Infection Control Assessment Tool:

A Standardized Approach for Improving Hospital Infection Control Practices

September 2013

health
Department:
Health
REPUBLIC OF SOUTH AFRICA

USAID
FROM THE AMERICAN PEOPLE

SIAPS
Systems for Improved Access to Pharmaceuticals and Services

This tool is made possible by the generous support of the American people through the US Agency for International Development (USAID), under the terms of cooperative agreement number AID-OAA-A-11-00021. The contents are the responsibility of Management Sciences for Health and do not necessarily reflect the views of USAID or the United States Government.

This adaptation of the Infection Control Assessment Tool was commissioned and published by the South Africa National Department of Health. For further information, please go to http://www.health.gov.za/

The information in this publication may be distributed and reproduced as long as the source is acknowledged and is used for non-commercial purposes only. The citation should read:

National Department of Health. *Infection Control Assessment Tool-September 2013*. Pretoria: Government of South Africa.

CONTENTS

Foreword by Minister of Health v

Statement by the Director-General of Health vi

Acknowledgement vii

Acronyms viii

Part I: Infection Control Assessment Tool Manual 1

Background 2
- Infection Control in Hospitals: A Worldwide Problem 2
- Infection Control Assessment Tool: A Systematic Approach to Improving Health Care Facility Infection Control Programs 2

Overview of the Infection Control Assessment Tool 4
- Assessment Modules 4

Types of Health Facility Assessments 6
- Comprehensive Infection Control Assessment 6
- Individual Clinical Unit or Service Area Assessment 6
- Problem-Focused Assessment 6

Conducting a Health Facility Assessment: Steps 8
- Identify the Need to Conduct an Assessment 8
- Identify an Assessment Team 8
- Prepare Observation Checklists 9
- Administer the Assessment 9
- Determine and Review Scoring Results 10
- Report and Act on Results 10

Glossary 11

Overview of Modules 14
- Modules Administered Once for the Facility as a Whole 14
- Modules Administered Once for Specific Services (if Present in the Facility) 15
- Modules Administered Once Where Disinfection or Sterilization Takes Place 16
- Modules Administered Once for Each Clinical Area (If Relevant) 16

Module Scoring 18
- Example Scoring Sheet 19
- Sample Scoring Sheet 20

Part II: Infection Control Assessment Tool Modules 21

Airway Suctioning 22

General Ward 26

Hand Hygiene 32
Health Facility Information 38
Infection Control Program 43
Injections 54
Intensive Care Units 59
Intravenous Catheters 67
Intravenous Fluids and Medications 74
Isolation and Standard Precautions 80
Labor and Delivery 92
Microbiology Laboratory 104
Occupational Health 114
Pharmacy 128
Renal Unit 138
Sterilization and Disinfection—Equipment and IV Fluids 146
Surgical Antibiotic Use and Surgical Equipment Procedures 162
Surgical Area Practices 171
Transplant Unit 185
Precautions for Tuberculosis 191
Urinary Catheters 202
Waste Management 210
Part III: Infection Control Assessment Tool Observation Checklists 216
Facility Checklist for Alcohol Hand Antiseptic 217
Facility Checklist for Hand washing Supplies 219
Observation Checklist for Hand Hygiene Practices 221
Checklist for Injection Administration 222
Checklist for Waste Disposal After Delivery 224
References 225

FOREWORD BY MINISTER OF HEALTH

Worldwide, countries are grappling with assuring the safety of patients and preventing health care-acquired infections. South Africa is no exception. Health care-acquired infections lead to increased morbidity and mortality as well as to longer hospital stays with additional costs of care, increased readmission rates and occasionally legal costs. However, this can be minimized or even prevented by ensuring sound infection prevention and control practices are being followed in all corners of our health facilities at all times.

Implementing infection prevention and control programmes is often challenging because of financial constraints, limited laboratory capacity, crowded hospital wards and inadequately trained or inexperienced staff. Under such conditions it therefore becomes of paramount importance that a systematic approach is followed to identify deficiencies in infection prevention and control practices, and that effective and affordable interventions are implemented. This Infection Control Assessment Tool (ICAT) provides the required systematic approach that infection control teams can on a daily basis apply in our health facilities to firstly identify risky practices and physical areas of work and to subsequently develop and implement corrective measures that reduce risks of poor and unsafe care.

Developed with extensive inputs from many different partners, this Infection Control Assessment Tool directly aligns with the expected levels of care as described by the infection prevention and control sections of the *National Core Standards for Health Establishment*, thus becoming another valuable tool that health care professionals can use to help meet our vision of a long and healthy life for all South Africans.

DR A MOTSOALEDI, MP
Minister of Health

STATEMENT BY THE DIRECTOR-GENERAL OF HEALTH

South Africa, like many other countries in the world, faces the challenge of new and emerging health care-acquired infections which are becoming more difficult to treat. Over the past few years the health care system in South Africa has experienced numerous outbreaks of health care-acquired infections especially in neonatal intensive care units and wards, resulting in high mortality rates. We also observe that infections are becoming increasingly resistant to our usual array of antibiotics leaving us with few options for treatment. One effective mechanism to reducing infections and preventing the emerging of resistant strains is through effective infection prevention and control systems, hand hygiene practices and antibiotic stewardship programmes.

Based on the serious concerns raised by patients and the public, the Department of Health has identified Infection Prevention and Control as one of six priority areas for immediate service delivery improvement as part of the *National Core Standards for Health Establishments*, the latter being the overall guide to quality care. Focusing on improvement in the priority area also contributes towards strengthening the effectiveness of the health system which is one of the key strategic outputs of the ministerial Negotiated Service Delivery Agreement.

This Infection Control Assessment Tool has been designed to assist managers and provide quality improvement teams such as the countrywide Health Facility Improvement Teams (HFIT) with a framework to use to identify, control and prevent health care-acquired infections through the implementation of risk assessments and clinical audits. Already referred to as the "ICAT" by many, this assessment tool comes at a time when a renewed focus is being placed on providing the necessary governance, support and guidance needed by facilities to meet the required levels of care as respectively described in the *National Core Standards for Health Establishments* and the *National Infection Prevention and Control Policy and Strategy*.

Thus, to ensure compliance and continuous quality improvement, infection-control teams, infection-control practitioners and quality managers are encouraged to use the ICAT across their facilities as a whole or at specific clinical and administrative areas. It will assist them to (i) understand the required level of infection control systems for delivering improved infection prevention, and the effective mechanisms of monitoring compliance with infection standards and norms to reduce infection rates, and (ii) improve antibiotic resistance patterns.

We believe that the ICAT through its 22 modules and observation checklists provides the necessary means for health workers to live up to our collective duty to patients and members of the public that we will do whatever is possible to prevent them from getting infections while receiving care at our hospitals and clinics.

MS M P MATSOSO
Director General of Health

ACKNOWLEDGMENT

The Department of Health would like to acknowledge the efforts of all the reviewers, contributors, and representatives of public health facilities and universities who assisted with the development of the South African version of the ICAT.

The Department of Health would in particular like to extend a special word of thanks to the US Agency for International Development (USAID)-funded Systems for Improved Access to Pharmaceuticals and Services (SIAPS) Program, implemented by Management Sciences for Health (MSH) for driving and funding the project of developing this Infection Control Assessment Tool. A very special word of thanks is extended to the following staff members of SIAPS, Mr. M. Ntengu, Mr. W. Goredema, Mr. B. Pharasi, Mr. J. P. Sallet, and Dr. M. Joshi who all contributed to the final product.

The generic tool was field-tested, revised, and adapted for use in South Africa. The following hospitals participated in various ways during these processes:

- Tshwane District hospital, Pretoria
- Steve Biko Academic Hospital, Pretoria
- Kimberley Hospital, Pretoria
- Kuruman Hospital, Kuruman
- Weskoppies Psychiatric Hospital, Pretoria
- Polokwane Mankweng Hospital Complex, Polokwane
- Frere/East London Hospital Complex, East London
- Edendale Hospital, Pietermaritzburg
- Rob Ferreira Hospital, Nelspruit
- Mafikeng/ Bophelong Hospital Complex, Mafikeng
- Pelonomi Hospital, Bloemfontein
- Rustenburg Provincial Hospital, Rustenburg

ACRONYMS

CDC	US Centers for Disease Control and Prevention
HAI	health care-associated infections
HIV	human immunodeficiency virus
ICAT	Infection Control Assessment Tool
ICU	intensive care unit
IV	intravenous
MSH	Management Sciences for Health
SPS	Strengthening Pharmaceutical Systems
TB	tuberculosis
USAID	US Agency for International Development
WHO	World Health Organization

Part I: Infection Control Assessment Tool Manual

BACKGROUND

Infection Control in Hospitals: A Worldwide Problem

Health care-associated infections (HAIs) are a significant cause of morbidity and mortality in every health care system, especially in developing countries. Common HAIs include surgical site infections, bloodstream infections, pneumonia, and tuberculosis (TB). Outbreaks of infections, particularly in health facilities with limited resources, can affect numerous health care providers and consumers. Controlling these outbreaks unnecessarily consumes scarce resources. Furthermore, worldwide increases in the resistance of infectious organisms to common antimicrobials multiply the difficulties and expense of treating HAIs. However, HAIs can be prevented and controlled among staff and patients through careful and systematic attention to infection prevention and control guidelines and procedures.

Many developing nations spend more than 50 percent of their health care budgets in health care facilities, including substantial expenditures for advanced diagnosis and treatment equipment and for care of high-risk patients such as newborns, surgical patients, or patients in intensive care units. Failure to prevent or control HAIs can limit the benefits of these expenditures and further stress health care facility budgets. Therefore, sound facility infection control programs are essential from both an economic and a clinical perspective to reduce the risk of serious, preventable, costly infections for patients and health care workers.

Implementing infection prevention and control programs in resource-limited settings is frequently hampered by financial constraints, limited laboratory capacity, and inadequate staff training in areas such as hand hygiene, sterilization procedures, isolation precautions, occupational health programs, hospital epidemiology, and quality improvement. Therefore, a systematic approach to detect deficiencies in infection prevention and control practices and to implement effective, affordable solutions is urgently needed. The Infection Control Assessment Tool (ICAT) provides an approach that can be used by infection control teams to identify and solve problems economically and practically in low-resource health care facilities.

Infection Control Assessment Tool: A Systematic Approach to Improving Health Care Facility Infection Control Programs

The ICAT is designed to help identify, control, and prevent HAIs through an easily administered instrument that highlights areas of concern and suggests cost-efficient improvements within health facilities. It may be applied across the facility as a whole or for specific clinical and administrative areas.

Many international organizations have developed standards for preventing the transmission of infections among patients and health workers. For example, the World Health Organization (WHO) has developed standards for infection control and injection safety in resource-poor hospitals,[1] and organizations such as EngenderHealth[2] and Jhpiego[3] have created useful

[1] World Health Organization (WHO)/Regional Office for Africa (AFRO), Commonwealth Regional Health Community Secretariat (CRHCS), and East, Central and Southern African College of Nursing (ECSACON). 2001. *Manual of Infection Prevention and Control Policies and Guidelines*. Prepared by U. V. Reid. A copy of this manual is also available on the CD-ROM.

approaches for implementing infection control programs in health facilities in resource-limited settings.

The ICAT offers a simple and practical approach for assessing the adequacy of existing infection prevention and control practices and gives specific recommendations for improving practices and monitoring their ongoing effectiveness.

[2] EngenderHealth. 2004. Infection Prevention Online Course. http://www.engenderhealth.org/res/onc/index.html#start (accessed July 17, 2006). Copies of EngenderHealth materials are also available on the CD-ROM.

[3] Tietjen, L., D. Bossemeyer, and N. McIntosh. 2003. *Infection Prevention: Guidelines for Healthcare Facilities with Limited Resources*. Baltimore, MD: Jhpiego. http://www.reproline.jhu.edu/english/4morerh/4ip/IP_manual/ipmanual.htm (accessed July 28, 2006). A copy of this manual is also available on the CD-ROM.

OVERVIEW OF THE INFECTION CONTROL ASSESSMENT TOOL

This manual describes how to use the assessment tool. Please read this manual *before* reviewing the modules of the tool.

Assessment Modules

The ICAT consists of 22 modules (standardized units) that are to be used to conduct a comprehensive assessment of infection prevention and control activities in health care-facility settings. Each module focuses on a topic or specific service area, such as labor and delivery, intensive care, or general medical or surgical wards. Modules that target topics that are not relevant (for example, if a hospital has no microbiology laboratory) can be omitted.

The ICAT is designed to be adapted for use by large and small health care facilities, regardless of bed size, budget, or type (referral, regional, district, or community). It may be used to address issues at all levels—

- To strengthen infection prevention and control activities at a facility with no formal infection control program
- To identify weaknesses in a facility's existing infection prevention and control program
- To target a specific infection prevention and control issue needing improvement

A brief description of the topics covered in each module is included in the Overview of Modules section. The number of modules completed in an assessment will depend on the identified needs of an individual facility or complex of facilities.

Assessment Module Structure

Each assessment module consists of groups of questions that can be answered by yes/no, multiple choice, or checklist responses. Modules will be completed either for the facility as a whole or from the perspective of a specific ward or department. If a facility has multiple departments or areas of a similar type (such as medical wards, surgical areas, intensive care units [ICUs]) that follow similar practices and standards, the relevant module is completed only once. If departments or clinical areas differ in patient populations or standard practices, the relevant module is completed separately for each department or clinical area.

Each module is divided into sections that cover different aspects of the general topic (such as procedures for surgical scrubs within the Surgical Areas module). Each section is scored by totaling the number of points associated with the responses ticked for questions in that section. Each response is assigned a point value (ranging from 0 to 3).

The overall quality of the practices measured in each section is summarized using three categories—

- A—recommended practices are followed consistently and thoroughly (more than 75% of possible points)
- B—recommended practices usually followed (50–75% of possible points)
- C—training and follow-up needed on recommended practices (less than 50% of possible points)

The Module Scoring Sheet section provides a detailed explanation on how to determine the points scoring.

Completing the assessment tool and totaling the points received is not intended as a test. Point values are intended to help respondents identify areas in which existing practices are satisfactory, or where opportunities exist for improvement. For example, if results from completing the Labor and Delivery module indicate that only 40 percent of points were awarded for the section on use of barrier equipment such as gloves, special shoes, or gowns, this score may be a signal that the issue needs special attention to control the spread of infection among mothers and babies. Financial or logistic constraints may limit what is possible, but part of the assessment and quality improvement approach involves looking at alternatives that may be practical and cost-effective in a given situation. Pilot tests indicate that low-cost solutions can frequently be found to address infection prevention and control problem areas. The annotations at the end of each module or the resource materials on the accompanying CD-ROM can help identify inexpensive and practical approaches.

Annotations and Recommended Practices

Following the questions in each module are annotations that explain "best practices" for the issues addressed. These annotations are generally based on recommendations from respected organizations such as WHO, CDC, EngenderHealth, and Jhpiego,[4] as well as from recognized international experts in infection control. Where possible, recommendations are referenced to specific publications.

If a province has its own policies, guidelines, or standards that address specific topic areas not covered in the ICAT, questions can be added to a module on such issues. Also, the annotations provide a way to compare local practices with internationally accepted standards.

[4] See, for example: WHO. http:// www.who.int/; CDC (US Centers for Disease Control and Prevention). http://www.cdc.gov/; EngenderHealth. http://www.engenderhealth.org/; Jhpiego. http://www.jhpiego.org/.

TYPES OF HEALTH FACILITY ASSESSMENTS

There are three types of assessments that can be performed using the ICAT.

Comprehensive Infection Control Assessment

A comprehensive infection control assessment can be performed for accreditation or external evaluation. The ICAT can also be used when introducing a new infection control program. When conducting a comprehensive infection control assessment, all ICAT modules should be completed, including modules that apply to the facility as a whole and those that apply to each ward and service area (see Overview of Modules section). A comprehensive assessment should be led by a team identified by the infection control committee, working in cooperation with the facility manager, superintendent, or chief executive officer.

Individual Clinical Unit or Service Area Assessment

Unit or service area assessments must be conducted when requested by the unit or service area manager or when there are insufficient resources to conduct a comprehensive assessment. The request can also originate from concerns raised by doctors or nurses in a ward or clinical service area such as labor and delivery or surgery.

Where resources are insufficient to carry out a full infection control assessment, the team may wish to begin by assessing practices (such as hand hygiene practices) in one or two wards or service areas. In such situations, only the assessment modules that apply to those specific services or facility areas would be included.

It is recommended that modules that apply to the entire facility are completed first to provide a baseline perspective on facility-wide policies. The unit manager in the given clinical unit or service area must lead this type of assessment with the support of facility management.

Additional modules must be completed later as appropriate, especially if completed modules point to other areas of concern.

Problem-Focused Assessment

A problem-focused assessment is required to address a specific infection outbreak or area of concern. In such situations, a targeted set of modules would be completed. For example—

- If a high rate of surgical site infections has been identified by the microbiology laboratory, ward personnel, or pharmacy department, the modules chosen for an assessment might include those that apply to surgical issues, including Surgical Area Practices, Surgical Antibiotic Use and Equipment Reprocessing, Hand Hygiene, General Ward (for each ward caring for surgical patients), ICU (if available), Intravenous (IV) Catheter, IV Fluids and Medications, Urinary Catheters, and the Sterilization and Disinfection modules.

- If a concern exists about the adequacy of instrument and equipment processing, particularly disinfection and sterilization procedures, all Sterilization and Disinfection modules should be completed by the central sterile supplies department responsible for this function.

- If facility management or clinical heads observe an increase in the number of cases of TB or pneumonia among patients or staff, the appropriate modules to complete might include TB, Isolation and Standard Precautions, General Ward, Waste Management, Hand Hygiene, Occupational Health, and Sterilization and Disinfection.

- If a general concern exists about adherence to hand hygiene guidelines, particularly in facilities with scarce resources, the Hand Hygiene module should be completed for all patient care areas throughout the facility. The annotations to the Hand Hygiene module suggest low-cost alternatives to sinks or sources of clean water, such as preparation and use of antiseptics for ward or facility personnel. Depending on the findings, additional modules relevant to specific services, such as the Labor and Delivery or General Ward might also be completed.

CONDUCTING A HEALTH FACILITY ASSESSMENT: STEPS

The following sections provide an overview of the steps needed to introduce and prepare facility management, health care workers, and the assessment team for conducting an infection control assessment.

Identify the Need to Conduct an Assessment

The first step in conducting an assessment of infection control practices is to identify needs, which can originate from several sources—

- Colleagues from different facilities in a complex, region, referral network, or district may identify areas of similar concern in infection control practices and join to address them.
- Personnel from a district or provincial department may decide to survey the state of infection control programs in a given area to assess current practices.
- National health authorities may decide to survey hospitals to determine whether national infection control standards have been implemented.
- Management or clinical staff in an individual facility may recognize that infection control requires improvement because of an overall high level of reported infections, the occurrence of an outbreak, an increasing number of antimicrobial-resistant infections, or a general decision to focus on improving quality.

Identify an Assessment Team

In consultation with senior facility management, the chairperson of the infection control committee should identify a multidisciplinary team to take part in the assessment process, ideally including a doctor, a senior registered nurse, and at least one other appropriate infection control partner, such as a quality improvement representative, pharmacist, or microbiologist.

The team leader should convene an initial meeting with the identified team to present an overview of the project and discuss viable approaches for improving infection control quality. Prior to the meeting, each team member should read the ICAT manual and review the contents of the assessment modules. At the meeting, the team can—

- Agree on assessment objectives
- Plan the assessment process
- Establish a schedule for meetings and targets during the process
- Assign individual assessment topics to team members

- Identify which facility staff (as identified in the assessment plan) will be the most appropriate to approach to complete interviews or observations for individual modules

Prepare Observation Checklists

For some aspects of the assessment, it is recommended that practices be directly observed in a clinical area over time, for example, hand-washing practices during the process of patient care. For direct observation, key questions in the assessment tool can be adapted to a short observation checklist. The assessment team should make a list of the procedures that can effectively be assessed by observation rather than by questioning and develop the checklist on a given topic. It is important to pilot-test the observation checklist to be sure that it captures the information as intended.

If checklists are used, the team should identify facility personnel to participate in and assist with the observation process. These individuals may be members of the assessment team, or they could be other staff working on the wards or clinical areas. Nurses are a valuable resource in this process.

Administer the Assessment

The team must identify the respondents who will be asked to complete given modules. Most modules can be completed in one hour or less.

Copies of each module should be distributed to the people who will complete them prior to the actual assessment interview. The assessment team member should take a spare copy in case the respondent is unable to locate the copy sent in advance. Schedule a convenient time for the interview and/or observations. During the assessment, the assessment team member and the respondent should both have a copy of the module so that they can easily follow the questions.

The assessment interview may be easier and more informative if the following points are observed—

- The assessment team member leads the respondent through the questions in the module, marking the answers as indicated in the instructions (such as “Mark one answer” or “Mark all that apply” or “Yes/No”).

- As the interview begins, reassure the respondent that the scores highlight areas that offer opportunities for improvement and are not designed to find fault.

- If a section of the module is not relevant because the health care facility does not offer specific services or follow certain practices, leave the section blank and explain that this result may indicate an area that could become the focus for future quality improvement activities.

- To make the interview flow smoothly, introduce each section of a module by saying, “Now we will move to questions about <topic>.”

- If the respondent asks why no point has been awarded for a particular response, the assessment team member can refer to the annotations associated with the module and explain why points are awarded to some answers and not for others. Again, the assessment team member should emphasize that the assessment is not a test, but a tool for identifying areas for improvement.

- If an observation process is included in the module, such as hand washing prior to surgery or handling of instruments, the interviewer and respondent should complete the observation process together and record on the checklist which items or practices are followed.

Determine and Review Scoring Results

When the interview is complete, the assessment team member calculates the total point values for each section of the module and enters them in the **Module Scoring Sheet**. When the scoring results have been determined, the interviewer reviews results immediately with the respondent. Once again, emphasize that low point totals are not failing scores on a test but rather indications of areas that may need improvement.

Note that some questions ask respondents to “Mark one answer” or “Mark all that apply.” These questions must be completed correctly to obtain accurate scores. If a section or question within a module section does not apply to the facility, skip those questions and deduct their points from the possible total.

Report and Act on Results

The assessment results should be discussed first within the assessment team and then in a face-to-face meeting with the facility management. The assessment should then be used to determine possible areas for improvement.

If the score for a section is very low or zero—and that service is offered in the facility—it generally signals the need for attention in that area. For example, if no points are awarded for supplies and sinks in the Hand Hygiene module, it is clear that there is an infection control issue to address. The annotations frequently suggest solutions and low-cost alternatives to achieve the purpose.

GLOSSARY

Antimicrobial resistance:	The process by which microbes become resistant to antibiotics, antidiarrheals, antiretrovirals, antifungals, or other substances designed to inhibit the growth of harmful microorganisms, generally due to overuse.
Asepsis:	Condition of being free of germs (sterile).
Autoclave:	A device that sterilizes instruments or other equipment through the use of steam under pressure.
Auto-disable syringe:	Syringe that can be filled and emptied only once.
Barrier/barrier equipment:	Items such as gowns, aprons, shoes, masks, and shoe covers used to protect health care workers from spills, airborne pathogens, or bodily fluids.
Butterfly catheters:	Steel needle peripheral catheters with a “butterfly” to facilitate insertion and securing of catheter.
CBC:	Complete blood count, with an analysis of blood components including white blood cells, red blood cells, and platelets.
Cleaning (instruments/equipment):	Second step in the reprocessing (i.e., sterilization, disinfection) process, involving mechanical cleaning of instruments by washing or scrubbing to remove large or visible particles or debris.
Decontamination:	First step in the reprocessing (i.e., sterilization, disinfection) process that markedly reduces the level of microbial contamination of soiled instruments or equipment. It involves immersing an instrument in a chemical solution to make it safe for handling and processing. The process also inactivates the human immunodeficiency virus (HIV), hepatitis B virus, and hepatitis C virus.
Disinfection (high-level):	Terminal step in the disinfection process. It is appropriate for heat-sensitive instruments that will not contact normally sterile spaces and involves chemical treatment to eliminate nearly all microorganisms (except spore-forming gram-positive bacteria).
Dip:	Antiseptic liquid placed in a container into which health workers dip their hands prior to performing surgery or other procedures. This procedure is sometimes used

	instead of a surgical scrub, but it is not generally as effective and is prone to contamination.
Emollient:	Ointment or other agent used to moisturize the skin when applied locally, for example in hand-washing solutions to prevent cracks in the skin or cuts that could facilitate the proliferation of microorganisms.
Formulary:	A list of drugs approved for use in a hospital or other health care facility.
Fumigation:	Aerosolization of an antimicrobial agent to kill vectors that transmit infections.
High-level disinfection:	See **disinfection**.
Intravenous catheter:	Device used to administer an intravenous solution, such as an antibiotic or electrolyte fluid, directly into a vein.
Isolation:	An approach to infection control in which infected patients are isolated from other patients and cared for with special precautions to reduce disease transmission. The usually two-tiered approach includes standard precautions and **transmission-based precautions**.
Neonate:	Newborn infant. Generally, infants are considered neonates for the first 28 days (4 weeks) of life.
Nosocomial infection:	Infection that is not present or incubating when the patient arrives at the hospital, but is acquired in the hospital from other patients, health workers, or the environment.
Pasteurization:	High-level disinfection by steaming or boiling
Pathogen:	A causative agent of disease, most commonly referring to infectious organisms including bacteria, viruses, and fungi.
Positive-pressure ventilation:	System used to keep the air in rooms or wards at positive pressure with respect to the corridor, so that air flows outward and potentially contaminated air cannot flow into the room.
Prophylaxis/prophylactic:	Procedure performed to prevent infection, usually involving administration of antibiotics, for example during surgery or childbirth.
Perioperative:	Time surrounding a surgical procedure from hospital admission to discharge.

Puerperal sepsis:	An infection occurring during childbirth or the period immediately following childbirth (also known as childbed fever), which is generally attributed to microorganisms spread by health workers or instruments that have not been disinfected.
Rooming in:	Placing a newborn in the same room as the mother.
SIGN guidelines:	WHO guidelines (the Safe Injection Global Network) to promote safe injection practices and to prevent infections from injections.
Standard precautions:	Procedures designed to treat all patients regardless of their presumed diagnosis or the potential presence of an infectious agent.
Steam sterilization:	Treatment that renders an instrument free of all microorganisms (including spore-forming gram-positive bacteria), which is required for surgical instruments and vascular devices that will contact normally sterile spaces (see **autoclave**).
Sterilization:	Terminal step in the sterilization process that eliminates all bacteria, viruses, fungi, and parasites (including spore-forming gram-positive bacteria). It involves high-pressure steam (autoclave), dry heat (oven), chemical methods, or radiation.
Surgical scrub (“scrub”):	Thorough washing of hands and forearms, such as before surgery, using a soft, nonabrasive brush, as well as an implement to clean under the nails.
Tacky mats:	Sticky mats to step on before entering a surgical area or ward, designed to remove dirt from shoes. However, this method has not proven to be effective.
Transmission-based precautions:	Isolation policies and procedures based on the ways in which microorganisms are transmitted—airborne, droplet, direct or indirect contact spread.

