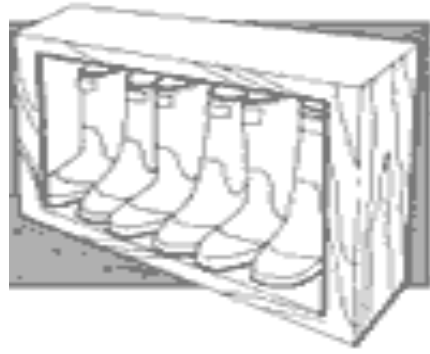
## 6.7 Headgear

- Disposable caps or scarves should be used where indicated (e.g. in operating theatres, reverse isolation, etc.)
- If disposable ones are not available, well-fitting cotton caps and scarves should be used. These should be laundered at high temperatures or sterilised.

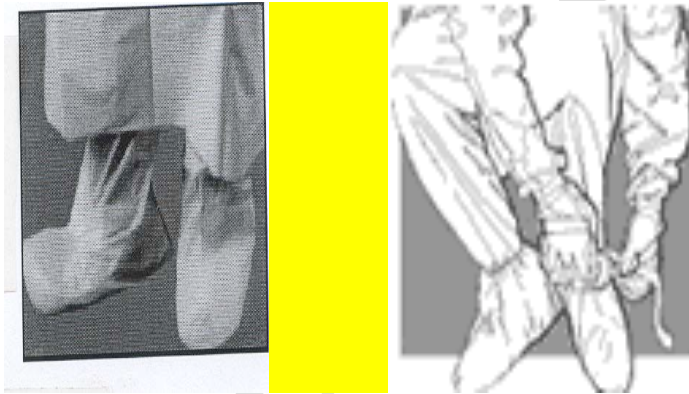
## 6.8 Leg protections like boots/shoes/overshoes

Staff must wear leg protections whenever there is the potential of the legs coming into contact with blood, body fluids or other contaminated materials e.g. during surgical operations, delivery and in the isolation wards (see figures below). Examples of leg protections are:

- **Boots** – common rubber boots are recommended. The sides of the boots should be at least 30cm high and should have textured soles and be easy to clean. If boots are not available, wear two layers of plastic bags.
- If possible assign staff who work in high risk area such as isolation area individual pairs of boots.
- Boots should be stored in covered shelves or in a plastic sack between each use. See figure below.



- **Overshoes** must be worn over street shoes when there is infectious waste on the floor. It must be discarded after single use (see figures below).



Safety shoes should also be worn in any area where there is a significant risk of dropping heavy objects on the foot. For general biological laboratory use, comfortable shoes such as tennis shoes or nurses shoes can be used. Sandals and other types of open-toed shoes are not permitted in laboratories using biohazards or chemicals, due to the potential exposure to infectious agents or toxic materials as well as physical injuries associated with the work.

Figures 6.5 and 6.6 outline the suggested sequence of putting on and removing PPE in isolation practice



#### Step 1

- Identify hazards & manage risk
- Gather the necessary PPE
- Plan where to put on & take off PPE.
- Do you have an assistant?
- Do you know how you will deal with waste?

#### Step 2

- Put on an apron and a gown or put on a gown with an impermeable lining

#### Step 3

- Put on recommended mask. Caps are optional: if worn, put on before the mask

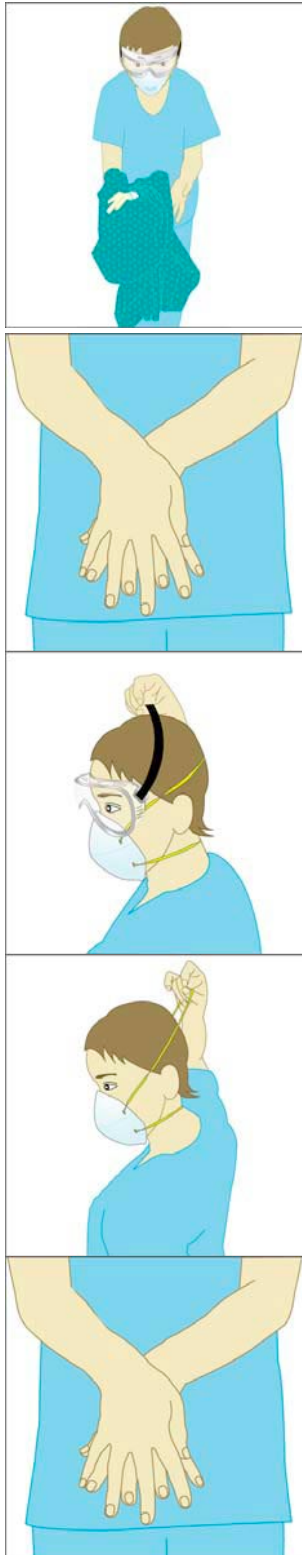
#### Step 4

- Put on eye protection e.g. face shield/goggles (consider anti-fog drops or fog-resistant goggles)

#### Step 5

- Put on gloves

**Figure 6.5: Suggested sequence for putting on personal protective equipment (PPE)**  
Adapted from "Infection prevention and control of epidemic- and pandemic-prone acute respiratory diseases in health care-WHO Interim Guidelines" available at [http://www.who.int/csr/resources/publications/WHO\\_CD\\_EPR\\_2007\\_6/en/index.html](http://www.who.int/csr/resources/publications/WHO_CD_EPR_2007_6/en/index.html)



The principle is to avoid contamination of self, others & the environment as such remove the most heavily contaminated items first.

**Step 1**

- Remove glove and perform hand hygiene or
- Remove gloves & gown by peeling off gown & gloves and roll inside out and dispose gloves and gown safely

**Step 2**

- Perform hand hygiene

**Step 3**

- Remove goggles from behind and put in a separate container for reprocessing
- Remove cap (if worn)

**Step 4**

- Remove mask from behind

**Step 5**

- Perform hand hygiene

**Figure 6.6:** *Suggested sequence for taking off personal protective equipment (PPE).* Adapted from “Infection prevention and control of epidemic- and pandemic-prone acute respiratory diseases in health care-WHO Interim Guidelines” available at [http://www.who.int/csr/resources/publications/WHO\\_CD\\_EPR\\_2007\\_6/en/index.ht](http://www.who.int/csr/resources/publications/WHO_CD_EPR_2007_6/en/index.ht)

## **SECTION 7**

### **PATIENT PLACEMENT AND TRANSPORTATION**

#### **7.1 Patient placement**

Place patients who pose a risk for transmission of infections to others (e.g. patients with uncontained secretions, excretions or wound drainage; infants with suspected viral respiratory or gastrointestinal infections) in a single-patient room when available. If not available, place patients with similar diseases in the same room. Determine patient placement based on the following principles:

- 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 health associated infections in other patients in the area or room being considered for patient placement;
- Availability of single-patient rooms; and
- Patient options for room-sharing (e.g. cohorting patients with the same infection).

#### **7.2 Transportation of patients with infectious diseases**

The following shall be observed when transporting patients with infectious diseases:

- Patients infected with virulent or epidemiologically important micro-organisms shall leave their room only for essential purposes;
- When transporting the patient, the appropriate precautionary procedures related to their specific infection shall be adhered to. e.g. In infectious respiratory diseases like SARS, Avian influenza and MDR-TB surgical masks should be used to cover the mouths and noses of patients.
- Staff transporting the patient in a single chamber ambulance should wear the appropriate PPE
- The department or institution receiving the patient shall be notified.



## **SECTION 8**

### **PATIENT CARE EQUIPMENT**

The risk of transferring infections from instruments and equipment is dependent on the presence of microorganisms, the number and virulence of the organisms and the type of procedure to be performed (invasive or non-invasive). The classification of the risk of transmission of infection by instruments and equipment is according to the site where the instrument is to be used. These are

- Critical
- Semi-critical
- Non-critical

#### **a. Critical items**

These are instruments or objects that are introduced directly into the blood stream or into other normally sterile areas of the body. Examples include surgical instruments, IV canulae, implants and lumbar puncture needles.

These items must be sterilised before use.

#### **b. Semi critical items**

These refer to instruments or objects that come into contact with intact mucous membranes but do not necessarily penetrate body surfaces, e.g. endotracheal tubes, anaesthetic breathing circuits, vaginal instruments, oral thermometers and endoscopes.

These items should be sterilised before use. Where sterilisation is not possible, high-level disinfection should be used.

#### **c. Non-critical items**

These are items that either do not ordinarily touch the patient or touch only intact skin. Examples of these are walls, floors, bedpans, blood pressure cuffs, stethoscopes, and clinical thermometers.

Depending on the particular piece of equipment or item, washing or wiping with a detergent or alcohol (low level disinfection) may be sufficient.

Proper processing of instruments and other objects that will be reused in clinical procedure is vital for reducing the transmission of infections.

It is important to keep in mind that staff involved in processing instruments and objects are themselves at high risk of infections and must thus take appropriate steps to reduce the risk.

Infections in this regard can occur from exposure to blood and blood products, and other body fluids that pass through:

- open cuts on their hands or forearm, chapped or cracked hands;
- injuries from needle sticks or other sharp instruments; and
- splashing of blood and other body fluids onto mucous membranes like the eyes.

## 8.1 Steps in processing used medical devices including instruments

The steps in processing instruments are decontamination, cleaning, sterilisation or high-level disinfection and proper storage.

- **Decontamination**

This is a process that involves the removal or destruction of most microorganisms to render a surface or object safe to handle. It is the first step in the processing of instruments and objects for reuse. All instruments and other medical devices that come into contact with blood or body fluids must be decontaminated immediately after use. See 8.2 for details on the process of decontamination.

- **Cleaning**

This is the second step in processing instruments and other medical devices. It removes foreign materials, which may contain microorganisms from an instrument. Cleaning greatly reduces the number of microorganisms on items and is therefore a crucial step in processing instruments.

If items are not first cleaned, further processing may not be effective because:

- microorganisms trapped in organic materials may be protected and survive further processing; and
- organic materials and dirt can make the chemicals used in some processing techniques less effective.

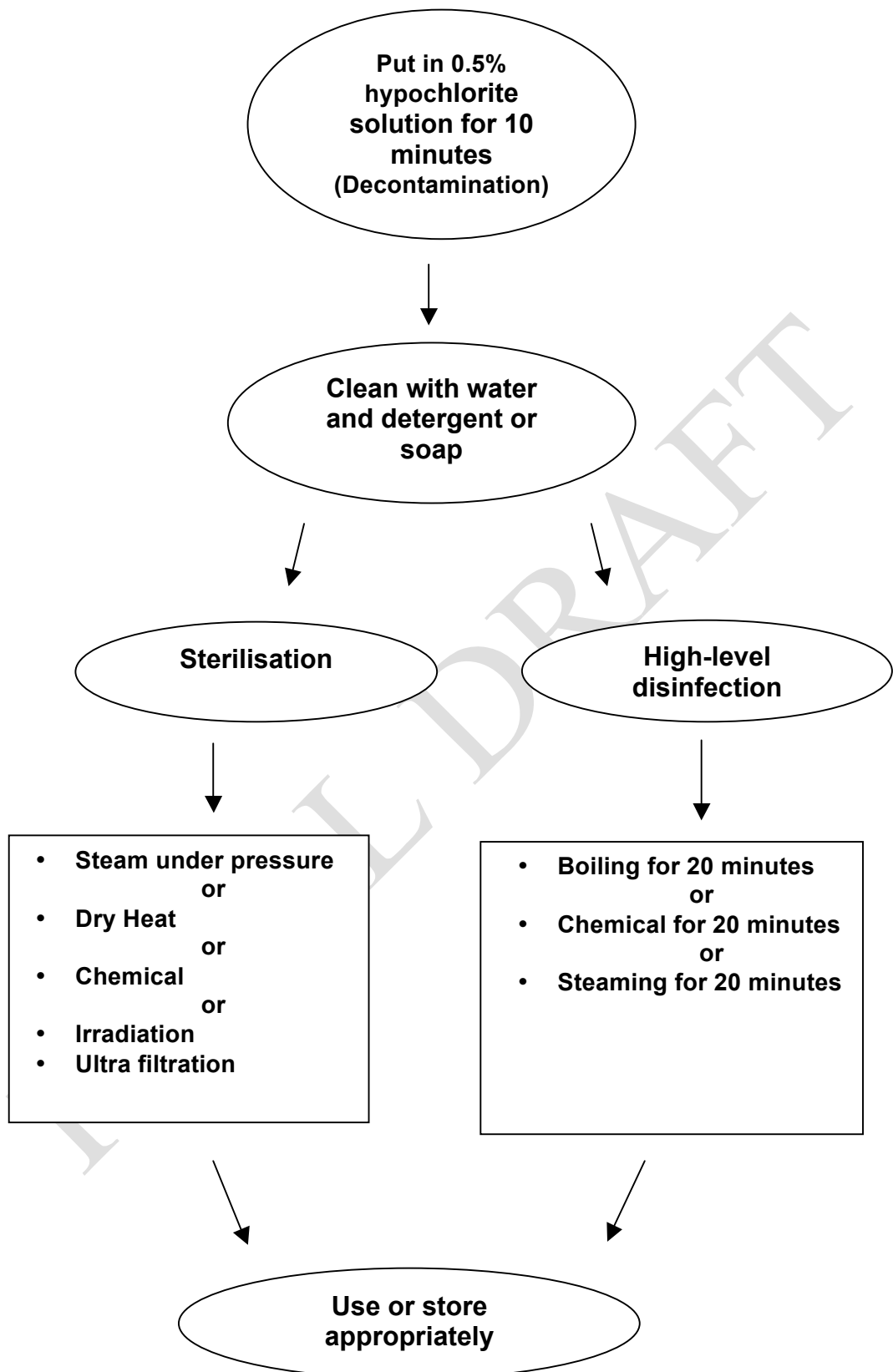
It is important to use detergent in cleaning because water alone will not remove protein, oils and greases.

- **Sterilization**

This is the destruction of all microorganisms including bacteria spores. This is achieved principally by autoclaving.

- **Disinfection**

This refers to the use of chemical or physical agents to eliminate virtually all disease causing microorganisms BUT NOT BACTERIA SPORES on objects and surfaces to a level that is not normally harmful.



*Figure 8.1: Steps in decontaminating, disinfecting and sterilising instruments and other medical devices*

## 8.2 Decontamination of instruments

Use chlorine-based disinfectant or any other approved disinfectant for decontamination. Chlorine-based products are cheap and universally available. **All instruments or medical items should be fully submerged in 0.5% hypochlorite (bleach) solution for 10 minutes.**

A solution that is too weak (less than 0.5% active chlorine) may not adequately kill microorganisms. A solution that is too strong (more than 0.5%) will damage instruments, other items and environmental surfaces, and will also increase the cost of providing services to the health facility.

*Bleach is one of the most widely used disinfectants for preventing infections because it:*

- *kills microorganisms.*
- *is easily available.*
- *is economical.*
- *leaves no poisonous residue and is not poisonous to people in the concentration in which it is used.*
- *is colourless and easy to handle.*

*But it:*

- *bleaches items.*
- *is irritant to skin and mucous membranes.*

### Process of decontamination

- i. After completing a procedure and while still wearing gloves, place all instruments and reusable syringes immediately in bleach solution for 10 minutes then remove instruments from the solution.
- ii. In case of hollow instruments, syringe the instrument three times with the bleach solution and then place it in the solution for 10 minutes.
- iii. Objects like examination or operating tables that come into contact with body fluids must be decontaminated (wiped with 0.5% chlorine solution) before reuse.

*Do not leave items soaking for more than 10 minutes or stored in disinfectant solutions.*

### Preparing 0.5% hypochlorite (bleach) solution

Chlorine solution can be made from:

- liquid chlorine concentrates; and
- chlorine releasing powder or tablet forms.

See appendix 2 for how to calculate or prepare 0.5% chlorine solution

Liquid chlorine and chlorine releasing powder or tablets contain a certain percentage of active (available) chlorine. It is the active chlorine in these products that kill microorganisms. The amount of active chlorine is usually described as a percentage and this percentage differs from one product to another. It is important to know the percentage of active chlorine in any chlorine releasing solution, tablet or powder so that the desired percentage can be prepared. Information on the active chlorine must

always be noted on the container. If the chlorine solution is not in its container or is in powder or tablet form, check with the stores or the pharmacy to find out the amount of active chlorine in the product.

Always read the label and instructions on disinfectant before use.

***Prepared chlorine solution must be discarded after 24 hours whether used or not. You must also change or prepare a new chlorine solution if the solution becomes heavily contaminated with blood or other body fluids or becomes cloudy.***

***(Note: when bleach powder is used, the solution is likely to look cloudy at the start).***

It may be useful to set up a bucket of tap water next to the bucket of decontamination solution in which instruments and other items are soaking. The instruments should be removed from the decontamination solution and placed in the water till staff are ready to clean them.

### **8.2.1 Storage of disinfectants**

- Disinfectants should be stored in accordance with the manufacturer's recommendations.
- The storage area should be restricted to authorized persons only.
- Storage containers should be properly stoppered.
- Do not pour back leftover disinfectants and antiseptics into the holding containers.

### **8.2.2 Preventing contamination of the decontamination solution**

Even though disinfectants are effective in killing microorganisms, their abilities are limited and can easily become contaminated. Disinfectants can become contaminated if:

- the water used to dilute the solution is contaminated;
- the containers in which the solution is placed are contaminated;
- resistant microorganisms from a contaminated item or the service provider's skin come in contact with the solution during use; and
- the area in which solutions are prepared or used is not clean.

Solutions may also become more susceptible to contamination, and less effective when exposed to heat and direct light.

To prevent contamination, use clean water and container, and pour the solution without touching the rim of the container with your hands, a cotton swab, cloth or gauze.

### **8.3 Cleaning of instruments**

Thorough cleaning should always precede disinfection and sterilization of instruments and other medical devices. There are two methods of cleaning. These are

### Manual cleaning

This refers to cleaning of devices with the hands. It must be done with extreme caution by adhering to the following steps:

#### Step 1

- Wear the appropriate utility gloves, plastic apron, face and eye protection when necessary and dismantle all items requiring disinfection or sterilisation before cleaning. Use tap water for the initial washing.
- Using a soft brush, detergent (preferably, the liquid form) and water, firmly brush off all debris, keeping the brush below the surface of the water. Be sure to brush the grooves, teeth and joints of the items where organic materials can collect.

#### Step 2

- Rinse items finally in clean, warm water to remove all detergent. Any detergent left on the items can reduce the effectiveness of further chemical processing. Allow to air dry or dry them with clean towel before disinfection or sterilisation.

***Instruments that will be further processed with chemical solutions must dry completely to avoid diluting the chemicals. Items that will be boiled or steamed do not need to be dried first.***

Decontaminate brush after use by soaking, fully submerged in 0.5% chlorine solution, for 10 minutes. Then rinse clean and dry.

### Mechanical cleaning

- Washing machines, washer-disinfectants and ultrasonicators could be used if they are available.
- Staff must have adequate training on the use of the machines and must follow manufacturer's instructions strictly in operating them.
- If in doubt, seek advice on how to use the machine.

## **8.4 Disinfection**

Disinfection can be achieved by the use of disinfectants and antiseptics.

- Disinfectant – is a chemical agent used to kill or destroy most disease-causing microorganisms on non-living objects such as instruments and surfaces.
- Antiseptic – is a chemical agent safe enough to be used on the skin and mucous membrane to kill or destroy microorganisms.

Disinfectants and antiseptics shall always be used as specified by the manufacturer's instructions to obtain maximum effect. Suggested areas/items and samples of disinfectants and antiseptics that could be used is outlined in Table 3 Examples of commonly used disinfectants and antiseptics in healthcare facilities are in Appendix 3.