OVERVIEW OF MODULES

Modules Administered Once for the Facility as a Whole

Health Facility Information

This module gathers information about the overall structure and organization of the hospital or health care facility, awareness and adoption of national infection control guidelines, bed capacity and crowding, adequacy of water supply, and availability of separate wards for special populations. The module should be completed by the facility's infection control officer.

Infection Control Program

An infection control program may not be a formal program, but rather it may consist of all activities related to investigating, preventing, and controlling infections acquired by health care users or health care workers. This module reviews the scope of these activities, including applicable government infection control protocols or standards, the nature and organization of infection control activities, composition and functioning of the infection control committee, key infection control personnel, education programs for staff related to infection prevention and control, and infection surveillance practices and reporting. The module should be completed by the person in charge of the health care facility's infection control program or the person who can best report on infection control activities.

Isolation and Standard Precautions

This module examines a facility's overall policy for handling health care users with infectious diseases. The questions cover facility-wide policies and precautions; procedures for screening visitors, family members, and staff; supplies available for isolation precautions; precautions for other airborne diseases; and precautions for handling viral hemorrhagic fever. This module should be completed by the person in charge of the health care facility's infection control program or the person who can best report on infection control activities.

Occupational Health

This module includes topics related to occupational health programs and activities, including occupational health education programs, medical evaluations and screening for new employees, immunizations available to employees, screening for conditions such as TB and HIV, work restrictions for infected employees, handling of exposures and prophylaxis, control and handling of sharps and gloving, and maintenance of employee health records. The questions should be answered by the officer in charge of occupational health or another officer familiar with occupational health issues.

Pharmacy

This module addresses pharmacy services and functions related to infection control, including collection and use of data on medication use, policies on control of antimicrobials and antibiotics, antibiotic use monitoring and reporting, and routine procedures for reporting medicine use to facility management or the Pharmaceutical and Therapeutics Committee

(Drug and Therapeutics Committee). The module should be completed by the chief pharmacist or the person in charge of the pharmacy.

Tuberculosis Precautions

This module covers facility policies and practices for the prevention and containment of TB. The module should be completed by the TB coordinator or sister in charge of the medical/TB ward.

Waste Management

This module covers facility policies regarding segregation of waste; procedures for segregation, containerization, storage, and disposal; and procedures in the postmortem room and mortuary. The module should be completed by staff familiar with waste management throughout the facility, including surgical areas, wards, patient care areas, laboratories, and support facilities.

Modules Administered Once for Specific Services (if Present in the Facility)

Labor and Delivery

For health care facilities with a maternity service, this module assesses general issues pertaining to labor and delivery, including ward hygiene, glove and barrier protection use, education programs on infection prevention for labor and delivery personnel, labor and delivery procedures, dress code for vaginal deliveries, use of invasive devices, prophylactic antibiotic use, and postpartum care. This module is to be completed by the unit manager of the labor and delivery area.

Renal Unit

This module covers policies and practices related to prevention of infections in patients undergoing haemodialysis and continuous ambulatory peritoneal dialysis. These questions should be completed in consultation with the chief renal physician or senior sister of the renal unit.

Surgical Antibiotic Use and Equipment Reprocessing

For facilities that perform routine surgical procedures, this module covers perioperative antimicrobial administration, storage and administration of antibiotics used in surgery, surgical drain placement, reprocessing of surgical instruments and equipment, reprocessing of anesthesia equipment, and postoperative antibiotic practices. This module should be completed by the unit manager of each surgical ward.

Surgical Area Practices

For facilities that perform routine surgical procedures, this module covers preoperative preparation of patients, scrub by operating room personnel, barrier precautions and operating room attire, routine cleaning and decontamination by spillage, surgical area ventilation,

traffic in and out of the area, and treatment of contaminated equipment or supplies. The unit manager in the operating theatre should address these questions.

Transplant Unit

This module covers policies and practices related to the prevention and control of infections in patients undergoing organ transplants. These questions should be completed in consultation with the chief specialist or senior sister of the transplant unit.

Intensive Care Units

For facilities with one or more intensive care units, this module assesses staffing, general hygiene practices, and procedures for mechanical ventilation. These questions should be completed by the unit manager of each intensive care unit assessed. If there is only one ICU, or if policies are similar for all ICUs, the module may be completed only once.

Microbiology Laboratory

For facilities that have a clinical microbiology laboratory, this module assesses general laboratory procedures and record keeping; availability, use, and reporting results of specific tests; blood culture methods; procedures for testing and monitoring antibiotic resistance; and handling of pathogenic substances. The module should be completed by the head of the department or supervisor of the microbiology laboratory.

Modules Administered Once Where Disinfection or Sterilization Takes Place

Sterilization and Disinfection: Equipment and IV Fluids

This key module covers procedures for sterilizing and disinfecting equipment and IV fluids. It will take longer to complete than most other modules. Among the areas covered are the presence of written and/or posted policies on which items require decontamination, cleaning, disinfection, and sterilization; preparation of sterile irrigation and IV fluids; specific processes for the decontamination, cleaning, disinfection, and sterilization of equipment and instruments; and storage and handling of sterile supplies. This module should be completed by the person in charge of the central sterilization unit or by personnel in charge of sterilization/disinfection in support units, such as dental clinics.

Modules Administered Once for Each Clinical Area (If Relevant)

General Ward

The module covers key features of physical layout, staffing, and general hygiene practices on a specific ward. The module should be completed by the unit manager for each medical or surgical ward to be included in the assessment.

Hand Hygiene

This module, essential for any health care facility or health care setting, addresses hand hygiene procedures, including use of soap and antiseptics, and hand hygiene before and after contact with patients. These questions should be completed by the unit manager of each clinical or service area assessed (including each medical or surgical ward, ICU, labor and delivery unit, or surgical area).

Injections

This module covers facility-wide injection policies and staff education. The module should be filled out by the unit manager of each medical and surgical ward and ICU included in the assessment.

Airway Suctioning

This module assesses the adequacy of common procedures for administering airway suctioning and handling airway suctioning equipment in specific clinical areas. This module should be completed by the unit manager for each medical or surgical ward in which airway suctioning occurs.

Intravenous Catheters

The questions in this module cover the types of intravenous catheters used, antiseptic use when inserting catheters, routines for changing catheters, use of antimicrobial ointment, and the types of catheters used for central venous access. The module should be completed by the unit manager in each ward assessed on which IV catheters are inserted or maintained.

Intravenous Fluids and Medications

This module covers when and how IV fluids and medications are mixed or purchased, how often tubing is changed, and how to use multidose vials. The unit manager of each area where IV fluids or medications are prepared or administered should answer these questions.

Urinary Catheters

The topics covered in this module include use of indwelling versus straight urinary catheters, indications for use of indwelling catheters, use of gloves and antiseptics, and drainage systems. These questions should be answered by the unit manager in each clinical area where urinary catheters are used.

MODULE SCORING

Each module in the ICAT is divided into sections to assess performance in particular areas of practice. Each section has its own possible total score and performance rating. There is also a total score and overall performance rating for the module as a whole.

For each response, a point value of **1** indicates a recommended practice and a point value of **3** indicates a highly recommended practice. Responses with no point value attached are generally not recommended. Review the annotations associated with the module or refer to the resource material on the CD-ROM to learn about the reason for recommendations. If the team leader decides to adapt the tool and insert additional questions and possible responses on specific issues, it is recommended that the team leader review available local or international standards and allocate point values of 0, 1, 2, or 3 to the possible responses, depending on recommended practices.

Calculate section scores by adding the point values marked for each question in a section. If a question says "Mark one answer," record only *one* response. If a question says "Mark all that apply," add the points for all marked responses. No points are given if the ticked answer has no points associated with it. Enter the assessment section totals at the end of each section. The possible section totals are provided for the team leader's convenience.

Go to the **Module Scoring Sheet** located at the end of each module and enter the assessment section totals and possible section totals in columns (1) and (2). Compute the module totals by summing up columns (1) and (2) and then compute section and module percent scores and enter in column (3). Calculate the rating (A, B, C) associated with that point range and enter in column (4). Percent score ratings are based on—

More than 75% of possible points:	A—recommended practices are followed consistently and thoroughly
50–75% of possible points:	B—recommended practices usually followed
Less than 50% of possible points:	C—training and follow-up needed on recommended practices

Completing the assessment tool and evaluating the point values is not intended as a test. Point values identify areas in which existing practices are generally satisfactory or where opportunities exist for improvement. In a given situation, there may be general agreement that the issues assessed in a given section or module are immediate priorities for the facility and should be addressed with new policies or programs.

In the following example, the Labor and Delivery module has been scored. Each section of the module has been entered into the module scoring sheet, along with the values that were obtained during the assessment. The blank form is included at the end of each module and is included here for easy reference. It can be copied as needed to use as a score sheet during an actual assessment.

Example Scoring Sheet

Name of facility: Phedisong Health Center

Name of module: Labor and Delivery

Date completed: 15 October 2008

Module section	1 Assessment total	2 Possible total	3 Percentage score	4 Rating based on percentage score
General issues: staff education and labor and delivery services design	3	4	3/4 × 100 = 75%	B
Cleaning and general hygiene	3	4	3/4 × 100 = 75%	B
Glove use for vaginal deliveries	3	4	3/4 × 100 = 75%	B
Glove use for cesarean sections	2	2	2/2 × 100 = 100%	A
Scrub for vaginal delivery	5	6	5/6 × 100 = 83.3%	A
Barriers worn for vaginal delivery	2	8	2/8 × 100 = 25%	C
Invasive devices	4	5	4/5 × 100 = 80%	A
Labor and delivery procedures	8	11	8/11 × 100 = 72.7%	B
Prophylactic antibiotic use	4	5	4/5 × 100 = 80%	A
Postpartum care	2	5	2/5 × 100 = 40%	C
Total for module	**Sum of 1 = 36**	**Sum of 2 = 54**	**(column 1)/ (column 2) = 36/54 × 100 = 66.6%**	**Overall score = B**

Column notes:

1. Assessment total—sum of points for all marked responses

2. Possible total—sum of all possible points for the question

3. Percent score—(column 1/column 2) × 100

4. Rating—

More than 75% of possible points:	A—recommended practices are followed consistently and thoroughly
50–75% of possible points:	B—recommended practices usually followed
Less than 50% of possible points:	C—training and follow-up needed on recommended practices

Sample Scoring Sheet

Name of facility: _____

Name of module: _____

Date completed: _____

Module section	1 Assessment total	2 Possible total	3 Percentage score	4 Rating based on percentage score
Total for module			**%**	

Column notes:

1. Assessment total—sum of points for all marked responses

2. Possible total—sum of all possible points for the question

3. Percent score—(column 1/column 2) × 100

4. Rating—

More than 75% of possible points:	A—recommended practices are followed consistently and thoroughly
50–75% of possible points:	B—recommended practices usually followed
Less than 50% of possible points:	C—training and follow-up needed on recommended practices

Part II: Infection Control Assessment Tool Modules

AIRWAY SUCTIONING

These questions should be completed by the unit manager for each clinical area where airway suctioning is performed.

For each item, mark the answer that best describes your current situation by putting a tick ✓ inside the brackets [✓]. Note that some questions ask for only one answer, and others ask you to tick all answers that apply.

The following questions provide information about your facility's respiratory care practices. The questions cover airway suctioning fluids, changing of suction catheters, and general infection control practices to control the spread of nosocomial infections.

1. What type of fluid is instilled for airway suctioning? (Mark one answer)
[ ] Tap water [ ] Distilled or filtered water [ ] Sterile water [ ] Non-sterile saline [ ]1 Sterile saline
2. How is this fluid dispensed? (Mark one answer) [ ] Single dose drawn from a multi-dose container [ ]1 Commercially manufactured single-dose vial [ ]1 Locally made single-dose vial [ ]1 Container made for individual patient use and discarded
3. How frequently are airway suction catheters changed? (Mark the description that best applies) [ ] Suction catheters not used [ ] Approximately every day [ ]1 Approximately once every shift [ ]1 More frequently than once per shift
4. Are suction catheters and masks used for more than one patient without reprocessing? [ ]2 No [ ] Yes
5. Does the person performing suctioning wear gloves on one or two hands? [ ] Gloves not worn [ ] Gloves worn on one hand [ ]1 Gloves worn on two hands
6. Are the gloves sterile or not sterile? (Mark one answer) [ ] Gloves not worn [ ]1 Sterile [ ]1 Not sterile

7. How frequently is there a sufficient supply of gloves for use during suctioning? (Mark answer that best applies)

[ ] Never
[ ] Sometimes
[ ] Usually
[ ]1 Always

8. How are suction catheters stored between uses? (Mark the answer that best applies)

[ ]1 In-line suctioning is available so no external storage is necessary
[ ] In a bottle containing sterile or distilled water
[ ] In a bottle containing filtered or tap water
[ ]1 In a paper or cloth wrap
[ ]1 Covered in a dry container
[ ] Uncovered container

9. If medication nebulizers are used, how often are they changed? (Mark one answer)

[ ] Nebulizers not used
[ ]1 Approximately every day
[ ] Only changed for use in another patient

10. What type of cuff is used on endotracheal tubes? (Mark one answer)

[ ]1 Low pressure cuffs
[ ]1 High volume-low pressure cuffs

Assessment total: _____ **Possible total:** 11 _____

AIRWAY SUCTIONING ANNOTATIONS

Background

Nosocomial (hospital-acquired) pneumonia is a major cause of infections, has a high mortality rate, and is expensive to treat. Most nosocomial pneumonias occur because of aspiration of bacteria growing in the back of the throat (oropharynx) or stomach. Intubation and mechanical ventilation greatly increase the risk of infection (Tietjen et al. 2003, 27-1).

Item Notes

1, 2. If possible, only small containers of sterile saline solutions or boiled water—used only once and then replaced—should be used. Using large containers of saline or other fluids for instillation or rinsing suction catheters should be avoided (Tietjen et al. 2003, 27-3).

4. Airway suction catheters should be decontaminated, cleaned, and high-level disinfected by boiling or steaming between uses on patients (Tietjen et al. 2003, 27-3).

5. Gloves should be worn for handling respiratory secretions or objects contaminated with respiratory secretions of any patient (CDC 2004). The recommended practice is to wear gloves on both hands.

6, 7. Wear clean (new) examination gloves or reused surgical gloves that have been high-level disinfected and a protective face shield or mask when suctioning (Tietjen et al. 2003, 27-3).

9. Use only small nebulizer bulbs because nebulizers produce aerosols that can penetrate deep into the lungs. (Contaminated large-volume nebulizers have been associated with gram-negative pneumonia and should not be used.) To prevent small-volume nebulizer bulbs from becoming contaminated, clean and dry them between uses on one patient, and use only with sterile fluids (Tietjen et al. 2003, 27-3).

10. Adult endotracheal tubes have cuffs. Pediatric tubes generally do not except those used for large children and adolescents. Cuffs help prevent movement of secretions from the upper airway to the lower airway. Low-pressure cuffs are less likely to cause ischemia.

References

US Centers for Disease Control and Prevention (CDC). 2004. Guidelines for Preventing Health-Care–Associated Pneumonia, 2003: Recommendations of CDC and the Healthcare Infection Control Practices Advisory Committee. *MMWR* 2004:53(No. RR-3).

Emori, T. G., and R. P. Gaynes. 1993. An Overview of Nosocomial Infections, Including the Role of Microbiology Laboratory. *Clinical Microbiology Reviews* 6(4):428–42.

Tietjen, L., D. Bossemeyer, and N. McIntosh. 2003. *Infection Prevention: Guidelines for Healthcare Facilities with Limited Resources*. Baltimore, MD: Jhpiego.

MODULE SCORING SHEET

Name of facility: _____

Name of module: _____

Date completed: _____

Module section	1 Assessment total	2 Possible total	3 Percentage score	4 Rating based on percentage score
Total for module			**%**	

Column notes:

1. Assessment total—sum of points for all marked responses

2. Possible total—sum of all possible points for the question

3. Percent score—(column 1/column 2) × 100

4. Rating—

More than 75% of possible points:	A—recommended practices are followed consistently and thoroughly
50–75% of possible points:	B—recommended practices usually followed
Less than 50% of possible points:	C—training and follow-up needed on recommended practices

GENERAL WARD

These questions should be completed in consultation with the unit manager of each medical or surgical ward included in the assessment.

For each item, mark the answer that best describes your current situation by putting a tick ✓ inside the brackets [✓]. Note that some questions ask for only one answer, and others ask you to mark all answers that apply.

What is the name of this ward? _____

1. What is the patient population in this ward? (Mark answer that best describes this ward) [ ] General medical [ ] General surgical [ ] Mixed medical/surgical [ ] Ob-gyn [ ] Neonatal
2. This ward has: [ ] Adults only [ ] Children only [ ] Both adults and children

Physical Layout and Staffing

The following questions address the number of beds on the ward and the number of doctors and nurses providing patient care.

3. What size are the rooms with regard to number of beds? (Mark all that apply) [ ]1 One-bed or two-bed rooms [ ] Three-bed rooms [ ] Four-bed rooms [ ] Rooms with five or more beds or open ward	
4. What is the total number of beds on this ward?	
5. On weekdays, how many doctors provide care on this ward to patients during the day shift which includes 12 noon? Calculate number of beds per doctor:	
6. On weekdays, how many nurses provide care to patients on this ward during a typical day shift which includes 12 noon? Calculate number of beds per nurse:	

7. On weekdays, how many nurses provide care to patients on this ward during a typical evening/night shift which includes 12 midnight? Calculate number of beds per nurse:	

Assessment section total: _____ **Possible section total:** 1

General Practices on Ward

The following questions cover your facility's policies and procedures for general hygiene, cleaning and disinfecting instruments, and use of antiseptics.

8. Is there a written policy for general hygiene and cleaning of surfaces, walls, floors, toilets, beds, clothing, and general equipment on this unit? [ ] No written policy or procedures [ ] Policy/procedures communicated verbally only [ ]1 Written policy/procedures available in an operations manual but not generally available for daily practice [ ]2 Written policy/procedures in a manual but also posted on walls in clinical or support areas
9. Does the written policy cover processes for decontaminating areas contaminated by spillage (such as blood or body fluids)? [ ] No [ ]1 Yes
10. Are instruments soaked in antiseptic solution used for multiple patients? [ ]2 No [ ] Yes
11. Are cotton balls stored in antiseptic solution for use in prepping or cleaning the skin? [ ]1 No [ ] Yes
12. Are antiseptics routinely protected from direct sunlight and high heat? [ ] No [ ]1 Yes

Assessment section total: _____ **Possible section total:** 7

Checklist of Additional Modules to be Completed for the General Ward

- ☐ Airway Suctioning
- ☐ Hand Hygiene
- ☐ Injections
- ☐ Intravenous Catheters (if used on ward)
- ☐ Urinary Catheters (if used on ward)
- ☐ Intravenous Fluids and Medications (if used on ward)
- ☐ Isolation and Standard Precautions
- ☐ Sterilization and Disinfection (if equipment, needles, or gloves are disinfected or sterilized on the general ward)

GENERAL WARD ANNOTATIONS

Background

The transfer of microorganisms from environmental surfaces (such as walls, floors, beds, and general equipment) to patients is largely via hand contact. Hand hygiene is therefore very important for minimizing the impact of this transfer, but cleaning and disinfecting environmental surfaces are fundamental in reducing their contribution to health-associated infections (CDC 2003).

Item Notes

3. One- or two-bed rooms are preferred to avoid the spread of infectious disease, although in many settings this is not feasible.

8. The housekeeping service, in collaboration with the Infection Control Committee, is responsible for classifying the different hospital areas by type of cleaning needed, developing written policies for appropriate cleaning techniques (procedure, frequency, and agents used for each type of room, from highly contaminated to the most clean) and ensuring that these practices are followed (WHO 2002, 13). Housekeeping and cleaning schedules should be planned, written, and closely followed according to the needs of each area (walls, windows, ceilings, doors, tabletops, beds, etc.) (Tietjen et al. 2003, 16-6).

9. Written schedules and procedures for cleaning each specific area (including decontaminating areas contaminated by spillage) should be available and posted prominently (Tietjen et al. 2003, 16-5).

10. Antiseptics should be used to reduce or destroy microorganisms on skin and mucous membranes and they should never be used to disinfect objects. Instruments should never be left soaking in an antiseptic solution (EngenderHealth 2004, “Introduction to Aseptic Technique”).

11. Cotton balls, cotton wool, or gauze sponges should never be left soaking in antiseptic solutions (EngenderHealth 2004, “Introduction to Aseptic Technique”).

12. Disinfectants and antiseptics should always be stored in a cool, dark place. They should never be stored in direct light or near excessive heat (EngenderHealth 2004, “Introduction to Aseptic Technique,” “Steps of Chemical High-Level Disinfection”).

References

US Centers for Disease Control and Prevention (CDC). 2003. Guidelines for Environmental Infection Control in Health-Care Facilities: Recommendations of CDC and the Healthcare Infection Control Practices Advisory Committee. *MMWR* 2003;52(No. RR-10):1–48.

EngenderHealth. 2004. Infection Prevention Online Course. http://www.engenderhealth.org/res/onc/index.html#start (accessed July 17, 2006)

Tietjen, L., D. Bossemeyer, and N. McIntosh. 2003. *Infection Prevention: Guidelines for Healthcare Facilities with Limited Resources*. Baltimore, MD: Jhpiego.

World Health Organization (WHO). 2002. *Prevention of Hospital-Acquired Infections: A Practical Guide*. 2nd ed. WHO/CDS/CSR/EPH/2002/12. Geneva: WHO.

MODULE SCORING SHEET

Name of facility: _____

Name of module: _____

Date completed: _____

Module section	1 Assessment total	2 Possible total	3 Percentage score	4 Rating based on percentage score
Total for module			**%**	

Column notes:

1. Assessment total—sum of points for all marked responses

2. Possible total—sum of all possible points for the question

3. Percent score—(column 1/column 2) × 100

4. Rating—

More than 75% of possible points:	A—recommended practices are followed consistently and thoroughly
50–75% of possible points:	B—recommended practices usually followed
Less than 50% of possible points:	C—training and follow-up needed on recommended practices

HAND HYGIENE

These questions should be completed by the unit manager of each clinical or service area assessed, including Medical/Surgical wards, Labor and Delivery ward, and Surgical areas.

For each item, mark the answer that best describes your current situation by putting a tick ✓ inside the brackets [✓]. Note that some questions ask for only one answer, and others ask you to mark all answers that apply.

What is the name of this unit or service area? _____

Hand Hygiene Equipment and Supplies

The first set of questions focuses on the availability of equipment and supplies recommended for good hand hygiene practices.

1. How many hand washing stations and how many beds are on this unit? Enter numbers for each in the space to the right, then mark one answer below.	***/***
[ ] None [ ]1 Fewer than one hand washing station per six beds if General Ward (per two beds if Intensive Care Unit) [ ]2 One or more hand washing station per six beds if General Ward (per two beds if Intensive Care Unit)	
2. What is the usual source of water for hand washing? (Mark one answer) [ ] No water is usually available [ ] Water is scooped from a basin and poured over hands [ ]1 Water is usually poured over hands from a basin [ ]1 Water is usually available from a cistern or container with gravity flow [ ]2 Running water from sink	
3. How frequently is running water available? [ ] Never [ ] Sometimes [ ]1 Usually [ ]2 Always	
4. What type of soap is most frequently available for hand washing? (Mark one answer) [ ] No soap is available [ ] Plain bar soap stored in a receptacle that does not allow water to drain [ ]1 Plain bar soap stored in a receptacle that allows water to drain [ ]1 Plain liquid soap [ ]1 Soap powder, leaves, or flakes [ ]1 Soap with antimicrobial agent	

5. How frequently is soap available? (Mark one answer)

[ ] Never
[ ] Sometimes
[ ]1 Usually
[ ]2 Always

6. What types of dispensers are used on this unit for liquid soaps? (Mark one answer)

[ ] Liquid soaps are not used (if yes, skip question 7)
[ ] Handheld pour bottle or squeeze dispenser
[ ]1 Hand operated pump dispenser
[ ]1 Foot pump dispenser

7. How are liquid soap dispensers usually cleaned? (Mark one answer)

[ ] Dispensers are topped off or refilled without cleaning
[ ]1 Dispensers are emptied, washed, and dried before refilling
[ ]1 Dispenser or dispenser insert is disposed of when empty and new one is used

8. What method is usually available for drying hands after hand washing? (Mark one answer)

[ ] None (air dry)
[ ] Multiple-use cloth towel
[ ] Hot air dryer
[ ]1 Single-use cloth towel
[ ]1 Paper towels

9. Is a waterless alcohol-based hand antiseptic used for hand hygiene? (Mark one answer)

[ ] No
[ ]1 Yes, alcohol-based antiseptic without emollient
[ ]3 Yes, alcohol-based antiseptic with emollient

10. How frequently is there a sufficient supply of waterless alcohol-based hand antiseptic? (Mark one answer)

[ ] Alcohol-based hand antiseptic is not available
[ ] Supply of alcohol-based antiseptic is never sufficient
[ ] Sometimes
[ ]1 Usually
[ ]2 Always

11. How many dispensers of waterless alcohol-based antiseptic are available on the ward? (Mark one answer)

[ ] Alcohol-based hand antiseptic is not available
[ ]1 Fewer than one for every four beds
[ ]2 One or more for every four beds

Assessment section total: _____ **Possible section total:** 19

Hand Hygiene Practices

The following questions address hand hygiene practices in the clinical areas of your facility.

12. In which of the following situations do health care personnel, such as doctors and nurses, routinely wash their hands with soap and water or a waterless alcohol-based hand antiseptic? (Mark all answers that apply)

[ ]1 Before contact with patients
[ ]1 After contact with individual patients or their immediate environment
[ ]1 Before manipulating medical devices, such as intravenous catheters, urinary catheters, or endotracheal tubes, or before handling wound dressing
[ ]1 After touching potentially contaminated objects or surfaces
[ ]1 After removing gloves

13. Is there a policy on covering skin lesions and cuts with waterproof dressings?

[ ] No
[ ]1 Yes

14. Does the hand hygiene policy include keeping finger nails short and/or not using artificial nails or nail extenders?

[ ] No
[ ]1 Yes

15. Is it usual practice to wear gloves instead of washing hands for contact with patients or potentially contaminated environmental surfaces? (Mark one answer)

[ ]1 No
[ ] Yes

16. Is hand lotion (emollient) usually available for staff to use after hand washing? (Mark one answer)

[ ] No
[ ]1 Yes, hand lotion in disposable containers
[ ]1 Yes, hand lotion in reusable containers

17. When a hand lotion container is empty, what usually happens? (Mark one answer)

[ ] Hand lotion is not usually available
[ ] Container is refilled or topped off without cleaning
[ ]1 Container is emptied, washed, and dried before refilling
[ ]1 Container is disposed of when empty and new container is used

Assessment section total: _____ **Possible section total:** 10

HAND HYGIENE ANNOTATIONS

Background

Infectious agents frequently contaminate the hands of clinicians and other health care personnel. Effective and frequent hand hygiene procedures can prevent the acquiring and spreading of infectious microorganisms from clinicians and health care personnel to patients and other hospital workers. Good hand hygiene practices are an important—**and one of the simplest**—methods of preventing the spread of nosocomial infections.