**Table 3: Areas/items and sample of disinfectants and antiseptics that could be used.**

- Area Or Item	- Disinfectant	- Antiseptic
- Dirty wound (wound dressing) -	-	- Normal saline - Povidine, - Potassium permanganate -
- Surgical scrub, - skin disinfection -	-	- Povidine, - Chlorhexidine (Hibiscrub), - Chlorhexidine + Cetrimide (Savlon) - 70% Alcohol rub -
- Cleaning blood spillage, - utensils, equipment	- Hypochlorite (bleach) 0.5%	
- Skin	-	- Diguanydes, - 70% Alcohol rub, - Chloroxylenol (dettol)
- Working surfaces	- Alcohol, - Hypochlorite (bleach) + Detergent	
- Floors	- Phenols	
- Chemical sterilisation of endoscopes	- Glutaraldehydes, peracetic	
- Hand washing	-	- Quaternary ammonium compounds, - Detergent
- Serum, - antibiotics preparation, - culture media	- Ultrafiltration	

### **8.5 The role of the Pharmacy Unit in the management of disinfectants and antiseptics**

The pharmacy unit shall be actively involved in the procurement, storage, distribution, preparation and quality control programmes for the appropriate use of disinfectants and antiseptics. **No further dilution of disinfectants or antiseptics shall occur at**

**the point of use.** Where this is not applicable, appropriate instructions on how to dilute the disinfectant shall be provided on the disinfectant container.

The following shall also be applied:

- Officials of the pharmacy shall label all disinfectants and antiseptics appropriately, specifying type, preparation and expiry dates and concentration.

NB: Sterilisation is preferable to high-level disinfection for instruments and other medical devices that will come in contact with the blood stream and tissues under the skin.

- Precautionary signs and measures shall be prominent on all containers.
- Precautions regarding expiry dates of disinfectants and antiseptics shall be strictly adhered to.
- Officials of the pharmacy shall ensure that disinfectants are poured into labelled containers that are clean and dry.

## 8.6 Disinfection of instruments

There are 3 levels of disinfection. These are High, Intermediate and Low levels.

### a. High-level disinfection

This kills all micro-organisms except bacteria spores. High-level disinfection can be done by boiling, steaming and using acids (e.g. peracetic acids) and halogens (e.g. chlorine). (Refer to Appendix 3 for example of disinfectants and Table 3 for areas/items and type of agent to use).

### b. Intermediate level disinfection

This kills mycobacteria, most viruses and bacteria. Intermediate disinfection can be done by boiling for about 10 minutes, using alcohols (70%) and bleach (0.1%) for about 10 minutes. Intermediate disinfection can be used for trolleys, surfaces and skin.

### c. Low-level disinfection

This kills some viruses and bacteria. It does not kill mycobacteria. Examples of agents for low-level disinfection are Cetrimide, Savlon and soap (liquid or cake) or bleach 0.01% for about 10 minutes. An example is hand washing with soap and water. Always follow the manufacturer's instructions.

### 8.6.1 High-level disinfection of instruments

When sterilisation is not available or feasible, high-level disinfection (HLD) could be done. HLD is also the third step in the processing of instruments.

The effectiveness of HLD depends on both the:

- amount and type of microorganisms, organic material (blood, other body fluids, tissue) and other matter present on the instrument or other medical items; and



- extent of protection the item gives the micro-organism (such as whether the item has grooves or other areas in which microorganisms can hide)

It is therefore very necessary to decontaminate and thoroughly clean instruments and other medical devices before HLD.

### **8.6.1.1 Methods of High-Level Disinfection of instruments**

There are three methods of HLD namely, boiling, chemical and steaming. All facilities must have more than one method of sterilisation or HLD available to use as a backup when equipment break down, supplies run out or when electricity is not available.

#### *High-level disinfection by boiling*

Boiling is a simple method of disinfection that can be performed in any location that has access to clean water and a source of heat. Boiling is HLD not sterilisation.

#### **Steps in High-Level Disinfection by boiling**

##### **Steps 1**

- Decontaminate and clean all instruments and other medical devices to be boiled.
- Open all hinged instruments and disassemble those with sliding or multiple parts.
- Place bowls and containers upright, not up side down and fill with water.
- Completely submerge all instruments and other items in the water in the pot or boiler. This is because water must touch all surfaces for HLD to be achieved.
- Cover the pot or boiler and bring the water to a gentle, rolling boil.

##### **Step 2**

- When the water comes to a rolling boil, start timing for 20 minutes. Use a timer or make sure to record the time that boiling begins. From this point on, do not add or remove any water or item to or from the pot or boiler.

##### **Step 3**

- Lower the heat to keep the water at a gentle, rolling boil. This is because, if you boil the water too vigorously the water will evaporate and the items may become damaged if they bounce around the container and hit the sidewalls and other items being boiled. Lowering the heat also saves fuel or electricity.

##### **Step 4**

- After 20 minutes, remove the items using dry high-level disinfected pickups (e.g. lifters, cheatle's forceps).
- Place the instruments or medical devices on a high-level disinfected tray or in a high-level disinfected container that is in the low-traffic area away from insects and dust.

**Note:**

A high-level disinfected tray or container can be prepared by boiling it for 20 minutes or by filling it with a 0.5% chlorine solution and letting it soak for 20 minutes, then draining the chlorine solution and rinsing thoroughly with boiled water.

### Step 5

- Allow to air dry before use or storage. Use items immediately or keep them in a covered, sterile or HLD container for up to one week.

**Note:**

*Never leave boiled items in water that has stopped boiling; they can become contaminated as the water cools down.*

*A white scaly deposit may be left on items that have been boiled frequently and on the pot or boiler. These are lime deposits caused by lime salts in the water. To minimise lime deposits:*

- *Add some vinegar to the water to remove deposits on the inside of the boiler.*
- *Boil the water for 10 minutes to precipitate the lime (to make it come out of the water and settle on the bottom or sides of the boiler instead of on the instruments or other items) before the items are added.*
- *Use the same water throughout the day, adding only enough to keep the items below the surface*
- *Drain and clean out the boiler at the end of each day.*

### High-level disinfection using chemicals

This method is used for heat-sensitive items when heat source is not available. In most health care settings, the only chemicals appropriate for HLD are chlorine and glutaraldehyde gluconate with cetrimide.

### Step 1

- Decontaminate, clean and thoroughly dry all instruments and other medical devices to be processed.

**Note:**

*Water from wet items will dilute the chemical solution thereby reducing its effectiveness. It is therefore very important to dry all items that will be high-level disinfected using the chemical method*

### Step 2

a. ***When using a glutaraldehyde solution (preferably only for endoscopes):***

Prepare the solution according to the manufacturer's instructions; normally the strength is 2% for 20 minutes. Ideally, an indicator strip should be used each time the solution is used to determine if the solution is still effective.

After preparing the solution, put it in a clean container with a lid.

Mark the container with the date the solution was prepared and the date it will expire.

b. ***When using a chlorine solution:***

- Prepare the 0.5% chlorine solution as described for decontamination.
- Fresh solution should be made each day or more frequently if the solution becomes cloudy.
- Put the solution in an HLD container with a lid

### Step 3

- Open all hinged instruments and medical devices and disassemble those with sliding or multiple parts.

- The solution must come into contact with all surfaces in order for HLD to be achieved.
- Completely submerge all items in the solution.
- Place the bowls and containers upright, not upside-down and fill with the solution.
- Cover the container and allow the items to soak for 20 minutes. Do not add or remove any instrument or other items once timing has begun.

#### **Step 4**

- Remove the items from the solution using dry, HLD pickups (lifters, cheatle's forceps).
- Rinse thoroughly with cold sterile water or water that has been boiled for 20 minutes to remove the residue that chemical leaves on items. This residue is toxic to skin and tissues.
- Place the items on a HLD tray or container and allow to air-drying before use or storage. Use items immediately or keep in a covered dry HLD container and use within one week.

#### **High-level disinfection by steaming**

This method is recommended for disinfecting gloves and cannulae. Although gloves may be high-level disinfected by steaming, it is not recommended since it is difficult to dry gloves properly without contaminating them. Whenever possible, use disposable gloves.

#### **Processing other medical devices**

Special considerations must be taken when decontaminating reusable, storage containers, laparoscopes and other instruments used in suction and similar procedures.

#### **Storage containers (e.g. waste bins and buckets)**

- Fill containers (especially those for infectious materials) with 0.5% chlorine solution and soak for 10 minutes.
- Pour out the chlorine solution from the container.
- Rinse, clean and allow to air-dry

#### **Endoscopes (Laparoscopes)**

Do not soak in chlorine solution, since chlorine can damage them. Do not also use alcohols on them as it can fog the lens or dissolve the cement holding the lens in place. The preferred chemicals for disinfecting/sterilising endoscopes are glutaraldehyde 2% and peracetic acid. The procedure for disinfecting/sterilising endoscopes using glutaraldehyde is in Table 4 below.

**Table 4 Procedure for disinfecting/sterilising endoscopes using glutaraldehyde**

<b>Step 1</b>	<ul style="list-style-type: none"><li>• Immediately after use, gently wipe the laparoscope and fibre optic light source, and cables and plastic tubing with luer-lock with a cloth soaked in 60-90% ethyl or isopropyl alcohol to remove all blood and organic material.</li></ul>
<b>Step 2</b>	<ul style="list-style-type: none"><li>• Completely disassemble the laparoscopic equipment.</li></ul>
<b>Step 3</b>	<ul style="list-style-type: none"><li>• Place disassembled parts in clean water and mild non-abrasive detergent (e.g. liquid soap).</li></ul>
<b>Step 4</b>	<ul style="list-style-type: none"><li>• Wash all outer surfaces using a soft cotton cloth.</li></ul>
<b>Step 5</b>	<ul style="list-style-type: none"><li>• Clean inner channels with a cleaning brush supplied with the kit. Use a rotating motion to remove particles (organic material) in the narrow channels. Be careful not to forcibly push the brush against the close end of the inner tube as this may damage it.</li></ul>
<b>Step 6</b>	<ul style="list-style-type: none"><li>• Rinse all parts thoroughly with clean water (running water or from a basin). Use the brush to remove detergent and particles from the inner channels.</li></ul>
<b>Step 7</b>	<ul style="list-style-type: none"><li>• Dry equipment with a clean soft cotton cloth or air-dry.</li></ul>
<b>Step 8</b>	<ul style="list-style-type: none"><li>• Clean lens at least weekly, and more often as needed. Do not touch the lens with fingers.</li></ul>
<b>Step 9</b>	<ul style="list-style-type: none"><li>• High-level disinfect (for 20 minutes or sterilise overnight) or if not needed immediately, carefully store in instrument container after cleaning and drying for next use.</li></ul>

### **8.7 Sterilisation**

Sterilisation refers to the destruction of all microorganisms including bacteria spores. Sterilisation of instruments, equipment, culture media, solutions and biohazard materials shall be achieved by one of the following methods:

- autoclaving (Steam under pressure) at 121°C for 15 mins or 134°C for 4 minutes.
- dry heat at 160<sup>0</sup> C or higher for 1 hour – (Hot air ovens).
- large-scale irradiation systems e.g. Gamma irradiation.
- ethylene oxide sterilization systems.
- chemical treatments like glutaraldehyde / peracetic acids for endoscopes.
- ultra filtration e.g. cellulose membrane for purifying antibiotics.

The method of sterilisation chosen depends on the type of item, porosity, infectious nature of the materials and the load size. **Users are encouraged to periodically verify sterility of items by using autoclave tapes.** Health workers shall be trained on the correct use of all sterilization equipment. If in doubt about the use of any machine, seek advice on how to use the equipment. When using hot oven the timing starts after reaching 1600 C.

All healthcare facilities shall have autoclaves and / or access to Central Sterile Supply Department (CSSD) services and should have quality control systems in place.

FINAL DRAFT

## SECTION 9 ENVIRONMENTAL MANAGEMENT OR CONTROLS

Environmental controls are practices that are performed to render the health care facility environment safe from infections or reduce infections to the barest minimum. It includes cleaning and disinfection of surfaces and other items in the health care facility and the appropriate design of health facilities. This section deals with cleaning and disinfection of surfaces. Section 20 addresses issues regarding facility design.

Environmental cleaning is the process that physically removes foreign materials that may contain microorganisms from an object or surface.

***Thorough cleaning and drying will remove most organisms from a surface. Cleaning is normally accomplished by the use of water, mechanical action and detergent. It may be manual or mechanical (e.g. vacuum cleaner).***

### 9.1 General cleaning guidelines

Although certain areas of the facility require special cleaning, the following guidelines apply to health care facilities. Health care facilities shall provide a clean environment by following these procedures and using approved agents for cleaning:

- Cleaning could be manual or mechanical.
- Clean and disinfect surfaces that are likely to be contaminated with pathogens that are touched frequently such as bed rails, bed tables, door knobs, light-switches frequent compared to other surfaces such as walls that are not touched.
- All housekeeping staff shall have regular in-service training (Refer to GHS Structured In-Service Training document)
- All ward/unit supervisors shall draw up cleaning schedules for the different areas of the ward/unit. These shall be posted at vantage points where all staff responsible for housekeeping can see and closely follow;
- Housekeeping staff shall wear gloves, (heavy duty/domestic utility gloves) plastic aprons, masks (where applicable) and protective shoes when cleaning client-care areas.
- Use a damp or wet mop or cloth for walls, floors and surfaces instead of dry dusting or sweeping to reduce the spread of dust and microorganisms.
- 



- Scrubbing is the most effective way to remove dirt and microorganisms. Scrubbing should be applied in areas such as the bathroom.
- Wash surfaces from top to bottom so that debris falls to the floor and is cleaned up last. Clean the highest fixtures first and work downwards. For example, clean ceiling lamps, then shelves, then tables and then the floor.
- Change cleaning solutions whenever they appear dirty. A solution is less likely to kill infectious microorganisms if it is heavily soiled.

- Use separate equipment (brushes and cloths) for high risk areas which are likely to be contaminated example, toilets)

## 9.2 Cleaning Patient-Care areas

These areas include operating theatres, procedure rooms, laboratories, wards, injection rooms, detention rooms, toilets and sluice rooms. In these areas there is a greater potential for contamination with infectious materials for both clients and staff. Such areas must be cleaned with special care using a disinfectant cleaning solution.

In addition to the above general guidelines on environmental cleaning, the following should be applied:

- Wear appropriate protective clothing if spraying is to be done or if splattering is likely to occur.
- Sweep all patient care areas with sweeping brush and mopped.



- Mop floors thoroughly and clean with disinfectant solution daily and as required.
- Damp-wipe countertops, tables, trolleys and floors with water and detergent to remove dust that has accumulated at the beginning of each work day.
- Clean operating and procedure rooms, examination tables, trolleys, countertops and any other potentially contaminated surface with cloth dampened with a disinfectant cleaning solution in-between clients.
- Clean spills of blood or other body fluids immediately.

### Toilets and sluice rooms

These areas are usually heavily contaminated and should be cleaned as often as possible with a disinfectant cleaning solution and in accordance with a cleaning schedule. Use a separate set of cleaning equipment and supplies to clean these areas.

## 9.3 Cleaning spills of blood and body fluids on surfaces.

Clean up spills of potentially infectious materials immediately. Besides preventing the spread of infections, prompt removal also prevents accidents.

- Staff cleaning spills must wear appropriate protective clothing.
- Standard cleaning equipment including a mop and cleaning bucket plus cleaning agents should be readily available for spills and should be stored and sign-posted in an area known to all staff.
- Procedure for spill management will depend on the following:
  - Nature of the spill, e.g. blood, urine and faeces.
  - Possible pathogens that may be involved.
  - Size of the spill i.e. spot, splash, puddle, large spill.
  - Type of surface involved i.e. linoleum, carpet, wood, laminated etc.

- Area involved i.e. preparatory laboratory, teaching, common access areas, etc.
- Likelihood of bare skin contact with the soiled area.
- For a small spill, disinfect using a disinfectant cleaning solution and clean.
- For a large spill, flood with disinfectant, mop and clean the area with disinfectant cleaning solution and allow to air dry.
- If the spill is a large spill of cultures or concentrated infectious materials, cover with (0.5% chlorine) solution, clean and then disinfect it again with fresh disinfectant, clean and allow to air dry.
- Do not place a rag over the spill for cleaning up later, someone could easily slip and fall on it.
- Supplies and equipment used for cleaning must be cleaned. Equipment such as mops, buckets, and cloths should be decontaminated with a disinfectant (0.5% chlorine) solution, cleaned with detergent and water, rinsed in clean water and dry before reuse.

#### **9.4 Cleaning non-patient-care areas**

In areas of the facility where clinical services are not provided and processing of instruments and other items does not occur such as the kitchen and administrative spaces, the risk of infections is generally minimal. Routine domestic cleaning is usually satisfactory. These areas shall be cleaned with a cloth or mop dampened with detergent and water daily, or when visibly dirty. Carpeted areas shall be vacuum-cleaned daily and as required. Should contamination occur in these areas, appropriate cleaning practices shall be done as for patient /client care areas.

#### **9.5 Terminal cleaning/cleaning after discharge**

The following additional activities shall be carried out during terminal cleaning or cleaning after discharge:

- Disinfect beds, lockers and cupboards and other items in the room using low-level disinfection.
- Change all linen.  
Disinfect plastic covering of pillows and mattresses and air-dried for at least an hour before the next admission.

#### **9.6 Types of cleaning solutions**

Three kinds of cleaning solutions are normally used during housekeeping in health care facilities. It is essential that housekeeping staff know and understand the different types of solutions and how each should be used.

- **Detergent or plain soap and water**  
This is used for low-risk areas (non-patient care areas) and general cleaning tasks. Detergent removes dirt and organic material and dissolves or suspends grease, oils and other matter so it can easily be removed by scrubbing.
- **Disinfectant solution (0.5% hypochlorite solution)**  
Disinfectants rapidly kill or inactivate infectious microorganisms during the cleaning process. Disinfectants are also used to decontaminate an area (flooding) so that it is safer to clean with a disinfectant cleaning solution. In most settings, a 0.5% 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.

- **Disinfectant cleaning solution**

This solution contains a disinfectant, detergent and water. It is used for cleaning areas that may be contaminated with infectious materials such as operating theatres, procedure rooms, toilets and sluice rooms. The disinfectant rapidly kills or inactivates infectious microorganisms during the cleaning process, while the detergent removes dirt and organic materials which cannot be done by water or disinfectant alone. Instructions on how to prepare a disinfectant cleaning solution is provided below.

#### **How to make a disinfectant cleaning solution**

##### **Step 1**

Prepare a 0.5% chlorine solution or obtain any disinfectant that contains 5% carbolic acid.

##### **Step 2**

Add some liquid or powdered detergent or soap and mix. Continue adding detergent until the solution becomes mildly foamy or bubbly.

##### **NB:**

*Chlorine solution should never be mixed with cleaning products containing ammonia, ammonium chloride or phosphoric acid. Combining these chemicals will result in the release of a chlorine gas which can cause nausea, eye irritation, tearing, headache and shortness of breath. These symptoms may last for several hours.*

## **SECTION 10 HANDLING LINEN, FOOD AND DRINKS**

### **10.1 Processing linen**

Processing linen consists of all the steps required to collect, transport, sort, launder (wash, dry and fold or pack), store and deliver clean linen for client care. Health care facilities may launder their soiled or dirty linen in-house or contract it out to companies that have specialized in this work. Regardless of where the soiled/dirty linen is processed, the following infection prevention and control recommendations must be applied.