Item Notes

1. Easy access to sinks will allow clinicians and health care workers to clean their hands immediately before and after patient contact. Health care personnel are more likely to use sinks if they are within immediate or easy reach. It is most desirable for a sink to be shared by no more than four patient beds, and ideally there would be one sink per patient bed, especially in critical care areas. It is also recommended to use a sink with hand free taps (e.g., elbow operated taps, taps with sensor, etc.).

2. Microorganisms can live and multiply in stagnant water. Scooping water, probably with a ladle, can mean that the ladle is likely set down on a surface that may be contaminated between uses, and the ladle inserted in the water for the next use. Pouring is cleaner because nothing has been inserted into the water. Freely flowing water inhibits the growth of microorganisms and will prevent hands from being re-exposed to pathogens. Flowing water may be delivered by a cistern or container with gravity flow or through pipes from a distant source.

4. The use of soap has been shown to reduce debris and microorganisms from hands. Soap is especially effective when hands are vigorously scrubbed beneath flowing water. Bars of soap that sit in a pool of water in a soap dish can become heavily contaminated, so if bar soap is used, there should be good drainage from the soap dish. Antimicrobial soap has inherent microbicidal activity and is especially preferred in intensive care units.

5. Because soap should be used before and after all patient encounters, an adequate supply should always be available.

6. Because liquid soap is dispensed before hands are clean, soap dispensers may become contaminated by microbes on the user's hands. The use of pump-dispensers can minimize or prevent contact with contaminated hands.

7. Microorganisms can live and grow in liquid soap. Even antimicrobial soaps can harbor bacteria. If containers are refilled without being completely emptied and cleaned first, bacteria in the residual soap may contaminate the entire container. To prevent contamination, soap dispensers should be emptied and thoroughly washed and dried before reuse.

8. Hands should be dried after washing to remove residual bacteria and minimize recolonization of infectious microorganisms, using single-use paper towels.

9. Alcohol-based hand antiseptics are quick and convenient, and their proper use reduces hand flora more effectively than hand washing with soap. The alcohol content should be 60–90 percent. Unlike hand washing, alcohol-based antiseptics will not remove dirt or debris, so if any visible dirt or debris is present, hands should be washed with soap and dried before using an alcohol-based antiseptic. Emollients such as glycerine, propylene glycol, and sorbitol protect and soften skin and prevent irritation. The use of emollients improves compliance with alcohol-based hand antiseptics.

10. An adequate supply of alcohol-based antiseptics will ensure that proper hand hygiene can always be practiced. Easy availability will facilitate compliance with alcohol-based hand antiseptics. An adequate number of dispensers conveniently placed in a patient care area will facilitate compliance.

12. Hands must be cleaned immediately before and after every patient encounter. Hands must also be cleaned after contact with any potentially contaminated area or object. These include—

- Objects in contact with patients (i.e., dressings, catheters, and linens)
- Surfaces in clinical or laboratory areas
- Bathrooms, toilets, and latrines

Furthermore, gloves do not provide complete protection against the transmission of bacteria and viruses because the hands are easily contaminated in the process of glove removal. Hands must be washed immediately after their removal.

15. Bacteria from patients can be recovered from a significant number of health care workers who wear gloves. Some hospital workers have contracted blood-borne pathogens, such as hepatitis B, from patients despite wearing gloves. Gloves may have microscopic defects, particularly if they are cleaned and reused. Thus, glove use *should not alter* hand-hygiene practices (washing and drying) in any way.

16. Skin irritation can occur when hands are frequently washed. The periodic use of hand lotions can prevent dermatitis and inhibit bacterial growth.

17. Bacteria can grow in hand lotion dispensers. The use of small, disposable containers will minimize colonization. Reusable containers should be emptied, thoroughly washed, and dried to eliminate residual bacteria before refilling.

MODULE SCORING SHEET

Name of facility: _____

Name of module: _____

Date completed: _____

Module Section	1 Assessment Total	2 Possible Total	3 Percent Score	4 Rating Based on Percent Score
Total for Module			**%**	

Column Notes:

1. Assessment Total—Sum of points for all marked responses

2. Possible Total—Sum of all possible points for the question

3. Percent Score—(Column 1/Column 2) × 100

4. Rating—

More than 75% of possible points:	A—recommended practices are followed consistently and thoroughly
50–75% of possible points:	B—recommended practices usually followed
Less than 50% of possible points:	C—training and follow-up needed on recommended practices

HEALTH FACILITY INFORMATION

This module should be completed by the infection control officer.

For each item, mark the answer that best describes your current situation by putting a tick ✓ inside the brackets [✓]. Note that some questions ask for only one answer, and others ask you to mark all answers that apply. Questions that are intended to provide contextual information only are not scored.

Name of facility: _____

Date: _____

Address: _____

_____

Person Completing this Questionnaire

Name: _____ Title: _____

Position: _____

Facility Demographic Information

The following questions provide information about your facility's organization, bed capacity, bed utilization, and adherence to infection control guidelines.

1. How would you describe your facility? (Mark one answer) [ ] Public health facility (owned and operated by government and financed from general taxes) [ ] Private health facility (for-profit facility owned and operated for financial gain) [ ] Academic hospital (associated with a university faculty; has a major role in training) [ ] Charity (missionary health facility funded by charity)
2. Are you familiar with the Department of Health guidelines covering infection control? If no, skip question 3. [ ] No, not aware of guidelines [ ] Yes, aware of guidelines
3. Has your facility adopted the Department of Health's infection control guidelines? (Skip this question if your answer to question 2 is No.) [ ] No, have not adopted the guidelines [ ] Yes, have adopted the guidelines

4. How many beds are in your facility?

   Total beds: _____
   Adult beds: _____
   Newborn beds: _____
   Pediatric beds (excluding newborns): _____

5. What is the average daily number of in-patients in your facility? _____

6. How often does the number of in-patients exceed the number of facility beds? (Mark one answer)

   [ ] Always
   [ ] Usually
   [ ]1 Sometimes
   [ ]1 Never

7. How often do patients have to share a bed? (Mark one answer)

   [ ] Always
   [ ] Usually
   [ ] Sometimes
   [ ]2 Never

8. How often do families stay overnight in patient care areas on adult wards? (Mark one answer)

   [ ] Always
   [ ] Usually
   [ ] Sometimes
   [ ]1 Never

Assessment section total: _____ **Possible section total:** 4

Water Supply

The following questions cover the source and treatment of water entering your facility.

9. What is the source of the facility's general water supply (e.g., water supply for sinks)? (Mark one answer) [ ] Surface water (e.g., river or lake) [ ]1 Municipal water [ ]1 Well water [ ]1 Rainwater [ ]1 Water brought in tanker trucks or containers
10. Does the water undergo purification to ensure potability prior to arriving at the facility? [ ] No [ ]1 Yes
11. If No, does this water undergo additional treatment at the facility? [ ] No [ ]1 Yes
12. Which method is used for additional treatment of water? (Mark the method that is generally used) [ ]2 Chlorination [ ]1 Filtration [ ]2 Boiling

Assessment section total: _____ **Possible section total:** 5

General Characteristics of Facility Wards

The remaining questions in this module provide a profile of your facility's wards.

13. How many separate wards are in the facility? __
14. Is there a separate ward for labor and delivery patients? [ ] No [ ]1 Yes
15. Is there a separate ward for newborn infants? [ ] No [ ]1 Yes

Assessment section total: _____ **Possible section total:** 2

HEALTH FACILITY INFORMATION ANNOTATIONS

Background

Public and private hospitals should attempt to meet quality standards as described in *Prevention of Hospital-Acquired Infections: A Practical Guide* (WHO 2002, 47; ISO 9000 and ISO 14000 series). WHO recognizes that older facilities and facilities in developing countries may not be able to achieve these standards, however, the underlying principles should be kept in mind when local planning and changes or revisions are made.

Item Notes

10, 11, 12. The physical, chemical, and bacteriological characteristics of water in health care institutions must meet local regulations. The institution is responsible for the quality of water once it enters the building. For specific uses, water taken from a public network must often be treated by physical or chemical treatment for medical uses (WHO 2002, 50). Water boiled for 1 to 5 minutes is considered safe to drink, whereas water boiled for 20 minutes is high-level disinfected. Alternatively, water can be disinfected and made safe for drinking by adding a small amount of sodium hypochlorite solution. Chlorination should be done just before storing the water in a container, preferably one with a narrow neck as storage containers often become contaminated if the neck is large enough to permit hands or utensils to enter (Tietjen et al. 2003, 26-9).

References

Tietjen, L., D. Bossemeyer, and N. McIntosh. 2003. *Infection Prevention: Guidelines for Healthcare Facilities with Limited Resources*. Baltimore, MD: Jhpiego.

World Health Organization (WHO). 2002. *Prevention of Hospital-Acquired Infections: A Practical Guide*. 2nd ed. WHO/CDS/CSR/EPH/2002/12. Geneva: WHO.

MODULE SCORING SHEET

Name of facility: _____

Name of module: _____

Date completed: _____

Module section	1 Assessment total	2 Possible total	3 Percentage score	4 Rating based on percentage score
Total for module			**%**	

Column notes:

1. Assessment total—sum of points for all marked responses

2. Possible total—sum of all possible points for the question

3. Percent score—(column 1/column 2) × 100

4. Rating—

More than 75% of possible points:	A—recommended practices are followed consistently and thoroughly
50–75% of possible points:	B—recommended practices usually followed
Less than 50% of possible points:	C—training and follow-up needed on recommended practices

INFECTION CONTROL PROGRAM

These questions should be answered by the person in charge of the facility's infection control program or the person who can best speak for the program.

For each item, mark the answer that best describes your current situation by putting a tick ✓ inside the brackets [✓]. Note that some questions ask for only one answer, and others ask you to mark all answers that apply. Questions that are intended to provide contextual information only are not scored.

Infection Control Regulations and Accreditation

These questions about government accreditation provide a context for understanding an infection control program and are not scored.

1. Are there accreditation standards related to infection control that apply to your facility? (Mark one answer)

[ ] No
[ ] Yes

2. Has your facility assessed its compliance with the accreditation standards relating to infection prevention and control?

[ ] No
[ ] Yes

Infection Control Program: Responsibilities and Authority

The following questions cover the responsibilities and authority of the individuals in your facility's infection control program.

3. What are the main responsibilities of staff members in charge of the infection control program? (Mark all that apply)

[ ]1 Perform surveillance for nosocomial infection
[ ]1 Generate reports of nosocomial infection rates
[ ]1 Investigate and control clusters of nosocomial infections
[ ]1 Develop policies and procedures for infection control, including isolation precautions
[ ]1 Educate hospital personnel regarding infection control
[ ]1 Participate in providing occupational health services related to infection control
[ ]1 Participate in monitoring and controlling antibiotic use
[ ]1 Evaluate new products or devices
[ ] None of the above

4. Is there a written policy outlining the responsibilities of those in charge of the infection control program?

[ ] No written policy or procedures
[ ] Policy/procedures communicated verbally only
[ ]1 Written policy/procedures available in an operations manual but not generally available for daily practice

5. Patient care—Do those in charge of the infection control program regularly examine the following services? (Mark all that apply)

[ ]1 Sanitary food preparation
[ ]1 Sanitary preparation of enteral feeds
[ ]1 Sterilization/disinfection of reused equipment, instruments, or other items
[ ] None of the above

6. Environmental services—Do those in charge of the infection control program regularly examine the following? (Mark all that apply)

[ ]1 Facilities maintenance
[ ]1 Quality of drinking water
[ ]1 Disposal of contaminated waste material (e.g., wound dressings)
[ ]1 Handling and disposal of corpses or body parts
[ ]1 Cleaning services
[ ]1 Sewage system
[ ]1 Air quality
[ ] None of the above

7. What actions do those in charge of the infection control program have the authority to undertake? (Mark all that apply)

[ ]1 Review patient records
[ ]1 Examine patients
[ ]1 Order cultures or other laboratory tests (e.g., serologic tests)
[ ]1 Order patient isolation precautions and if possible, put patient with other similarly infected patients
[ ]1 Close a patient room/ward or the operating room if an unusually high risk of infection exists
[ ] None of the above

8. Is there financial support available for infection control activities? (Mark all that apply)

[ ] No financial support is available
[ ]1 Financial support is available for educational programs
[ ]1 Financial support is available for laboratory services or monitoring

Assessment section total: _____ **Possible section total:** 26

Infection Control Committee

The following questions focus on the organization, membership, and functions of your facility's Infection Control Committee, or those who conduct infection control activities.

9. Is there a person or team of people responsible for conducting infection control activities in your facility?

[ ] No
[ ]2 Yes

10. Is there a formal Infection Control Committee in the facility?

[ ] No
[ ]1 Yes

11. Does the committee include at least one doctor, one nurse, and one other person with training in infection control?

[ ] No
[ ]1 Yes

12. How many times did the committee meet during the past 12 months? (Mark one answer)

[ ] None
[ ]1 Fewer than three times
[ ]2 Four or more times

13. Which of these general topics are discussed at these meetings? (Mark all that apply)

[ ] Infection rates (surveillance results)
[ ] Specific hospital infection cases
[ ] Outbreaks of hospital infections
[ ] Sterilization/disinfection procedures
[ ] Isolation or barrier precautions
[ ] Occupational health/health worker issues
[ ] Education and training programs in infection control
[ ]1 Five of the above seven answers
[ ]2 All seven answers

14. Does the committee discuss antibiotic use and control?

[ ] No
[ ]1 Yes

15. Which of the following topics related to antibiotic resistance are discussed? (Mark all that apply)

[ ] No topics related to antibiotic resistance are discussed
[ ]1 Results of microbiology testing
[ ]1 Trends in antibiotic resistance

Assessment section total: _____ **Possible section total:** 11

Key Infection Control Personnel

The next set of questions explores training and the level of effort provided by key infection control personnel. This section should be completed by the head of the infection control program.

16. What is your role in the hospital?

[ ] Doctor
[ ] Nurse
[ ] Public health specialist
[ ] Medical technician
[ ] Other (specify): _____

17. What specialized training have you completed in infection control? (Mark all that apply)

[ ] None
[ ]1 Less than six months training in infection control
[ ]1 Work experience in infection control (specify duration in years): _____
[ ]2 Special training in infection control for at least six months

18. Do you spend at least some time each week on infection control activities?

[ ] No
[ ]1 Yes

This section should be completed by the nurse who performs infection control activities (if this is someone other than the head of the program).

19. What specialized training have you completed in infection control? (Mark all that apply)

[ ] None
[ ]1 Less than six months training in infection control
[ ]1 Work experience in infection control (specify duration in years): _____
[ ]2 Special training in infection control for at least six months

20. Do you spend the majority of your time on infection control activities?

[ ] No
[ ]1 Yes

Assessment section total: _____ **Possible section total:** 8 _____

Infection Control Education Programs

The following questions provide an overview of educational programs in infection control throughout your facility.

21. Is there an orientation program with information on infection control for nurses and other staff who provide patient care in this facility? [ ] No [ ]1 Yes
22. Are doctors required to attend this orientation program? [ ] No [ ]1 Yes
23. Is there a periodic in-service (continuing education) program for nurses and other staff who provide patient care? [ ] No [ ]1 Yes
24. Are doctors required to attend this continuing education program? [ ] No [ ]1 Yes
25. What topics were discussed during continuing education sessions in the last year? (Mark all that apply) [ ] No programs were conducted [ ]1 Hand washing/hand hygiene [ ]1 Prevention of transmissible/communicable infections [ ]1 Prevention of intravascular catheter-associated infections [ ]1 Prevention of catheter-associated urinary tract infections [ ]1 Postsurgical care to prevent infections [ ]1 Labor and delivery infection control [ ]1 Antibiotic use [ ]1 Antibiotic resistance [ ]1 Prevention of infections among health care workers

Assessment section total: _____ **Possible section total:** 13

Outbreak Investigation and Nosocomial Infection Surveillance

This final set of questions addresses the investigation and reporting of infection outbreaks, and ongoing methods of nosocomial infection surveillance.

26. Were any outbreaks investigated by the infection control program in the last 12 months?

[ ] No
[ ]2 Yes

27. Was routine surveillance for nosocomial infections performed in your facility in the last 12 months?

[ ] No
[ ]2 Yes

28. About which infections were data collected in the last 12 months? (Mark all that apply)

[ ]1 Nosocomial bloodstream infection
[ ]1 Nosocomial pneumonia
[ ]1 Nosocomial urinary tract infection
[ ]1 Surgical site/wound infections
[ ]1 Episiotomy infections
[ ]1 Postpartum endometritis
[ ]1 Nosocomial meningitis
[ ]1 Nosocomial skin infections/cellulitis
[ ]1 Nosocomial gastroenteritis
[ ]1 Newborn conjunctivitis
[ ]1 Newborn omphalitis
[ ] None of these infections

29. What type of surveillance was performed for bloodstream infections? (Mark all that apply)

[ ] Discharge diagnosis reporting
[ ] Voluntary notification from physicians or nurses
[ ]1 Ward-based (e.g., chart review, discussion with nurses or physicians, patient exam)
[ ]1 Laboratory-based (e.g., review of blood cultures)
[ ] None of these types of surveillance

30. Were infection rates calculated on the number of discharges or on patient days?

[ ] No
[ ]1 Yes

31. Were rates reported to doctors and nurses caring for these patients?

[ ] No
[ ]1 Twice a year or less
[ ]2 Three or more times a year

32. Which methods were used to collect data on nosocomial pneumonia? (Mark all that apply)

[ ] Discharge diagnosis reporting
[ ] Voluntary notification from physicians or nurses
[ ]1 Ward-based (e.g., chart review, discussion with nurses or physicians, patient exam)
[ ]1 Laboratory-based (e.g., review of blood cultures)
[ ] None of these types or methods

33. Were nosocomial pneumonia infection rates calculated on the number of discharges or on patient days? [ ] No [ ]1 Yes
34. Were rates reported to doctors and nurses caring for these patients? [ ] No [ ]1 Twice a year or less [ ]2 Three or more times a year
35. Who collected data on surgical wound infections? (Mark all that apply) [ ] Ward doctors/nurses or supervisor [ ]1 Infection control staff
36. Which methods were used to collect data on surgical site infections? (Mark all that apply) [ ] Discharge diagnosis reporting [ ] Voluntary notification from doctors or nurses [ ]1 Ward-based (e.g., chart review, discussion with nurses or physicians, patient exam) [ ]1 Laboratory-based (e.g., review of blood cultures)
37. Were surgical site infection rates calculated on the number of discharges or on patient days? [ ] No [ ]1 Yes
38. Were data on surgical site infection rates stratified? (Mark all that apply) [ ] Rates not stratified [ ]1 Stratified by wound class (e.g., clean, clean-contaminated, contaminated, dirty) or some other risk index [ ]1 Stratified for specific surgical procedures [ ]1 Stratified for specific surgeons
39. Were surgical site infection rates reported to doctors and nurses caring for these patients? [ ] No [ ]1 Twice a year or less [ ]2 Three or more times a year
40. Is any post-discharge surveillance of surgical site infections performed? [ ] No [ ]1 Yes

Assessment section total: _____ **Possible section total:** 35

INFECTION CONTROL PROGRAM ANNOTATIONS

Background

Preventing nosocomial (hospital-acquired) infections requires a team approach in hospital settings that includes hospital management; direct providers of patient care including clinicians, nurses, and other health care providers; those who hire, supervise, and train health care workers; physical plant managers; pharmacy and laboratory technicians; and providers of materials and products. Infection control programs in a hospital are effective only if they involve all hospital personnel and include surveillance and prevention activities and effective and ongoing staff training. Ideally, the program receives effective support from national and regional levels (WHO 2002).

Item Notes

2. All facilities must assess their compliance with accreditation standards for infection prevention and control.

3–6. The facility manager/chief executive officer must ensure that Infection Prevention and Control Committee members' roles and responsibilities are executed as outlined in The National Infection Prevention and Control Policy. Infection Prevention and Control Committee roles and responsibilities must be clearly detailed in the health care workers' performance management contracts (The National Infection Prevention and Control Policy 2007).

7–10. The facility management must provide leadership by supporting the infection control program and executing its responsibilities as prescribed by the National Infection Prevention and Control Policy (NDOH 2007).

11–14. The hospital's Infection Prevention and Control Committee should include a core group (infection control team) that executes the day-to-day work of infection control. The roles and responsibilities of the team must be executed as prescribed in The National Infection Prevention and Control Policy. Ideally, this team would include managers, doctors, nurses, other health care workers, clinical microbiologists, pharmacists, and individuals in charge of sterilization processes, maintenance, housekeeping, and training services (WHO 2002, 9; NDOH 2007).

12. It is recommended that the Infection Prevention and Control Committee meet at a set time and place monthly or quarterly (Wiblin 1998, 29–32).

16–18. The duties of the Infection Prevention and Control Officer primarily include infection prevention and control practices. The officer should be a health professional with post-basic education in infection prevention and control and have responsibility for the day-to-day activities of infection prevention and control (WHO/AFRO et al. 2001, 14).

19. The Infection Control Professional (ICP) generally is a registered nurse, often with a bachelor's degree. Other ICPs are medical technologists, and some may have master's degrees in epidemiology or related fields. ICPs often receive training in infection surveillance

and control and in epidemiology through basic courses offered by professional organizations or health care institutions (Scheckler et al. 1998, 119).

21, 22. The Infection Prevention and Control Committee's responsibilities include developing training programs on infection prevention and control for integration in the pre-service curricula of all health care workers. They also encourage participation of all health care facility staff in infection prevention and control through orientation sessions, regular meetings, and in-service education (WHO/AFRO et al. 2001, 11–12).

23–25. The Infection Prevention and Control Committee should plan and conduct ongoing training programs to ensure that all staff members are sensitized to measures to prevent infection transmission (WHO/AFRO et al. 2001, 11–12).

26. One of the responsibilities of the Infection Prevention and Control Committee is investigating the spread of infection outbreaks in collaboration with medical, nursing, and other staff members. General experience demonstrates that outbreaks of nosocomial infections are extremely common in hospitals with limited resources. If no outbreaks have been detected, review the procedures for surveillance and detection (WHO/AFRO et al. 2001, 12).

27. The nosocomial infection rate is an indicator of quality and safety of care. The development of a surveillance process to monitor this rate is an essential first step to identify local problems and priorities and evaluate the effectiveness of infection control activity (WHO 2002, 16).

28. Where resources are limited, the use of surveillance as an infection monitoring tool generally should be restricted to investigating outbreaks or exposures. When considering initiating other types of surveillance activities, the objectives should be reasonable in terms of the resources and time available, and the projected use for the data should be clearly defined before routine collection of data is established (Tietjen et al. 2003, 28-3).

29, 32, 36. Data collection requires multiple sources of information as no method, by itself, is sensitive enough to ensure data quality. Techniques for case finding include ward activity and observations, laboratory reports, other diagnostic tests, and discussion of cases with the clinical staff during periodic ward visits (WHO 2002, 20).

30, 33, 37. Attack rates can be estimated by the calculation of a simplified infection ratio using an estimate of the denominator for the same period of time (e.g., number of admissions or discharges, number of surgical procedures). The use of incidence rates is encouraged as they take into account the patient's length of exposure or the length of stay. This gives a better reflection of risk and facilitates comparisons. Either patient-day rates or device-associated rates can be used (WHO 2002, 20).

31, 34, 39. To be effective, feedback must be prompt, relevant to the target group (i.e., the people directly involved in patient care), and have the potential for maximum influence on infection prevention (e.g., surgeons for surgical site infection, physicians and nurses in intensive care units) (WHO 2002, 23).

35. ICPs should collect surveillance data. Less highly trained individuals are used by some hospitals as surveillance technicians (e.g., licensed practical nurses or medical care

associates). With on-the-job training and close supervision by an ICP, such individuals may function effectively in surveillance (Scheckler et al. 1998, p. 119).

38. Infection rates should be stratified by the extent of endogenous bacterial contamination at surgery: clean, clean-contaminated, or dirty. Surgical site infection rates may also be stratified by duration of operation and underlying patient status using indices such as those developed by the Centers for Disease Control and Prevention's National Nosocomial Infection Surveillance Study. Individual surgeons should be provided their own surgical site infection rates in a confidential manner (WHO 2002, 41; Culver et al. 1991).

40. In some instances, almost two-thirds of surgical procedures are performed in the outpatient setting; and now that the postoperative length of stay for surgical patients is shorter, it is desirable to include post-discharge surveillance in any surgical site infection surveillance program (Roy 2003, 377–78).

References

Culver, D. H., Horan T. C., Gaynes R. P., et al. 1991. Surgical Wound Infection Rates by Wound Class, Operative Procedure and Patient Risk Index. National Nosocomial Infections Surveillance System. *The American Journal of Medicine* 91(Suppl. 3B):152S–157S.

Roy, M. C. 2003. Modern Approaches to Preventing Surgical Site Infections. In *Prevention and Control of Nosocomial Infections*, 4th ed., edited by R. P. Wenzel, 377–78. Philadelphia, PA: Lippincott, Williams & Wilkins.

Scheckler, W. E., D. Brimhall, A. S. Buck, et al. 1998. Requirements for Infrastructure and Essential Activities of Infection Control and Epidemiology in Hospitals: A Consensus Panel Report. SHEA Position Paper. *Infection Control and Hospital Epidemiology* 19(2):114–24.

South Africa National Department of Health. 2007. *National Infection Prevention and Control Policy.*

Tietjen, L., D. Bossemeyer, and N. McIntosh. 2003. *Infection Prevention: Guidelines for Healthcare Facilities with Limited Resources*. Baltimore, MD: Jhpiego.

WHO. 2002. *Prevention of Hospital-Acquired Infections: A Practical Guide*. 2nd ed. WHO/CDS/CSR/EPH/2002/12. Geneva: WHO.

WHO/AFRO, Commonwealth Regional Health Community Secretariat, and East, Central and Southern African College of Nursing. 2001. *Manual of Infection Prevention and Control Policies and Guidelines*. Prepared by U. V. Reid.

Wiblin, R. T., and R. P. Wenzel. 1998. The Infection Control Committee. In *A Practical Handbook for Hospital Epidemiologists*, edited by L. A. Herwaldt and M. Decker. Thorofare, NJ: SLACK Incorporated.

MODULE SCORING SHEET

Name of facility: _____

Name of module: _____

Date completed: _____

Module section	1 Assessment total	2 Possible total	3 Percentage score	4 Rating based on percentage score
Total for module			**%**	

Column notes:

1. Assessment total—sum of points for all marked responses

2. Possible total—sum of all possible points for the question

3. Percent score—(column 1/column 2) × 100

4. Rating—

More than 75% of possible points:	A—recommended practices are followed consistently and thoroughly
50–75% of possible points:	B—recommended practices usually followed
Less than 50% of possible points:	C—training and follow-up needed on recommended practices

INJECTIONS

These questions should be completed by the unit manager of the medical and surgical wards, labor and delivery area, and/or surgical areas.

For each item, mark the answer that best describes your current situation by putting a tick ✓ inside the double brackets [✓]. Note that some questions ask for only one answer, and others ask you to mark all answers that apply.

Injection Practices

The following questions focus on the use of needles and syringes for injections in your facility.

1. Are auto-disable needles available? (Mark one answer) [ ] Never [ ] Sometimes [ ]2 Usually [ ]2 Always
2. When drawing medications or vaccines from ampoule/vials, do you swab the top of the vial with alcohol or alcohol-containing disinfectant (e.g., tincture of iodine) before puncturing with a needle? [ ] No [ ]1 Yes
3. Do you leave the needle sticking into multi-dose vials so that the solution can be withdrawn easily for multiple patients? [ ]1 No [ ] Yes
4. Do you use glass ampoules that must be cracked open by hand? [ ]1 No [ ] Yes
5. Are ampoules cracked using sterile gauze to protect the hands and to keep the contents sterile? [ ] No [ ]1 Yes

Assessment section total: _____ **Possible section total:** 6 _____

Injection Policies and Education

These questions ask about your facility's awareness of and adherence to the World Health Organization's (WHO) Safe Injection Global Network (SIGN) guidelines and staff education practices.

6. Do you follow the WHO's SIGN guidelines for safe use of needles? [ ] No [ ]2 Yes
7. Do you have routine training sessions to educate staff about safe injection practices? [ ] No [ ]1 Yes

Assessment section total: _____ **Possible section total:** 3 _____

INJECTIONS ANNOTATIONS

Background

The World Health Organization (WHO) estimates that each year unsafe injection practices result in 80,000 to 160,000 new HIV-1 infections, 8 to 16 million hepatitis B virus (HBV) infections, and 2.3 to 4.7 million hepatitis C virus (HCV) infections worldwide. Together, these illnesses account for 1.3 million deaths. Even under the auspices of WHO regional immunization programs, an estimated 30 percent of immunization injections are administered with unclean, commonly reused syringes. And, more than 50 percent of injections of other medications are deemed unsafe, with rates as high as 90 percent in some immunization campaigns (Drucker et al. 2001, 1989).

Item Notes

1. Syringes with a reuse prevention feature (auto-disable) offer the highest level of safety for injection recipients. They should be considered for use where local data indicate that unsafe practices are particularly common. There are many types of auto-disable syringes, but the key feature of all of them is that they permit the syringe to be filled and emptied only once. Although they are similar to conventional syringes, most health workers will require training and practice in correctly filling them to avoid wasting medication, syringes, and needles (Tietjen et al. 2003, Ch. 7-11).

2. Before drawing medications or vaccines from vials, the top of the vial should be wiped with a cotton swab soaked in a 60–90 percent alcohol solution or other locally available disinfectant containing alcohol (Tietjen et al. 2003, Ch. 7-11).

3. The needle should not be left inserted in multi-dose vials. This practice provides a direct route for microorganisms to enter the bottle and contaminate the fluid between uses (Tietjen et al. 2003, Ch. 7-11).

4. Pop-open ampoules should be selected rather than ampoules that require use of a metal file to open (WHO/SIGN 2003).

5. If using ampoules that require a metal file to open, fingers should be protected with a clean barrier (e.g., small gauze pad) when opening the ampoule (WHO/SIGN 2003).

6. When injections are medically indicated, they should be administered safely. A safe injection does not harm the recipient, does not expose the provider to any avoidable risk, and does not result in any waste that is dangerous for other people. Eliminating unnecessary injections is the highest priority for preventing injection-associated infections. These best practices are measures that have been determined through scientific evidence or expert consensus to most effectively protect patients, providers, and communities (WHO/SIGN 2003).

7. The three strategies for the safe and appropriate use of injections are (1) behavior change among patients and health care workers to decrease injection overuse and achieve injection

safety; (2) availability of necessary equipment and supplies, and (3) management of waste sharps (WHO 2002).

References

Tietjen, L., D. Bossemeyer, and N. McIntosh. 2003. *Infection Prevention: Guidelines for Healthcare Facilities with Limited Resources*. Baltimore, MD: Jhpiego.

World Health Organization (WHO). 2002. *Prevention of Hospital-Acquired Infections: A Practical Guide*. 2nd ed. WHO/CDS/CSR/EPH/2002/12. Geneva: WHO.

WHO, Safe Injection Global Network. 2003. Department of Blood Safety and Clinical Technology Recommendations. *Guiding Principles to Ensure Injection Device Safety*. WHO/BCT/03.12. Geneva: WHO. http://www.who.int/injection_safety/toolbox/docs/en/Guiding_Principle_Inj.pdf (accessed Aug. 17, 2006).

MODULE SCORING SHEET

Name of facility: _____

Name of module: _____

Date completed: _____

Module section	1 Assessment total	2 Possible total	3 Percentage score	4 Rating based on percentage score
Total for module			**%**	

Column notes:

1. Assessment total—sum of points for all marked responses

2. Possible total—sum of all possible points for the question

3. Percent score—(column 1/column 2) × 100

4. Rating—

More than 75% of possible points:	A—recommended practices are followed consistently and thoroughly
50–75% of possible points:	B—recommended practices usually followed
Less than 50% of possible points:	C—training and follow-up needed on recommended practices

INTENSIVE CARE UNITS

These questions should be completed in consultation with the unit manager of each intensive care unit (ICU). If policies are similar for all ICUs, complete the form once. If policies differ substantially, fill out a separate form for each ICU.

For each item, mark the answer that best describes your current situation by putting a tick ✓ inside the brackets [✓]. Note that some questions ask for only one answer, and others ask you to mark all answers that apply. Questions that are intended to provide contextual information only are not scored.

What is the name of this ICU? _____

Staffing

The following questions cover ICU patient populations and staffing patterns.

1. This ICU has

[ ] Adults only
[ ] Children only
[ ] Both adults and children

2. What is the total number of beds in this ICU? _____

3. On weekdays, how many nurses provide care to patients in this ICU during a typical day shift that includes 12 noon? _____

Calculate and write down the number of beds per nurse: _____

Then mark the answer that applies.

[ ] More than five beds per nurse
[ ]1 Three to five beds per nurse
[ ]2 Two or less beds per nurse

Assessment section total: _____ **Possible section total:** 2

General Practices in the ICU

The next questions cover cleaning of the ICU and staff hand hygiene patterns.

4. How frequently are immediate patient care areas in this ICU thoroughly cleaned? (Mark one answer)

[ ] Less than daily
[ ]1 At least daily
[ ]2 At least daily and between patients

5. Are staff required to wear cover gowns or special shoes to enter the ICU? (Mark one answer)

[ ]1 No requirement
[ ] Gown required
[ ] Special shoes required

6. Are staff and visitors required to perform thorough hand hygiene prior to entering the ICU? (Mark one answer)

[ ] No
[ ]1 Yes

7. What method is used for the hand hygiene? (Mark all that apply)

[ ] None required
[ ] Dip in disinfecting agent
[ ] Brushes with soap or antiseptic agent
[ ]1 Very soft brushes with soap or antiseptic agent
[ ]1 Waterless alcohol hand antiseptic

Assessment section total: _____ **Possible section total:** 6

Mechanical Ventilation

8. The following questions cover mechanical ventilation in the ICU, including the handling of ventilator circuits and humidifiers. What percentage of patients in this unit requires mechanical ventilation?

[ ] None
[ ] Less than 25 percent
[ ] 25–50 percent
[ ] More than 50 percent

9. Is the same suction catheter used for more than one episode of endotracheal suctioning in patients receiving positive pressure ventilation?

[ ]2 No
[ ] Yes

10. How often are ventilator circuits changed? (Mark one answer)

[ ] Every day
[ ]1 Every three to six days
[ ]1 Less frequently than once a week
[ ]1 Never when used for an individual patient

11. What type of humidifier is used in the ventilator circuit? (Mark one answer)

[ ] No humidifier used
[ ]1 Mechanical ventilator
[ ]1 Bubbling humidifier
[ ]1 Wick humidifier
[ ]1 Passover humidifier
[ ]1 Cascade humidifier
[ ]1 Hygroscopic condenser or heat-moisture exchange humidifier

12. What type of water is used to fill the humidifier?

[ ]1 Sterilized water
[ ] Distilled water
[ ] Tap water

13. Are in-line bacterial filters used in ventilator circuits?

[ ]1 No
[ ] Yes

Assessment section total: _____ **Possible section total:** 6

Prophylaxis and Monitoring

The next set of questions covers written procedures for ICU procedures, prophylaxis for a number of conditions, and blood glucose monitoring.

14. For which of the following are there written procedures? (Mark all that apply)

[ ]1 Prevention of deep vein thrombosis (DVT)
[ ]1 Prevention of stress ulcers or gastritis
[ ]1 Elevation of the head of bed
[ ]1 Appropriateness of sedation
[ ]1 Assessment of readiness to extubate
[ ]1 Glucose control

15. What proportion of mechanically ventilated patients receives routine DVT prophylaxis? (Mark one answer)

[ ] Less than 50 percent
[ ]1 50–75 percent
[ ]2 Greater than 75 percent

16. What is the most commonly used procedure for DVT prophylaxis in mechanically ventilated patients? (Mark one answer)

[ ] Not routinely done
[ ]1 Heparin (unfractionated or low molecular weight)
[ ]1 Compression stockings
[ ] Other (Specify) _____

17. What is the typical position of the head of the bed in mechanically ventilated patients? (Mark one answer)

[ ] Flat
[ ] Elevated to between 1 and 29 degrees
[ ]1 Elevated greater than 30 degrees

18. What percentage of patients receives routine prophylaxis for stress ulcers or gastritis? (Mark one answer)

[ ] Less than 50 percent
[ ]1 50–75 percent
[ ]2 More than 75 percent

19. What is used most commonly for the routine prevention of stress gastritis? (Mark one answer)

[ ]1 Proton pump inhibitors (omeprazole, lansoprazole)
[ ]1 H2 blockers
[ ]1 Sucralfate
[ ] Other

20. How is appropriateness of sedation usually monitored? (Mark one answer)

[ ] No monitoring is done
[ ]1 Daily interruption of sedation
[ ] Other

21. How are patients routinely screened for readiness to extubate? (Mark all that apply)

[ ] No screening is done
[ ]1 Daily assessment of lung mechanics
[ ]1 Daily assessment of ventilator parameters
[ ]1 Daily trial of spontaneous respiration
[ ] Other

22. What percentage of mechanically ventilated patients has routine (at least daily) blood glucose monitoring? (Mark one answer)

[ ] Less than 50 percent
[ ]1 50–75 percent
[ ]2 More than 75 percent

23. What is the blood glucose goal in mechanically ventilated patients? (Mark one answer)

[ ] Blood glucose greater than 300 mg/dL (16 mmol/L)
[ ]1 Blood glucose greater than 200 mg/dL (11 mmol/L)
[ ]2 Blood glucose greater than 110 mg/dL (6 mmol/L)
[ ] Other

24. When a ventilated patient has a blood sugar exceeding the above goal, how often is insulin given? (Mark one answer)

[ ] Less then 50 percent of the time
[ ]1 50–75 percent of the time
[ ]2 More than 75 percent of the time

Assessment section total: _____ **Possible section total:** 23

Checklist of Additional Modules to be Completed for This ICU

- ☐ Airway Suctioning
- ☐ Hand Hygiene
- ☐ Intravenous Catheters (if used in ICU)
- ☐ Intravenous Fluids and Medications (if used in ICU)
- ☐ Isolation and Standard Precautions
- ☐ Sterilization and Disinfection (if instruments, equipment, needles, or gloves are disinfected or sterilized in this ICU)
- ☐ Urinary Catheters (if used in ICU)

INTENSIVE CARE UNIT ANNOTATIONS

Background

Although only 5 to 10 percent of all hospitalized patients are treated in an intensive care unit (ICU), the incidence of nosocomial infections in ICUs is five to 10 times higher than that observed in general hospital wards. Systemic and respiratory infections are far more common in ICUs than in general wards, and most epidemics originate in ICUs (Widmer 1994).

Item Notes

2. The number of ICU beds in a hospital usually ranges from one to four per 100 total hospital beds. The number depends on the role and the type of ICU. Multidisciplinary ICUs require more beds than single-specialty ICUs, especially if high-dependency beds are not available elsewhere in the hospital. ICUs with fewer than four beds are not considered cost-effective, whereas those with over 20 non-high-dependency beds may be difficult to manage. There are different levels of technology available to ICUs in different settings, and we recognize that not all hospitals are able to provide the ideal ratio of beds to facility (Oh 1997, 3–9).

3. Ideally, all critically ill patients should have one-to-one nursing. Occasionally, very unstable patients requiring complex therapy (e.g., dialytic therapy) require two nurses most of the time. Again, we recognize that not all hospitals are able to provide these levels of care (Oh 1997, 3–9).

4. Patient care areas (surgical areas, procedure rooms, laboratories, areas where instruments are cleaned and processed) must be cleaned with special care using a disinfectant cleaning solution. In these areas, there is a greater potential for contamination by infectious materials for both clients and clinic staff. These areas should be cleaned as follows—

- Each morning: At the beginning of each day, damp-wipe or mop countertops, tables, trolleys, and floors with water to remove dust and lint that has accumulated overnight.

- Between clients: Clean operating and procedure rooms, examination tables, trolleys or Mayo stands, countertops, lamp handles, and any other potentially contaminated surfaces with a cloth dampened with a disinfectant cleaning solution. Clean spills of blood or other body fluids immediately with a 0.5 percent chlorine solution. Put waste in a leak-proof container. Remove the container from the operating theater or procedure room whenever it is three-quarters full. Clean visibly soiled areas of the floor with a mop soaked in a disinfectant cleaning solution.

- At the end of the clinic session or day, remove contaminated waste and dispose of it as soon as possible to limit exposure; wipe down all surfaces—including counters, tabletops, sinks, lights, and door handles and plates—with a cloth saturated with a disinfectant cleaning solution. Pay particular attention to procedure/operating tables, making sure to thoroughly clean the sides, base, and legs with a disinfectant cleaning solution. Clean the floors with a mop dampened with a disinfectant cleaning solution (EngenderHealth 2004, “Housekeeping”).

5. There is no demonstrated value to wearing gowns or special shoes in the ICU.

6, 7. Hands should be decontaminated before direct contact with patients. When hands are visibly dirty or contaminated with proteinaceous material, wash them with plain soap and water; when hands are visibly soiled with blood or other body fluids, wash them with an antimicrobial soap and water. If hands are not visibly soiled, an alcohol-based hand rub may be used for routinely decontaminating hands. Alternatively, hands can be washed with an antimicrobial soap and water in all clinical situations (CDC 2002).

14. Several interventions, when routinely applied to mechanically ventilated patients, have been shown to reduce ICU complications, mortality, length of ICU stay, and cost of hospitalization. Deep vein thromboses (DVTs) are common complications in sick, immobilized patients (up to 30 percent of ICU patients), which can lead to pulmonary thromboembolism. Routine use of heparin or compression stockings can reduce the risk of DVT by 50 percent. This corresponds to significantly lower mortality, length of ICU stay, length of total hospitalization, and medical costs (IHI 2006).

17. Routine elevation of the head of the bed to beyond 30 degrees has been shown to reduce the risk of nosocomial pneumonia from 38 to 8 percent. Nosocomial pneumonia increases the likelihood of in-hospital mortality by 40 percent and length of stay by two weeks. Universal elevation of the head of the bed can significantly improve outcomes among ICU patients.

19. The principal risk factors for stress gastritis and consequent upper GI bleeding are mechanical ventilation for more than 48 hours and coagulopathy. Many different physiologic stressors are associated with stress gastritis. Pharmacologic prophylaxis can be effectively accomplished by using Sucralfate, H2 blockers, or proton pump inhibitors.

20. Monitoring sedation can be easily accomplished with daily interruption or weaning of sedation. This allows earlier identification of patients in whom significant sedation or ventilator weaning is possible. Daily interruption of sedation has been shown to reduce time of mechanical ventilation and ICU stay by more than 30 percent and to reduce the average length of ICU stay by 2.4 days.

21. Daily assessments should be made of a patient's readiness for extubation. These can be made by reviewing a patient's requirements for ventilatory support, direct measures of lung mechanics (such as compliance and negative inspiratory force), and trials of spontaneous respiration. In a randomized trial looking only at daily spontaneous breathing trials, patients who were assessed daily for readiness to extubate had a mean 1.5 fewer days of mechanical ventilation and a 50 percent reduction in ventilator-associated complications.

23. Intensive control of blood glucose has also been shown to markedly improve both in-hospital and long-term mortality in ICU patients. This effect is best demonstrated when aggressive insulin therapy is provided with a goal blood sugar of under 110 mg/dL (6 mmol/L).

In summary, the above interventions can not only improve the outcomes of the individual patient, but if applied universally can dramatically improve the complication rate and medical expenditures in the intensive care unit. Written policies should exist to implement the above procedures for all patients in whom there is no contraindication (Engender Health 2006, "Implement the Ventilator Bundle").

References

US Centers for Disease Control and Prevention (CDC). 2002. Guideline for Hand Hygiene in Health-Care Settings: Recommendations of the Healthcare Infection Control Practices Advisory Committee and the HICPAC/SHEA/APIC/IDSA Hand Hygiene Task Force. *MMWR* 2002;51(No. RR-16):1–44.

EngenderHealth. 2004. Infection Prevention Online Course. Module: Housekeeping http://www.engenderhealth.org/res/onc/index.html#start (accessed July 17, 2006).

EngenderHealth. 2006. Critical Care: Intensive Care: Changes. Implement the Ventilator Bundle. http://www.ihi.org/IHI/Topics/CriticalCare/IntensiveCare/Changes/ImplementtheVentilatorBundle.htm (accessed Oct. 3, 2006).

Institute for Healthcare Improvement. 2006. 100,000 Lives Campaign. http://www.ihi.org/IHI/Programs/Campaign/ (accessed July 17, 2006).

Oh, T. E. 1997. Design and Organization of Intensive Care Units. In *Intensive Care Manual*, 4th ed., edited by T. E. Oh, 3–9. Boston: Butterworth-Heinemann Medical.

Widmer, A. F. 1994. Infection Control and Prevention Strategies in the ICU. *Journal of Intensive Care Medicine* 20, Suppl. no. 4:S7–S11.

MODULE SCORING SHEET

Name of facility: _____

Name of module: _____

Date completed: _____

Module section	1 Assessment total	2 Possible total	3 Percentage score	4 Rating based on percentage score
Total for module			**%**	

Column Notes:

1. Assessment total—sum of points for all marked responses

2. Possible total—sum of all possible points for the question

3. Percent score—(column 1/column 2) × 100

4. Rating—

More than 75% of possible points:	A—recommended practices are followed consistently and thoroughly
50–75% of possible points:	B—recommended practices usually followed
Less than 50% of possible points:	C—training and follow-up needed on recommended practices

INTRAVENOUS CATHETERS

This module should be completed by the unit manager for each clinical area in the assessment where intravenous catheters are used.

For each item, mark the answer that best describes your current situation by putting a tick ✓ inside the brackets [✓]. Note that some questions ask for only one answer, and others ask you to mark all answers that apply.

What is the name of this unit? _____

1. What proportion of patients in this unit receives peripheral intravenous catheters? (Mark one answer)

[ ] None
[ ] Some
[ ] Most
[ ] All

If intravenous catheters are never used, skip the rest of this module.

2. What types of catheters are usually used for peripheral intravenous access? (Mark one answer)

[ ] Short rigid metal catheters (“butterfly”)
[ ]1 Short flexible polyethylene catheters (needle)

3. What type of skin antiseptic is used for inserting intravenous catheters? (Mark all that apply)

[ ] None
[ ] Thiomersal
[ ] Benzalkonium chloride
[ ]1 Chlorhexidine
[ ]1 Iodine
[ ]1 Betadine (povidone-iodine)
[ ]1 Alcohol
[ ]1 Chlorhexidine + alcohol
[ ]1 Iodine + alcohol

4. How often is there a sufficient supply of skin antiseptic for use during intravenous catheter insertion procedures? (Mark the answer that best applies)

[ ] Never
[ ] Sometimes
[ ]1 Usually
[ ]2 Always

5. What proportion of patients in this unit requires central venous catheters?

[ ] None
[ ] Some
[ ] Most

If NONE, skip the rest of this module.

6. How often are noncommercial intravascular catheters used (e.g., feeding tubes or locally assembled catheters)? (Mark answer that best applies)

[ ]2 Never
[ ] Sometimes
[ ] Usually
[ ] Always

7. Which of the following intravascular catheters are routinely changed? (Mark all that apply)

[ ] No catheters routinely changed
[ ] Umbilical venous catheter
[ ] Umbilical artery catheter
[ ] Catheters inserted peripherally into an arm or leg vein and threaded into central veins (PICCs)
[ ] Percutaneous central venous catheter (e.g., inserted in subclavian, jugular, femoral vein)
[ ]1 Peripheral metal ("butterfly") or short Teflon®, polyethylene, or other plastic catheter changed after 72 hours
[ ]2 Peripheral metal ("butterfly") or short Teflon, polyethylene, or other plastic catheter changed within 72 hours

8. How often are intravenous catheters inserted by cut-down? (Mark the answer that best applies)

[ ]2 Never
[ ]1 Sometimes
[ ] Usually
[ ] Always

9. What type of dressing is used to cover the catheter insertion site? (Mark the most common dressing used)

[ ] None
[ ] No dressing used, covered, or secured with sterile tape
[ ] No dressing used, covered, or secured with non-sterile tape
[ ]1 Sterile gauze
[ ]1 Transparent dressing (specify type): _____
[ ]1 Sterile gauze covered with transparent dressing

10. What type of antimicrobial ointment or cream is applied to the site of insertion of an intravenous catheter? (Mark all that apply)

[ ] Bacitracin
[ ] Neomycin, polymyxin B, and bacitracin (Neosporin®)
[ ] Polysporin
[ ] Mupirocin
[ ] Iodophor
[ ]1 No ointment or cream used

11. Are intravenous catheters reprocessed for use in another patient?

[ ]2 No
[ ] Yes

If intravenous catheters are reused, complete all remaining questions in this module. Then complete the Sterilization and Disinfection—Equipment and Intravenous Fluids module.

12. What types of catheters are used for central venous access? (Mark all that apply)

[ ] Percutaneous, central venous catheter (CVC) (e.g., inserted into subclavian, jugular, or femoral vein)—stiff polyurethane
[ ] Umbilical venous/arterial catheter in newborn—stiff polyurethane
[ ]1 Percutaneous, CVC (e.g., inserted into subclavian, jugular, or femoral vein)—flexible Teflon, polyurethane
[ ]1 Umbilical venous/arterial catheter in newborn—flexible Teflon, polyurethane
[ ]1 Pliable plastic catheters inserted peripherally into an arm or leg vein and threaded into the central veins (PICCs)

13. What barriers are used for central venous catheter insertion? (Mark all that apply)

[ ] Non-sterile gloves
[ ] Mask
[ ] Hair cover (cap)
[ ] Small sterile drape
[ ]1 Sterile gloves
[ ]1 Gown (sterile or non-sterile)
[ ]1 Large sterile drape (such as used in surgery)

14. When the intravascular infusion system is disconnected at the site of a hub connection, is the inside of the connection cleaned with sterile water, sterile saline, or alcohol prior to reconnection?

[ ] No
[ ]1 Yes

15. When an injection is made into a port in the intravascular infusion system, is the port covering (e.g., latex membrane) cleaned with alcohol or an iodinated disinfectant?

[ ] No
[ ]1 Yes

16. When the intravenous infusion system is disconnected, are the ends placed in a sterile fluid?
 [ ] No
 [ ]1 Yes

Assessment total: _____ **Possible total:** 29

INTRAVENOUS CATHETERS ANNOTATIONS

Background

The use of intravascular devices, both venous and arterial, to deliver sterile fluids, medications, and nutritional products and for central monitoring of blood pressure and other hemodynamic functions, has increased dramatically during the past decade. The risk of infection associated with the use of intravascular devices can be reduced by following recommended infection prevention practices related to their insertion (e.g., the use of aseptic technique) and by better management of the device once it is in place. In many countries, poor infection prevention practices, such as infrequent hand washing or use of antiseptic hand rub, failure to use gloves, and failure to use maximal barrier precautions when inserting central intravenous catheters, often result in increased rates of local and systemic infections (Tietjen et al. 2003, 24-1).

Item Notes

***2**. Teflon® or polyurethane catheters have been associated with fewer infectious complications than catheters made of polyvinyl chloride or polyethylene. Steel needles used as an alternative to catheters for peripheral venous access have the same rate of infectious complications as do Teflon catheters. However, the use of steel needles frequently is complicated by infiltration of intravenous (IV) fluids into the subcutaneous tissues, a potentially serious complication if the infused fluid is a vesicant. The use of steel needles should be avoided for the administration of fluids and medication that might cause tissue necrosis if extravasation occurs (CDC 2002).*

3, 4. Clean skin should be disinfected with an appropriate antiseptic before catheter insertion and during dressing changes. Although a 2% chlorhexidine-based preparation is preferred for central venous catheter insertion, tincture of iodine, an Iodophor, or 70% alcohol can all be used (CDC 2002). Alcohol is an inexpensive, cost effective, efficacious antiseptic for cleaning skin for peripheral catheter insertion. Chlorhexidine is also highly effective. Iodine and Iodophor are effective as well, but they must be allowed to dry before IV access is attempted.

6. Commercial catheters manufactured under strictly controlled antiseptic conditions are ideal for patient use. Locally produced/assembled catheters are more likely to be contaminated and may be more irritating to blood vessels, putting patients at risk of phlebitis and infection. Moreover, connections of locally produced and assembled administration systems may not fit well, allowing contamination of the system.

7. Do not routinely replace central venous or arterial catheters solely for the purposes of reducing the incidence of infection. Replace peripheral venous catheters at least every 72–96 hours in adults to prevent phlebitis. Leave peripheral venous catheters in place in children

until IV therapy is completed, unless complications (e.g., phlebitis and infiltration) occur (CDC 2002).