The principles of linen handling and storage are based on ‘clean management’ as opposed to sterile. In handling linen the following must be observed:

- All laundry units must have:
  - Separate area must be provided in the laundry unit for sorting dirty/soiled linen, folding and storing clean linen.
  - Adequate ventilation (6 to 10 air change per hour) and physical barriers (walls) between the clean and soiled linen areas.
  - Sufficient tubs, preferably stainless steel, for the separation and soaking of used and soiled linen
- Laundry staff must be trained and should follow manufacturer’s recommendation with regard to the use of equipment and products.
- All laundry staff should be trained on guidelines for handling linen and how to use laundry equipment and logistics.
- Health care facility managers and supervisors should ensure that there are adequate numbers of linen for use in the different sections. Remember that all used linen are potentially infectious and must be handled with care.
- Standard precautions should be observed when handling all laundry. Always wear utility gloves and appropriate protective clothing (minimum heavy-duty utility/household gloves, goggles, apron and boots) when handling used linen.
- Linen should be handled as little as possible and with minimum shaking to prevent the spread of micro-organisms in the environment.
- All health care facilities should develop procedures for laundering client’s personal clothing.
  - All units/wards should have separate linen bags for “used” and “soiled” linen and laundry.
  - The bags should be appropriately labelled.



**Figure 10.1:** *Examples of Linen Bags*

### 10.1.1 Laundry procedures

#### *Collecting and sorting of linen*

- Place soiled linen in impervious (leak-proof) bags immediately on the unit/ward and transported to the laundry unit.

**Note:**

*The storage time for soiled linen before washing is related to practical issues, such as available storage space and aesthetics and not necessarily to infection prevention and control concerns.*

- Soiled linen should be placed in a linen bag or containers with lids or covered carts marked “soiled” and be well secured. Transportation of soiled linen should be done using any available means of transport that will prevent contact with the carrier’s body.
- Sorting of soiled linen must be done at the laundry unit and not on the ward with the personnel wearing all appropriate protective clothing.
- Do not let soiled linen come into contact with your clothes and do not sort in patient care areas.
- Health workers should not carry wet, soiled linen close to their bodies even if they are wearing a plastic or rubber apron.

#### ***Laundering (washing) linen***

The laundering process is designed to remove organic soil and render the linen incapable of causing disease. No microbiology standards exist to define "safe" levels of bacteria in textiles because of the variability in microbial survival, degree of soiling, specific laundering techniques, fabric content, and ability of various

organisms to adhere to certain fabrics. Guidelines for the different methods of washing linen are provided in Table 5.

**NOTE:**

Decontamination of linen, as in decontamination of medical devices (e.g. instruments) is impractical and often ineffective and so must be avoided because:

- The 0.5% chlorine is too strong for most fabrics.
- Repeated soaking of linen in chlorine, even if diluted, will cause the fabric to deteriorate more quickly.

If required, heavily soiled linen could be pre-soaked in soap, water and bleach solution before hand washing. The best protection for health workers responsible for hand washing linen is the use of the appropriate PPE.

**Table 5: Guidelines for washing linen**

<i>Hand Washing</i>	<i>Machine Washing</i>
<p>Step 1</p> <ul style="list-style-type: none"> <li>• Wash soiled linen separately from dirty linen.</li> </ul>	<p>Step 1</p> <p>Wash heavily soiled linen separately from non-soiled linen.</p>
<p>Step 2</p> <ul style="list-style-type: none"> <li>• Wash the entire linen in water with liquid/cake/powered soap to remove soiled materials.</li> <li>• Use warm water if available.</li> <li>• Add bleach (e.g., 30–60 ml, about 2–3 tablespoons, of a 5% chlorine solution) to washing solution aid cleaning and bactericidal action.</li> </ul>	<p>Step 2</p> <ul style="list-style-type: none"> <li>• Adjust the temperature and time cycle of the machine according to manufacturer’s instructions and the type of soap or other washing product being used.</li> <li>• Both cold and hot water washing cycles that include bleach reduce bacterial counts in the linen.</li> </ul>
<p>Step 3</p> <ul style="list-style-type: none"> <li>• Check the item for cleanliness. Rewash if it is dirty or stained.</li> </ul>	<p>Step 3</p> <ul style="list-style-type: none"> <li>• When the wash cycle is complete, check the linen for cleanliness.</li> <li>• Rewash if it is dirty or stained. (Heavily soiled linen may require two wash cycles.)</li> </ul>
<p>Step 4</p> <ul style="list-style-type: none"> <li>• Rinse the item with clean water.</li> </ul>	

***Drying, checking, folding, storage and transportation of linen***

The procedure is the same for both hand and machine washed linens.

- Completely air or machine dry before further processing.
- Air-dry in direct sunlight, if possible, keeping the fabric off the ground, away from dust and moisture.
- After linen are totally dry, check for holes and threadbare areas. If these are present, the item must be discarded or repaired before reuse or storage.

- Clean and dry linen should be ironed as needed and folded. If sterile linen is required, prepare and sterilize wrapped packs.
- Once processing is complete, the clean linen should be handled as little as possible, wrapped with wrapping paper or cloth to prevent contamination and stored in a covered area.
- Clean linen should be transported in carts that are used for clean linen only and should be covered in a manner which will prevent contamination.
- Wrapped linen that has been opened should be placed on the front of the shelf and used first.
- Linen which has been stored for long periods should be inspected and when found to be dirty must be reprocessed before using.

#### Laundering Clients clothing

- Where relations or patients have to launder their clothing, the area where this should be done must be provided.
- Persons who collect or handle these clothing should be trained to wear the appropriate protective equipment.
- **Never leave clothing on the floor.**
- Other principles for handling linen do apply to the laundering of clients clothing.

#### **10.1.2 Protection of laundry workers**

- Workers shall protect themselves from potential cross-infection from soiled linen by wearing appropriate personal protective equipment, such as gloves and gowns or aprons, when handling soiled linens.
- Utility gloves shall be washed after use, allowed to air dry, and discarded if punctured or torn.
- Hand washing facilities should be readily available.
- Personnel should wash their hands whenever gloves are changed or removed.
- Staff in care areas needs to be aware of sharps when placing soiled linen in bags.
- Workers are at risk of contaminated sharps, instruments or broken glass that may be contained with linen in the laundry bags.
- All staff, including laundry workers shall be trained in procedures for handling of soiled linen.
- Laundry workers, as other health care workers, shall be offered immunization against Hepatitis B.

#### **10.2 Handling food and drinks**

Food and drinks shall be handled in such a manner as to prevent contamination and infections. Storage of food and drinks should conform to standards set by the Catering Unit of the GHS.

*(Refer to Standard Management Procedure Manual for Catering Services).*

- All food service staff should comply with guidelines on standard precautions.
- They should all follow established dress codes and use appropriate barriers when preparing, transporting and serving food;
- Hand washing is mandatory before and after handling food and equipment.
- No eating, drinking or smoking is permitted in food preparation area;

- Staff with communicable diseases- skin infections, respiratory infections and or gastrointestinal infections should not work in food handling units until they are cleared by a physician to resume work;
- Food borne or suspected food-related illness in employees or client should be reported to the IPC nurse for it to be investigated;
- Cleaning, dishwashing and disinfection procedures should be strictly followed and monitored;
- Public eating areas should be maintained in a sanitary condition.
- Vending companies should clean their machines and ensure the safety of food products. These machines must be monitored for cleanliness and reports of compliance provided to the appropriate authority; and
- Commercially prepared foods should be inspected for expiry dates and for other signs of deterioration and if found to be unwholesome must be discarded.
- Health care facility managers must ensure that all food vendors (sellers) in and around the health care facility comply with the guidelines on handling of food by the District Assemblies.

#### **Refrigeration**

- Where required, separate refrigerators for food, specimens and medicines should be kept. These must be labelled to indicate the purpose for which it must be used.
- A log should be maintained to monitor weekly temperatures, cleaning schedule and routine inspection of contents.

**Under no circumstance should food and medicines be stored in the same refrigerator.**

## SECTION 11 INJECTION SAFETY AND HANDLING OF SHARPS

Exercise caution when handling all used needles, syringes and other sharps like scalpels, blades, scissors, lancets, broken glass, etc.

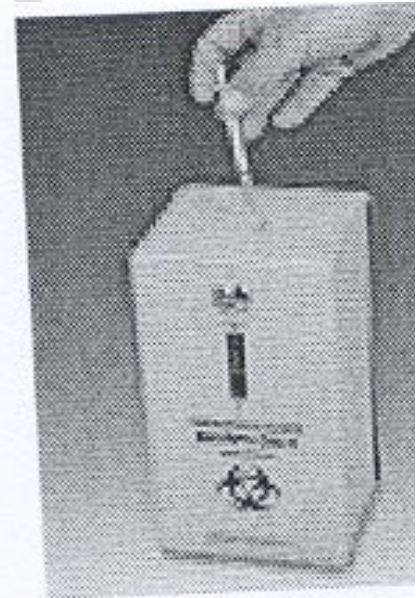
### 11.1 General guidelines for handling used syringes and needles

The following guidelines shall apply when handling sharps:

**NOTE:**

***All waste management practices shall comply with GHS Policy and Guidelines on Health Care waste management.***

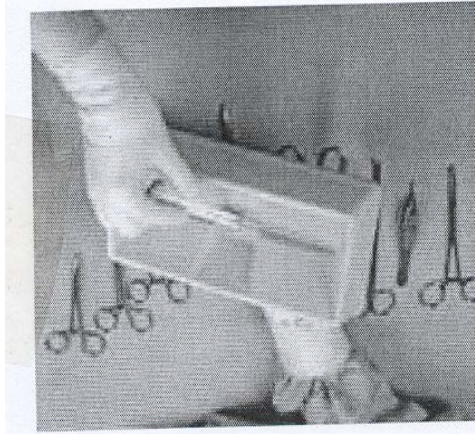
- Do not recap, bend, break or remove used needles from syringes. Where it is absolutely necessary to recap use the “**one hand technique**” or use toothed dissecting or artery forceps  
(*See below for the hands free technique*).
- Dispose of used needles and syringes into the appropriate sharp container after use.
- Sharp containers must be:
  - Rigid and puncture-resistant.
  - Sealed on all sides and must have a one-way lid opening system.
  - Tamper proof.
- Label all sharp containers appropriately with the international biohazard symbol.
- Do not recycle disposable needles and syringes.
- Sharps must be segregated at the source of generation.



### 11.2 Passing sharps

When passing sharps, uncapped or otherwise, unprotected sharps should never be passed directly from one person to another. In the operating theatre or procedure room, pass sharp instruments in such a way that the surgeon and assistant are never touching the item at the same time. This way of passing sharps is known as the “**hands-free**” technique:

1. The assistant places the instrument in a sterile kidney basin or in a designated “safe zone” in the sterile field.
2. The assistant tells the service provider that the instrument is in the kidney basin or safe zone.
3. The service provider picks up the instrument, uses it, and returns it to the basin or safe zone.

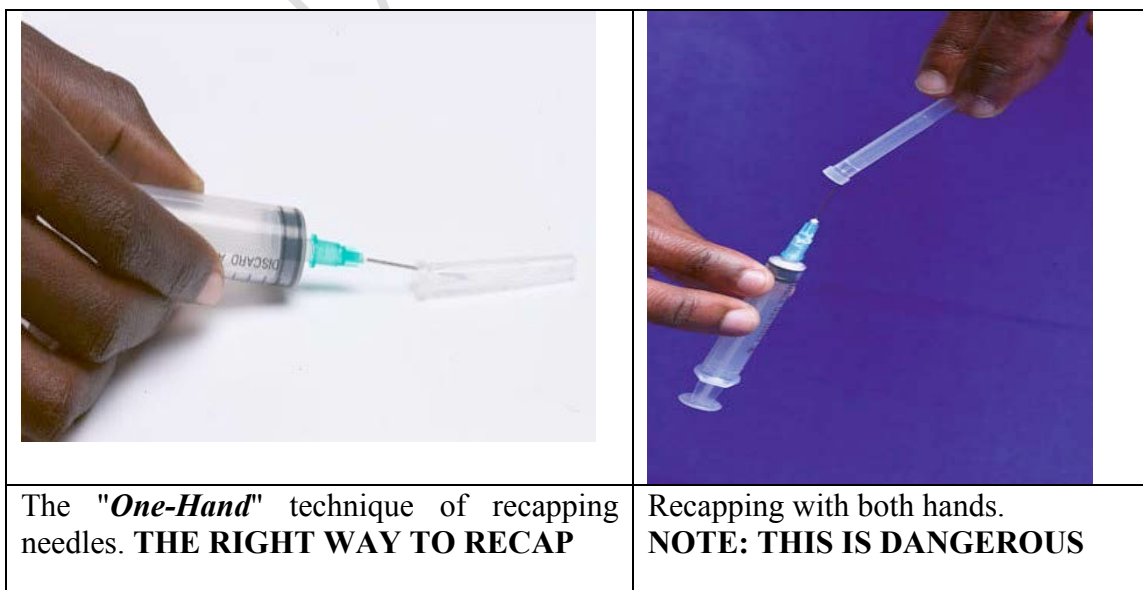


When giving injections:

- Unexpected client motion at the time of injection can lead to accidental needle sticks. Many needle-sticks occur when children or adults move unexpectedly.
- Therefore, always prompt clients when you are about to give them an injection.
- Restrain children gently and securely in the lap of an adult with arms and legs held
- Assess the mental condition of bed-ridden patients and ask a co-worker to help restrain adult patients who may be confused

### 11.3 Recapping: The "One-Hand" Technique

Recapping is a dangerous practice. Sharps injuries are responsible for about 2.5% of HIV among health care workers and contributes 30% of new cases of HBV among health care workers annually. Many accidental needlesticks occur when health workers are recapping needles using both hands. See Figure 11.1 below.



*Figure 11.1 Recapping of needles*



If at all possible, dispose of needles immediately without recapping them. If it does become necessary for you to recap a needle (for example, to avoid carrying an unprotected sharp when immediate disposal is not possible), do not bend or break the needle and do not remove a hypodermic needle from the syringe by hand. To safely recap needles, use the "one-hand" technique. (See Figure 11.1)

**Step 1**

Place the cap on a flat surface, then remove your hand from the cap.

**Step 2**

With one hand, hold the syringe and use the needle to "scoop up" the cap.

**Step 3**

When the cap covers the needle completely; use the other hand to secure the cap on the needle hub. Be careful to handle the cap at the bottom only (near the hub).

FINAL DRAFT

## SECTION 12 HEALTH CARE WASTE MANAGEMENT

### 12.1 Introduction

Clinical and related waste is defined as waste generated in health care institutions, e.g. waste generated during investigation or treatment of patients or in research studies. Health care waste includes all solid and liquid waste (both hazardous and non hazardous). Management of clinical and related waste shall conform to the health care waste management policy of the Ministry of Health.

All staffs have a responsibility to manage waste in a manner that poses minimal hazard to patients / clients, visitors, staff and the community. Proper handling of waste minimizes the spread of infections and reduces the risk of accidental injuries. It helps provide an aesthetically pleasing atmosphere and reduces unpleasant odour. It also prevents the attraction of insects and other animals to the facility and reduces the likelihood of contamination of the soil or ground water with chemicals or microorganisms.

Healthcare waste carries a higher risk of infection and injury than any type of waste. The greater part of waste generated by health institutions (75% - 90% of all waste) is not hazardous and can be managed like household waste. The remaining 10-25% is hazardous and requires special arrangement from the management of the facility.

### 12.2 Classification of healthcare waste

Healthcare waste can be classified as follows:

#### **General or normal waste**

- This is similar to domestic waste. It is not harmful. Examples are waste from the hospital kitchen/canteen, sweepings from offices i.e. paper, cardboard, plastics, etc.

#### **Infectious waste**

- **Infectious Waste:**  
Waste generated by inpatient and outpatient activities that are likely to contain harmful organisms. Examples of infectious waste are blood and body fluids, and laboratory waste.
- **Sharps:**  
These are sharp-edged waste with puncturing and / or cutting properties. Examples are needles, syringes, blades and broken vials. They may be infectious when contaminated with blood or body fluids. They are also likely to cause injuries.
- **Pathological Waste:**  
This type of waste includes body parts, placenta, tissues from surgery, birth, etc. They are potentially infectious.

#### **Toxic waste**

- **Pharmaceutical waste:**  
These are chemical wastes that are normally generated in the provision of pharmaceutical services. Examples are expired drugs and vaccines and left over drugs.

- **Electronic Waste**  
e.g. X-ray machines, Films, Computers, Ultra-Sound Scans etc
- **Radioactive Waste**  
e.g. Radionuclides etc

### 12.3 Principles of Health Care Waste Management

The principles are:

- The “**Polluter Pays**” principle  
This implies that all generators of waste are legally and financially responsible for the safe and environmentally sound disposal of the waste they produce;
- The “**Precautionary**” principle  
This is concerned with the adaptation of measures to protect health and safety when the magnitude of the particular risk posed by the waste is uncertain;
- The “**proximity**” principle  
This principle demands that waste be disposed of at the closest possible location to its source in order to minimize the risks involved in transportation;
- The “**Duty of Care**” principle  
This stipulates that any person handling or managing hazardous substances or related equipment is ethically responsible for applying the utmost care; and
- **Prior informed consent principle** (cradle to grave control):  
All parties involved in the generation, storage, transportation, treatment and disposal of hazardous waste should be licensed or registered to do so. Only licensed organisations and sites must be allowed to receive and handle these wastes.

The ultimate responsibility for ensuring that waste is disposed off lies with the person or institution that generates the waste. Health care institutions are therefore responsible for the waste that is generated by their activities and are required to take practical steps to ensure their separation, storage, treatment and safe disposal.

### 12.4 Components of health care waste management

A healthcare waste management system comprises of the following components:

- Collection and segregation.
- Transportation
- Storage.
- Treatment.
- Final disposal.

Health care waste management will be discussed under these components.

#### 12.4.1 Collection and Segregation

Different types of waste require different methods of disposal. It is therefore important that healthcare waste is segregated into various categories for effective disposal. Segregation should be at the source of generation. Example, each type of waste must be placed immediately in its appropriate colour-coded container.

### General Requirements for waste containers

Containers for collecting waste should meet the following requirements:

- They should be non transparent.
- They should be impervious.
- They should be leak proof.
- They should have close fitted lids.
- They should have sufficient strength to prevent easy damage during handling or use.

Table 6 and Figure 12.1 below show the approved colour-codes for the different types of waste containers.

**Table 6 Colour-coding of healthcare waste containers**

Category	Container and Colour code
General Waste	Black plastic bags and/or bins
Sharps	Yellow puncture resistant containers
Other Infectious Waste	Yellow plastic bags and or bins
Pharmaceutical and chemical containers	Brown plastic bags and or bins



**Figure 12.1 :**            **Colour-coded bins**

**BINS WILL BE COLOUR-CODED APPROPRIATELY and labelled**

#### 12.4.2 Storage

Storage takes place from the time of generation of waste until collection for final disposal. There are two types of waste storage—internal and external.

### ***Internal waste storage***

This is temporary placement of waste at the point of generation (e.g. consulting room and injection room) before being sent to external storage sites.

The following shall apply to internal waste storage:

- Do not store healthcare waste at the temporary sites for more than 24 hours.
- Empty waste bins /containers daily or when two thirds full (whichever comes first) but discard sharp containers.
- Every unit or ward in the health care facility should be provided with adequate numbers of appropriate waste bins.
- Once you drop waste in the container, do not put your hands to remove anything from the container.
- Waste bins should be covered and placed in areas protected from rain, pests, etc.
- Waste containers used should be cleaned and disinfected after emptying.