8. Cut down procedures for venous access put patients at extremely high risk of infection. Intraosseous catheter insertion is possible even in adult patients and is a preferable route for emergency intravascular access. If a cutdown or intraosseous procedure is necessary, this line should be replaced by a conventional, aseptically inserted central venous line as soon as possible.

9. Covering the catheter site with a transparent dressing, sterile gauze, or both, forms an effective barrier and allows caretakers to monitor the site for discharge or other evidence of infection.

10. Do not routinely apply prophylactic topical antimicrobial or antiseptic ointment or cream to the insertion site of peripheral venous catheters. Do not use topical antibiotic ointment or creams on insertion sites (except when using dialysis catheters) because of their potential to promote fungal infections and antimicrobial resistance (CDC 2002).

11. Reuse of IV catheters and tubing is dangerous because it puts patients at risk of acquiring blood-borne pathogens, such as HIV or hepatitis B, from a previous patient. Furthermore, defects can arise in catheters and tubing that can cause mechanical dysfunction or bacterial contamination. Thus, IV materials should be discarded after each use.

12. Stiff catheters confer higher risk of venous thrombosis and infection. The risk of these complications is lower with flexible intravascular catheters.

13. Use aseptic technique including the use of a cap, mask, sterile gown, sterile gloves, and a large sterile sheet for the insertion of CVCs (including PICCS) or guidewire exchange (CDC 2002).

14, 15. Clean injection ports with 70% alcohol or an Iodophor before accessing the system (CDC 2002).

References

US Centers for Disease Control and Prevention. *2002. Guidelines for the Prevention of Intravascular Catheter Related Infections.* MMWR *2002; 51 (No. RR-10):1–29.*

Tietjen, L., D. Bossemeyer, and N. McIntosh. 2003. *Infection Prevention: Guidelines for Healthcare Facilities with Limited Resources*. Baltimore, MD: Jhpiego.

MODULE SCORING SHEET

Name of facility: _____

Name of module: _____

Date completed: _____

Module section	1 Assessment total	2 Possible total	3 Percentage score	4 Rating based on percentage score
Total for module			**%**	

Column notes:

1. Assessment total—sum of points for all marked responses

2. Possible total—sum of all possible points for the question

3. Percent score—(column 1/column 2) × 100

4. Rating—

More than 75% of possible points:	A—recommended practices are followed consistently and thoroughly
50–75% of possible points:	B—recommended practices usually followed
Less than 50% of possible points:	C—training and follow-up needed on recommended practices

INTRAVENOUS FLUIDS AND MEDICATIONS

This module should be completed by the unit manager for each unit where intravenous fluids and medications are used.

For each item, mark the answer that best describes your current situation by putting a tick ✓ inside the brackets [✓]. Note that some questions ask for only one answer, and others ask you to mark all answers that apply.

What is the name of this unit? _____

Preparation of Intravenous Fluids and Medications

These questions provide contextual information for understanding the use of intravenous (IV) fluids and medications in your facility, including the preparation of IV fluids, handling and changing infusion tubing, and procedures for using single or multi-dose vials of injectable fluids.

1. Where are standard IV fluids used in this unit admixed (e.g., addition of potassium chloride? (Mark the description that applies best) [ ] Where patient care is performed [ ]2 In the pharmacy [ ]1 In a designated "clean" area (e.g., within the operating room area, intensive care unit, or in a room specifically designated for this purpose).
2. What is the source of premixed IV fluids available in this unit? (Mark all that apply) [ ] None are used [ ] Prepared on ward [ ]2 Commercial source [ ]1 Prepared centrally in hospital
3. How frequently is commercial IV infusion tubing available with connections that are compatible with the bottles or bags used in this unit? (Mark one answer) [ ] Never [ ] Sometimes [ ]1 Usually [ ]2 Always

4. How frequently is IV infusion tubing changed in this unit for each of the following? (Mark one box in each column)

Infusion tubing is changed:	Blood products	Total parenteral nutrition fluids	Dextrose/saline fluids
When infusion is complete	[ ]1	[ ]1	[ ]
Every 12–24 hours	[ ]	[ ]	[ ]
Every 48 hours	[ ]	[ ]	[ ]
Every 72 hours	[ ]	[ ]1	[ ]1
More than 72 hours	[ ]	[ ]	[ ]
When IV is discontinued	[ ]	[ ]	[ ]

5. How frequently are single-dose vials used for injectable fluids/medications? (Mark one answer)

[ ] Never
[ ] Sometimes
[ ]1 Usually
[ ]2 Always

6. When multi-dose vials are used for injectable fluids/medications, how often do they have rubber, silicon, or latex diaphragms? (Mark one answer)

[ ] Never
[ ] Sometimes
[ ]1 Usually
[ ]2 Always

7. If vials with latex/silicon diaphragms are used, is the diaphragm disinfected with alcohol or iodinated disinfectant prior to access?

[ ] No
[ ]1 Yes

8. Is there a written facility policy for handling and storage of multi-dose vials? If not, skip question 9.

[ ] No
[ ]2 Yes

9. Does the policy state that opened vials should be marked with the date and time of expiration? (Mark one answer)

[ ] No
[ ]1 Yes

10. Are single-use medications manufactured for use in a single patient being used for multiple patients?

[ ]2 No
[ ] Yes

Assessment total: _____ **Possible total:** 20

INTRAVENOUS FLUIDS AND MEDICATIONS ANNOTATIONS

Background

It is estimated that about 50 percent of all patients admitted to hospitals will receive intravenous therapy, creating a large population at risk for local and systemic blood stream infections. Catheters inserted into the venous and arterial bloodstream bypass the normal skin defense mechanism; therefore, these devices provide a way for microorganisms to enter the bloodstream at the time of insertion through several routes—from the device at the time of insertion; from subsequent contamination of the device or attachments (e.g., tubing connected to the blood monitoring apparatus or the fluids being administered); or from pathogens on the skin surrounding the insertion site (Tietjen et al. 2003, 24-1).

Item Notes

1, 2. All routine parenteral fluids should be admixed in the pharmacy in a laminar-flow hood using aseptic technique (CDC 2002, 15). Where laminar-flow hoods are not available, choose a clean, separate area in the pharmacy; or if there is no pharmacy, admix in a similar area near the point of care.

3. All components of the IV infusion system should be compatible to minimize leaks and breaks in the system (CDC 2002, 15).

4. Infusion tubing used to administer blood, blood products, or lipid emulsions should be replaced within 24 hours. If the solution contains only dextrose and amino acids, the administration set does not need to be replaced more frequently than every 72 hours or when the IV is disconnected. Also, infusion sets should be changed whenever they are damaged (CDC 2002, 11).

5. To prevent contamination of injection equipment and medication, single-dose vials are recommended rather than multi-dose vials (WHO/SIGN 2001).

7. If multi-dose vials are used, the access diaphragm should be cleaned with a 70 percent alcohol solution before inserting a device into the vial. Sterile devices must be used to access a multi-dose vial, avoiding touch contamination of the device before penetrating the access diaphragm. Multiple dose vials should be discarded if sterility is compromised (CDC 2002, 11).

8. Up-to-date policies and procedures for compounding and storage of sterile products should be written and available to all personnel involved in these activities. When policies and procedures are changed they should be updated, as necessary, to reflect current standards of practice and quality (ASHP 2000).

9. All sterile products should bear an appropriate expiration date. The expiration date assigned should be based on currently available drug stability information and sterility considerations (ASHP 2000).

10. Single-use vials are frequently preservative-free and pose a risk for contamination if they are punctured several times. Leftover contents of single-use vials ideally should be discarded, and should not be saved for later use (CDC 2002, 11).

References

American Society of Hospital Pharmacists (ASHP) Council on Professional Affairs. 2000. ASHP Guidelines on Quality Assurance for Pharmacy-Prepared Sterile Products. *American Journal of Health-System Pharmacy* 57(12):1150–69.

U.S. Centers for Disease Control and Prevention. 2002. Guidelines for the Prevention of Intravascular Catheter-Related Infections. *MMWR* 2002;51(No. RR-10):1–26.

Tietjen, L., D. Bossemeyer, and N. McIntosh. 2003. *Infection Prevention: Guidelines for Healthcare Facilities with Limited Resources*. Baltimore, MD: Jhpiego.

World Health Organization (WHO), Safe Injection Global Network, International Council of Nurses. 2001. *Best Infection Control Practices for Skin-Piercing Intradermal, Subcutaneous, and Intramuscular Needle Injections*. Geneva: WHO.

MODULE SCORING SHEET

Name of facility: _____

Name of module: _____

Date completed: _____

Module Section	1 Assessment Total	2 Possible Total	3 Percent Score	4 Rating Based on Percent Score
Total for Module			**%**	

Column Notes:

1. Assessment Total—Sum of points for all marked responses

2. Possible Total—Sum of all possible points for the question

3. Percent Score—(Column 1/Column 2) × 100

4. Rating—

More than 75% of possible points:	A—recommended practices are followed consistently and thoroughly
50–75% of possible points:	B—recommended practices usually followed
Less than 50% of possible points:	C—training and follow-up needed on recommended practices

ISOLATION AND STANDARD PRECAUTIONS

This module should be completed by the person in charge of the health care facility's infection control program or the person who can best report on infection control activities.

For each item, mark the answer that best describes your current situation by putting a tick ✓ inside the brackets [✓]. Note that some questions ask for only one answer, and others ask you to mark all answers that apply. Questions that are intended to provide contextual information only are not scored.

Isolation Policies and Precautions

The following questions focus on your facility's policies and precautions for isolating patients with potential contagious infections to prevent the spread to other patients and to health care workers.

1. Does your facility have a formal written policy for placing patients with potentially contagious infections in isolation or for instituting specific procedures (often called "precautions") to prevent spread to other people? (Mark one answer)

[ ] No written policy or procedures
[ ] Policy and procedures communicated verbally only
[ ]1 Written policy and procedures available in an operations manual but not generally available for daily practice
[ ]2 Written policy and procedures in a manual but also posted on walls in clinical or support areas

2. Does your facility have a written policy for standard precautions similar to those defined by the National Department of Health? (Mark one answer)

[ ] No written policy or procedures
[ ] Policy and procedures communicated verbally only
[ ]1 Written policy and procedures available in an operations manual but not generally available for daily practice
[ ]2 Written policy and procedures in a manual but also posted on walls in clinical or support areas

3. Does your facility have a written policy regarding cleaning and fumigation of rooms following outbreaks such as cholera, viral hemorrhagic fever (VHF), and plague? (Mark one answer)

[ ] No written policy or procedures
[ ] Policy and procedures communicated verbally only
[ ]1 Written policy and procedures available in an operations manual but not generally available for daily practice
[ ]2 Written policy and procedures in a manual but also posted in clinical or support areas

4. Does your facility have the following isolation precautions? (Mark all that apply)

[ ] This hospital does not use an isolation system based on the route of transmission of pathogens
[ ] Special precautions for immunocompromised patients (including HIV/AIDS)
[ ]1 Airborne precautions (droplet nuclei that travel long distances in the air, as with tuberculosis [TB] and measles)
[ ]1 Droplet precautions (large droplets that travel only several meters in the air, as with meningococcus, pertussis, and Group A streptococcus)
[ ]1 Contact precautions (direct contact with the patient, excretions, or contaminated objects, as with salmonella, formerly known as “enteric precautions”)
[ ]1 Special precautions for multidrug-resistant organisms (bacteria resistant to multiple antibiotics, as with methicillin-resistant staph)

5. Are there specific isolation precautions for patients infected with the following pathogens? (Mark all that apply)

[ ] This facility does not have an isolation system based on specific types of infection
[ ]1 TB
[ ]1 Measles
[ ]1 Cholera (or other diarrheal diseases; please specify diseases)
[ ]1 VHF
[ ]1 Sudden acute respiratory syndrome
[ ]1 Group A streptococcus disease (in infants and children)
[ ]1 Staphylococcus aureus infection
[ ]1 Varicella

6. Do the isolation precaution guidelines include instructions about the following? (Mark all that apply)

[ ] Handling of linen
[ ] Handling of equipment and supplies
[ ] Disposal of waste and corpses
[ ] Cleaning
[ ]1 All of the above
[ ]1 Patient placement in specific rooms according to their disease or mode of transmission
[ ]1 Transport of isolated patients to other locations in hospital (X-ray)

7. Who is responsible for placing a patient on isolation precautions? (Mark one answer)

[ ] There is no formal policy for who should place a patient on precautions
[ ]1 Doctor
[ ]1 Nurse

8. Is there a policy for screening and restricting family and visitors with illnesses?

[ ] No
[ ]1 Yes

9. Which of these illnesses are screened for and restricted in family visits? (Mark all that apply)

[ ] None are screened for or restricted in family visits
[ ] Acute respiratory illness
[ ] Gastrointestinal illness
[ ]1 Chronic cough

Assessment section total: _____ **Possible section total:** 24

Supplies for Isolation Precautions

This question seeks information on supplies available for isolation precautions.

10. Which of the following items needed for isolation precautions are usually available in adequate supply? (Mark all that apply)

[ ]1 Standard surgical masks
[ ]1 Special respirator masks (such as N95)
[ ]1 Thick utility gloves
[ ]1 Nonsterile gloves (e.g., latex, nitrile)
[ ]1 Protective eye wear
[ ]1 Full face shields
[ ]1 Protective caps
[ ]1 Fluid resistant gowns
[ ]1 Non-fluid resistant gowns
[ ]1 Fluid resistant aprons
[ ]1 Fluid-proof shoes or shoe covers

Assessment section total: _____ **Possible section total:** 11

Precautions for Other Airborne Diseases

The following questions address practices in your hospital for isolating patients with airborne diseases, excluding TB (for example, measles, varicella).

11. Are patients with other airborne diseases (e.g., measles, varicella) usually placed on special isolation precautions?

[ ] No
[ ]1 Yes

12. Where are patients with other airborne diseases usually isolated? (Mark all that apply)

[ ] Patients with other airborne diseases are not isolated
[ ] In a secluded area of a general ward
[ ]1 In a separate single-bed room
[ ]1 In a separate room in which other patients with the same conditions are cared for

13. How often are the number of isolation rooms and/or the capacity of the airborne diseases ward *not* sufficient for the number of patients requiring isolation? (Mark one answer)

[ ] Patients with other airborne diseases are not isolated
[ ] Never
[ ] Sometimes
[ ]1 Usually
[ ]1 Always

Assessment section total: _____ **Possible section total:** 4

Viral Hemorrhagic Fever

If your facility is in an area where VHF occurs, the following questions cover education and policies for dealing with the disease, the type of rooms in which these patients are placed, and equipment available to those caring for VHF patients.

14. Which of the following best describes written policies for managing VHF? (Mark one answer)

[ ] No written policies
[ ]1 Written policies not based on international standards
[ ]2 Written policies based on National Department of Health policies
[ ]2 Written policies based on WHO policies

15. Do the policies cover the following? (Mark all that apply)

[ ] No written policies
[ ]1 Disposing of wastes and contaminated items from VHF patients
[ ]1 Disposing of corpses of patients who have died from VHF

16. Is there an education program for all staff that may participate in the care of VHF patients?

[ ] No
[ ]1 Yes

17. Are single rooms or a separate ward or building for VHF patients available?

[ ] No
[ ]2 Yes

18. How often is the number of single rooms or the capacity of the VHF ward sufficient for the number of patients requiring isolation? (Mark the answer that best applies)

[ ] Never
[ ] Sometimes
[ ] Usually
[ ]1 Always

19. Do the rooms used for patients with VHF have an anteroom?

[ ] No
[ ]1 Yes

20. Do the rooms used for patients with VHF have a dedicated toilet or latrine?

[ ] No
[ ]1 Yes

21. How is frequently used equipment (e.g., thermometer, blood pressure cuff, stethoscope) shared among VHF patients? (Mark one answer)

[ ] Equipment for non-VHF patients is not used with VHF patients
[ ]1 Equipment is used for multiple patients, but only patients with VHF
[ ]2 Each VHF patient has dedicated equipment

22. Are fluid-proof boots or shoe covers available?

[ ] No
[ ]1 Yes

23. Is there a device for removing boots without using hands?

[ ] No
[ ]1 Yes

24. Is plastic tape available for securing cuffs and ankles of protective garments?

[ ] No
[ ]1 Yes

25. Are leak-proof containers for infectious waste and patient linens available?

[ ] No
[ ]1 Yes

26. Are leak-proof containers for soiled personal attire available?

[ ] No
[ ]1 Yes

27. Is a bleach solution available?

[ ] No [ ]1 Yes
28. Are bedpans available? [ ] No [ ]1 Yes

Assessment section total: _____ **Possible section total:** 19

ISOLATION AND STANDARD PRECAUTIONS ANNOTATIONS

Background

There are two tiers of isolation precautions. The first tier, "Standard Precautions," is designed for the care of all patients in hospitals, regardless of their diagnosis or presumed infection status. Implementation of these standard precautions is the primary strategy for successful nosocomial infection control. The second tier, "Transmission-Based Precautions," is designed for the care of patients known or suspected to be infected by epidemiologically important pathogens that spread by airborne or droplet transmission, such as TB, or by contact with dry skin or contaminated surfaces (CDC 1996).

Item Notes

1, 2. Isolation and other barrier precautions should be available to staff in clearly written standardized policies that are adaptable to the infectious agent and the patients. These include standard precautions to be followed for all patients and additional precautions for selected patients (WHO 2002, 44). Standard precautions apply to blood; all body fluids, secretions, and excretions except sweat, regardless of whether or not they contain visible blood; non-intact skin; and mucous membranes. Standard precautions are designed to reduce the risk of transmission of microorganisms from both recognized and unrecognized sources of infection in hospitals (CDC 1996).

3. The room, cubicle, and bedside equipment of patients on Transmission-Based Precautions are cleaned using the same procedures used for patients on Standard Precautions, unless the infecting microorganism(s) and the amount of environmental contamination indicate special cleaning. In addition to thorough cleaning, adequate disinfection of bedside equipment and environmental surfaces (e.g., bed rails, bedside tables, carts, commodes, doorknobs, faucet handles) is indicated for certain pathogens, especially enterococci, which can survive in the inanimate environment for prolonged periods of time. Patients admitted to hospital rooms that previously were occupied by patients infected or colonized with such pathogens are at increased risk of infection from contaminated environmental surfaces and bedside equipment if they have not been cleaned and disinfected adequately. The methods, thoroughness, and frequency of cleaning and the products used are determined by hospital policy (CDC 1996).

4, 5. Transmission-Based Precautions are designed for patients documented or suspected to be infected with highly transmissible or epidemiologically important pathogens for which additional precautions beyond Standard Precautions are needed to interrupt transmission in hospitals. There are three types of Transmission-Based Precautions—airborne, droplet, and contact. They may be combined for diseases that have multiple routes of transmission. When used either singularly or in combination, they are to be used in addition to Standard Precautions.

- Airborne precautions are designed to reduce the nosocomial transmission of particles 5 µm or less in size that can remain in the air for several hours and be widely dispersed. Microorganisms spread wholly or partly by the airborne route include TB, chicken pox (varicella virus), and measles (rubeola virus). Airborne precautions are recommended for patients with either known or suspected infections with these

agents. For example, an HIV-infected person with a cough, night sweats, or fever, and clinical or X-ray findings that suggest TB should go on airborne precautions until TB is ruled out.

- Droplet precautions reduce the risks for nosocomial transmission of pathogens spread wholly or partly by droplets larger than 5 µm in size (e.g., *H. influenzae* and *N. meningitides meningitis*; *M. pneumoniae*, flu, mumps and rubella viruses). Other conditions include diphtheria, pertussis, pneumonic plague, and strep pharyngitis (scarlet fever in infants and young children). Droplet precautions are simpler than airborne precautions because the particles remain in the air only for a short time and travel only a few feet; therefore, contact with the source must be close for a susceptible host to become infected.

- Contact precautions reduce the risk of transmission of organisms from an infected or colonized patient through direct or indirect contact. They are indicated for patients infected or colonized with enteric pathogens (hepatitis A or echo viruses), herpes simplex and hemorrhagic fever viruses, and multidrug-resistant bacteria. Interestingly, chicken pox is spread both by the airborne and contact routes at different stages of the illness. Among infants, there are a number of viruses transmitted by direct contact. In addition, contact precautions should be implemented for patients with wet or draining infections that may be contagious (e.g., draining abscesses, herpes zoster, impetigo, conjunctivitis, scabies, lice, and wound infections) (Tietjen et al. 2003, 21-3; CDC 1996).

6. Although soiled linen may be contaminated with pathogenic microorganisms, hygienic and common sense storage and processing of clean and soiled linen are recommended. The methods are determined by hospital policy and any applicable regulations (See Tietjen et al. 2003, 8-3, for recommendations on handling, transporting, and laundering soiled linen). Contaminated, reusable, critical medical devices or patient-care equipment (i.e., equipment that enters normally sterile tissue or equipment through which blood flows) or semi-critical medical devices or patient-care equipment (i.e., equipment that touches mucous membranes) are sterilized or disinfected after use to reduce the risk of transmission of microorganisms to other patients; the type of reprocessing is determined by the article and its intended use, the manufacturer's recommendations, and hospital sterilization policy. Noncritical equipment (i.e., equipment that touches intact skin) contaminated with blood, body fluids, secretions, or excretions is cleaned and disinfected after use. Contaminated disposable (single-use) patient-care equipment is handled and transported in a manner that reduces the risk of transmission of microorganisms and decreases environmental contamination in the hospital; the equipment is disposed of according to hospital sterilization policy. Dishes, glasses, cups, or eating utensils should be cleaned with hot water and detergents.

Patients admitted to hospital rooms previously occupied by patients infected or colonized with nosocomial pathogens are at increased risk of infection from contaminated environmental surfaces and bedside equipment unless the room has been adequately cleaned and disinfected. Limiting the movement and transport of patients infected with virulent or epidemiologically important microorganisms and ensuring that such patients leave their rooms only for essential purposes reduces opportunities for transmission of microorganisms. When patient transport is necessary, appropriate barriers (e.g., masks, impervious dressings) should be worn or used by the patient to reduce the opportunity for transmission of pertinent microorganisms to other patients, personnel, and visitors and to reduce contamination of the

environment; personnel in the area to which the patient is to be taken should be notified of the impending arrival of the patient and of the precautions to be used. Patients should be informed of ways by which they can assist to preventing the transmission of their infectious microorganisms to others (CDC 1996; Tietjen et al. 2003, 8-3).

7. It is recommended that isolation involves collaborative decision making among nursing personnel and physicians (and takes into account written isolation policies) (WHO/AFRO et al. 2001).

8, 9. Visitors should be restricted to two persons at a time during visiting hours, observe any "STOP" signs, and report to the nurse-in-charge prior to entering an isolation area. Visitors should be requested not to bring items that may harbor potentially harmful microorganisms, and should be informed of precautions to be taken to prevent the spread of infection to family, friends, and community members. If requested, visitors should wear personal protective equipment (WHO/AFRO et al. 2001, 61).

10. Various types of masks, goggles, and face shields are worn alone or in combination to provide barrier protection. Hospital personnel should wear either a mask (that covers both the nose and the mouth) and goggles or a face shield during procedures and patient care activities that are likely to generate splashes or sprays of blood, body fluids, secretions, or excretions to protect the mucous membranes of the eyes, nose, and mouth from contact transmission of pathogens. A surgical mask generally is worn by hospital personnel to provide protection against the spread of infectious, large particle droplets that are transmitted by close contact and generally travel only short distances (up to about 1 meter from infected patients who are coughing or sneezing). High-efficiency masks should be worn by staff entering airborne isolation rooms. Gowns prevent contamination of clothing and protect skin from blood and body fluid exposures. Gowns treated to make them impermeable to liquids, leg coverings, boots, or shoe covers provide greater protection against splashes or when large quantities of infective material are present or anticipated. Gowns also are worn during the care of patients infected with epidemiologically important microorganisms to reduce the opportunity for transmission of pathogens from patients or items in their environment to other patients or environments; when gowns are worn for this purpose, they are removed before leaving the patient's environment and hands are washed (CDC 1996; WHO 2002, 45).

11-13. Airborne precautions are used for patients known or suspected to be infected with epidemiologically important pathogens that can be transmitted by the airborne route (e.g., TB, chickenpox, measles). The following are ideal—an individual room with adequate ventilation including, where possible, negative pressure; door closed; at least six air exchanges per hour; exhaust to the outside away from intake ducts; staff wearing high-efficiency masks in the room; patient stays in the room (WHO 2002, 45). When a private room is not available, the patient should be placed in a room with a patient who has an active infection with the same microorganism, but no other infection, unless otherwise recommended (CDC 1996).

14, 15. For complete infection prevention and control procedures for VHF, written policies based on WHO, the US Department of Health and Human Services, and the Centers for Disease Control and Prevention standards should be used. Isolation precautions should include safe disposal of waste and use of safe burial practices (WHO/AFRO et al. 2001, 84).

16. To reduce the risk of VHF transmission in a health care setting, information about the risk of VHF transmission should be provided to health facility staff (WHO/CDC 1998).

17, 18. Ideally, a fully equipped isolation area should be available to patients requiring isolation. If an isolation area is not available and VHF is suspected, immediately identify and set aside a single room with an adjoining toilet or latrine. If a single room is not available, select one of the following in order of preference: a separate building or ward that can be used for VHF patients only; an area in a larger ward that is separate and far away from other patients in the ward; an uncrowded corner of a large room or hall; or any area that can be separated from the rest of the health facility (WHO/CDC 1998).

19. One changing room outside the patient isolation area where health care workers can put on protective clothing is required. After leaving the patient's room, health care workers will reenter the changing room and remove protective clothing (WHO/CDC 1998).

21. When VHF is suspected in the health facility, all medical, nursing, laboratory, and cleaning staff should disinfect thermometers, stethoscopes, and other medical instruments after use with each VHF patient (WHO/CDC 1998). Disposable equipment dedicated for use with individual VHF patients is preferred.

22, 23. Boots or overboots must be worn over street shoes. Common rubber boots are recommended. The sides of the boots should be at least 30 cm high and have textured soles. If boots are not available, two layers of plastic bags should be worn. A boot remover should be used to take off the rubber boots. Touching the boots with bare or gloved hands should be avoided (WHO/CDC 1998).

24–26. Supplies for the changing room to be used for VHF patient care should include hooks, nails, or hangers for hanging reusable protective clothing; plastic tape for taping cuffs and trousers of protective clothing; a disinfection station with bleach solution for disinfecting gloved hands; a hand washing station with bucket, soap, soap dish, clean water, and supply of single-use towels; containers with soapy water for collecting discarded gloves and used instruments to be sterilized; and containers for collecting reusable protective clothing to be laundered and for infectious waste to be burned. All used disposable needles and syringes should be discarded in a puncture-resistant container, then burned with the container in an incinerator or pit for burning (WHO/CDC 1998).