### ***External waste storage***

This refers to the site where waste is stored after removal from internal storage area until it is collected for final disposal. Guidelines for external waste storage are as follows:

- External storage areas for health care waste should be sited away from the reach of the general public.
- The storage site should be enclosed and provided with gate and locked.
- The floor should be smooth, impervious and easy to clean.
- Do not allow access to the storage sites by unauthorized human beings and animals.
- Waste bins should be washed and disinfected after each collection and more frequently if required.

### **12.4.3 Transportation**

Healthcare waste must be transported directly to disposal or treatment site within the shortest possible time. Vehicles (e.g. wheelbarrow) used for transportation (internally or externally) should be such as to prevent scattering of waste, odour and be leak-proof.

### **11.4.4 Treatment**

The recommended treatment options are:

- Incineration
- Sterilisation by Autoclave or Dry Heat: and
- Chemical Disinfection.

## 12.4.5 Final disposal

### 12.4.5.1 *Disposal of solid waste*

Proper treatment and disposal of healthcare waste is necessary to ensure that its impact on health workers, waste collectors, public and the environment is minimized or eliminated. The best disposal methods for treated health care waste are controlled disposal at proper sanitary landfill and burial. General waste should be treated as domestic waste and disposed of at landfill sites. Sharps, pharmaceutical as well as pathological waste must be incinerated.

#### NOTE

- *Ideally, final disposal must be by incineration.*
- *Final disposal could also be by burning or burying in well-fenced pits in facilities where incinerators are not available.*

### 12.4.5.2 **Disposal of liquid waste**

Disposal of liquid waste should be handled with utmost care to avoid splashing the waste on oneself, others or on the floor and other surfaces. The following should serve as a guide:

- Carefully pour liquid waste down a sink dedicated for the purpose, drain, water closet or latrine. If this is not possible, bury it in a pit along with solid waste.
- Rinse the sink, drain or toilet thoroughly with water to remove residual waste, still avoiding splashing.
- Clean these areas with a disinfectant cleaning solution at the end of each day or more frequently if heavily used or soiled.
- Decontaminate the containers that held the liquid waste by filling with or soaking it for 10 minutes in a 0.5% chlorine solution before washing.
- Wash your hands after handling liquid waste and decontaminate and wash gloves.

### 12.4.5.3 **Other waste**

- Placenta or body parts should be incinerated or buried in a safe area;
- Chemical wastes should be treated as for liquid waste; and
- Genotoxics should be disposed of in consultation with experts.

Health workers who handle waste should be provided with protective clothing. These include:

- Heavy duty gloves;
- Overalls;
- Eye protection (goggles);
- Face masks; and
- Helmets (if applicable).

Housekeepers and cleaners should have a thorough understanding of issues relating to health care waste management as other health care professionals since they all perform some aspects of waste management. Supervisors and administrators who make decisions about waste management practices and procurement of items related to it should also be familiar with this section.

FINAL DRAFT

## SECTION 13

### SAFE INJECTION PRACTICES

These are practices which when complied with render injections safe.

#### 13.1 Injection safety guidelines

##### 13.1.1 Medication

- Perform hand hygiene prior to handling all parenteral material.
- Follow manufacturer's guidelines for expiration date, storage, use, and disposal of pharmaceuticals
- Use aseptic technique to avoid contamination of sterile injection equipment.
- **DO NOT** administer medications from a syringe to multiple patients, even if the needle or cannula on the syringe is changed
- Inspect the syringe and needle package for breaks. Discard syringe and needle if the package has been punctured, torn, damaged by exposure to moisture, or if it has expired
- Check the vial to be sure there are no leaks or cracks.
- Check the solution to be sure it is not cloudy and that there is no particle in it.
- Wipe the top of the vial with a fresh cotton swab soaked with 60-70% alcohol, and allow it to dry.
- Use a sterile, single-use disposable syringe and needle for each injection and discard intact in an appropriate sharps container immediately after use.
- Use aseptic technique to avoid contamination of sterile injection equipment and medications.
- Prepare each injection in a designated clean area where blood and body fluid contamination is unlikely.
- Discard syringe and needle in a puncture-resistant, leak-proof container if contaminated during the medication preparation.
- Use single-dose medication vials, pre-filled syringes, and ampoules when possible.
- **DO NOT** administer medications from single-dose vials to multiple patients or combine leftover contents for later use.
- Never leave one needle inserted in the vial cap or infusion bag for multiple uses as this increases the risk of contamination of the fluid between each use.
- Most medicines especially, antibiotics are unstable when constituted and should not be stored for long. It is therefore recommended that staff consult the production literature or the Pharmacist of the institution on storage after constitution.
- Needles, cannulae and syringes are sterile, single-use items; they should not be reused for another patient or to withdraw a medication or solution that might be used for a subsequent patient.
- Use fluid infusion, and administration sets (giving 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.
- Use single-dose vials for parenteral medications whenever possible.



- If using an ampoule that requires a metal file to open, protect fingers with a clean barrier (e.g., small gauze pad) when opening the ampoule.
- **Not more than one** vial of a multi-dose medication should be opened at a time in each patient care area.
- **NEVER** re-enter a vial or infusion bag with a needle or syringe used on a patient even if for the same patient.
- As much as possible, **DO NOT** use bags or bottles of intravenous solution as a common source of supply for multiple patients.
- Use sterile syringe and needle, and sterile diluent to reconstitute medication.
- For medications requiring reconstitution, add a label, which must include:
  - Date and time of preparation
  - Type and volume of diluent (if applicable);
  - Final concentration;
  - Expiry date and time;
  - Name of and signature of the person reconstituting the drug.
- For medications that **DO NOT** require reconstitution, add a label, which must include:
  - Date and time of first piercing the vial;
  - Name and signature of the person first piercing the vial.
- Discard multi-dose vials:
  - If sterility or content is compromised;
  - At expiry date/time;
  - Without antimicrobial preservatives within 24 hours of opening;
  - With antimicrobial preservatives according to the manufacturer's recommended expiration date on the vial;
  - All undated, improperly stored multi-dose vials inadvertently contaminated are perceived as contaminated immediately upon discovery regardless of expiration date.

### 13.1.2 Multi-dose ampoules

Use of multi-dose ampoules poses a serious risk of infection. As much as possible use single-dose ampoules or where practicable discard multi-dose ampoules after single use.

#### When giving injections:

- Unexpected client motion at the time of injection can lead to accidental needle sticks. Therefore, always prompt patients/clients when you are about to give them an injection;
- To protect patients/clients, always use proper client preparation when giving an injection; and
- Use appropriate PPE for insertion of catheters or injection of material into spinal or epidural spaces via lumbar puncture procedures e.g. myelogram, spinal or epidural anaesthesia.

## **SECTION 14 OCCUPATIONAL HEALTH AND SAFETY**

### **14.1 Introduction**

It is the responsibility of the Ministry of Health to ensure the safety of all staff whilst at work. Individual staffs also have the responsibility to take reasonable care for the health and safety of themselves and other people who may be affected by their acts or omissions at work. Team Leaders/Supervisors by acting as role models will be able to influence the practice of others.

Health care workers should be protected against acquiring infections in the work place. Several infections can be acquired in the health care setting. Infections such as TB, HIV, Hepatitis B, C, D, Human Papilloma Virus (HPV) and Methicillin Resistant Staphylococcus aureas (MRSA).

The following are therefore recommended to ensure the health and safety of health care workers:

### **14.2 Risk assessment and management**

Infection prevention and control risk assessments should be carried out in each health facility.

- The various District Infection Prevention and Control Committees should receive and discuss institutional risk assessment, risk management and plans.
- District Infection Prevention and Control Committees should submit their risk assessment and management plans to Regional Infection Prevention and Control Committees.
- The Regional Infection Prevention and Control Committee will discuss and submit their regional risk profiles and management plans to the national IPC programme management unit.
- The Regional Infection Prevention and Control Committee should monitor the implementation of the risk management plans at the lower levels of service delivery.
- The National IPC programme management unit shall analyze the national economic impact of health care associated infections on the health care system.

In assessing risk, the following shall be done:

1. Identify the hazard (e.g. infection) and its likely mode(s) of contact;
2. Determine the likelihood (probability) of its occurrence;
3. Ascertain the likely severity of its effect;
4. Determine level of priority
5. Recommend level of action or control measures to be taken.

In instituting control measures, apply the hierarchy of controls in the following order:

- Engineering and environmental controls – e.g. provision of appropriate physical structures, adequate ventilation, proper environmental cleaning;
- Administrative controls – e.g. provision of adequate staff and supplies, education of health workers, patients and visitors); and
- Personal protective measures.

**Staff (Management Strategies)**

- All health workers shall have entry, periodic and exit medical examination. (Refer to Occupational Health Policy)
- All health staff shall be immunized against immunisable diseases on recruitment into Service and booster doses shall be given as appropriate.
- All health staff who are accidentally exposed to an infected person shall be thoroughly investigated and treated.
- A logbook shall be kept within units for recording injuries and infections (both potential and real).
- Another logbook shall be kept at the occupational health unit to record results of all investigations and treatments done on the staff.
- Information obtained on health workers shall be confidential and shall be disclosed only with the consent of the health worker except when disclosure is in the public interest or required by law.

For staff in special units, the frequency of the exams should be determined and applied.

## **SECTION 15**

### **LABORATORY BIOSAFETY**

The primary goal of this section is to provide basic information on laboratory biosafety. More in-depth information can be found in standard operating procedures for laboratory services.

#### **15.1 General laboratory guidelines**

- All laboratory personnel and others whose work require them to enter the laboratory shall be knowledgeable about the chemical and biological hazards with which they will come into contact through their normal work in the laboratory, and be trained in appropriate safety precautions and procedures.
- Access to the laboratory shall be severely restricted to only authorized persons
- All laboratories shall have clear written procedures for dealing with spillages or other accidental contamination.
- The laboratory shall be kept neat, orderly and clean, and storage of materials not pertinent to the work shall be minimized.
- Protective laboratory clothing (e.g. uniforms, coats, gowns) shall be made available, and worn properly by all personnel including visitors, trainees, and others entering or working in the laboratory.
- Protective laboratory clothing shall not be worn in non-laboratory areas.
- Suitable footwear with closed toes and heels and preferably with non-slip soles shall be worn in all laboratory areas.
- Safety face and eyewear, (e.g., glasses, goggles, face shields, or other protective devices) shall be worn when necessary to protect the face and eyes from splashes, impacting objects, harmful substances, UV light, or other rays
- Eating, drinking, smoking, storing food or utensils, and applying cosmetics, shall not be permitted in any laboratory work area
- Long hair shall be tied back or restrained.
- Oral (MOUTH) pipetting is prohibited in any laboratory.
- Ideally, vacutainers should be used, where this is not possible, hypodermic needles and syringes shall be used. These must be disposed off appropriately.
- Extreme caution shall be used when handling needles and syringes to avoid auto-inoculation and the generation of aerosols during use and disposal. Needles shall not be bent or re-capped, and shall be promptly placed in a puncture-resistant container for disposal
- Gloves shall be worn for all procedures that might involve direct skin contact with toxins, blood or infectious materials
- Gloves should be changed in-between patients/clients
- Reusable utility gloves shall be appropriately decontaminated.
- Hands shall be washed before leaving the laboratory and at any time after handling materials known or suspected to be contaminated, and after removal of gloves.
- Disinfect work surfaces before and after procedures are completed and at the end of each working day. An effective all-purpose disinfectant is a hypochlorite (bleach) solution with a concentration of 0.5% available chlorine.

- Loose or cracked work surfaces should be replaced by management as soon as possible.
- All technical procedures shall be performed in a manner that minimises the creation of aerosols.
- All contaminated or infectious liquid or solid materials shall be treated before disposal.
- Contaminated materials that are to be autoclaved or incinerated at a site away from the laboratory shall have the outside disinfected chemically or be double-bagged and then transported to the autoclave or incinerator in durable leak-proof containers which are closed and wiped on the outside with disinfectant before being removed from the laboratory.
- Hazard warning signs shall be posted outside laboratory entrances, where the infectious agent(s) used in the laboratory require special provisions for entry. The relevant information shall be included in the sign
- All spills, accidents/incidents and overt or potential exposures shall be reported in writing to the supervisor.
- **The Accident/Incident Spill Report Form and Post-Exposure Form** shall be completed. (See Appendix 4 for samples of reporting forms). Appropriate medical evaluation, surveillance, and treatment shall be provided as required.
- Laboratory personnel shall be protected against relevant infection by immunisation where possible and show immunity.

Note: Refer to Laboratory Safety Guidelines

## 15.2 Handling clinical specimen

Clinical specimens include excreta, secretions, blood and its components, body fluids, tissue and tissue fluid from human and animal origin. The proper handling (selection, collection, storage and transportation) of clinical specimens is an essential component of IPC and the quality assurance system of the microbiological laboratory.

### Rationale for proper handling of specimens

Proper handling of specimens ensures:

- Their integrity.
- Their timely receipt in the laboratory.
- Reduction of wastage of resources.
- Reduction in incorrect diagnosis.
- Reduction in the risk of infections to the client and health staff.

### Type of clinical specimens

There are several types of clinical specimens some of which are:

- Stool and urine.
- Blood and body fluids.
- Body tissues.
- Sputum.

The correct type of specimen to collect depends on the type of infection and symptoms. For example, if one suspects septicaemia a blood specimen is required; if it is a urinary tract infection, a urine sample is required; and for respiratory tract infections, sputum and not saliva is required.

### **15.3 General principles for the collection of specimens**

#### **15.3.1 Time for collection**

The time for collection of most specimens depends on the condition of the patient, the type of disease being investigated and times agreed between the clinician, nursing and laboratory staff for the delivery of specimens to the laboratory. For example, sputum and urine are best collected in the morning soon after the patient wakes up, when the organisms have had the opportunity to multiply over several hours. In cases of septicaemia blood is best collected at the peak of the patient's temperature. Specimens must be collected before antimicrobial treatment is started. If antimicrobial treatment has started indicate on the form time and type of antimicrobial administered.

#### **15.3.2 Precautions for the collection of microbiological specimens.**

- Laboratories should provide wards and outpatient clinics with appropriate specimen containers and instructions to ensure that specimens are safely kept and transported. *Under no circumstance should patients be allowed to use their own specimen containers.*
- Use aseptic techniques to prevent contamination of the specimen, especially during collection from sites that are normally sterile e.g. blood, cerebrospinal fluid or effusions. This ensures that the specimen contains microorganisms from the site where it was actually collected.
- Swabs used to collect discharges and wound materials must be sterile and free from antibacterial agents. Avoid contaminating discharges and wound with skin commensals (normal flora). Collect specimens in sterile leak-proof, dry containers, free from traces of disinfectants.
- The containers must be autoclavable plastic to avoid breakages.
- Sterile containers are not necessarily required for collection of faeces and sputum. Containers must however be clean.
- Instruct patients on how to aseptically collect specimens to avoid contaminating the outside of the containers. Wipe the outside of the container with a paper tissue or cloth soaked in disinfectant if contamination occurs before the specimen is sent to the laboratory.
- Specimen should be collected in the appropriate place to avoid transmission of infections. For example, all facilities should be encouraged to provide separate toilets for collection of urine and faecal specimens and properly ventilated areas for collection of sputum.
- Upon receipt, the specimen must be evaluated for abnormal features such as cloudiness, abnormal coloration, or presence of pus, blood, mucus, or parasites.
- As a routine, the appearance of urine, pus, vaginal discharge, faeces, effusion and cerebrospinal fluid should be evaluated and reported.

NB: Ensure that the appropriate container is used for the collection of specimens.

### **15.3.3 The Request form and Labelling of Specimens**

The clinician or health provider must label the specimen container correctly and fill the request form appropriately. Incorrect patient identification or incorrect labelling of either specimen or request form may lead to incorrect diagnosis, hence inappropriate treatment. Each specimen must be accompanied by a request form which gives the following information:

- Patient's name.
- Name of hospital.
- Ward / unit / department.
- Identification number or insurance number.
- Date of birth or age.
- Sex
- Specimen type and source.
- Date and time of collection.
- Main clinical signs and symptoms and most likely diagnosis.
- The physician to whom results are to be sent.
- Any antimicrobial agent the patient is receiving or has received.

The specimen container must be properly labelled with the following information.

- Patient's name
- Age and sex
- Ward/unit/department
- Identification number
- Source of specimen
- Date and time of collection.

### **15.3.4 Transportation of specimens**

To ensure that pathogens survive during transportation to the laboratory, specimens should be delivered to the laboratory as soon as possible after collection. When delay is unavoidable suitable preservatives or transport media must be used to prevent the organisms from dying due to enzyme action, change of pH, or lack of essential nutrients. Anaerobes usually require transport medium.

### **15.3.5 Mailing /dispatch of clinical specimens**

Special precautions must be taken when transporting or mailing specimens as the carriage of infectious specimens over long distances, whether by hand, motor transport, or by inland mail or external mail is more hazardous if the organisms are in Risk Group III or IV (e.g. sputum for acid fast bacilli and blood for brucella).

Regulations governing the carriage of such materials by mail should be applied. Guidelines may be obtained from the Post Office and health authorities. For carriage of specimens by air across international boundaries, obtain the regulations from the health and aviation or airline authorities.

Specimens for dispatch must be packed well and safely. All specimens should be considered potentially hazardous and must bear Biohazard labels as shown Figure 15.1 below.



**Figure 15.1: Biohazard Symbol**

### **15.3.6 Storage of microbiological specimens**

The following guidelines should be applied for storage of specimens:

- Refrigeration at 4-10°C can help to preserve and reduce the multiplication (overgrowth) of normal flora in unpreserved specimens. However, specimens for the isolation of *Haemophilus influenzae*, *S. pneumoniae* or *Neisseria gonorrhoeae*, must be sent immediately they are taken to the laboratory. They must never be refrigerated because these pathogens die under cold condition.
- Infectious materials and agents that require low temperature should be stored in deep-freeze cabinets or on dry ice. The outer surfaces of ampoules stored in these ways should be disinfected when the ampoules are removed from storage.

### **15.4 Standard Precautions and dangers involved in handling specimens**

Because it is often impossible to know which specimen might be infectious, all specimens are to be treated with standard precautions at all times (see Standard Precautions in Section 4). The primary dangers are contamination of hands, parenteral exposure through accidental needlesticks, cuts from contaminated equipment, exposure of mucous membranes (e.g. eye, nose) to aerosolized droplets, and exposure of broken skin, wounds and scratches to contaminated specimens.

The handling, transfer and shipment of improperly packed specimens also carry a risk of infection to all people directly engaged in or in contact with any part of the process. It also endangers personnel who are indirectly involved e.g. the administrators, secretarial and other support personnel. It also poses a risk to the public and to personnel of the transport and postal services.

It is always important that infectious specimens should be worked upon in the right environment by laboratory personnel e.g. inside biological safety cabinets where necessary.

**Always practice standard precautions with all specimens at all times.**



## SECTION 16 ADDITIONAL PRECAUTIONS

Additional precautions are also called expanded precautions or transmission based precautions. These are additional measures to compliment standard precautions and are designed to prevent transmission of microorganisms that are transmitted through airborne, droplet and contact modes. They apply mainly in hospitalized patients. In practicing additional precautions, isolation is mandatory. Additional precautions include:

- Contact precautions;
- Droplet precautions; and
- Air borne precautions.

**When additional precautions are indicated, appropriate education and counselling must be given to patients and relations to counteract possible adverse effects on patients (e.g. anxiety, depression, perception of stigma, reduced contact with clinical staff) in order to improve compliance by patients.**

### 16.1 Contact precautions

Contact precautions are intended to prevent transmission of infectious agents which are spread by direct or indirect contact with the patient or the patient's environment. Excessive wound drainage, faecal incontinence and other discharges from the body all lead to extensive environmental contamination. In addition to Standard Precautions:

- Patients shall be nursed in a single room if available. If unavailable, share with another patient who has an active infection with the same organism;
- Ensure that patients are physically separated from each other- distance should be more than 1 metre;
- Health care personnel caring for patients on contact precautions shall wear a gown and gloves for all interactions that may involve contact with the patient or patient's contaminated environment;
- Change protective attire and perform hand hygiene between contacts with patients in the same room;
- After completing procedures, gloves should be removed before leaving the patient's room and hands shall be washed with an antimicrobial soap;
- Personnel shall ensure that their hands do not touch potentially contaminated environmental surfaces after gloves are removed;
- Patient movement shall be limited to that which is absolutely necessary. Care shall be taken during transport to minimize contact with other patients or environmental surfaces;
- When transport is necessary ensure that infected or colonised areas of the patients' body are contained and covered;
- Remove and dispose of contaminated PPE and perform hand hygiene prior to transporting patients;
- Wear clean PPE to handle the patient at the transport destination;
- Non-critical patient care equipment (e.g. blood pressure cuffs, crutches) shall be used only for a single patient; and
- If sharing of common equipment is absolutely necessary, the equipment shall be adequately cleaned and disinfected before using it for another patient.

## 16.2 Droplet Precautions

Droplets are usually generated from coughing, sneezing, talking, as well as during procedures such as bronchoscopy or suctioning. Droplet precautions are intended to prevent transmission of pathogens spread through close respiratory or mucous membrane contact with respiratory secretions. Examples of organisms in this category include Influenza and Mumps viruses, Mycoplasma, *Streptococcus pneumoniae*, and *Bordetella pertussis*. Because these pathogens do not remain infectious over long distances in a health care facility, special air handling and ventilation are not required to prevent droplet transmission.

In addition to standard precautions the following shall be observed:

- Patients shall be placed in a single room or, if not available, they may be cared for in isolation or in a corner of the ward;
- A sign indicating precautions to be taken shall be placed on the door of the patient's room and on the patient's chart;
- The appropriate mask shall be worn when working within one metre of the patient;
- Patient movement shall be limited to that which is absolutely necessary;
- Relatives shall wear appropriate masks;
- Patients shall be encouraged to cover their mouths with disposable tissue when coughing or sneezing;
- Instruct patients to follow Respiratory hygiene/ cough etiquette;
- With regards to patient transport instruct patient to wear mask and follow respiratory hygiene; and
- No mask is required for person transporting patients in open spaces.

## 16.3 Airborne precautions

Airborne precautions are designed for infections that are transmitted by airborne droplets that can remain suspended in the air. Airborne precautions prevent transmission of infectious agents that remain infectious over long distances and period when suspended in the air. Examples include tuberculosis, rubella (German measles), varicella (chickenpox), and possibly SARS.

In addition to Standard Precautions, the following shall be observed in airborne precautions:

- Patients shall be isolated (refer to Category "A" isolation) or in an airborne infection isolation room. An airborne infection isolation room is a single patient room that is equipped with special air handling and ventilation capacity (6 to 12 air exchanges per hour);
- Respiratory protection programme that includes education about use of respirators, fit testing and user seal checks is required in any facility for airborne precaution;
- In settings where airborne precautions cannot be implemented, masking the patient, placing the patient in a single room with the door closed and providing N95 or FFP2 or higher level respirator for health care personnel will reduce airborne transmission. Mask should only be used in such a situation if respirators are unavailable;

- A sign indicating precautions to be taken shall be placed on the door of the client's room and on the client's chart;
- All relatives must wear the appropriate protective clothing before entering the room;
- Patient movement shall be limited to that which is absolutely necessary;
- Patients shall wear masks when being transported outside the room; and
- Patients must practice Respiratory hygiene/cough etiquette.

### **16.3.1 Precautions for aerosol-generating procedures when airborne precautions is indicated**

The performance of procedures that can generate aerosol, such as bronchoscopy, endotracheal intubation, and open suctioning of the respiratory tract have been associated with transmission of infections such as tuberculosis, SARS and meningitis to health care personnel.

Protection of the eyes, nose and mouth in addition to gown and gloves is recommended during performance of these procedures in accordance with standard precautions. A respirator is recommended during procedures likely to contain TB, SARS, Avian or Pandemic Influenza viruses.

### **16.3.2 Respiratory hygiene/ cough etiquette**

Respiratory hygiene is a practice encouraged to reduce the spread of microbes (droplets) from coughing, sneezing and nose blowing through the use of a barrier such as handkerchief /tissue paper to contain the microbes.

Healthcare personnel should be educated 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 from organisms (e.g., influenza virus, adenovirus, para-influenza virus) in communities.

The following measures to contain respiratory secretions are recommended for all individuals with signs and symptoms of a respiratory infection:

- Cover the mouth and nose with a handkerchief or tissue when coughing or sneezing.
- Use disposable tissue to contain respiratory secretions and dispose of it in the nearest waste receptacle after use.
- Perform hand hygiene- hand washing with soap and water, alcohol-based hand rub or antiseptic hand wash, after having contact with respiratory secretions or contaminated objects/articles.
- Health care facilities should ensure the availability of materials for adhering to respiratory hygiene in waiting areas for patients and visitors by:
  - Providing tissues and non touch receptacles for used tissue disposal.
  - Providing conveniently located dispensers of alcohol-based hand rub.
  - Putting notices in the facility to facilitate cough etiquette, including not spitting on the floor.

- Ensuring that supplies for hand washing (i.e., water, soap, disposable towels) are available.

Measures to contain respiratory secretions in patients and accompanying individuals who have signs and symptoms of a respiratory infection should:

- Begin 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).
- Include posting signs at entrances and in strategic places (e.g., corridors, lift (elevators), canteens) within OPD 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.
- Continue during periods of increased prevalence of respiratory infections in the community (e.g., as indicated by increased number of patients seeking care for a respiratory infection). For example:
  - Offer appropriate masks to coughing patients and other symptomatic persons (e.g., persons who accompany ill patients) upon entry into the facility or medical office.
  - Encourage them to maintain special separation, ideally a distance of at least 1 metre from others in common waiting areas.

## SECTION 17 ISOLATION

Isolation is the process of separating patients with certain communicable diseases from uninfected persons and separating immunocompromised patients from others.

All persons accessing the isolation area shall observe the Standard Precautions guidelines.

### 17.1 Categories of isolation.

There are three main categories of isolation. These are categories A, B and C.

- **Category A**  
This applies to infections spread by direct contact with contaminated equipment, faeces, body fluids and airborne infections.
- **Category B**  
This applies to patients that require Strict Isolation. They are specialized units for patients with highly contagious diseases like rabies, anthrax, diphtheria and haemorrhagic fevers.
- **Category C**  
This is also referred to as Protective (reverse) Isolation. It applies to immunocompromised patients who must be protected from other patients and attending staff, e.g. patients on cancer treatment.

#### 17.1.1 Category 'A' isolation:

Examples of diseases in this category are cholera, enteric fever and severely ill pulmonary tuberculosis.

The requirements for category "A" isolation are:

- Cubicle
- Protective clothing – gloves and aprons are essential (Masks shall be used if indicated).

In addition to standard precautions, the following measures shall be adhered to in category "A" isolations:

- All health staff and visitors shall abide by IPC protocols and wear protective clothing as indicated.
- Protective clothing shall be disposed of immediately after use.
- Patients in this category shall be attended to last, i.e. after dealing with all non-infected patients.
- All health staff who are inadvertently exposed to an infected person(s) shall be thoroughly investigated.
- Body fluids and faeces shall be disposed of immediately.
- Reliable decontamination method shall be used where separate equipment are not available for different patients before reusing the equipment on other patients.
- *Airborne Precautions shall be applied when indicated*

### **17.1.2 Category ‘B’- Isolation (Strict isolation)**

These are specialized units and apply to patients with highly contagious diseases like; rabies, anthrax, diphtheria, Haemorrhagic fevers, etc.

The requirements for category B isolation shall include:

- Cubicle.
- Protective clothing, such as plastic aprons, masks, gloves, eye goggles, gowns.
- Disposable plates, cups and cutlery.

In addition to standard precautions, the following measures shall apply:

- Use disposable non-clinical items and do not recycle items like plates, cups and cutlery.
- Heat sterilise all other clinical equipment which are heat resistant.
- Keep airborne contamination and patient handling to a minimum.
- Educate health care facility staff and visitors on the risk involved when looking after such patients.
- There shall be restricted access to the patient.
- All waste produced in this unit shall be handled as highly infectious.

NB: Airborne precautions and other precautions to be taken by visitors also apply. Dead bodies from isolation “B” diseases should be put in body bags before removal from the wards.

### **17.1.3 Category ‘C’ isolation (Protective isolation)**

This shall apply to patients who must be protected from other patients and attending staff such as immunosuppressed patients such as patients on cancer treatment.

The requirements shall be:

- Cubicle.
- Protective clothing, plastic aprons, masks, gloves, eye goggles and gowns.

**In addition to standard precautions, the following measures shall be observed:**

- Patients in this category must be attended to first before attending to all other patients.
- Hygienic hand wash, sterile aprons, gloves and head gear/cap, mask, etc. must be worn.
- All protective clothing shall be discarded after attending to patients.

### **17.2 General isolation guidelines**

- Health care providers shall collaborate in effecting the timely and appropriate application of isolation.
- All isolation wards shall be clearly labelled.
- Explain procedure and need for isolation to the patient and family.
- Prepare a well-ventilated room/area for isolation with all necessary equipment.

- Display a ‘NO VISITORS’ sign clearly in the patient’s isolation area.
- The physician or Nurse-In-Charge shall report on the appropriate form, all infectious cases suspected or confirmed to the appropriate authority.
- The patient’s charts and records shall be kept outside the patient’s room.
- Contact tracing should be done and investigations must be carried out especially for all visitors and relations when indicated.

#### **Preparation of isolation ward/room**

- All isolation ward/room shall have an ante-room;
- Ensure appropriate hand washing facilities are available within the ward/room
- Ensure adequate room ventilation
- Post isolation sign on the door
- Remove all non essential furniture; the remaining furniture should be easy to clean, and should not conceal or retain dirt or moisture
- Waste bins and dirty linen bins should be kept in the isolation ward/room
- Place a puncture proof container for sharp disposal inside the isolation room
- Keep adequate and separate equipment for cleaning or disinfection of the isolation room and ensure daily cleaning of the isolation room
- Stock PPE supplies and linen outside the isolation room

#### **Transporting Infected Patients**

- Patients shall leave the isolation area only for essential purposes.
- When patient transportation is necessary, it is important that:
  - Appropriate barriers (e.g. masks, barrier-proof dressings) are worn or used by the patient to reduce the transmission of pertinent micro-organisms to other patients, staff and visitors, and to reduce contamination of the environment.
  - Personnel in the area to which the patient is to be taken are notified of the impending arrival of the patient and of the precautions to be taken.
  - Patients are informed of ways by which they can assist in preventing the transmission of their infectious micro-organisms to others
- The vehicle used for transporting the patient shall be decontaminated, cleaned and disinfected.

#### **Visitors**

- Shall be restricted to two persons at a time during visiting hours.
- Shall observe the ‘NO VISITORS’ sign and report to the Nurse-In-Charge prior to entering the isolation ward/room;
- Shall be requested **not** to bring items, which may harbour potentially harmful microorganisms;
- Shall be educated on the necessary precautions to be taken to prevent the spread of infection to the family, friends and community; and
- If required, shall wear personal protective equipment (e.g., gloves, masks, gowns).
- Practice hand hygiene before and after visiting the isolation ward

#### **Patient’s Personal Effects**

- Patients in isolation shall **not** share items, which may serve as a vehicle for transmission of micro-organisms;

- Stuffed toys for children shall be discouraged. Soft plastic toys shall be suggested as an alternative. These plastic toys shall be disinfected before discharge.
- No special precautions are required for utensils. Follow standard procedures for the handling and care of utensils, i.e. washing with soap and hot water or 0.5% (1:10) sodium hypochlorite solution. Soak in solution for 10 minutes, then rinse.

#### **Patient Care Equipment and Articles**

- Contaminated, reusable critical medical devices or patient care equipment shall be sterilized.
- Semi-critical medical devices or patient care equipment shall be sterilized or disinfected after use to reduce the risk of transmission of micro-organisms to other patients. The article and its intended use, the manufacturer's recommendations, the health care facility policy, and any applicable guidelines and regulations determine the type of disinfection.
- Non-critical equipment contaminated with blood, body fluids, secretions or excretions shall be decontaminated, cleaned and disinfected after use, according to the health care facility policy.
- Contaminated disposable (single-use) patient care equipment shall be handled and transported in a manner that reduces the risk of transmission of micro-organisms and environmental contamination in the health care facility.
- The equipment shall be disposed of according to the institutions' policy and applicable regulations.

#### **Linen and Laundry**

- Soiled linen shall be handled, transported and laundered in a manner that avoids transfer of micro-organisms to patients, personnel, and the environment.

#### **Routine and Terminal Cleaning of the isolation ward / unit**

- Standard routine cleaning procedures shall be strictly adhered to.
- Terminal decontamination, cleaning and disinfection shall be done when the patient no longer occupies the room.
- The room, or area and bedside equipment of patients on **Expanded Precautions** shall be cleaned using the same procedures used for patients on **Standard Precautions** unless the infecting micro-organism(s) and the amount of environmental contamination indicates special cleaning.
- In addition to thorough cleaning, adequate disinfection of bedside equipment and environmental surfaces (e.g., bedrails, bedside tables, carts, doorknobs, faucet handles, light switch etc.) are indicated for certain pathogens, especially enterococci, which can survive in the inanimate environment for prolonged periods of time.
- All waste shall be decontaminated and disinfected before disposal.
- The room should be aired for at least 24 hours before the next admission.



## **SECTION 18**

### **ASEPSIS AND ASEPTIC TECHNIQUES IN CLINICAL PROCEDURES**

Asepsis literally means without microorganisms and aseptic technique refers to practices that help reduce the risk of post-procedure infections in patients/clients by decreasing the likelihood of microorganisms entering the body during clinical procedures. It also reduces the service provider's risk of exposure to potentially infectious blood and blood products, other body fluids and tissues during clinical procedures.

#### **18.1 Components of aseptic technique**

Components of aseptic technique are general measures taken to prevent risk of infection and include:

- Hand hygiene.
- Use of personal protective equipment (PPE)
- Skin and mucous membrane preparation for clinical procedures.
- Maintaining a sterile field during sterile procedures.
- Maintaining clinically safe environment in the surgical/procedure area.

Guidelines on hand hygiene and use of protective clothing are in sections 5 and 6 respectively.

#### **18.2 Skin and mucous membrane preparation for clinical procedures**

Although skin cannot be sterilised, applying an antiseptic solution minimises the number of microorganisms around the surgical wound that may contaminate and cause infection. Additionally:

- Avoid shaving the hair around the operative site. Where necessary, remove hair with clippers;
- If the area is heavily soiled, wash with soap and water and dry before applying antiseptic;
- Ask patients about allergic reactions so as to inform the selection of antiseptics; and
- Apply antiseptic to operating site before incision.

#### **18.3 Maintaining asepsis in specific clinical procedures**

##### **18.3.1 Intravascular device insertion**

Intravenous procedures are the most common invasive procedures performed in clinical settings and are administered either by the peripheral or central routes. Infections associated with devices used are common and in some countries tend to be the commonest source of nosocomial infections.

##### **18.3.1 Principles for the prevention of intravascular infection**

In ensuring prevention of intravascular infection, the following measures should be taken:

- Ensure that infusion fluid is free from contamination – no cloudiness, no sediments and not expired;
- Thoroughly disinfect the insertion site with alcohol;

- Use sterile equipment for all invasive procedures –e.g. cannula, needle, etc;
- Use aseptic technique during insertion of catheters. - (hand disinfection, non touch technique and use of sterile gloves);
- Cover site with sterile dressing as soon as possible;
- Change dressing only when soiled, loosened or wet/damp, using aseptic technique;
- Change infusion sets after 72 hours and, consider re-siting the canula after the same period;
- Keep site dry, free from contamination and secure;
- Inspect site daily and remove device immediately signs of infection are noticed.
- Close injection ports that are not needed with sterile stopcocks;
- Change blood and blood products giving set within 24 hours;
- Dispose of IV line and any remaining fluid when infusion is replaced or discontinued; and
- Needle and catheter should be disposed of in a similar manner as sharps.

### **18.3.2 Principles for the prevention of infections in urinary tract catheterization**

Majority of urinary tract infections (UTIs) in hospitalized patients are associated with the use of urinary drainage devices such as bladder catheters. Normal urethral flora which migrates to the bladder is flushed out during urination. When a catheter is inserted, this flushing mechanism is altered and thus facilitates the passing of both urethral and perineal flora into the bladder causing infections. Urinary catheters should therefore be inserted only when there are clear medical indications. These include, but are not limited to:

- relief of urinary tract obstructions;
- urinary drainage in patients with neurogenic bladder dysfunction and urinary retention;
- urologic surgery or other surgeries on contiguous structures;
- accurate measurement of output in critically ill patients; and
- radiological investigations.

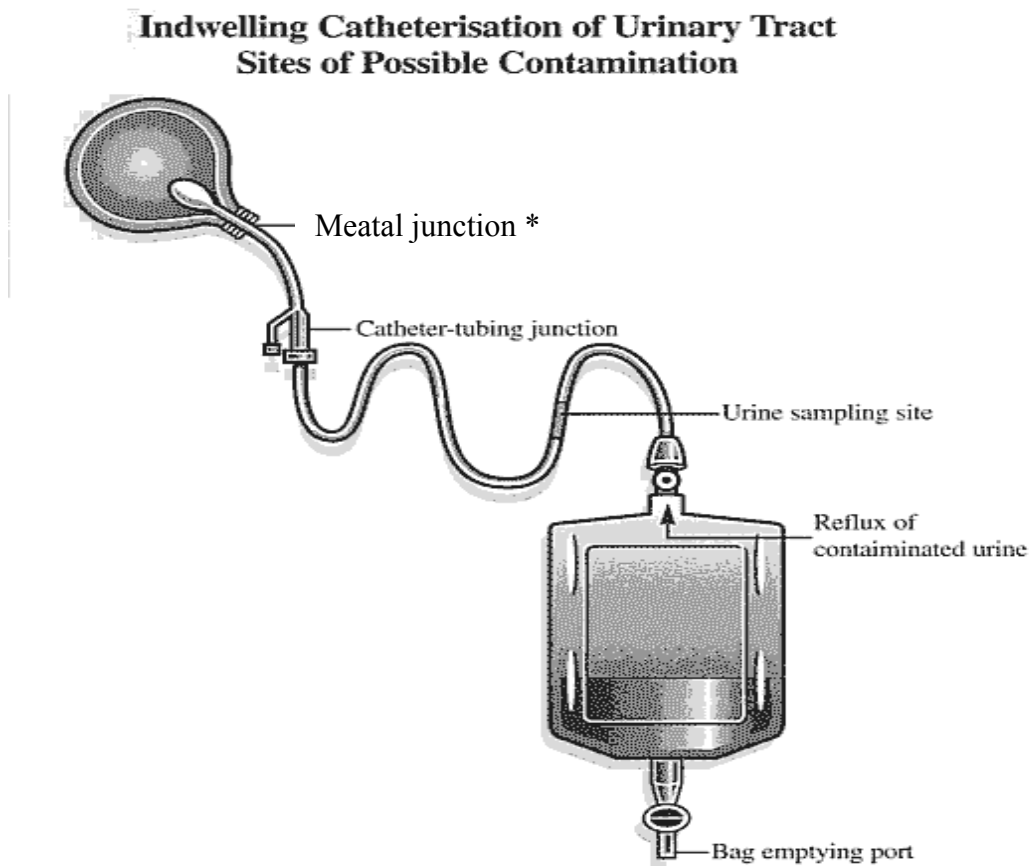
#### ***Principles for infection prevention in urinary catheterisation***

This includes the following:

- Use sterile disposable catheters.
- Hands should be washed and sterile gloves worn.
- Peri-urethral area should be cleaned preferably with antiseptic (e.g. savlon or hibitane).
- Catheter should be secured to avoid movement in the urethra.
- If urine sample is required, collect with sterile syringe and needle from sampling area of the tubing after cleaning the area with alcohol.
- If irrigation is required to remove clots, aseptic technique must be used.
- Drainage bag must be emptied into a receptacle used for that patient only.
- The bag should not be allowed to stand on the floor or rise above waist height.
- Avoid changing catheters routinely to reduce risk of infection and trauma (check duration and best practice).
- Hand hygiene must be practiced before and after emptying draining bags.