27. Two different solutions of household bleach should be prepared in a central location in the health facility—a 1:10 solution and a 1:100 solution (ordinary household bleach has a 5.0 percent chlorine concentration). The 1:10 bleach solution is a strong solution used to disinfect excreta and bodies. It is also used to prepare the 1:100 bleach solution used to disinfect surfaces, medical equipment, patient bedding, and reusable protective clothing before it is laundered. It is also recommended for rinsing gloves between patient contacts, rinsing aprons and boots before leaving the patient's room, and disinfecting contaminated waste for disposal (WHO/CDC 1998).

28. A bedpan should be available in each patient room (WHO/CDC 1998).

References

US Centers for Disease Control and Prevention (CDC). 1996. Guideline for Isolation Precautions in Hospitals. Part II. Recommendations for Isolation Precautions in Hospitals. Hospital Infection Control Practices Advisory Committee. *American Journal of Infection Control* 24(1):32–52.

Tietjen, L., D. Bossemeyer, and N. McIntosh. 2003. *Infection Prevention: Guidelines for Healthcare Facilities with Limited Resources*. Baltimore, MD: Jhpiego.

World Health Organization (WHO). 2002. *Prevention of Hospital-Acquired Infections: A Practical Guide*. 2nd ed. WHO/CDS/CSR/EPH/2002/12. Geneva: WHO.

WHO and CDC. 1998. *Infection Control for Viral Hemorrhagic Fevers in the African Health Care Setting*. Geneva: WHO and CDC. http://www.cdc.gov/ncidod/dvrd/spb/mnpages/vhfmanual.htm (accessed July 19, 2006).

WHO/Regional Office for Africa, Commonwealth Regional Health Community Secretariat, and East, Central and Southern African College of Nursing. 2001. *Manual of Infection Prevention and Control Policies and Guidelines*. Prepared by U. V. Reid.

MODULE SCORING SHEET

Name of facility: _____

Name of module: _____

Date completed: _____

Module section	1 Assessment total	2 Possible total	3 Percentage score	4 Rating based on percentage score
Total for module			**%**	

Column notes:

1. Assessment total—sum of points for all marked responses

2. Possible total—sum of all possible points for the question

3. Percent score—(column 1/column 2) × 100

4. Rating—

More than 75% of possible points:	A—recommended practices are followed consistently and thoroughly
50–75% of possible points:	B—recommended practices usually followed
Less than 50% of possible points:	C—training and follow-up needed on recommended practices

LABOR AND DELIVERY

This survey should be completed by the unit manager of the labor and delivery area.

For each item, mark the answer that best describes your current situation by putting a tick ✓ inside the brackets [✓]. Note that some questions ask for only one answer, and others ask you to mark all answers that apply. Questions that are intended to provide contextual information only are not scored.

General Issues: Staff Education and Labor and Delivery Services Design

This module is designed to provide contextual information on labor and delivery practices in your facility. The first set of questions looks at staff education.

1. In the past year, did you lead or participate in education programs for labor and delivery personnel related to preventing nosocomial infections? If no, skip question 2.

[ ] No
[ ]1 Yes

2. If yes, which of the following topics were discussed? (Mark all that apply)

[ ] Hand hygiene
[ ] Standard precautions
[ ] Prevention of chorioamnionitis
[ ] Prevention of surgical site infections after cesarean section (C-section) (puerperal sepsis)
[ ] Prevention of infection after vaginal delivery
[ ] Prevention of postpartum endometritis
[ ] Prevention of peripartum infections in the baby
[ ] Prevention of intravenous catheter-associated infections
[ ] Prevention of urinary catheter-associated urinary tract infections
[ ] Care of breast milk pumps, and/or stored breast milk
[ ] Skin and cord care of the baby (neonate)
[ ] Preparation of commercial formulas
[ ] Eye care for the baby (neonate)
[ ]1 At least six items checked
[ ]2 Seven to eleven items checked

3. Are there designated rooms or wards for women in labor? (Mark one answer)

[ ] General hospital ward
[ ]1 Dedicated labor and delivery rooms

Assessment section total: _____ **Possible section total:** 4

Cleaning and General Hygiene

The following questions focus on general hygiene practices on the ward.

4. Is there a written policy for general hygiene and cleaning of surfaces such as walls, floors, and toilets on this unit? (Mark one answer)

[ ] No written policy or procedures
[ ] Policy/procedures communicated verbally only
[ ]1 Written policy/procedures available in an operations manual but not generally available for daily practice
[ ]2 Written policy/procedures in manual but also posted on walls in clinical or support areas

5. Does the policy cover clothing and equipment?

[ ] No
[ ]1 Yes

6. Do the guidelines cover processes for decontaminating areas contaminated by spillage of blood or body fluids?

[ ] No
[ ]1 Yes

Assessment section total: _____ **Possible section total:** 4

Glove Use for Vaginal Deliveries

7. How frequently are gloves worn for antepartum and postpartum vaginal exams and vaginal deliveries? (Mark one answer)

[ ] Never
[ ] Sometimes
[ ]1 Usually
[ ]2 Always

8. How frequently are gloves changed between patients? (Mark one answer)

[ ] Never
[ ] Sometimes
[ ]1 Usually
[ ]2 Always

Assessment section total: _____ **Possible section total:** 4

Glove Use for C-Sections

9. How frequently are sterile gloves used when performing C-sections? (Mark one answer)

[ ] C-sections are not performed
[ ] Never
[ ] Sometimes
[ ]1 Usually
[ ]2 Always

Assessment section total: _____ **Possible section total:** 2

Barriers Worn for Vaginal Deliveries

The following questions focus on barriers worn for vaginal deliveries, including the use of gowns and other protective equipment.

10. Does the doctor/nurse/midwife usually wear a cover gown or apron during the delivery? (Mark one answer)

[ ] None
[ ]1 Gown
[ ]1 Apron
[ ]2 Gown and apron

11. How often is a gown or apron available for use? (Mark one answer)

[ ] Never
[ ] Sometimes
[ ] Usually
[ ]1 Always

12. Are gowns or aprons usually changed between patients?

[ ] No
[ ]1 Yes

13. Are aprons fluid proof?

[ ] No
[ ]1 Yes

14. Do the gowns have long sleeves?

[ ] No
[ ]1 Yes

15. Are the following items readily available and routinely worn during vaginal deliveries? (Mark one answer in each row)

Protective eye wear (e.g., goggles)	[ ]	No
	[ ]1	Yes
Closed toe shoes or shoe covers (e.g., booties)	[ ]	No
	[ ]1	Yes
Masks	[ ]	No
	[ ]1	Yes

Assessment section total: _____ **Possible section total:** 9

Invasive Devices in Labor and Delivery

The following questions examine the use of invasive devices, such as catheters and clamps, during labor and delivery.

If central venous catheters are used, complete all remaining questions in this module. Then complete the Intravenous Catheters module.

16. Are peripheral or central venous catheters used in labor and delivery?

[ ] No
[ ] Yes

17. When urinary catheters are used, which type of catheter is **usually** used?

[ ] No urinary catheters are used
[ ] Indwelling catheters
[ ]1 Straight catheters (in/out)

If catheters are used, complete all remaining questions in this module. Then complete the Urinary Catheters module.

18. How often are delivery kits available to birth attendants for vaginal deliveries? (Mark the number that best applies)

[ ] Never
[ ] Sometimes
[ ]1 Usually
[ ]1 Always

19. Are sterile umbilical clamps/ties routinely used?

[ ] No
[ ]1 Yes

20. Are cord clamps intended for single use (disposable) or reusable? (Mark one answer)

[ ] Reusable
[ ]1 Single use

Assessment section total: _____ **Possible section total:** 4

Labor and Delivery Procedures

The following questions provide an overview of labor and delivery practices in your facility, including antenatal preparation, postpartum practices such as cord care, and antibiotic prophylaxis for C-sections.

21. How is the perineum usually prepared for delivery? (Mark one answer)

[ ] No cleansing performed routinely
[ ] Tap water
[ ] Distilled water
[ ] Sterile water
[ ] Chlorhexidine gluconate solution without alcohol
[ ] Benzalkonium chloride
[ ] Cetrimide
[ ]1 Povidone Iodine solution (Betadine)

22. What types of suction devices are routinely used for cleaning of nasopharynx or meconium post delivery? (Mark all that apply)

[ ] No suction devices used
[ ] Mouth-to-tube suctioning
[ ]1 Attaches to wall suction
[ ]1 Bulb suction

23. What agent is usually used to clean the cord prior to clamping and cutting? (Mark one answer)

[ ] No cleansing performed routinely
[ ] Tap water
[ ] Distilled water
[ ] Benzalkonium chloride
[ ] Cetrimide
[ ]1 Sterile water
[ ]1 Povidone Iodine solution (Betadine)
[ ]1 Chlorhexidine Gluconate solution without alcohol
[ ]1 Chlorhexidine Gluconate solution containing alcohol
[ ]1 Alcohol

24. Are single sterile scissors used to cut the cord?

[ ] No
[ ]1 Yes

25. What agent is usually used for the cord care? (Mark one answer)

[ ] No agent used
[ ] Tap water
[ ] Distilled water
[ ] Chlorhexidine Gluconate solution without alcohol
[ ] Tetracycline
[ ]1 Sterile water
[ ]1 Betadine
[ ]1 Chlorhexidine Gluconate solution containing alcohol
[ ]1 Alcohol
[ ]1 Triple dye
[ ]1 Mupirocin
[ ]1 Bacitracin

26. What is usually used to clean the newborn after delivery? (Mark one answer)

[ ] Hexachlorophene, full strength
[ ] Chlorhexidine Gluconate solution without alcohol
[ ] Chlorhexidine Gluconate solution containing alcohol
[ ]1 Clean cotton cloth soaked in warm tap water
[ ]1 Clean cotton cloth soaked in warm sterile saline solution
[ ]1 Clean cotton cloth soaked in warm sterile water

27. How are the newborn's eyes treated after birth to prevent gonococcal infection? (Mark one answer)

[ ] No agent used
[ ] Ceftriaxone (parenteral)
[ ]1 Chloramphenicol eye ointment (topical)
[ ]1 Tetracycline eye ointment (topical)

28. Is the newborn received in clean hospital linen?

[ ] No
[ ]1 Yes

Assessment section total: _____ **Possible section total:** 9

Prophylactic Antibiotic Use in Labor and Delivery

These questions cover indications and use of prophylactic antibiotic use during labor and delivery, including C-sections.

29. For which procedures are prophylactic antibiotics routinely used? (Mark all that apply)

[ ] None at all
[ ] In labor with spontaneous rupture of membranes four hours or more, no fever or other signs of infection
[ ]1 Elective C-section
[ ]1 Nonscheduled (emergency) C-section
[ ]1 Prolonged labor with rupture of membranes more than 18 hours with no fever or other signs of infection

30. At which point are prophylactic antibiotics usually given in a C-section? (Mark one answer)

[ ] No C-section performed
[ ] Post-C-section
[ ]1 Two hours or less prior to C-section
[ ]1 As soon as cord is clamped

Assessment section total: _____ **Possible section total:** 4

Postpartum Care

The following questions cover postpartum care practices for mother and neonate.

31. Are neonate and mother separated under any of the following conditions? (Mark all that apply)

[ ] Never
[ ] Mother has a postpartum infection
[ ] Mother has eclampsia
[ ] Mother has group A streptococcus infection
[ ] Mother has oral herpes simplex virus
[ ] Mother has genital herpes simplex virus
[ ] Mother has fever
[ ] Mother has HIV
[ ]1 Mother has active tuberculosis

32. How often is “rooming in” practiced for mother and baby? (Mark one answer)

[ ] Never
[ ] Sometimes
[ ]1 Usually
[ ]1 Always

33. Is there a policy for preventing group B streptococcus infection in the newborn? (Mark one answer) [ ] No policy [ ]1 Pregnant women are screened at 35 to 37 weeks and positive cultures treated intrapartum [ ]1 No screening but intrapartum treatment for high-risk women (i.e., duration of membrane rupture greater than 18 hours, gestation less than 37 weeks, intrapartum fever)
34. What is the average duration of stay for an uncomplicated vaginal delivery? (Mark one answer) [ ] More than two days [ ]1 Less than one day [ ]1 One to two days
35. What is the average duration of stay for an uncomplicated C-section delivery? (Mark one answer) [ ] C-sections are not performed in this facility [ ] More than four days [ ]1 One to four days

Assessment section total: _____ **Possible section total:** 5

LABOR AND DELIVERY ANNOTATIONS

Background

In developing countries, postpartum infection remains second only to postpartum hemorrhage as a cause of maternal deaths, and is the leading cause of serious maternal complications of childbirth. This is still the case despite the fact that more than 150 years have elapsed since it was determined not only that childbed fever (puerperal sepsis) was spread from woman to woman on the hands of physicians, but also that outbreaks of this deadly disease could be prevented by hand washing with chlorinated lime before delivery, and boiling all instruments and utensils after use when treating an infected postpartum woman (Tietjen et al. 2003, 25-3).

Item Notes

4–6. WHO recommends that there be (written) policies specifying the frequency of cleaning and types of cleaning agents used for walls, floors, windows, beds, curtains, screens, fixtures, furniture, baths and toilets, and all reused medical devices. Methods must be appropriate for the likelihood of contamination, including spillage, and necessary levels of asepsis (WHO 2002, 33).

7, 8. To minimize the risk of infection, a clean pair of examination gloves should be used for each vaginal examination. Sterilized gloves are not necessary for vaginal examinations (Tietjen et al. 2003, 25-9). Gloves should be changed between care activities and procedures with the same patient (WHO/AFRO et al. 2001, 40).

9. C-sections should be performed using the same standards as for any general surgical procedure (Tietjen et al. 2003, 25-12). Operating staff must wear sterile gloves (WHO 2002, 40). Prior to delivery, hands should be washed thoroughly, preferably with an antimicrobial soap containing Chlorhexidine Gluconate or an iodinated compound, especially between the fingers, and forearms up to the elbows with soap and clean water and dried with a clean, dry towel or air dried. If antimicrobial soap is unavailable, an alcohol-based hand rub should be applied to the hands and forearms after hand washing until dry (Tietjen et al. 2003, 25-11).

10, 11. Gowns should be worn to protect uncovered skin and to prevent soiling of clothing during procedures and patient care activities likely to generate splashes or sprays of blood, body fluids, secretions, or excretions. Plastic aprons are recommended where splashes are likely to occur (WHO/AFRO et al. 2001, 42).

12. A soiled gown should be removed as promptly as possible, and hands washed to avoid transfer of microorganisms to other patients or environments (Garner 1996).

13. Surgical gowns made of fluid-resistant materials play a role in keeping blood and other fluids, such as amniotic fluid, off the skin of personnel, particularly in the surgical, delivery, and emergency areas (Tietjen et al. 2003, 5-6).

14. If surgical gowns are worn, sleeves should either taper gently toward the wrists or end with elastic or ties around the wrists (Tietjen et al. 2003, 5-6).

15. Steps that can be taken to decrease the risk of maternal infection during delivery also include wearing a face shield (or a mask and goggles), and shoe covers which are resistant to fluids (Tietjen et al. 2003, 25-11).

17. Steps that can be taken to decrease the risk of maternal infection before and during delivery (if catheters are used) include making sure that the following items are available—high-level disinfected or sterile urinary catheter (straight, rubber or metal) and a clean basin to collect urine (Tietjen et al. 2003, 25-10).

19, 20. High-level disinfected or sterile cord clamp or cloth to tie off the cord should be available for a safe delivery (Tietjen et al. 2003, 25-9).

25. No single method of cord care has proved to be better than others in preventing infection. General suggestions are to keep the cord stump clean and dry; if the cord stump gets soiled or dirty, gently wash it with boiled soapy water, and dry with a clean cloth (Tietjen et al. 2003, 25-15). Avoid water sources that could be contaminated or antiseptics (such as chlorhexidine) without alcohol that could support microbial growth.

26. Minimizing the risk of nosocomial infection in the newborn involves the following—wear gloves and a plastic or rubber apron when handling the infant until blood, meconium, or amniotic fluid has been removed from the infant's skin. Careful removal of blood and other body fluids using a cotton cloth, not gauze, soaked in warm water followed by drying the skin may minimize the risk of infection. In some hospitals, bathing or washing the newborn is delayed until the baby's temperature has stabilized (usually about 6 hours). The buttocks and perineal areas are the most important to keep clean. They should be washed after each diaper change using a cotton cloth soaked in warm soapy water, and then carefully dried (Tietjen et al. 2003, 25-14).

28. A clean drape or cloth for wrapping the baby should be available (Tietjen et al. 2003, 25-10).

29, 30. The infusion of the first antimicrobial dose should begin within 60 minutes before surgical incision. In the Unites States, the antimicrobial is usually not administered to patients undergoing C-section until the umbilical cord is clamped. Although there is no evidence to support the delay in administration, it is standard practice and is preferred by neonatologists because of concern of masking septic manifestations in the neonate (Bratzler et al. 2004, 1706).

31. The baby can be with a mother with group A streptococcal infection if the mother has been treated for at least 24 hours. The baby can be with a mother with herpes simplex if the mother can be trained in a rigorous barrier technique to avoid inoculating the infant.

33. Where antenatal services include laboratory testing, most neonatal group B streptococcal infections can be prevented through the use of intrapartum antimicrobial prophylaxis in women at increased risk of transmitting the infection to their newborns. Such women can be identified by having a positive anogenital culture for this pathogen at 35–37 weeks or at least one of the risk factors associated with early infection: group B streptococci bacteriuria during pregnancy; previously delivered infant infected with group B streptococci; preterm birth (less than 37 weeks of gestation); rupture of membranes (more than 18 hours); and clinically evident intra-amniotic infection syndrome with maternal temperature greater than 38 °C, or

prior infected child (Tietjen et al. 2003, K-1, K-2). Treatment should be started as close to four hours prior to delivery as possible and include the baby.

References

Bratzler, D. W., P. M. Houck, Surgical Infection Prevention Guidelines Writers Workgroup, et al. 2004. Antimicrobial Prophylaxis for Surgery: An Advisory Statement from the National Surgical Infection Prevention Project. *Clinical Infectious Diseases* 38(12):1706–15.

US Centers for Disease Control and Prevention. 2002. Guideline for Hand Hygiene in Health-Care Settings. Recommendations of the Healthcare Infection Control Practices Advisory Committee and the HICPAC/SHEA/APIC/IDSA Hand Hygiene Task Force. *MMWR* 2002;51(No. RR-16):1–44.

EngenderHealth. 2004. Infection Prevention Online Course. http://www.engenderhealth.org/res/onc/index.html#start (accessed July 17, 2006).

Garner, J. S. 1996. Guideline for Isolation Precautions in Hospitals. The Hospital Infection Control Practices Advisory Committee. *Infection Control and Hospital Epidemiology* 17(1):53–80.

Mangram, A. J., T. C. Horan, M. L. Pearson, et al. 1999. Guideline for Prevention of Surgical Site Infections. *Infection Control and Hospital Epidemiology* 20(4):250–80.

Saiman, L. 2003. Preventing Infections in the Neonatal Intensive Care Unit. In *Prevention and Control of Nosocomial Infections*, 4th ed., edited by R. P. Wenzel, 356–57. Philadelphia, PA: Lippincott, Williams & Wilkins.

Tietjen, L., D. Bossemeyer, and N. McIntosh. 2003. *Infection Prevention: Guidelines for Healthcare Facilities with Limited Resources*. Baltimore, MD: Jhpiego.

World Health Organization (WHO). 2002. *Prevention of Hospital-Acquired Infections: A Practical Guide*. 2nd ed. WHO/CDS/CSR/EPH/2002/12. Geneva: WHO.

WHO/Regional Office for Africa, Commonwealth Regional Health Community Secretariat, and East, Central and Southern African College of Nursing. 2001. *Manual of Infection Prevention and Control Policies and Guidelines*. Prepared by U. V. Reid.

MODULE SCORING SHEET

Name of facility: _____

Name of module: _____

Date completed: _____

Module Section	1 Assessment Total	2 Possible Total	3 Percent Score	4 Rating Based on Percent Score
Total for Module			**%**	

Column Notes:

1. Assessment Total—Sum of points for all marked responses

2. Possible Total—Sum of all possible points for the question

3. Percent Score—(Column 1/Column 2) × 100

4. Rating—

More than 75% of possible points:	A—recommended practices are followed consistently and thoroughly
50–75% of possible points:	B—recommended practices usually followed
Less than 50% of possible points:	C—training and follow-up needed on recommended practices

MICROBIOLOGY LABORATORY

This survey should be completed by the department head or microbiology laboratory supervisor.

For each item, mark the answer that best describes your current situation by putting a tick ✓ inside the brackets [✓]. Note that some questions ask for only one answer, and others ask you to mark all answers that apply. Questions that are intended to provide contextual information only are not scored.

Supervisor of the clinical microbiology laboratory/section: _____

Name: _____ Title: _____

General Laboratory Issues

The following questions cover general microbiology procedures, contact with infection control personnel, record keeping, and the use of cultures.

1. Please indicate your background education for this position. (Mark highest level of training)

[ ] Special course or program
[ ] On-the-job training
[ ]1 Medical technology diploma
[ ]1 BSc or other university degree
[ ]1 MSc
[ ]1 MBChB
[ ]2 PhD or other doctoral degree

2. How frequently do you have formal meetings or discussion with infection control personnel? (Mark one answer)

[ ] Never
[ ] Less than every three months
[ ]1 Every three months or more

3. Are microbiology records routinely kept?

[ ] No
[ ]1 Yes

4. How long are these records kept? (Mark one answer)

[ ] No records kept
[ ] Less than one year
[ ]1 One year or more

5. Does your laboratory routinely perform any of the following cultures for surveillance purposes? (Mark all that apply)

[ ]1 No cultures performed
[ ] Personnel
[ ] Equipment and supplies
[ ] Environment
[ ] Fluids (e.g., IV fluids, irrigation solutions)

6. Does your laboratory routinely perform the following cultures as part of infant care? (Mark all that apply)

[ ] Hospital does not provide care for infants
[ ] No infant nutrition cultures performed
[ ]1 Infant formula made in the hospital (noncommercial)
[ ]1 Breast milk

7. Does your laboratory have the capacity to perform the following cultures as part of outbreak investigations? (Mark all that apply)

[ ] No cultures performed
[ ]1 Personnel
[ ]1 Equipment and supplies
[ ]1 Environment
[ ]1 Fluids (e.g., IV fluids, irrigation solutions)

8. Does this laboratory have high-level containment safety cabinets, such as Class 2, for infectious agents?

[ ] No
[ ]1 Yes

Assessment section total: _____ **Possible section total:** 13

Availability and Use of Tests

The following questions provide an overview of the types of tests performed in your facility or in outside laboratory facilities.

9. Which of the following microscopy tests are performed in the facility? (Mark all that apply)

[ ]1 Fungal stains
[ ]1 Acid-fast stain (Ziehl Neelsen or Auramine) for TB
[ ]1 Wright-Giemsa stain
[ ]1 Methylene blue stain
[ ]1 Stool ova and parasites
[ ]2 Gram stain

10. Which of the following cultures or rapid tests are routinely available in a timely way? (Mark one answer in each row)

Test	Performed in hospital	Available from outside lab	Not available
Blood culture	[ ]2	[ ]1	[ ]
CSF culture	[ ]2	[ ]1	[ ]
Fungal culture	[ ]2	[ ]1	[ ]
Measles culture or fluorescent antibody test	[ ]2	[ ]1	[ ]
Myobacterial culture	[ ]2	[ ]1	[ ]
Myobacterial amplified test (e.g., PCR)	[ ]2	[ ]1	[ ]
Sputum culture	[ ]2	[ ]1	[ ]
Stool culture for *Campylobacter* spp.	[ ]2	[ ]1	[ ]
Stool culture for cholera	[ ]2	[ ]1	[ ]
Stool culture for *E. coli* O:157	[ ]2	[ ]1	[ ]
Stool culture for *Shigella* spp.	[ ]2	[ ]1	[ ]
Urine culture	[ ]2	[ ]1	[ ]
Wound culture	[ ]2	[ ]1	[ ]

11. Which of the following cultures or rapid tests are routinely available in a timely way? (Mark one answer in each row)

Test	Performed in hospital	Available from outside lab	Not performed
Dengue serology	[ ]1	[ ]1	[ ]
Hepatitis A serology	[ ]1	[ ]1	[ ]
Hepatitis C serology	[ ]1	[ ]1	[ ]
Hepatitis B serology	[ ]2	[ ]1	[ ]
HIV-1 serology	[ ]2	[ ]1	[ ]

12. What tests do you routinely use to identify staphylococci? (Mark all that apply)

[ ] Staphylococci not routinely identified
[ ]1 Gram stain
[ ]1 Colony morphology (pigmentation, hemolysis, etc.)
[ ]1 Coagulase test, thermonuclease test, or latex agglutination test

13. What tests do you routinely use to identify streptococci and enterococci? (Mark all that apply)

[ ] Streptococci not routinely identified
[ ] Catalase test
[ ]1 Colony morphology (hemolysis, etc.)
[ ]1 Gram stain
[ ]1 Bacitracin disc or PYR test
[ ]1 Optochin disc, Quellung test, or bile solubility test
[ ]1 Bile esculin and NaCL 6.5 percent or PYR test
[ ]1 CAMP or hippurate hydrolysis
[ ]1 Serotyping for Lancefield group streptococci

14. What test do you routinely use to identify gram-negative bacilli? (Mark one answer)

[ ] Gram negative bacilli not routinely identified
[ ]1 Biochemical tests manufactured in the lab
[ ]1 Commercial diagnostic strips (e.g., API)
[ ]1 Commercial biochemical tests (tube media)
[ ]1 Automated system(e.g., Vitek, Microscan

Assessment section total: _____ **Possible section total:** 51

Blood Culture Methods

The following questions cover methods of blood culturing and methods of reporting test results.

15. What method is used for culturing blood? (Mark the usual method)

[ ] Blood cultures not performed
[ ]1 Homemade broth culture
[ ]2 Commercial broth culture
[ ]2 Automated system

16. Which of the following procedures are performed directly from the blood culture broth? (Mark all that apply)

[ ] No procedures are performed directly from the blood culture broth
[ ]1 Gram stain
[ ]1 Preliminary disk antibiotic susceptibility testing
[ ]1 Preliminary identification of the microorganism

17. What criteria are routinely used for subculturing blood cultures onto solid media? (Mark all that apply)

[ ] Subculturing is not done
[ ]1 Blind subculturing before reporting a final result of negative
[ ]1 When visual inspection suggests that the culture is positive
[ ]1 When the incubator signals growth

18. How are doctors notified that a blood culture is positive? (Mark the usual method)

[ ] No notification is sent to physicians
[ ] Paper report sent to the ward or unit
[ ]2 Telephone call or page made directly to the physician

19. After how many days of incubation is a blood culture reported as officially negative? (Mark the most usual number)

[ ] Less than five days
[ ]1 Five days or more

Assessment section total: _____ **Possible section total:** 11

Antibiotic Resistance Testing

These questions provide contextual information about determining antibiotic resistance in your hospital, as well as the reporting of results.