- Maintain closed drainage system as much as possible.
- All procedures involving the catheter and drainage system should be documented in the medical or nursing notes. At a minimum, these should include:
  - The date.
  - The type.
  - The size of catheter.
  - The volume of water in the balloon.

The possible sites that can be easily contaminated when a urinary catheter is in place are shown in Figure 18.1



**Figure 18.1:** Possible sites of contamination in using urinary catheters. Copied from International Federation of Infection Control (2003)

## **18.4 Maintaining safer environment in the surgical/procedure area.**

### **18.4.1 Principles for the prevention of infections in post-operative wound.**

Post-operative wound infections or surgical site infections delay recovery, increase length of stay, cost of services and are also associated with increased morbidity and mortality.

There are risk factors that increase vulnerability and these include:

- patient conditions such as the age (e.g. elderly and neonates), diseases (e.g. diabetes) and nutritional status (e.g. obesity);
- surgical categories as in contaminated or dirty surgical procedures and transplant or implants;
- surgical operations of long duration, haemorrhage and haematomas, degree of tissue trauma and location and types of drains used;
- inappropriate antibiotic prophylaxis, inadequate skin preparation and care, unsuitable theatre environment and excessive movement of staff;
- inadequate sterilization and re-use of processed invasive devices; and
- prolonged post-operative stay in the surgical ward and the use of inappropriate dressing techniques.

### **18.4.2 Peri-operative care**

Patient care during peri-operative period also determines to a large extent, the risk of infection; thus the under-mentioned measures should be observed:

- if antibiotics prophylaxis is required, it should conform to the antibiotic policy of the facility;
- concurrent diseases should be attended to or stabilized before operations;
- adequate surgical training and experience is required to prevent surgical site infections (SSI);
- closed system of wound drainage is preferable to open wound drains which increase SSI;
- control excessive numbers and movements of staff in the operating room since they contribute to an increase in airborne infections;
- staff should change into clean theatre clothing prior to an operation to avoid transfer of pathogens into the operating rooms. Clothes intended for work in the suite should not be worn in patient care areas or outside the suite;
- surgical hand hygiene should be maintained; and
- before a new patient is brought into the operation theatre, clean and disinfect all surfaces such as the surgery tables, trolleys that may have been contaminated during the last procedure.

### **18.4.3 Operating theatre ventilation**

The following shall apply in operating room ventilation:

- operating theatre air should ideally be filtered to reduce the concentration of airborne pathogens generated by staff. If windows have to be left open, they should be covered with fly or insect-proof netting;
- air conditioning systems should ensure that a minimum of 12 air changes per hour of filtered air is delivered; and

- routine bacteriological testing of operating room air is unnecessary. It should be performed when commissioning a new theatre and may be useful when investigating an outbreak.
- Regular planned preventive maintenance of the air-condition

#### **18.4.4 Surgical ward**

The following shall be observed in surgical wards:

- avoid prolonged pre-operative stay on the ward;
- ensure proper prophylactic antibiotic use;
- ensure sterilization or high level disinfection of instruments before use;
- surgical hand disinfection should be maintained;
- use sterile gloves; and
- ensure clean environment and adequate ventilation.

#### **18.4.5 Creating and maintaining sterile field**

A sterile field is an area created by placing sterile towels or surgical drapes around the procedure site. It can also be created on a stand that will hold sterile instruments and other items needed during the procedure. It is enhanced when a service provider is properly dressed in sterile surgical attire.

Items below the level of the draped patient are outside the field and are not sterile. A properly gowned and gloved provider's sterile area extends from the chest to the level of the sterile field. Sleeves are sterile from 5cm above the elbow to the cuff.

#### **18.4.6 Maintaining the sterile field**

Once a sterile object comes in contact with a non-sterile object or person or with dust or other air-borne particles, the object is no longer sterile. Maintaining the sterile field is therefore imperative. The following measures should be practiced:

- do not place sterile items near open windows or doors;
- place only sterile items within the sterile field;
- do not contaminate sterile items when opening, dispensing or transferring them;
- do not allow sterile personnel to reach across the unsterile areas or touch unsterile items;
- recognise and maintain the provider's sterile area;
- recognise that the edges of a package containing sterile items are considered unsterile; and
- be conscious of where your body is at all times, and move within or around the sterile or HLD field in a way that maintains sterility or HLD status.

## **SECTION 19**

### **INFECTION PREVENTION AND CONTROL IN SELECTED SITUATIONS**

#### **19.1 HUMAN IMMUNODEFICIENCY VIRUS (HIV)**

##### **19.1.1 INTRODUCTION**

The national HIV prevalence rate for Ghana is currently estimated at 1.9% (Ministry of Health Ghana, 2007) with an estimated number of 264,481 people living with HIV (PLHIV). A large percent of them are in the economically active age group. Though sexual transmission accounts for the large chunk of infections (80%) few cases of occupational transmission (1%) have been documented. Occupational transmission could be prevented by the use of post exposure prophylaxis (PEP) and it is recommended that every health care facility puts in place a programme to provide PEP to all health workers who are exposed to the virus in the line of duty not due to their lifestyle and behaviours.

##### **19.1.2 HIV Post Exposure Prophylaxis**

The risk of exposure to blood and blood borne pathogens is slightly greater for health care personnel than people who do not work around blood. Workplace accidents or injuries may occur that expose the health worker to body fluids of a patient.

The transmission of HIV in the workplace may occur through accidental or non-accidental exposure to blood and other body fluids as a result of injury with a needle or any other sharp instruments, or via mucous membrane (eye, mouth), or contact via damaged skin (eczema, wounds). Preventing transmission of HIV in the workplace, therefore, means:

- complying with Standard Precautions; and
- providing post exposure prophylaxis after high-risk exposure to HIV.

In the event of possible exposure to HIV, the following steps should be taken immediately:

- the wound site must be cleaned with soap and water or in case of mucous membranes, flushed with water.
- if therapy is necessary, it should be initiated promptly, preferably, 1-2 hours after exposure.
- report the incident immediately to the supervisor.

Post exposure prophylaxis reduces the likelihood of HIV infection after high-risk exposure. PEP may either prevent the establishment of infection or prevent new infection while allowing clearance of already infected cells. PEP is particularly effective within 1 -2 hours of exposure and not more than 72 hours after exposure.

##### **Assessment of exposure to risk:**

Exposure to HIV can be classified into three stages:

###### Very low risk exposure is:

Splash of body fluid on intact skin.

###### Low risk exposure is:

- Exposure to small volume of blood or body fluid from asymptomatic HIV positive patient with low viral load.

- An injury with a soiled needle.
- Any superficial injury or mucocutaneous exposure.

High-risk exposure is:

- Exposure to large volume of blood or potentially infectious fluid.
- Exposure to blood or blood contaminated fluid from a patient with a high viral titre (i.e. In the AIDS phase or early seroconversion phase of HIV).
- Injury with soiled hollow bore needle.
- Deep and extensive injury
- Resistance to ART in source patient.

***Actions to be taken in the event of possible exposure to HIV***

In the event of possible exposure to HIV the following actions should be taken

**Very low risk**

- wash exposed/wound area immediately with soap and water.
- In the case of mucous membranes, exposed area should be flushed with water.
- Eyes should be flushed with water or saline.

**Low risk**

In addition to the measures for very low risk, give

- Lamivudine 150mg 12 hourly x 28 days and
- Zidovudine 200mg 8 hourly x 28 days

**High risk**

In addition to the measures for very low risk, give

- Lamivudine 150mg 12 hourly x 28 days and
- Zidovudine 200mg 8 hourly x 28 days and
- Nelfinavir 750mg tid or 1250mg bd x 28days  
or
- Lopinavir/r 400mg/100mg 12 hourly x 28 days.

**RECOMMENDED LABORATORY INVESTIGATIONS AFTER HIV EXPOSURE**

Baseline tests:	<ul style="list-style-type: none"> <li>- Full blood count.</li> <li>- Liver and renal function tests.</li> <li>- HIV serology &amp; Polymerase Chain Reaction (PCR)</li> </ul>
Two weeks:	<ul style="list-style-type: none"> <li>- Full blood count</li> <li>- Liver and renal function tests</li> </ul>
Six weeks	<ul style="list-style-type: none"> <li>- HIV serology</li> </ul>
Three months	<ul style="list-style-type: none"> <li>- HIV serology</li> </ul>
Six months	<ul style="list-style-type: none"> <li>- HIV serology</li> </ul>

All exposed persons should receive counselling from trained counsellors throughout the period and thereafter if necessary.

(For more details refer to *Guidelines for Antiretroviral Therapy in Ghana*, June 2008)

## **19.2 TUBERCULOSIS**

### **19.2.1 Introduction**

Recent increases in tuberculosis (TB) notification among health care workers (HCWs), as well as hospital-based outbreaks of multidrug-resistant TB (MDR-TB) among HIV-infected patients and extremely drug-resistant TB (XDR-TB), have led to greater concern about the risk of *Mycobacterium tuberculosis* (*M. tuberculosis*) transmission in health care settings (nosocomial transmission). The Ministry of Health thus sees the issue of TB-IPC as very important.

It is recommended that any facility providing care for TB suspects shall have a complete IPC programme in place comprising of administrative and environmental controls, and personal respiratory protection.

### **19.2.2 TB specific administrative controls**

This is the first and most important level of IPC to prevent droplet nuclei from being generated and thus reducing the exposure of HCWs and patients to *M. tuberculosis*. Important administrative measures include:

- early diagnosis of potentially infectious TB patients;
- prompt separation of infectious TB patients; and
- prompt initiation of appropriate anti-tuberculosis treatment.

The following are the administrative controls specific to TB:

- all health care facilities should have a specific set of administrative measures for early identification of TB patients;
- patients presenting in OPDs shall be triaged to quickly identify those with symptoms of TB. The method of triaging shall include:
  - screen all patients attending OPD with a cough to look for symptoms of TB
  - educate the patient on cough etiquette
  - separate the patient from others to limit spread of infection
  - rapidly provide services for them
  - investigate for TB and treat or refer.
- all diagnosed TB patients should be notified; and
- all PLWHIV should be screened for TB using the symptom screening questionnaire (See questionnaire in appendix 5).

### **19.2.3 TB-specific environmental controls**

These environmental controls aim at reducing the concentration of droplet nuclei in the air by maximising natural ventilation and controlling the direction of airflow. Environmental controls for reducing TB transmission are the following:

- patient areas should have all windows and doors fully open to ensure adequate ventilation (i.e. 6 to 12 air changes per hour);



- where natural ventilation would not be enough use ceiling fans or extraction fans;
- regular checks and maintenance schedules should be in place for mechanical ventilation systems;
- where possible, MDR TB cases shall be isolated in negative pressure rooms;
- patients should be managed in well lit areas with easy access and exit to persons and equipment;
- in laboratories where sputum culture for TB is done safety cabinets shall be used;
- ensure that there is adequate ventilation in OPDs;
- ensure a minimum of 1 metre between beds on TB Wards; and
- ensure all admitted patients have beds.

#### **19.2.4 Personal protective measures for TB care**

Personal protective measures include surgical masks (cloth, paper) and respirators. Respirators (N95 or FFP2) are better than surgical masks but expensive, therefore their use must be limited only to high risk areas such as in the care of MDR TB patients or when performing high risk aerosol-generating procedures. HCWs must be fit-tested before using respirators and they should be adequately trained on their use.

### 19.3 VIRAL HEPATITIS

#### Hepatitis B and C

Transmission of Hepatitis B Virus (HBV) and Hepatitis C Virus (HCV) in the workplace occurs in the following ways:

- accidental exposure to blood : Any contact with blood or body fluids as a result of injury with a needle or any other sharp instruments, or via mucous membrane (eye, mouth), or contact via damaged skin (eczema, wounds);
- percutaneous exposure : Exposure to blood or body fluids through broken skin;
- needle stick or sharps injury: Puncture with a needle or sharp instrument that is contaminated or potentially contaminated with blood or body fluids;
- blood splash: Skin visibly contaminated with blood or body fluids;
- exposure of intact normal skin to a large volume of blood; and
- human bites.

Preventing transmission of HBV in the workplace, therefore, means:

- preventing the occurrence of exposure; and
- complying with Standard Precautions

#### **Procedure for post- hepatitis B exposure prophylaxis**

Health personnel exposed to blood or body fluids by needle stick, cuts or bites should do the following:

- wash the area thoroughly with soap and water immediately;
- worker should be tested for Hepatitis B surface antigen and Hepatitis B antibody;
- if the antibody titre level is low or negative, start immunisation or give booster dose of Hepatitis B immunisation;
- repeat tests after 1 month and then 6 months after the first test;
- if the titre is still low, repeat the Hepatitis B immunisation; and
- those who do not respond to Hepatitis B immunisation after a 3<sup>rd</sup> dose should not be assigned to high risk areas (e.g. area where blood specimens are handled, fevers units, obstetric and gynaecological units, etc.)

#### **Treatment for HBV**

Treatment for HBV is available and several methods exist. A few are listed here for easy reference.

- Tablet Lamivudine 150 mg twice daily or 300mg daily
- Tablet Tenofovir 300 mg daily
- Interferon alfa 5 MU daily or 10 MU 3 times a week

#### **CAUTION:**

Not all people infected with HBV will require treatment; any treatment for Hepatitis must therefore be initiated by a Physician Specialist and must be monitored by laboratory investigations.

## 19.4 VIRAL HAEMORRHAGIC FEVER

Viral Haemorrhagic Fever (VHF) may be caused by different viruses; e.g. Lassa, Marburg, Ebola, Crimean-Congo. VHF:

- is associated with high mortality;
- has limited or no treatment options; and
- has potential for person to person and specimen to person spread.

VHF is not endemic in Ghana but should be suspected in:

- persons who have been in an endemic area within 21 days of the onset of their febrile illness;
- persons who have had unprotected contact with blood, other body fluids, secretions or excretions of a person or animal with VHF; and
- persons with possible exposure when working in a laboratory that handles haemorrhagic fever viruses.

### 19.4.1 Infection Prevention and Control Precautions for VHF

The following precautions are recommended when VHF has been diagnosed:

- patients should be cared for in a category B isolation room;
- all workers should practice standard precautions;
- Caretakers should use barrier precautions to prevent skin or mucous membrane exposure;
- all persons entering the patient's room should wear appropriate PPE;
- prior to leaving the room of a patient with suspected VHF, safely remove and dispose of all protective gear, and clean and disinfect shoes that are soiled with body fluids;
- access to the room should be restricted to only authorized persons;
- maintain a log of all people (both clinical and non clinical) who enter the room; and
- the importance of standard precautions in the management of blood, other body fluids, secretions, or excretions, handling of soiled linen and wastes cannot be overemphasised.

### 19.4.2 Other special consideration in VHF

#### Laboratory specimens

- Laboratory investigations should be reduced to the barest minimum that allows for patient care and essential diagnostic evaluation. This is because of the potential risks associated with handling infectious material.

#### Deaths

- When patients die, handling of body should be minimized. Bodies should be kept in a leak-proof material and promptly buried.

### **Exposure management for VHV**

The following shall apply in exposure to VHV:

- persons with percutaneous or mucocutaneous exposures to blood, body fluids, secretions, or excretions from a patient with suspected VHF should immediately wash the affected skin surfaces with soap and water;
- mucous membranes (e.g. conjunctiva) should be irrigated with copious amounts of water or eyewash solution;
- exposed persons should receive medical evaluation and follow-up care, including fever monitoring twice daily for 21 days after exposure; and
- consultation with an infectious diseases expert is recommended for exposed persons who develop fever within 21 days of exposure.

## **19.5 ACUTE RESPIRATORY DISEASES (ARD)**

Acute respiratory diseases (ARD) are upper or lower respiratory tract illnesses, usually infectious in etiology, which can result in a spectrum of illnesses ranging from asymptomatic or mild infection to severe and fatal disease, depending on the causative pathogen, environmental, and host factors. Examples of pathogens causing ARDs are Rhinovirus, Respiratory syncytial virus, Para-influenza virus, Severe Acute Respiratory syndrome-associated coronavirus (SARS-CoV) and Influenza virus. Only guidelines on Avian Influenza virus and SARS-CoV are provided in this policy and guidelines document.

### **19.5.1 AVIAN INFLUENZA**

Avian influenza (Bird Flu) is a disease caused by an influenza virus that occurs naturally among birds but can cause disease in humans. In humans the virus can be transmitted via large respiratory droplets. Given the uncertainty about the exact modes by which avian influenza may be transmitted between humans, additional precautions for healthcare workers involved in the care of patients with documented or suspected avian influenza may be prudent.

The following are recommended IPC measures for Avian Influenza

- all patients who present to a health-care setting with fever and respiratory symptoms should be managed in accordance with the avian influenza clinical management guidelines of the Ministry of Health;
- all categories (i.e. suspected, probable or confirmed) of avian influenza cases that report to the health care facility must be admitted straight into isolation wards / room / area; and
- the admitting clinician must notify the IPC focal person or the emergency response team of the facility immediately.

See Appendix 6 for criteria of categorisation of human cases of avian influenza case.

In addition to standard precautions the following shall apply:

- contact precautions;
- airborne precautions; and

- respiratory hygiene.

The details of the above precautions are in section 16. These precautions should be continued for 14 days after onset of symptoms or until deemed otherwise by the attending clinician.

#### **19.5.1.1 Surveillance and Monitoring of Healthcare Workers**

- Healthcare workers exposed to avian influenza virus should carry out self-monitoring for the development of fever, respiratory symptoms, and/or conjunctivitis (i.e., eye infections) for 1 week after last exposure;
- Healthcare workers who become ill should seek medical care and, prior to arrival at the health facility, notify their healthcare provider that they may have been exposed to avian influenza;
- All symptomatic HCWs shall be given treatment within 24 hours of reporting to the health facility; and
- In addition, employees should notify occupational health and infection control personnel at their facility.

#### **19.5.1.2 Vaccination of Healthcare Workers against Human Influenza**

Health-care workers involved in the care of patients with confirmed or suspected avian influenza may be offered a vaccine against the most recent seasonal human influenza. In addition to providing protection against the predominant circulating seasonal influenza strain, this measure is intended to reduce the likelihood of a healthcare worker being co-infected with human and avian strains.

### **19.5.2 SEVERE ACUTE RESPIRATORY SYNDROME (SARS)**

Severe Acute Respiratory Syndrome is a disease caused by the SARS Coronavirus. Transmission of SARS Coronavirus (SARS-CoV) occurs predominantly through close interactions with infected persons, although fecal/oral transmission may occur in some settings. SARS-CoV may also be transmitted through close contact with respiratory droplets expelled when a patient coughs or sneezes. The aim of IPC in this instance is to ensure early recognition of patients at risk and to prevent transmission of SARS-CoV to healthcare workers by implementing appropriate infection prevention and control precautions.

The following are recommended:

- posters and audiovisuals (in appropriate languages) shall be posted at the entrance to outpatient facilities instructing patients and visitors to practice respiratory hygiene/cough etiquette;
- during periods of increased respiratory infection in the community, (surgical masks or respirators) shall be offered to persons who are coughing;
- coughing persons should sit 1 metre from others in common waiting areas; and
- ensure appropriate triage and management of patients with possible SARS-CoV disease.

In addition to standard precautions, healthcare workers should practice droplet precautions when examining a patient with symptoms of a respiratory infection.

Droplet precautions should be maintained until it is determined that they are no longer needed.

### **Patient placement**

The following shall apply in the placement of patient with SARS:

- patients shall be admitted to isolation in a well ventilated room;
- designate “clean” and “dirty” areas for isolation materials;
- limit the amount of patient-care equipment brought into the room to that which is medically necessary. Provide each patient with patient-dedicated equipment (e.g., thermometer, blood pressure cuff and stethoscope);
- limit staff to the number sufficient to meet patient-care needs using staff who have been specially trained to care for patients with SARS;
- precautions regarding to transportation and visitation of patients in isolation with airborne infections shall apply;
- visitors who have been in contact with the patient before and during hospitalization should be followed;
- the appropriate precautions shall be taken when performing aerosol-generating procedure (See section 16);
- all specimens should be appropriately contained (bagged if necessary) and have a completed laboratory requisition slip attached. Information on the requisition slip should indicate that the patient is or could be infected with SARS-CoV;
- laboratory personnel should be alerted to the possibility of SARS-CoV to ensure safe handling procedures; and
- exposed persons shall be managed according to the standard management protocol for SARS.

## **SECTION 20**

### **IPC CONSIDERATIONS IN THE USE OF ANTIBIOTICS**

Rational use of antibiotics is important for the prevention and control of development of resistant strains of micro-organisms and spread of infections. The following shall be followed in the use of antibiotics:

- antibiotics shall be prescribed rationally;
- prescribers must follow national guidelines on the use and choice of antibiotics for treatment and prophylaxis (Refer to the Ghana National Drug Policy and the current editions of the Essential Drug List and Standard Treatment Guidelines of the Ministry of Health);
- Medicine and Therapeutic Committees in conjunction with IPC teams shall develop operational policies on antibiotic use and monitor the rational use of antibiotics in all health facilities. This policy shall contain information on use of antibiotics for prophylaxis and the choice of antibiotic for empirical and targeted therapy of major infections;
- data shall be routinely collected on antibiotic use for surveillance; and
- operational policies on the use of antibiotics at the facility level shall be based on the national policy on the use of antibiotics.

### **ANTIBIOTIC RESISTANCE**

Antibiotics (antimicrobial) resistance may principally be due to irrational use of antibiotics (e.g. excessive, non-compliance and under usage) and the use of fake antibiotics. To ensure that information is obtained on bacteria resistance and used to improve services the following shall be done:

- all microbiological methods shall be standardized to ensure uniformity and comparability of results in all healthcare facilities;
- all requests to microbiological laboratories shall state clearly whether it is a suspected nosocomial infection or not; and
- there shall be routine collection of data on antibiotic sensitivity and resistance in all nosocomial infections and these shall be reviewed, analysed and disseminated regularly.

## **SECTION 21 ENVIRONMENTAL AND ENGINEERING CONSIDERATIONS FOR IPC (FACILITY DESIGN)**

### **21.1 Introduction**

The layout of physical structures and the installation of equipment have influence on the implementation of infection prevention and control guidelines in health facilities. There is therefore the need to ensure compliance of IPC requirements in the design of health facilities. The layout of physical structures and installation of equipment shall conform to standards set by the Estate Management Department. This section deals with some specific areas of design and construction of health care facilities that have an effect on IPC practices. They include the following:

- work areas;
- ventilation;
- surfaces;
- traffic pattern in the facility;
- positioning / siting of sink;
- storage facilities for supplies and equipment;
- storage facilities for food and drinks;
- water supply system;
- hazards associated with renovation and maintenance; and
- waste management systems (Refer to section 12).

### **21.2 Work Areas**

Work areas shall correspond to the standards set by the Estates Management Department and shall:

- have adequate lighting;
- have easy access and space for equipment and persons;
- be designed to allow thorough cleaning and disinfection of all surfaces;
- be of adequate size to accommodate the workload;
- have designated facilities for storing outer garments and personal items and for eating and drinking; and
- have adequate and easily accessible hand hygiene facilities.

### **21.3 Ventilation**

Airborne organisms may present a hazard in health care facilities particularly in high risk areas such as isolation wards, operating and emergency rooms. Adequate ventilation seeks to reduce the concentration of micro-organisms in the air. For these reasons:

- ventilation should be appropriate for each working area;
- where required, ventilation equipment should maintain the inflow of fresh air, temperature, humidity and purity of the air within prescribed limits; and
- for areas where unsafe concentrations of airborne contaminants are generated (e.g. incinerators, kitchen, steam and gas sterilizers) or where risk group microorganisms are being handled (e.g. isolation rooms and laboratories), fume extraction facilities and biological safety cabinets should be installed and used.



#### **21.4 Surfaces**

Surfaces should be such that they can easily be cleaned with disinfectant cleaning solution. Surfaces should therefore:

- be level and smooth, as well as have minimum joints where bacteria can accumulate;
- be unaffected by spilt liquids; and
- be durable enough to withstand repeated cleaning with disinfectant solution.

All surfaces including the surfaces of furniture and equipment should be made of materials that will facilitate effective cleaning and disinfection.

With regard to woollen carpets for floors, there are usually problems with staining and odours. Woollen carpets are therefore not advisable in areas where spillage or soiling is likely to occur (e.g. operating room, obstetrics, intensive care unit, kitchen, isolation rooms, paediatrics units where patients may play on the floor).

#### **21.5 Traffic Pattern in the Facility**

To prevent cross-infection, the design of the facility will need to take into consideration the following:

- patient movement should cause minimal exposure of patients to each other and to visitors;
- visitors' traffic routes should minimize contact with patients (e.g. elevators for visitors should be separated from that of the patients);
- staff required to wear protective clothing should have ready access to locker space without entering protected areas;
- movement of all supplies and equipment—whether clean, sterile or contaminated—should be done in closed containers that will not allow supplies to fall from the container to the floor;
- the design should put special areas like operating room, labour and delivery, waste storage, nursery, clinical laboratories out of the major traffic routes; and
- the design should provide area for emptying bedpans without leaving the patient's room.

#### **21.6 Positioning/Siting of Sinks for hand washing**

IPC policy states that hand washing should be done before and after patient contact. To support this, attention should be paid to the following:

- sinks should be placed in areas that are convenient and easily accessible such that they can easily be used for hand washing before and after patient contact;
- adequate number of sinks should be provided for use by health workers, patients and their relations;
- adequate space should be provided around the sinks for hand dryers, soap dispensers and garbage bins; and
- sinks should be large enough to prevent splashing (i.e. hygienic hand wash sinks)

Sinks should be operated by hand, elbow, foot or knee. Elbow, foot and knee controlled are preferred in areas where there is an increased risk of touch-contamination (e.g. isolation rooms).

### **21.7 Supplies and Equipment**

Storage areas for medical supplies and equipment should:

- be rodent-free;
- be away from sinks to avoid splashing;
- have adequate space including aisles between equipment to facilitate cleaning of equipment and staff movement as well as to eliminate pests' hiding places; and
- be well ventilated and lighted.

In addition to the above, special attention should be paid to the following:

- contaminated equipment and supplies should be kept away from clean/sterile equipment and supplies;
- contaminated equipment and supplies should not be stored for long periods; and
- dust covers or other protective coverings should be used to avoid contamination by dust and moisture.

### **21.8 Storage of food and drinks**

As indicated in the Management Standards and Guidelines manual for hospital catering services, adequate storerooms should be provided in the kitchen premises for storage of food and drinks. In addition, attention should be paid to the following:

- the storerooms should be well lit, ventilated, dry and have even temperature;
- walls and floor should be tiled. Floors could either be granolithic or terrazzo in order that they can easily be cleaned;
- stores should be fixed with shelves. These could be built with wooden shelving slate or marble topped benching or easily movable and adjustable metal racking with stainless-steel-topped tables. These could be fixed with castors so that they can be moved easily;
- cold storage facilities should be provided and should include refrigerator, deep freezer, and cold room walk-ins and chill room walk-ins; and
- there should be separate fridges for the storage of food, drinks, medicines and vaccines and patient specimens.

It should also be noted that under no circumstance should food be kept on the floor. Food should be stored away from cleaning items and poisons. Finally, food production areas should always be away from mortuary and incinerators.

### **21.9 Water Supply System**

To prevent spread of infection, wholesome and potable water should be easily available for drinking, food preparation, hand washing, patient bathing and cleaning, decontamination and sterilizing. Where water tanks are installed for storage, the tanks should have tight covers to prevent dust, animal droppings as well as sunlight from entering. These accelerate the growth of algae and other microorganisms. Routine emptying and cleaning of tanks is recommended.

## **SECTION 22**

### **SURVEILLANCE AND MONITORING**

#### **22.1 Introduction**

Surveillance and monitoring are key Infection prevention and control activities and are used to evaluate the effectiveness of IPC measures. It aims at reducing hospital-acquired infections and their cost. Surveillance and monitoring in IPC are organized methods of systematically identifying, collecting, analyzing, reporting, disseminating and utilizing information related to IPC activities and nosocomial infections.

The specific objectives are to:

- increase awareness of health care workers about hospital acquired infections and antimicrobial resistance so that they appreciate the need for preventive actions;
- monitor trends: incidence and distribution of hospital-acquired infections and its prevalence;
- identify possible areas for improvement in patient care and for further epidemiological studies; and
- identify the need for strengthening infection prevention and control activities, and also evaluate the impact of preventive measures.
- Disseminate the information gathered to stakeholders

#### **22.2 IPC surveillance and monitoring responsibility at national level**

The Ministry of Health/IPC programme management unit, in collaboration with the relevant key stakeholders shall develop a national surveillance system for health care associated infections. This system will generate quality data on health care acquired infections and antibiotic resistant organisms. The Ministry of Health/IPC programme management unit shall determine in consultation with the relevant partners microorganisms to be placed under surveillance.

The surveillance system will allow for reporting of outbreaks of infection in health care facilities so that appropriate interventions and support by national, regional and district structures can be provided when necessary. A national standardized reporting system shall be developed to enable the regional and district IPC structures to extract instant data on health care associated infections and anti-microbial resistance for their local use.

In addition, the Ministry of Health/IPC programme management unit shall develop a set of indicators to monitor specific IPC practices (e.g. hand hygiene, re-processing of used instruments and use of protective clothing) at all the levels of services delivery

Feedback and good practices shall be shared nationally through the following:

- an infection control bulletin (quarterly or bi-annual publication);
- a national infection prevention and control web page; and
- an annual conference.

### **22.3 IPC surveillance and monitoring responsibility at facility level**

At facility level, regular reports of comparative data on the levels of healthcare associated infections, anti-microbial resistance and other IPC practices within the facility should be made available to clinicians to make them aware of their local resistance profiles, to enable them to make better empirical treatment choices to assess implications of their treatment choices and infection prevention and control practices.

Reports on IPC should be prepared and regularly discussed with the relevant infection prevention and control officers, committees, and/or health departments/units.

### **22.4 General guidelines on collection, analysis and dissemination of surveillance and monitoring information**

#### 22.4.1 Data collection, analysis and dissemination

There must be routine collection of data on infections and IPC practices by the IPC Team, and these should be reviewed and analysed weekly, and disseminated to all stakeholders. (E.g. Hospital Management, Heads of Hospital Units, etc.).

Infection rate and isolates should be monitored by:

- daily report from the microbiology laboratories;
- prevalence studies on infections in the hospital; and
- notification of infections to and from the district, regional and national surveillance centres.

#### 22.4.2 Outbreak

An outbreak is defined as an unusual or unexpected increase of cases of a known nosocomial infection or the emergence of cases of a new infection.

An outbreak must be suspected when:

- laboratory report of a specimen yields an alert organisms and notifiable diseases (Refer weekly notifiable disease reporting form appendix 7);
- two or more patients are found to have an infection attributable to an infection not previously reported, particularly, when it happens after a surgical procedure;
- several people report infections caused by the same organism; and
- clinicians or ward staff report multiple infections of a similar nature.

#### 22.4.3 Guidelines on investigation and response to surveillance reports on infections

##### *Single case of nosocomial infection*

- When a single case of nosocomial infection is observed, the Infection Prevention and Control Team shall investigate the details of the patient and establish whether the cause has been a breakdown of procedures or whether it is a new admission. When the cause has been established the Infection Prevention and Control Team shall review the steps in the process with the unit staff to ensure that the policy is understood and properly implemented. See Appendix 8 for classification of nosocomial infections

- The Infection Prevention and Control Team shall contact the clinician responsible for the patient and discuss and advise on the possible implication of the outbreak. The patient shall be managed according to established infection prevention and control policies of the hospital.

#### *Two or more cases of nosocomial infections*

In case of two or more cases of nosocomial infections (potential or actual outbreak), full investigation shall be conducted. If an outbreak is confirmed, it shall be communicated to all staff and specific actions to be taken should be stated.

- A unit may have to be closed down to prevent further spread or to allow the outbreak to be investigated fully and/or to establish the source of the outbreak. If closure of unit(s) is necessary the staff shall be made fully aware of the consequences and the unit(s) shall be re-opened as soon as possible.
- The Infection Prevention and Control Committee shall critically review all aspects of investigations in order to identify problems so that future errors can be prevented. On conclusion of the investigations a formal written report shall be distributed to all departments.

#### 22.4.3 Procedure for Investigating Outbreaks in health facilities

An increase in the isolation of an infectious organism or any clustering of clinical cases shall form basis for investigating outbreaks in the hospital. The aim of investigation shall be to:

- determine how the outbreak occurred
- treat the infected patients/persons
- prevent spread of the infection with minimum disruption to activities of patients and staff
- recommend appropriate measures to prevent future occurrences.
- Conduct contact tracing if it is proven to be external to the health facility

The steps may vary depending on the nature of the problem. However, the first and second steps must be done before proceeding further.

#### **Step 1**

Establish or verify that an outbreak exists. Do the following:

- verify diagnosis and/or causative agent of reported case(s);
- develop specific criteria and a case definition;
- characterize the nature of the disease e.g. signs and symptoms, laboratory findings to include culture; and
- obtain the appropriate laboratory specimens to identify specific disease agent.

#### **Step 2**

Confirm the existence of an outbreak

- define or estimate the extent and magnitude of the problem, keeping within the range of a specific time period appropriate to the nature of the infection;
- compare current rates with the usual or baseline rate for the time frame;
- determine the need for outside assistance/consultation;

- institute early and appropriate prevention or control measures; and
- obtain and preserve cultures.

**Step 3**

- Continue surveillance for additional cases.

**Step 4**

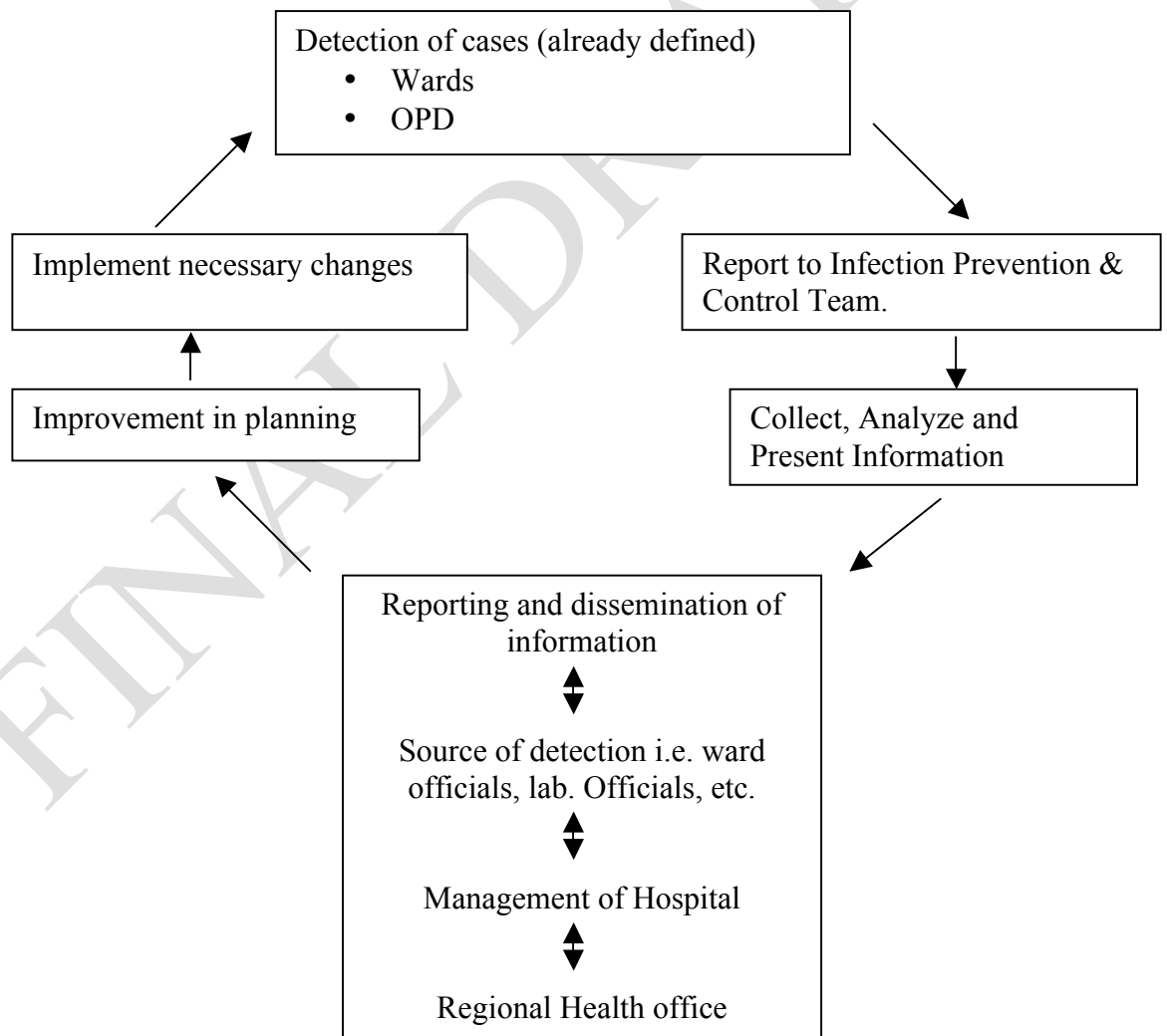
- Characterize cases by person, place and time to determine if the outbreak is from a common or propagated source.

**Step 5**

- Institute and evaluate other control measures, update and educate the staff as to findings, etc.

**Step 6**

- Provide and disseminate reports as required and maintain pertinent records. Suggested route of dissemination of information is in Figure 22.1



**Figure 22.1 : Diagram suggesting route of disseminating information**  
Adapted from the Manual of Epidemiology for District Health Management.  
1989WHO Year

## **SECTION 23 CARE OF THE DECEASED**

The transmission of deadly infectious diseases associated with mortuary care is sometimes seen among health care workers. In handling dead bodies all health care workers shall adhere to standard precautions at all times and appropriate PPE shall be used. Training should be organized for all people who handle dead bodies such as mortuary staff and undertakers.