20. How do you perform antibiotic susceptibility tests for bacterial isolates? (Mark one answer)

[ ] Antibiotic susceptibility tests not performed
[ ] Disc diffusion with homemade discs
[ ]1 Standardized disc diffusion method with commercially purchased discs
[ ]1 Minimum inhibitory concentration (MIC) testing using broth dilution or microdilution, automated MIC testing, agar dilution, or E-test

21. What criteria are usually used to determine antibiotic susceptibility or resistance? (Mark one answer)

[ ] Antibiotic susceptibility tests not performed
[ ]1 CSI (NCCLS)
[ ]1 European system (EUCAST)

22. Under what circumstances is antibiotic susceptibility of bacteria performed?

[ ]1 Only on doctor's request
[ ] Routinely

23. How is *Staphylococcus aureus* resistance to oxacillin (methicillin) determined? (Mark one answer)

[ ] No screening done
[ ]2 ORS (6 µg/mL oxacillin + 4 percent NaCl in Mueller-Hinton agar)
[ ]2 Cefoxitin or oxacillin disc

24. Do you test for extended spectrum beta-lactamase (ESBL) production?

[ ] No
[ ]2 Yes

25. How is the Infection Control Committee or person in charge of infection control usually notified if resistant bacterial strains are isolated? (Mark one answer)

[ ] Not routinely notified
[ ]1 Paper report sent to infection control committee or person in charge of infection control activities
[ ]1 Infection control personnel call or come to the laboratory to make routine checks
[ ]2 Telephone call or page to doctor

26. Do you routinely use reference or quality control organisms to validate the results of sensitivity testing?

[ ] No
[ ]2 Yes

27. Do you prepare summary reports of antibiotic susceptibility patterns for the facility?

[ ] No
[ ]2 Yes

28. Are organism-specific antibiotic resistance patterns reported?

[ ] No
[ ]1 Yes

29. Are the resistance patterns of nosocomial and community-acquired organisms reported separately? (e.g., organisms isolated from patients hospitalized for less than 48 hours versus more than 48 hours)

[ ] No
[ ]1 Yes

30. How frequently are these reports prepared? (Mark one answer)

[ ] No reports prepared
[ ]1 At least once a year or more

31. To whom are resistance patterns reported? (Mark all that apply)

[ ] Not reported
[ ]1 Head of infection control program or chair of infection control committee
[ ]1 Chief(s) of clinical department(s)
[ ]1 Person in charge of pharmacy
[ ]1 All facility doctors

Assessment section total: _____ **Possible section total:** 20

MICROBIOLOGY LABORATORY ANNOTATIONS

Item Notes

1. The accurate identification of frequently occurring organisms in the health care environment, and unusual or fastidious organisms, as well as appropriate antibiotic susceptibility testing are complex tasks and require trained staff.

2. Frequent interaction with infection control personnel is needed to keep them informed on trends in antibiotic susceptibility patterns and as well as organisms implicated in nosocomial infections.

3, 4. The data generated by the microbiology laboratory must be analyzed by a medically trained microbiologist or infectious disease specialist, so that the information can be used to benefit of patients with respect to empiric antibiotic choices and the prevention of noscomial infections. A stastistician can advise on a sample size to survey to provide significant data.

5, 6. Routine surveillance cultures are not indicated. Cultures of breast milk or homemade formula are prudent.

7. Personnel, equipment, the environment, and fluids can each be the source of the causative organism during an outbreak. The decision of what or who to culture should be made in consultation with an infection control specialist, medical microbiologist, or infectious disease physician. Selective media may be needed to detect a pathogen mixed with environmental or commensal bacteria. However, sometimes the environmental organisms may be implicated in outbreaks.

9, 10, and 11. Each of these tests should be available either within the institutional laboratory, or at a laboratory to which specimens can be quickly transported and from which data can be quickly reported to the institution.

12. Colony morphology and Gram stain can suggest that an organism is a Staphylococcus species; however, identification of *S. aureus* requires testing for coagulase, DNAase, or latex agglutination for *S. aureus* proteins. Latex agglutination assays may give false-positive results with *S. saprophyticus*, so this assay should not be used on suspected staphylococci from urine specimens.

13. Colony morphology, Gram stain, and catalane tests can suggest that an organism is a streptococcus species; however, identification of individual species requires additional testing. Either a positive PYR test or growth in the presence of bile and hydrolysis of esculin (bile esculin media) and growth in 6.5 percent salt demonstrate that catalase-negative gram-positive cocci in chains is in the enterococcus genus, but species identification requires additional testing. The other tests listed can be used for routine identification of S*treptococcus* if the colony morphology, Gram stain, and catalane test are all consistent with the suspected genus.

14. Most gram-negative bacilli cannot be identified by rapid tests and require biochemical panels. Exceptions include *Escherichia coli* and *Pseudomonas aeruginosa*, for which rapid

identification is possible. Quality control of biochemical assays is always important, but it is particularly important to perform quality control of assays manufactured in the laboratory.

15. Blood culture is one of the most important tests that the clinical microbiology laboratory can perform. Commercial broth media is generally high quality and more likely than homemade broth to support rapid growth of bacteria.

16. Gram staining, presumptive identification, and direct susceptibility tests are important in guiding initial therapy for sepsis. Performed correctly, direct antibiotic susceptibility testing from the blood culture bottle is reasonably accurate for Staphylococci and Enterobacteriaceae. The accuracy of the result for Staphylococci-Enterobacteriaceae may be confirmed using pure cultures grown on solid media. Gram-positive bacteria in chains should be tested for antibiotic sensitivity directly from the blood culture bottle, but the result should be ignored for Streptococcus pneumoniae, as this method is not adequate.

17. Visual inspection will not detect all positive blood cultures, so a blind subculture of all apparently negative cultures should be performed. If an automated blood culture system is used, blind subculture is usually not needed.

18. Doctors should be rapidly notified of positive blood cultures, so that the patient can receive appropriate therapy.

19. Blood cultures should be cultured for a minimum of five days. Although five days is adequate to detect most fastidious bacteria in automated blood culture systems, this has not been demonstrated for homemade broths or manually read cultures, so longer incubation may be needed.

20. Standardized disc diffusion or MIC testing by any of several methods is adequate for determining most antibiotic susceptibility. Commercially available discs are a relatively inexpensive and high-quality way of testing antibiotic susceptibility.

21. Appropriate interpretive criteria for antibiotic susceptibility results should be carefully applied. Use of interpretive criteria intended for one genus or species for a different genus or species is not recommended as the interpretation may be wrong.

22. For most organisms, including *Staphylococcus* species and Enterobacteriaceae (enteric gram-negative bacilli), susceptibility testing should be performed on all clinically significant isolates. Protocols to determine which organisms are “clinically significant” are generally determined through discussions between the attending doctor and the laboratory technician, or, if present, the medically trained microbiologist. A few bacteria are predictably susceptible to some antibiotics, so testing is rarely needed. For example, group A and group B streptococci are predictably sensitive to penicillins, so susceptibility testing is needed only for special circumstances, such as penicillin-allergic patients.

23. Standard procedures must be followed for accurate identification of methicillin-resistant *S. aureus*. Cefoxitin or oxacillin disk diffusion testing, or oxacillin-salt agar can be used to detect methicillin resistant *S. aureus*. Cefoxitin disc diffusion testing is more accurate than oxacillin disc diffusion testing for methicillin-resistant coagulase negative Staphylococcus.

24. Enterobacteriaceae (enteric gram-negative bacilli) that produce an ESBL may appear sensitive to beta-lactam antibiotics in culture; however, most beta-lactams are clinically ineffective against these organisms. Standard criteria (e.g., Clinical Laboratory Standards Institute/National Committee for Clinical Laboratory Standards) should be used to screen for and confirm the production of an ESBL.

25. Delays in reporting the identification of antibiotic resistant bacteria to the clinical staff and infection control officer results in a delay in appropriate therapeutic and infection prevention and control measures. The laboratory staff and clinicians should be vigilant and report any suspicion of an outbreak (i.e., two or more cases with similar organisms—species and antibiogram) in a particular area in the ward. This would allow for timely intervention and control measures.

26. It is essential that control tests based on American Type Culture Collection control organisms are used to validate all steps during antibiotic susceptibility testing. Controls should be set up for every batch performed. This is true of commercial and homemade reagents or media.

27. There is much regional- and facility-related variation in antibiotic susceptibility patterns, as well as organisms that cause nosocomial infection. Therefore, locally generated susceptibility data should be used to guide empiric antimicrobial therapy.

28. Species within the same genus may differ greatly in their antibiotic susceptibility. In general, organisms should be broken down into species for analysis of antibiotic susceptibility patterns.

29. The breakdown of organisms into community-acquired or nosocomial categories can be useful in determining empiric therapy and tracking the development of antibiotic resistance. The definition of community-acquired or nosocomial can be made in consultation with infection control specialists.

30. Annual reporting of resistance patterns is usually adequate. More frequent analysis might be needed if an outbreak of antibiotic resistant organisms is suspected.

31. Antibiotic resistance patterns should be available to all doctors in the community and are particularly important to the Infection Control Committee and Pharmacy. Significant increases in antibiotic resistance should be brought to the attention of the Infection Control Committee or head of Infection Control.

MODULE SCORING SHEET

Name of facility: _____

Name of module: _____

Date completed: _____

Module section	1 Assessment total	2 Possible total	3 Percentage score	4 Rating based on percentage score
Total for module			**%**	

Column Notes:

1. Assessment total—sum of points for all marked responses

2. Possible total—sum of all possible points for the question

3. Percent score—(column 1/column 2) × 100

4. Rating—

More than 75% of possible points:	A—recommended practices are followed consistently and thoroughly
50–75% of possible points:	B—recommended practices usually followed
Less than 50% of possible points:	C—training and follow-up needed on recommended practices

OCCUPATIONAL HEALTH

These questions should be completed by the person in charge of occupational health or another officer familiar with occupational health issues.

For each item, mark the answer that best describes your current situation by putting a tick ✓ inside the brackets [✓]. Note that some questions ask for only one answer, and others ask you to mark all answers that apply. Questions that are intended to provide contextual information only are not scored.

General Information

These questions provide general information about the occupational health program in your hospital. An occupational health program protects both employees and patients from the spread of infection.

1. Does the facility have a formal occupational health program? [ ] No [ ]1 Yes
2. Are there written policies and procedures for occupational health activities? [ ] No written policy or procedures [ ] Policy and procedures communicated verbally only [ ]1 Written policy and procedures available in an operations manual but not generally available for daily practice [ ]2 Written policy and procedures in a manual but also posted on walls in clinical or support areas
3. Is there a specific person or (team of persons) responsible for managing occupational health activities in your hospital? [ ] No [ ]1 Yes
4. Does the person or team responsible for occupational health have special training in occupational health issues related to communicable diseases? [ ] No specific person or team designated [ ] No one has specific training in occupational health [ ]1 Person responsible has special training in occupational health
5. Is the person or team responsible for occupational health paid for this work? [ ] No specific person or team designated [ ] No one is paid for this work [ ]1 Yes, the person is paid

Assessment section total: _____ **Possible section total:** 6 _____

Occupational Health Activities

The following questions address employee screening, tests, immunizations, and work restrictions.

6. Which of the following occupational health activities exist in your facility? (Mark all that apply)

[ ] Medical evaluation (history and physical) of employees
[ ] Employees screened for other communicable diseases
[ ] Other laboratory testing of employees, including cultures when clinically indicated
[ ] Employee immunization
[ ] Treatment/prophylaxis of employee hospital-acquired infections
[ ] Education or counseling employees about infection risk in the facility
[ ] Leave time for employees with communicable diseases or exposure

[ ]1 One to four answers checked
[ ]2 Five to seven answers checked

7. Does the facility provide funding for the employee activities in question 6 (apart from salary for the manager of the program, if any)?

[ ] No
[ ]1 Yes

8. Which of the following physical examinations are included in the employee medical evaluation? (Mark all that apply)

[ ] No physical examination performed
[ ]1 Skin conditions such as dermatitis
[ ]1 Active skin or soft tissue infections
[ ]1 Gastroenteritis
[ ]1 Chronic cough

9. When are new employees screened for infectious diseases? (Mark one answer)

[ ] No screening takes place
[ ] Prior to or at time of hire
[ ]1 After hire

10. For which of the following diseases are employees screened? (Mark all that apply)

[ ] Hepatitis A (evidence of immunity)
[ ] Hepatitis B infection
[ ] Hepatitis C infection
[ ] HIV infection
[ ] Measles (evidence of immunity)
[ ] Rubella (evidence of immunity)
[ ] Tuberculosis (TB) latent or active
[ ] Varicella (evidence of immunity)

[ ]1 One to three answers checked
[ ]2 Four to eight answers checked

11. Is there any provision for alternative work placement for an employee positive for hepatitis B antigen? [ ] No [ ]1 Yes
12. Is there any provision for alternative work placement for an employee positive for HIV? [ ] No [ ]1 Yes
13. Which of the following laboratory tests/cultures are performed routinely on employees? (Mark all that apply) [ ] Full blood count [ ] Urinalysis [ ] Nose culture for staphylococcus [ ] Throat culture for streptococcus [ ] Stool culture for enteric pathogens [ ]1 None of the above five laboratory tests are performed
14. Which immunizations are regularly available for employees? (Mark all that apply) [ ] Varicella zoster live virus if nonimmune [ ]2 Influenza [ ]2 Hepatitis B, required if nonimmune [ ]1 Measles live-virus, optional if nonimmune [ ]1 Rubella live virus, optional if nonimmune [ ]1 Measles live virus, required if nonimmune [ ]1 Rubella live virus, required if nonimmune
15. Which employees' infections are routinely treated with antibiotics? (Mark all that apply) [ ] No employee antibiotic treatment [ ]1 Staphylococcal infections [ ]1 Streptococcal infections [ ]1 Gastroenteritis [ ]1 TB [ ]1 Pertussis

Assessment section total: _____ **Possible section total:** 26

Employee Exposures

This set of questions provides information about your hospital's handling of employee exposures to various pathogens and available prophylaxis.

16. For which employee exposures does the hospital have written policies and procedures readily available or posted in clinical areas? (Mark all that apply)

[ ] Rabies
[ ] Varicella zoster
[ ] Diphtheria
[ ] Hepatitis A
[ ] Hepatitis B
[ ] Hepatitis C
[ ] HIV
[ ] Meningococcal disease
[ ] Pertussis

[ ]1 One to four answers checked
[ ]2 Five to nine answers checked

17. Is there a designated person to call when an exposure to a blood-borne pathogen occurs?

[ ] No
[ ]1 Yes

18. If a blood-borne exposure occurs, which tests are conducted on the source patient? (Mark all that apply)

[ ] No tests are conducted
[ ]1 Hepatitis B surface antigen
[ ]1 Hepatitis B core antigen
[ ]1 Hepatitis B e antigen
[ ]1 Syphilis
[ ]2 HIV

19. How soon is prophylaxis usually available for persons exposed to hepatitis B (e.g., hepatitis immune globulin and/or hepatitis B vaccine)? (Mark one answer)

[ ] No prophylaxis available
[ ]1 Available, but in more than 24 hours
[ ]2 Available in less 24 hours

20. How soon is prophylaxis usually available for persons exposed to HIV (e.g., zidovudine with or without other antiretroviral agents for at least four weeks)? (Mark one answer)

[ ] Not available
[ ]1 Available, but in more than 24 hours
[ ]2 Available in 6 hours or less

21. Are employees previously negative for TB monitored after exposure to pulmonary/laryngeal TB if precautions were not in place?

[ ] No
[ ]1 Yes

22. Are employees with face-to-face contact with meningococcal disease given a prophylactic antibiotic?

[ ] No
[ ]1 Yes

23. Are there written policies and procedures for managing employee exposures for pregnant personnel exposed to infectious agents?

[ ] No written policy or procedures
[ ] Policy and procedures communicated verbally only
[ ]1 Written policy and procedures available in an operations manual but not generally available for daily practice
[ ]2 Written policy and procedures in a manual but also posted on walls in clinical or support areas

24. Which of the following topics are routinely included in employee education programs that cover disease transmission, avoiding exposure, and what to do if exposed? (Mark all that apply)

[ ] TB
[ ] Viral hepatitis
[ ] HIV
[ ] Meningococcal disease
[ ] Pertussis
[ ] Viral hemorrhagic fever

[ ]1 One to three answers checked
[ ]2 Four to six answers checked

Assessment section total: _____ **Possible section total:** 19

Control of Sharp Instruments

These questions focus on policies and procedures for controlling the spread of infection by careful use of needles and other sharp instruments such as scalpels.

25. Are there written policies for reducing the risk of injuries to personnel by needles or other sharps?

[ ] No written policy or procedures
[ ] Policy and procedures communicated verbally only
[ ]1 Written policy and procedures available in an operations manual but not generally available for daily practice
[ ]2 Written policy and procedures in a manual but also posted on walls in clinical or support areas

26. Are containers available for disposable needles and other sharps?

[ ] No
[ ]2 Yes

27. Which types of containers are used? (Mark one answer)

[ ] No containers used
[ ] Non-puncture-resistant material
[ ]1 Puncture-resistant sharps container

28. How often are these containers available where needles or other sharps are used? (Mark answer that best applies)

[ ] Never
[ ] Sometimes
[ ]1 Usually
[ ]2 Always

29. Are these containers emptied or disposed of when they are 3/4 full? (Mark answer that best applies)

[ ] Never
[ ] Sometimes
[ ]1 Usually
[ ]2 Always

30. How are containers handled when they are changed? (Mark answer that best applies)

[ ] Emptied into another container and reused
[ ]1 Sent for disposal and not reused

31. How are the contents of these containers disposed of? (Mark answer that best applies)

[ ] Landfill or dumping
[ ] Regular trash
[ ]1 Burial
[ ]1 Incineration
[ ]2 Disposed by certified contractor

32. How often are needles recapped after use prior to disposal? (Mark answer that best applies)

[ ]2 Never
[ ]1 Sometimes
[ ] Usually
[ ] Always

33. If needles are recapped, is a one-handed (scoop) technique used when recapping needles?

[ ] Scoop not used
[ ]1 Scoop used

34. How often are needles bent or broken prior to disposal? (Mark answer that best applies)

[ ]1 Never
[ ] Sometimes
[ ] Usually
[ ] Always

35. Are retractable lancets available for obtaining blood? (Mark answer that best applies)

[ ] Never
[ ] Sometimes
[ ]1 Usually
[ ]2 Always

36. Are capillary tubes used for diagnostic testing (e.g., malaria smears, hematocrits) ever broken or cracked by hand? (Mark answer that best applies)

[ ] Tubes not used
[ ] Tubes sometimes broken or cracked
[ ]1 Tubes never broken

37. Are double gloves worn during surgery in deep body cavities or other procedures in which glove rips or punctures are likely? (Mark answer that best applies)

[ ] Hospital has no surgical areas
[ ] Never
[ ] Sometimes
[ ]1 Usually
[ ]2 Always

38. In the surgical areas, how often do surgeons warn colleagues (“announce”) when they are about to pass a scalpel or other sharp instrument? (Mark answer that best applies)

[ ] Hospital has no surgical areas
[ ] Never
[ ] Sometimes
[ ]1 Usually
[ ]2 Always

39. In the surgical areas, how often are sharps placed in a “neutral zone” (e.g., a basin) when they are passed to colleagues? (Mark answer that best applies)

[ ] Hospital has no surgical areas
[ ] Never
[ ] Sometimes
[ ]1 Usually
[ ]2 Always

40. Are employee punctures and sharp injuries monitored? (Mark one answer)

[ ] Incidents not tracked
[ ]1 Key features such as type of exposure (percutaneous, mucosal, skin, etc.), type of device (solid or hollow needle, etc.), circumstances at time of exposure (surgery, needle disposal), location of exposure, time of day of exposure, or length of hire of exposed staff member are recorded/documented

Assessment section total: _____ **Possible section total:** 26

Employee Health Records

The following questions cover the contents of employee health records.

41. Which of the following items of employee medical history are included in health records? (Mark all that apply)

[ ] Medical evaluation and history
[ ] Hepatitis B status
[ ] Hepatitis C status
[ ] TB history
[ ] Immunization records

[ ]1 One to three answers checked
[ ]2 Four to five answers checked

42. Which of the following employee exposures are documented in the medical record? (Mark all that apply)

[ ] Blood-borne disease exposure
[ ] Meningococcus exposures
[ ] Pertussis exposures
[ ] TB exposures
[ ] Diseases acquired from other employees

[ ]1 One to three answers checked
[ ]2 Four to five answers checked

Assessment section total: _____ **Possible section total:** 4

OCCUPATIONAL HEALTH ANNOTATIONS

Background

Health care workers are at risk of acquiring infection through occupational exposure. Hospital employees can also transmit infections to patients and other employees. Thus, a program must be in place to prevent and manage infections among hospital staff (WHO 2002, 61).

Item Notes

1. The infection control objectives for personnel should be an integral part of a health care organization's general program for infection control. These objectives cannot be met without the support of the organization's management, medical staff, and other health care personnel (Bolyard et al. 1998).

2, 3. An active employee (occupational) health system should be established and a written policy should be developed for notifying infection control personnel of infections among staff that require work restrictions or exclusion from work, clearance for work after an infectious illness that required work restrictions or exclusion, work-related infections and exposures, and, when appropriate, results of epidemiologic investigations. Protocols should be developed to ensure coordination among the employee health program, infection control program, and other relevant departments of the hospital (Bolyard et al. 1998).

4, 5. The organization of a personnel health service may be influenced by the size of the institution, the number of personnel, and the services offered. Personnel with specialized training and qualifications in occupational health can facilitate the provision of effective services (Bolyard et al. 1998).

6–8. Employee health should be reviewed at recruitment, including immunization history and previous exposures to communicable diseases (e.g., tuberculosis) and immune status. Some previous infections (e.g., varicella zoster virus infection) may be assessed by serological tests. Immunizations recommended for staff include hepatitis A and B, yearly influenza, measles, mumps, rubella, tetanus, and diphtheria (WHO 2002, 61). When personnel are exposed to particular infectious agents, they should be informed of the recommended postexposure management that is based on current knowledge about the epidemiology of the infection; the risk of transmitting the infection to patients, other personnel, or other contacts; and methods of preventing transmission of the infection to others. Personnel should also be offered necessary prophylactic treatment with medicines, vaccines, or immunoglobulin (Bolyard et al. 1998).

9, 10. New employee evaluation should include routine screening for tuberculosis. Routine serologic screening may be conducted for some vaccine-preventable diseases, such as hepatitis B, measles, mumps, rubella, or varicella, if deemed to be cost-effective to the hospital and beneficial to the health care personnel. Routine cultures on personnel (e.g., cultures of the nose, throat, or stool) should not be conducted as part of the placement evaluation. Personnel health assessments other than placement evaluations should be

performed on an as-needed basis, for example, as required to evaluate work-related illness or exposures to infectious diseases (Bolyard et al. 1998).

11. For personnel with acute or chronic hepatitis B surface antigenemia who do not perform exposure-prone procedures, no restriction is necessary unless epidemiologically linked to transmission of infection. Standard precautions should always be observed. Personnel with acute or chronic hepatitis B antigenemia should not perform exposure-prone invasive procedures until counsel from an expert review panel has been sought; the panel should review and recommend procedures the worker can perform, taking into account specific procedures as well as skill and technique of the worker (Bolyard et al. 1998).

12. HIV-positive personnel should not perform exposure-prone invasive procedures until counsel from an expert review panel has been sought; the panel should review and recommend procedures the worker can perform, taking into account specific procedure as well as skill and technique of the worker. Standard precautions should always be observed (Bolyard et al. 1998).

13. Routine cultures on personnel (e.g., cultures of the nose, throat, or stool) should not be conducted as part of the placement evaluation. Personnel health assessments other than placement evaluations should be performed on an as-needed basis, for example, as required to evaluate work-related illness or exposures to infectious diseases (Bolyard et al. 1998).

14. Immunizations recommended for staff include hepatitis A and B, yearly influenza, measles, mumps, rubella, tetanus, and diphtheria (WHO 2002, 61).

15. Please see table 3 in Bolyard et al. 1998. 407–63

16. Specific postexposure policies must be developed and compliance ensured for HIV, hepatitis A virus, hepatitis B virus (HBV), hepatitis C virus (HCV), *Neisseria meningitidis*, *Mycobacterium tuberculosis*, varicella zoster virus, hepatitis E virus, *Corynebacterium diphtheriae*, *Bordetella pertussis*, and rabies (WHO 2002, 61).

17. All health care institutions should have a plan to follow up all occupational exposures to blood-borne pathogens. Health care workers must be educated about the importance of promptly reporting exposures. Ideally, each institution should have a triage system available by phone 24 hours a day. Such a triage service could be provided by the infection control department, by the employee health service, or jointly by both services (Falk 2004, 1767).

18. The person whose blood or body fluid is the source of an occupational exposure should be evaluated for HBV, HCV, and HIV infection (test known sources for HBsAg, anti-HCV, and HIV antibody) (CDC 2001, 19-20).

19. Hepatitis B vaccine and/or hepatitis B immune globulin should be given as soon as possible, preferably within 48 hours and no later than a week after exposure (WHO 2002, 62).

20. Postexposure prophylaxis for HIV should be started within four hours of exposure (WHO 2002, 61).

21. As soon as possible after an exposure to tuberculosis (i.e., exposure to a person with pulmonary or laryngeal TB for whom proper isolation precautions were not implemented), conduct purified protein derivative (PPD) testing on personnel who are known to have negative PPD-test results. If the initial postexposure PPD test result is negative, repeat the PPD test 12 weeks after exposure (Bolyard et al. 1998).

22. Intensive close contact (e.g., mouth-to-mouth resuscitation, endotracheal intubation, endotracheal tube management) with a patient with meningococcal disease before administration of antibiotics without the use of proper precautions indicates a need for prophylactic therapy.

24. In-service training and education on infection control appropriate and specific for personnel work assignments should be provided annually and whenever the need arises so that personnel can maintain accurate and up-to-date knowledge about the essential elements of infection control. Ensure that the following topics are included in the initial training on infection control: (1) hand washing; (2) modes of transmission of infection and importance of complying with standard and transmission-based precautions; (3) importance of reporting certain illnesses or conditions (whether work related or acquired outside the hospital), such as generalized rash or skin lesions that are vesicular, pustular, or weeping; jaundice; illnesses that do not resolve within a designated period (e.g., a cough that persists for more than two weeks, gastrointestinal illness, or febrile illness with fever of greater than 103° F lasting more than two days); and hospitalizations resulting from febrile or other contagious diseases; (4) tuberculosis control; (5) complying with standard precautions and reporting exposure to blood and body fluids to prevent transmission of blood-borne pathogens; (6) cooperating with infection control personnel during outbreak investigations; and (7) personnel screening and immunization programs (Bolyard et al. 1998).