### **23.1 Recommended PPE for health care workers (HCWs) handling dead bodies**

The recommended PPE for handling dead bodies are:

- reusable long-sleeved, cuffed gown;
- water proof apron; and
- non sterile gloves.

If splashing of body fluids is anticipated, use facial protection e.g. face shield or goggles and a surgical mask.

**Note:** Perform hand hygiene after removing all PPE

### **23.2 Packing and transport of dead body to mortuary, crematorium and burial**

Apply the following when packing and transporting dead bodies:

- Use the appropriate PPE when performing the last offices;
- The body should be fully sealed in an impermeable body bag before removal from the room/ward and before transfer to pathology department or the mortuary to avoid leakage of body fluid;
- Transfer to the mortuary should occur as soon as possible after death;
- If an autopsy is being considered, the body may be held under refrigeration in the mortuary and be conducted only when a safe environment can be provided for the autopsy; and
- The deceased's family members should be educated on standard precautions to take if they wish to view or touch the body.

### **23.3 Mortuary care**

Mortuary staff and the burial team should apply standard precautions. Embalming must be conducted according to local regulation or legislation and hygienic preparation of the deceased such as cleaning the body, tidying of hair, trimming of nails shall be conducted with the application of standard precautions.

### **23.4 Post mortem examination**

Post mortem examinations and collection of samples are essential to ascertain cause of death. These procedures are associated with risk of transmitting infections and should be performed only when necessary and if safety measures are in place. The following are some safety precautions:

- A minimum number of staff should be involved in the procedure;
- A well ventilated room should be available for the procedure; and
- Appropriate PPE should be used.

Recommended PPE that shall be used when performing autopsy are:

- scrub suit: tops and trousers or equivalent garments;
- fluid resistant long sleeve gowns;
- surgical masks or if small particle aerosols might be generated during autopsy procedures, particulate respirator or its equivalent should be used;
- face shield or goggles;
- autopsy gloves or 2 pairs of non sterile gloves; and
- knee- high boots.

Health care workers should put on PPE in the dressing room before proceeding to the autopsy room where the body is located

When removing PPE:

- exit the autopsy room to the dress out room;
- remove PPE in designated dress out room; and
- dispose of in accordance with recommendations and perform hand hygiene.

### **23.6 Suggested methods to reduce aerosol generation during autopsy**

To reduce aerosol generation during autopsy:

- containment devices should be used whenever possible e.g. bio-safety cabinets for the handling and examination of smaller specimens;
- vacuum shrouds should be used for oscillating saws;
- high pressure water sprays should not be used; and
- open intestines under water.

In some instances, when death is due to a highly infectious organism the corpses may not be released to the family for burial.



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# APPENDIX

FINAL DRAFT

## **Appendix 1 Contents of Training Programmes on IPC**

Education and training in IPC shall be designed to meet the needs of the different categories of health staff. Training programmes shall include topics like:

- Basic microbiology and modes of disease transmission;
- Infection prevention and control principles;
- Support supervision, monitoring and evaluation of infection prevention and control;
- Importance of good hygiene and hand washing;
- Standard and specialised disinfection and sterilisation equipment;
- Sterilisation processes and practices;
- Decontamination, cleaning and disinfection of work areas;
- Use of protective clothing and equipment;
- Dealing with spills;
- Handling and disposal of waste;
- Management of exposures and accidents;
- Risk identification, assessment and control;
- Handling of specimen;
- Health and safety issues;
- Antibiotic policy and practice;
- Legal and ethical issue;
- Information management and research;

## Appendix 2 How to prepare 0.5% chlorine solution

<b>Formula for Calculations</b>	<p><b>Using chlorine releasing solution (bleach)</b></p> $\left[ \frac{\% \text{ Chlorine in liquid bleach}}{\% \text{ Chlorine desired}} \right] - 1 = \text{Total parts of water for each part of bleach.}$ <p><b>Example: To make a 0.5% chlorine solution from 3.5% bleach</b></p> $\left[ \frac{3.5}{0.5} \right] - 1 = 7 - 1 = 6 \text{ parts water for each part of bleach}$ <p><b>Thus to make 0.5% chlorine solution add 1 part bleach to 6 parts water.</b></p>
	<p><b>Using chlorine releasing powder</b></p> $\left[ \frac{\% \text{ chlorine desired}}{\% \text{ chlorine in chlorine releasing powder}} \right] \times 1,000 = \text{No of grams of powder for each litre of water}$ <p><b>Example: To make 0.5% chlorine solution from chlorine releasing powder containing 35% active chlorine</b></p> $\left[ \frac{0.5\%}{35\%} \right] \times 1,000 = 0.0143 \times 1,000 = 14.3$ <p>Thus, you must dissolve 14.3 grams of bleach powder in each litre of water to make a 0.5% bleach solution</p>
	<p><b>Using chlorine releasing tablets</b></p> <p>Follow the manufacture's instructions, since percentage active chlorine in these products vary.</p>

**Appendix 3. Examples of commonly used disinfectants and antiseptics**

<b>Type of Chemical</b>	<b>Disinfectants</b>	<b>Antiseptics</b>
<b>Halogens</b>	Hypochlorite (Bleach) 5%, Tincture of Iodine 1-3%	Iodophors (Povidone- iodine)
<b>Aldehydes</b>	2% Glutaraldehyde (Cidex)	
<b>Acids</b>	Peracetic acid	
<b>Oxidizing agents</b>	Potassium permanganate	Hydrogen peroxide, Potassium permanganate
<b>Alcohols – 70% (spirits)</b>	Ethanol, isopropyl alcohols	Ethanol, isopropyl alcohols
<b>Phenolics</b>	Phenol (Carbolic acid), Hexachloropane (Phisohex)	Hexachlorophane
<b>Quaternary ammonium compounds</b>	Cetrimide, Cetrimide + chlorhexidine (Savlon)	Cetrimide, Cetrimide + chlorhexidine (Savlon)
<b>Diguanides</b>	Chlorhexidine 4% Chlorhexidine 4% + detergent Chlorhexidine 4%+ glycerin	Chlorhexidine 4%+ detergent (Hibiscrub) Chlorhexidine 4%+ glycerin (Hibisol)

**Appendix 4: Reporting formats for workplace exposures / Injuries**

**Instructions:**

Fill out this form and have the appropriate test done within 48 hours after injury. Send the report to the Regional Director of Health Services through your immediate supervisor and the head of the facility. Follow up on the blood test results and forward it to the Regional Director through the same means.

Name and ID of employee: .....

Category / Rank; .....

Name of institution : .....

Age: .....

Sex: Male ( ) Female ( )

Date and time of injury, accident and assault  
.....

Diagnosis of patient: .....

Place of injury /accident/assault  
.....

Details on the type of injury, accident, assault and exposure (including amount of fluid or blood taken in the body.  
.....  
.....

Type of blood test done (e.g. Hepatitis B, HIV)  
.....  
.....

Date and time of test: .....

Results obtained: .....

Date on which results were obtained: .....

Person notified immediately after the injury or accident occurred  
.....

Time of exposure / injury / accident / assault

Was action taken within 48 hours? Yes No

Explanation .....

.....

Was action taken after 48 hours? Yes No

Explanation .....

.....

Signature of employee.....

Signature of receiver of the form.....

**Appendix 5: TB Screening Questionnaire**

**TB SCREENING QUESTIONNAIRE**

NAME: .....

AGE: ..... SEX: ..... DATE: .....

**SYMPTOM SCREEN**

Do you have any of the following symptoms? (Please circle grade for response)

	<b>No</b>	<b>Yes</b>
<b>Cough for more than 2 weeks</b>	<b>0</b>	<b>2</b>
Coughing up blood	<b>0</b>	<b>2</b>
Sputum production	<b>0</b>	<b>2</b>
Loss of weight in last 3 months	<b>0</b>	<b>1</b>
Loss of appetite recently	<b>0</b>	<b>1</b>
Fever for more than 1 week	<b>0</b>	<b>1</b>
Chest pain	<b>0</b>	<b>1</b>

**Total Score: (max 10)**

**PAST MEDICAL HISTORY**

Have you been exposed to a TB patient recently? **YES** **NO**  
 Have you been treated for TB in the past 5 years? **YES** **NO**  
 When: ..... (Year)  
 Duration: ..... (Months)

<b>If Patient has:</b>	<b>Interpretation</b>
Cough for > 2 weeks	<b>Suspect</b>
Score of 7 or more on symptom screen	<b>Suspect</b>
Previous TB treatment in last 5 years	<b>Suspect</b>

**CONCLUSION** (Circle) **SUSPECT** **NON SUSPECT**

**REQUEST SPUTUM SMEAR MICROSCOPY FOR ALL SUSPECTS**

**RESULTS** (Circle final diagnosis)

**SPUTUM 1: Date..... POS NEG REF NPC DEA ILL**  
**SPUTUM 2: Date..... POS NEG REF NPC DEA ILL**  
**SPUTUM 3: Date..... POS NEG REF NPC DEA ILL**

**KEY**

POS: positive smear result      NEG: negative smear result      REF: refused to provide a sputum  
 NPC: non productive cough      DEA: died before sputum collection      ILL: too ill to provide sputum

## Appendix 6: Categorisation of Human Cases of Avian Influenza (H5N1) Case

The schema shall be used to categorise clinical cases of human cases of avian influenza:

### a. Suspected avian influenza (H5N1) case

Any individual presenting with fever (temperature  $\geq 38^{\circ}\text{C}$ );

and

- i. one or more of the following symptoms  
cough  
shortness of breath  
sore throat
- OR
- ii. death from an unexplained acute respiratory illness

and

At least one of the following exposures within 7 days prior to onset of symptoms

- i. reside or visit on area where H5N1 is suspected or confirmed in birds or fowls and been in close contact with any sick or dead wild birds or domestic fowl;
- ii. work in a laboratory with potential exposure to influenza H5N1; and
- iii. close contact with a confirmed case.

### b. Probable influenza (H5N1) case

As suspected cases:

and

Limited laboratory evidence for influenza H5N1 (not conclusive e.g. H% specific antibodies detected in a single serum specimen).

### c. Confirmed influenza (H5N1) case

An individual for whom laboratory testing demonstrates one or more of the following:

- i. positive viral culture for influenza H5N1
- ii. positive PCR for influenza H5N1
- iii. immunofluorescence antibody (IFA) test positive using H5N1 monoclonal antibodies
- iv. 4-fold rise in influenza H5N1 specific antibody titre in paired serum samples





**Analysis, Interpretation and Response**

CHOLERA	MENINGITIS	MEASLES	AVIAN INFLUENZA	AFP CASES	GUINEA WORM
<b>Comments on Lab:</b>					
Total Samples sent to lab: _____ Type of Pathogens isolated: _____	Total No. of CSF samples sent to lab: _____ Type(s) of Pathogens isolated: _____	Total No. of samples sent to lab: _____	Total No. of samples sent to lab: _____	Total No. of samples sent to lab: _____	
<b>Comments on trends:</b> Compare number of cases with at least those of two previous weeks (State whether cases are increasing, decreasing or there is no change)					
<b>Comments on Mortality:</b> Compare case fatality rate (CFR) (State whether CFR is increasing, decreasing or there is no change)					
<b>Conclusion: (State the current disease situation)</b>					
	Sub-district/District Meningitis Alert Threshold crossed <input type="checkbox"/> Yes <input type="checkbox"/> No  Name(s) of Sub-district/District crossing Alert Threshold: _____  Sub-district/District Meningitis Epidemic Threshold crossed? <input type="checkbox"/> Yes <input type="checkbox"/> No Name(s) of Sub-district/District crossing Epidemic Threshold: _____				
<b>Actions taken:</b>					
<b>Recommendations:</b>					

Name of Person Reporting: \_\_\_\_\_ Telephone No.: \_\_\_\_\_  
 Signature \_\_\_\_\_ Date of Report: \_\_\_\_ / \_\_\_\_ / \_\_\_\_

FINAL

## **Appendix 8 Classification of Nosocomial Infections**

There are several classifications of nosocomial infections. In the Ministry of Health the classification shall depend on:

- 1. Source of infection.**
- 2. Type of infection.**

### **1. Source of infection** – These include:

- a. Self-infection
- b. Cross infection – person to person
- c. Environmental – from environment to person
- d. Iatrogenic

### **2. Type of infection:**

The four most frequent types of hospital-acquired infections are:

- a. Urinary Tract Infections (UTI)
- b. Wound Infections
- c. Lower respiratory tract infection.
- d. Skin sepsis such as pressure sores, varicose ulcers.

### Appendix 8 Common Nosocomial Infections (cont.)

Type	Main Organisms	Usual Sources	Means of Spread
1. Urinary tract infections (can occur in catheterized patients or those undergoing cystoscopy, prostatic biopsy or urological surgery)	Gram-negative bacilli e.g. E. coli Klebsiella Proteus Pseudomonas Serratia	1. Patient's own faecal flora 2. Contaminated equipment, e.g. urinary catheters or endoscopes	1. Hands of staff contaminated by infected urine, while handling patient, or infected urinary equipment. 2. Inadequately sterilized urinary equipment.
2. Post-operative wound sepsis in 'Clean' surgery	1. Staph. aureus 2. Strep. pyogenes (much less common than Staph.)	1. Patient's own skin or nasal flora 2. Staph. /Strep. from septic lesions of other patients or hospital staff. 3. 'Dry' environment-air, bedclothes, dust, etc.	1. Hands or clothing of patient/staff contaminated by an infected patient. 2. Carriage by staff or patients of an epidemic strain. 3. Dispersal of Staph. / Strep. from infected lesion or carriage site into air or dust.
Abdominal and gynaecological surgery (also frequently complicated by intra-abdominal or pelvic abscesses due to similar organisms)	1. Gram-negative bacilli e.g. E. Coli 2. Non-sporing anaerobes e.g. Bacteriodes fragilis 3. Staph. aureus	1. Patient's own faecal flora	1. usually 'self'-infections. 2. Staph. (See 'Clean' surgery above)
Orthopaedic surgery	1. Staph. aureus 2. Haemolytic 3. 4. streptococci 5. Clostridium perfringens  6. Staph. epidermidis  7. Gram-negative bacilli and 8. Non-sporing anaerobes	Same as 'Clean' surgery above  Patient's faecal flora: Spores on skin may germinate unless adequate prophylaxis given, especially for cases of ischaemic arterial disease and lower limb amputations Skin of patient or surgeon when hip joint replacement operation involved Patient's faecal flora when extensive lower limb surgery involved	Usually not applicable-'self'-infection          Usually not applicable-'self'-infection

**Appendix 8 Common Nosocomial Infections (cont.)**

<b>TYPE</b>	<b>MAIN ORGANISMS</b>	<b>USUAL SOURCES</b>	<b>MEANS OF SPREAD</b>
Respiratory tract infection Pneumonia in post-operative and debilitated cases	1. Strep. pneumonia  2. Staph. aureus	1. Patient's own upper respiratory flora 2. Patient's nasal flora or from hospital 'dry' environment	Usually not applicable  Air and dust
Pneumonias in aspiration cases	1. Strep. pneumonia 2. Staph. aureus 3. Haemophilus influenzae 4. Non-sporing anaerobes 5. Gram-negative bacilli	As above  Patient's own upper respiratory flora  From hospital 'moist' environment	As above  Not applicable  Hands of staff and 'moist' environment
Pneumonias in intensive care cases	Similar to aspiration pneumonia	As for aspiration pneumonia	As for aspiration pneumonia
Immunosuppressed cases	Similar to aspiration pneumonia + Cytomegalo-virus, Nocardia, Legionella pneumophila, Pneumocystis, fungi, Mycobacterium tuberculosis		
Tuberculosis	Mycobacterium tuberculosis	Respiratory droplets and sputum from open TB cases	Air and dust
Influenza	Influenza viruses	Respiratory droplets from infected patients or staff	Air
Upper respiratory tract in childhood	Strep. Pyogenes Rhinoviruses Respiratory syncytial virus Measles v Varicella-zoster v and other 'respiratory' viruses Herpes simplex	Respiratory droplets from infected patients or staff  Patient's latent mouth flora	Air

**Appendix 8 Common Nosocomial Infections (cont.)**

<b>TYPE</b>	<b>MAIN ORGANISMS</b>	<b>USUAL SOURCES</b>	<b>MEANS OF SPREAD</b>
3. Alimentary tract infections Gastro-enteritis.	1. Salmonella species 2. Clostridium perfringens 3. Campylobacter jejuni 4. Staph. aureus 5. Enteropathogenic E. coli (infants) 6. Rotavirus (infants)	1. Infected food from hospital kitchen or contaminated infant milk feeds 2. Infected or asymptomatic carrier patient-faeces	3. Hands of kitchen, nursing or other staff or 4. Direct spread in maternity or paediatric units 5. Contaminated 'moist' sites, e.g. infected bedpans (NB Clostridium perfringens food poisoning does not spread from patient to patient)
Bacillary dysentery	1. Shigella sonnei 2. Shigella flexneri 3. Other Shigellae	Faeces of infected patients	1. Direct spread in mental, paediatric and geriatric wards. 2. Hands of staff and patients 3. Moist sites in toilets, bedpans
Enteric fever	Salmonella typhi	Infected or carrier patient-faeces, urine, exudates	1. Contaminated hands of staff 2. Contaminated moist sites- e.g. endoscopes
5. Hepatitis and human immunodeficiency virus (HIV) infections	1. Hepatitis B virus Hep C virus HIV  2. Hepatitis A virus	Infected or carrier patient-blood, serum, exudate, tissues, etc.  Faeces of infected patient (before start or less than 1 week of jaundice)	1. Contamination of hands, mucous membranes or eyes of ward, theatre or laboratory staff. 2. Contaminated machines, 'sharps' bed pans and other environmental items
6. Maternity/neonatal infections Breast abscess in mother (develops later outside hospital) Neonatal skin/eye/umbilical cord sepsis, Ritter's disease	Staph. aureus (penicillin resistant)	Skin or nasal flora of hospital staff or infected patient	1. Hands of hospital staff 2. Air and dust in nursery-especially if neonates are close to each other

**Appendix 8 Common Nosocomial Infections (cont.)**

TYPE	MAIN ORGANISMS	USUAL SOURCES	MEANS OF SPREAD
Puerperal sepsis, septic abortion, intra-uterine sepsis	<p>Haemolytic Streptococci, Lancefield groups A, B, C or G</p> <p>Non-sporing anaerobes e.g. Bacteroides species Clostridium perfringens E. coli and other coliforms Staph. aureus</p>	<p>1. Vaginal or respiratory flora of patient. 2. Upper respiratory flora of hospital</p> <p>Faecal or lower vaginal flora of patient (As for Staph. above)</p>	<p>1. Hands of hospital staff (although most group B Strep. 'self'-infection)</p> <p>2. Not applicable-'self'-infection</p>
Neonatal septicaemia or meningitis (often following soft tissue or umbilical cord sepsis)	Group B haemolytic Streptococcus E. coli and other coliforms Pseudomonas aeruginosa	Maternal faecal or lower vaginal flora Maternal flora or contaminated antiseptics, water, baby incubator or resuscitation equipment	Usually not applicable-occasionally hands of hospital staff
<p>7. Skin sepsis</p> <p>Infected eczema, burns pressure sores and varicose ulcers</p>	<p>Staph aureus Strep. pyogenes and other haemolytic Streptococci</p> <p>'coliforms', Pseudomonas and Bacteroides</p>	<p>Pus and skin scales of infected patients Also Staph. aureus self-infection from patient's own carrier sites</p> <p>2. As above 3. Patient's own faecal flora</p>	<p>2. Hands of hospital staff 3. Air and dust</p> <p>1. Hands of hospital staff 2. Contaminated moist environment</p>