25. A plan for the collection, handling, predisposal treatment, and terminal disposal of regulated medical wastes should be developed and proper sharps disposal strategies should be used. Use a sharps container capable of maintaining its impermeability after waste treatment to avoid subsequent physical injuries during final disposal; place disposable syringes with needles, including sterile sharps that are being discarded, scalpel blades, and other sharp items into puncture-resistant containers located as close as practical to the point of use; do not bend, recap, or break used syringe needles before discarding them into a container (CDC 2003).

26, 27. A sharps disposal container is a puncture-resistant container used for the local disposal of used needles and other sharps. A sharps container may be made out of a heavy cardboard box, puncture resistant plastic, or a metal container. Puncture-resistant sharps disposal containers should be conveniently located in any area where sharp objects are frequently used (such as injection rooms, treatment rooms, operating theaters, labor and delivery rooms, and laboratories) (EngenderHealth 2004, “Needles and Other Sharps”).

29. Sharps containers should be disposed of when they are 3/4 full (Tietien et al. 2003, 7-13).

31. Although burning is the best way to dispose of medical waste, sharps are not destroyed by burning, except in large industrial incinerators. If an industrial incinerator is not available, sharps can be rendered harmless by placing needles, plastic syringes, and scalpels in a metal container and then, when the container is 3/4 full, pouring in fuel and igniting and burning it until the fire goes out on its own. When this is done, the plastic syringes will melt and, when

cool, become a solid block of plastic, with the sharps embedded within the block. The block can then be buried in the type of burial pit used for solid medical waste. If it is not possible to bury all medical waste on site, sharps should be given priority for burial, since they pose the biggest risk of injury and infections (EngenderHealth 2004, "Waste Disposal").

32. Many accidental needlestick injuries occur when staff are recapping needles. Recapping is a dangerous practice; if at all possible, dispose of needles immediately without recapping them (EngenderHealth 2004, "Needles and Other Sharps").

33. To safely recap needles, the "one-hand" technique should be used—

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

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

3. When the cap covers the needle, 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) (EngenderHealth 2004, "Needles and Other Sharps").

34. Hypodermic needles should not be bent, broken or cut before disposal (EngenderHealth 2004, "Needles and Other Sharps").

37. Even the best quality, new latex rubber surgical gloves may leak up to four percent of the time. Moreover, latex gloves, especially when exposed to fat in wounds, gradually become weaker and lose their integrity. Wear double gloves when (Tietjen et al. 2003, 7-7)—

- The procedure involves coming in contact with large amounts of blood or other body fluids (e.g., vaginal deliveries and cesarean sections)

- Orthopedic procedures in which sharp bone fragments, wire sutures, and other sharps are likely to be encountered

- Surgical gloves are being reused (the possibility of unapparent holes or perforations in any type of reprocessed glove is higher than with new gloves)

38. A safe method of passing sharp instruments (scalpels, suture needles, and sharp scissors) during surgery is the "hands-free" technique. This technique for sharps is inexpensive, simple to use, and ensures that the surgeon, assistant, or scrub nurse never touches the same instrument at the same time. Using this technique, the assistant or scrub nurse places a sterile or high-level disinfected kidney basin on the operative field between himself/herself and the surgeon. The container is designated as the neutral or safe zone in which sharps are placed before and immediately after use. For example, the assistant or scrub nurse alerts the surgeon that a sharp instrument has been placed in or on the safe zone with the handle pointing toward the surgeon by saying "scalpel" or "sharp" while placing it there. The surgeon then picks up the instrument and returns it to the container after use, this time with the handle pointing away from her/him (Tietjen et al. 2003, 7-5).

40. If an occupational exposure occurs, the circumstances and postexposure management should be recorded in the exposed person's confidential medical record. Recommendations for the contents of the occupational exposure report are as follows: date and time of exposure;

details of the procedure being performed, including where and how the exposure occurred; if related to a sharp device, the type and brand of device and how and when in the course of handling the device the exposure occurred; details of the exposure, including the type and amount of fluid or material and the severity of the exposure (e.g., for a percutaneous exposure, depth of injury and whether fluid was injected; for a skin or mucous membrane exposure, the estimated volume of material and the condition of the skin [e.g., chapped, abraded, intact]); details about the exposure source (e.g., whether the source material contained HBV, HCV, or HIV; if the source is HIV-infected, the stage of disease, history of antiretroviral therapy, viral load, and antiretroviral resistance information, if known); details about the exposed person (e.g., hepatitis B vaccination and vaccine-response status); and details about counseling, postexposure management, and follow-up (CDC 2001, 19).

41. An updated record should be kept for all personnel and the confidentiality of their records should be maintained while ensuring that they receive appropriate management for occupational illnesses or exposures. A personnel database should be maintained, preferably computerized, that allows tracking of personnel immunizations, screening tests, and assessment of trends of infections and diseases in personnel (Bolyard et al. 1998).

References

Bolyard, E. A., O. C. Tablan, W. W. Williams, et al. 1998. Guideline for Infection Control in Healthcare Personnel. *Infection Control and Hospital Epidemiology* 19(6):407–63.

US Centers for Disease Control and Prevention (CDC). 2001. Updated US Public Health Service Guidelines for the Management of Occupational Exposures to HBV, HCV, and HIV and Recommendations for Postexposure Prophylaxis. *MMWR* 2001; 50(No. RR-11):19-20.

CDC. 2003. Guidelines for Environmental Infection Control in Healthcare Facilities: Recommendations of CDC and the Healthcare Infection Control Practices Advisory Committee. *MMWR* 2003; 52(No. RR-10):1–48.

EngenderHealth. 2004. Infection Prevention Online Course. http://www.engenderhealth.org/res/onc/index.html#start (accessed July 17, 2006).

Falk, P. S. 2004. Infection Control and the Employee Health Service. In *Hospital Epidemiology and Infection Control*, 3rd ed., edited by C. G. Mayhall. Philadelphia: Lippincott, Williams & Wilkins.

Tietjen, L., D. Bossemeyer, and N. McIntosh. 2003. *Infection Prevention: Guidelines for Healthcare Facilities with Limited Resources*. Baltimore, MD: Jhpiego.

World Health Organization (WHO). 2002. *Prevention of Hospital-Acquired Infections: A Practical Guide*. 2nd ed. WHO/CDS/CSR/EPH/2002/12. Geneva: WHO.

MODULE SCORING SHEET

Name of facility: _____

Name of module: _____

Date completed: _____

Module section	1 Assessment total	2 Possible total	3 Percentage score	4 Rating based on percentage score
Total for module			**%**	

Column notes:

1. Assessment total—sum of points for all marked responses

2. Possible total—sum of all possible points for the question

3. Percent score—(column 1/column 2) × 100

4. Rating—

More than 75% of possible points:	A—recommended practices are followed consistently and thoroughly
50–75% of possible points:	B—recommended practices usually followed
Less than 50% of possible points:	C—training and follow-up needed on recommended practices

PHARMACY

This module should be completed by the chief pharmacist or the person in charge of the pharmacy.

For each item, mark the answer that best describes your current situation by putting a tick ✓ inside the brackets [✓]. Note that some questions ask for only one answer, and others ask you to mark all answers that apply. Questions that are intended to provide contextual information only are not scored.

Key Personnel

These questions provide contextual information about the pharmacy and the functions of the Pharmaceutical and Therapeutics Committee (PTC) in your facility.

1.	Mark the highest level of training of the responsible pharmacist
[ ]	Facility does not have a person in charge of pharmacy
[ ]	Special short course or program
[ ]	On-the-job training
[ ]1	Bachelor/Diploma in Pharmacy (BPharm, BSc Pharm, Dip Pharm)
[ ]1	Masters in Pharmacy (MSc, MPharm)
[ ]1	Doctor of Pharmacy (PharmD, PhD, DPharm)
2.	Does the facility have a PTC?
[ ]	No
[ ]1	Yes
3.	Is the responsible pharmacist a member of the PTC?
[ ]	No
[ ]1	Yes

Assessment section total: _____ **Possible section total:** 3

Pharmacy Services

The following questions focus on the functions performed by your pharmacy personnel, and reporting of infection outbreaks.

4.	Does the facility have a main pharmacy?
[ ]	No
[ ]1	Yes
5.	How are medicines usually provided to patients? (Mark all that apply)
[ ]	Patients purchase medicines outside the facility
[ ]1	From stocks kept on the ward
[ ]1	From the outpatient pharmacy
[ ]2	From the main pharmacy

6. What are the functions of the pharmacy in the facility? (Mark all that apply)

[ ] Procure medicines for the pharmacy
[ ] Distribute prepared medicines from commercial sources directly to patient care areas
[ ]1 Advise and educate medical and nursing staff on appropriate use of medicines
[ ]1 Select medicines for the facility formulary or procurement list
[ ]1 Conduct clinical pharmacy rounds on wards
[ ]1 Collect data on medicine use

7. Does the pharmacy have written polices and procedures for the following? (Mark all that apply)

[ ] No written policies
[ ]1 Aseptic technique for preparing sterile products (e.g., gloves, gowns, masks, booties)
[ ]1 Expiration dating and labeling of the compound
[ ]1 Storage conditions (e.g., room temperature, refrigeration) for compounded/manufactured sterile products

8. Are any of the following items available in the pharmacy? (Mark all that apply)

[ ]1 Sink for hand washing
[ ]1 Refrigerator and freezer
[ ]1 Controlled area (limited access area) with nonporous, washable floors
[ ] None of the above are available

9. Are pharmacy personnel certified or trained in compounding sterile products?

[ ] No
[ ]1 Yes

10. How are data on medicine use kept? (Mark the primary method used)

[ ] No routine data on medicine use are kept
[ ]1 Paper records
[ ]1 Computer database

11. How many outbreaks in the facility have occurred in the past 12 months due to contaminated pharmaceuticals?

[ ]1 None
[ ] One to two
[ ] Three or more

12. Did contamination in the pharmacy contribute to the most recent outbreak due to contaminated pharmaceuticals? (Mark one answer)

[ ]1 No outbreaks
[ ]1 No, pharmacy did not contribute
[ ] Yes
[ ] No

Assessment section total: _____ **Possible section total:** 19

Antibiotic Control Program

The following questions focus on your facility's formulary, antimicrobial drugs, and antibiotic use.

13. Is there a medicines formulary in the facility?

[ ] No
[ ]1 Yes

14. Which antimicrobials are usually available in the pharmacy? (Mark all that apply)

[ ] Piperacillin
[ ] Beta lactam/beta-lactamase combinations (e.g., piperacillin/tazobacam, ticarcillin/clavulate, or ampicillin/sulbactam)
[ ] Second generation cephalosporin (e.g., cefuroxime, cefoxitin, or cefotetam)
[ ] Third generation cephalosporin (e.g., ceftriaxone, ceftazidime, or cefotaxime)
[ ] Fluoroquinolones (e.g., ciprofloxacin or levofloxacin)
[ ] Imipenem-cilastatin or meropenem
[ ] Vancomycin
[ ]1 Aminoglycosides (e.g., gentamicin/netilmicin, tobramycin, or amikacin)
[ ]1 Parenteral first generation cephalosporin (e.g., cefazolin or cephalothin)
[ ]1 Penicillins (penicillin G or ampicillin)
[ ]1 Anti-staph penicillin (methicillin, nafcillin, cloxacillin, or oxacillin)

15. Do you limit the availability of any antimicrobials (e.g., broad spectrum antibiotics or expensive agents) in the facility?

[ ] No
[ ]1 Yes

16. Does the facility have a written policy to control the use of antimicrobial medicines? (Mark one answer)

[ ] No written policy or procedures
[ ] Policy and procedures communicated verbally only
[ ]1 Written policy and procedures available in an operations manual but not generally available for daily practice
[ ]2 Written policy and procedures in a manual but also posted on walls in clinical or support areas

17. Does the facility have written guidelines for antimicrobial use? (Mark one answer)

[ ] No written guidelines
[ ] Guidelines communicated verbally only
[ ]1 Written guidelines available in an operations manual but not generally available for daily practice
[ ]2 Written guidelines in a manual but also posted on walls in clinical or support areas

18. Does the facility restrict antibiotics on the formulary?

[ ] No
[ ]1 Yes

19. Does the facility rotate antibiotics in and out of the formulary to contain antimicrobial resistance?

[ ] No
[ ]1 Yes

20. Does the facility conduct retrospective or concurrent use and review programs for specific antibiotics? [ ] No [ ]1 Yes
21. Does the facility use structured antibiotic forms or preprinted order forms for specific conditions, such as sepsis? [ ] No [ ]1 Yes
22. Does the facility have a policy for automatic stop orders (e.g., discontinuation of antibiotics after a specific time period)? [ ] No [ ]1 Yes
23. Does the facility require approved motivation form from a consultant or head of department for the use of certain antimicrobials? [ ] No [ ]1 Yes
24. Are there facility guidelines for antibiotic prophylaxis during surgery? [ ] No [ ]1 Yes

Assessment section total: _____ **Possible section total:** 17

Antibiotic Use Monitoring and Reporting

The following questions deal with antibiotic use and use reporting.

25. How frequently is antibiotic use submitted and analyzed for specific antibiotics? (Mark one answer) [ ] Do not know [ ] Use not reported frequently [ ] Occasionally (less than once a year) [ ]1 One to four times a year [ ]1 Five or more times a year
26. To whom is antibiotic use reported? (Mark all that apply) [ ] No reporting of antibiotic use [ ] The facility management [ ] Head of infection control program or chair of infection control committee [ ] Head(s) of clinical department(s) [ ] Responsible pharmacist [ ]1 All of the people mentioned above [ ]1 All facility doctors

27. Do use reports include data on antimicrobial use expressed in the following way? (Mark all that apply)

[ ] No data are reported on antimicrobial use
[ ]1 Number of prescriptions for antimicrobial agents
[ ]1 Number of patients receiving antimicrobial therapy
[ ]1 Number of days of antimicrobial therapy used

28. For which groups of patients is antimicrobial use reported? (Mark all that apply)

[ ] None
[ ]1 Patients receiving antimicrobial therapy for peri-operative prophylaxis
[ ]1 Patients receiving antimicrobial therapy for specific diagnoses (e.g., pneumonia, sepsis, meningitis, etc.)

Assessment section total: _____ **Possible section total:** 8

PHARMACY ANNOTATIONS

Background

The hospital pharmacist and the pharmacy service are essential elements of the health care team, committed to fostering the quality, efficacy, safety, and cost-effectiveness of medicine use. Within this mission, there are four roles relevant to infection control activities: first, to distribute medicines from commercial sources directly to patient care areas and second, to prepare materials for use by repackaging or compounding. These first two roles, however, involve the risk of distributing contaminated materials. The third role is to advise and participate in the control of the hospital's use of medications, leading to an important role in evaluation and education; and the fourth is to be associated with data that may be useful for the investigation, analysis, and, ultimately, control of nosocomial infections (Hopkins 2004, 1315).

Item Notes

1. The pharmacy should be managed by a professionally qualified pharmacist. The responsible pharmacist should be thoroughly knowledgeable about hospital pharmacy practice and management.

2. The formulary is a list of medicines (and associated information) that are considered by the professional staff of the hospital to be the most useful in patient care. Development, maintenance, and approval of the formulary are the responsibilities of the PTC.

3. The pharmacist should be a member of and actively participate in committees responsible for establishing medication-related policies and procedures and those responsible for patient care (ASHP 1995).

4, 5. Medication management is the responsibility of the pharmaceutical service and clinical providers. How this responsibility is shared depends on the organization's structure and staffing.

6. The pharmacist provides patient-specific medicine information and accurate and comprehensive information about medicines to other pharmacists, other health professionals, and patients as appropriate (ASHP 1995). The pharmacist also contributes expertise to the formulary system to optimize patient care through rational selection and use of medicines. Pharmacists play a primary role in assessing the relative safety and efficacy of pharmaceuticals nominated for addition to or deletion from the formulary (ASHP 1992).

7. Up-to-date written policies and procedures for compounding sterile products should be available to all personnel involved in these activities. These policies should address personnel education and training requirements, competency evaluation, product acquisition, storage and handling of products and supplies, storage and delivery of final products, use and maintenance of facilities and equipment, appropriate garb and conduct for personnel working in controlled areas, process validation, preparation technique, labeling, documentation, and quality control (ASHP 2000).

8. For hand washing, a sink with hot and cold running water should be in close proximity to the controlled area. Solutions, medicines, supplies, and equipment used to prepare or administer sterile products should be stored in accordance with manufacturer requirements. Temperatures in refrigerators and freezers used to store ingredients and finished sterile preparations should be monitored and documented daily to ensure that storage conditions and requirements are met. The controlled area should be a limited-access area sufficiently separated from other pharmacy operations to minimize the potential for contamination that could result from the unnecessary flow of materials and personnel into and out of the area (ASHP 2000).

9. Pharmacy personnel preparing or dispensing sterile products should receive suitable training and competency evaluation through demonstration, testing (written or practical), or both (ASHP 2000).

10. Ideally, adequate space, resources, and information-handling and communication technology should be available to facilitate collection and provision of drug information (ASHP 1995).

11,12. Contamination of sterile products may occur before arrival in the hospital pharmacy, during the course of dispensing, repackaging, compounding in the pharmacy, or after they leave the pharmacy. Therefore, pharmacy personnel should be involved in the analysis and control of any resulting outbreaks (Hopkins 2004, 1035).

13. See annotation 2.

14–16. The appropriate use of antimicrobial agents is usually facilitated through an Antimicrobial Use Committee or PTC. These committees recommend antibiotics for the formulary and prescribing policies, review and approve practice guidelines, audit antibiotic use, oversee education and interact with pharmaceutical representatives. Each hospital will develop its own antibiotic policy, usually including classification of antimicrobial agents into the following categories: unrestricted (effective, safe, and inexpensive; e.g., benzyl penicillin); restricted or reserved (to be used only in special situations by selected practitioners, for severe infection, with particular resistance, etc.); or excluded (preparations without additional benefit to other, less costly alternatives) (WHO 2002, 59). In hospitals where antibiotic resistance is common, effective second or third tier antibiotics should be readily available in addition to the inexpensive first line agents listed in question 15.

17. The appropriate use of antimicrobial agents is facilitated through the Antimicrobial Use Committee or the PTC (WHO 2002, 59).

18. Hospitals should have a simple, flexible, and regularly updated antibiotic-prescribing policy on a disease-specific basis, relying whenever possible on knowledge of prevailing antibiotic-sensitivity patterns and controlled use of reserve antibiotics. This should incorporate local practice guidelines (WHO 2002).

19. Numerous strategies have been suggested to prevent or reduce microbial resistance to antibiotics, including antibiotic use guidelines, feedback of data on antibiotic resistance, removal of antibiotics from the formulary, required approval for use of restricted antibiotics, education (especially by opinion leaders), focused review of use of specific antibiotics, and rotational or cyclic use of antimicrobials (Gerding 2000).

20. Antimicrobial use monitoring is usually performed by the pharmacy department. Specific elements to be monitored include the amount of different antimicrobials used during a given period, and trends in antimicrobial use over time. In addition to monitoring antimicrobial use, intermittent audits should be undertaken to explore the appropriateness of antimicrobial use (WHO 2002, 60).

21, 22. Some institutions use antimicrobial order sheets that incorporate questions about indications for use of antimicrobial agents, suggested dosing regimens, and defined duration of use. These forms can facilitate antimicrobial audits. The pharmacy may also use automatic stop orders for antimicrobials. This technique is most successful for surgical prophylaxis (Duncan 1998, 286).

23. See annotations for 14–16.

24. See annotation for 18.

25. Monitoring the use of antimicrobials is recommended on a monthly basis or at a frequency appropriate to the prescription volume (Shlaes et al. 1997).

26. Antimicrobial use in the facility should be reported in a timely manner to the Antimicrobial Use Committee, Infection Control Committee, and PTC (WHO 2002, 60).

27. Elements to be monitored include the amount of different antimicrobials used during a given period and trends in antimicrobial use over time. In addition to monitoring antimicrobial use, intermittent audits should be undertaken to explore the appropriateness of antimicrobial use (WHO 2002).

References

American Society of Hospital Pharmacists (ASHP) Council on Professional Affairs. 1992. ASHP Guidelines on Formulary System Management. *American Journal of Health-System Pharmacy* 49(3):648–52.

ASHP Council on Professional Affairs. 1995. ASHP Guidelines: Minimum Standard for Pharmacies in Hospitals. *American Journal of Health-System Pharmacy* 52(23):2711–17.

ASHP Council on Professional Affairs. 2000. ASHP Guidelines on Quality Assurance for Pharmacy-Prepared Sterile Products. *American Journal of Health-System Pharmacy* 57(12):1150–69.

Duncan, R. A. 1998. Controlling Use of Antimicrobial Agents. In *A Practical Handbook for Hospital Epidemiologists*, edited by L. A. Herwaldt and M. Decker. Thorofare, NJ: SLACK Incorporated.

Gerding, D. N. 2000. Antimicrobial Cycling: Lessons Learned from the Aminoglycoside Experience. *Infection Control and Hospital Epidemiology* 21, Suppl. no. 1:S12–S17.

Hopkins, C. C. 2004. Pharmacy Service. In *Hospital Epidemiology and Infection Control*, 3rd ed., edited by C. G. Mayhall, 1315. Philadelphia: Lippincott, Williams & Wilkins.

Joint Commission International (JCI). 2002. Care of Patients in *Joint Commission International Accreditation Standards for Hospitals*. 2nd ed. Oak Brook, IL: JCI.

Shlaes, D. M., D. N. Gerding, J. F. John Jr., et al. 1997. Society for Healthcare Epidemiology of America and Infectious Diseases Society of America Joint Committee on the Prevention of Antimicrobial Resistance: Guidelines for the Prevention of Antimicrobial Resistance in Hospitals. *Infection Control and Hospital Epidemiology* 18(4):275–91.

World Health Organization (WHO). 2002. *Prevention of Hospital-Acquired Infections: A Practical Guide*. 2nd ed. WHO/CDS/CSR/EPH/2002/12. Geneva: WHO.

MODULE SCORING SHEET

Name of facility: _____

Name of module: _____

Date completed: _____

Module section	1 Assessment total	2 Possible total	3 Percentage score	4 Rating based on percentage score
Total for module			**%**	

Column Notes:

1. Assessment total—sum of points for all marked responses

2. Possible total—sum of all possible points for the question

3. Percent score—(column 1/column 2) × 100

4. Rating—

More than 75% of possible points:	A—recommended practices are followed consistently and thoroughly
50–75% of possible points:	B—recommended practices usually followed
Less than 50% of possible points:	C—training and follow-up needed on recommended practices

RENAL UNIT

These questions should be completed in consultation with the chief renal physician or senior sister of the renal unit.

For each item, mark the one answer that best describes your current situation by putting a tick ✓ inside the brackets [✓]. Note that all questions ask for only one answer. Questions that are intended to provide contextual information only are not scored.

Haemodialysis Unit

1. Which types of vascular access are used most frequently in your unit? [ ] Nontunneled central venous catheter (CVC) [ ]1 Tunneled CVC [ ]2 Grafts [ ]3 Arteriovenous fistulae
2. Which types of catheters are used for temporary vascular access? [ ] Noncuffed [ ]1 Cuffed
3. Is routine replacement of CVCs by guidewire exchange practiced in your unit for well-functioning catheters with no evidence of local or systemic infection? [ ]1 No [ ] Yes
4. During haemodialysis, are catheters and arterial and venous blood line tubing monitored for cracks, tears, and breaks of the catheter hub or luer connection? [ ] No [ ]1 Yes
5. Is an aseptic technique employed when accessing dialysis catheter ports? [ ] No [ ]1 Yes
6. Are dialyzers reprocessed in the unit? If no, skip to question 8. [ ]1 No [ ] Yes
7. If dialyzers are reprocessed, is it reused on— [ ]1 the same patient? [ ] a different patient?

8. How often are assays performed by using standard quantitative methods for endotoxin in water used to reprocess hemodialyzers, and for heterotrophic and mesophilic bacteria in water used to prepare dialysate, and for hemodialyzer reprocessing?

[ ]1 monthly
[ ] quarterly

9. Which of the following containers are used for priming the dialyzer?

[ ]2 disposable
[ ]1 nondisposable

10. Is special attention paid to the haemodialysis control panels with regard to blood spills (a high-touch area)?

[ ] No
[ ]1 Yes

11. For hospitalized hepatitis B surface antigen (HBsAg)-positive chronic haemodialysis patients, dialysis is carried out in a separate room, and separate machines, equipment, instruments, supplies, and medications are designated only for HBsAg-positive patients.

[ ] No
[ ]1 Yes

12. Proper guidelines on the prevention and control of hepatitis B virus (HBV) infection among haemodialysis patients are available to all staff members.

[ ] No
[ ]1 Yes

13. Does the unit use a common medication cart?

[ ]1 No
[ ] Yes

Assessment section total: _____ **Possible section total**: _16_____

Staffing

14. What is the staff to patient ratio for chronic dialysis?

[ ]2 1 to 2
[ ]1 1 to 4
[ ] 1 to 6

15. Is there designated staff to monitor and assess whether dressings and antiseptics are catheter compatible and effective?

[ ] No
[ ]1 Yes

16. Is there close supervision of new and inexperienced staff?

[ ] No
[ ]1 Yes

17. How often are internal audits with corrective action plans carried out?

[ ] Not at all
[ ]3 Monthly
[ ]2 Quarterly
[ ]1 Annually

Assessment section total: _____ **Possible section total**: _7_____

Antibiotic Prescribing

18. Does your unit have a formal written antibiotic policy for continuous ambulatory peritoneal dialysis (CAPD) and haemodialysis patients?

[ ] No written policy or procedure
[ ] Policy and procedure communicated verbally only
[ ]1 Written policy available in an operations manual but not generally available for daily practice
[ ]2 Written policy in manual but also posted on walls in clinical areas

19. Is there a structured orientation program for new staff on antibiotic policies in the unit?

[ ] No
[ ]1 Yes

20. How frequently are antibiotic policies reviewed in the unit?

[ ]1 Annually
[ ] Every 2 years or more

21. Are antibiotics for suspected CAPD-related peritonitis prescribed without first sending peritoneal dialysis effluent samples to the laboratory?

[ ]1 No
[ ] Yes

22. Are antibiotics for suspected soft tissue infection related to a vascular catheter, graft, or fistula ever prescribed before blood cultures have been taken?

[ ]1 No
[ ] Yes

Assessment section total: _____ **Possible section total**: _6_____

Catheter Care

How often are patients and caregivers educated on personal catheter care and signs of infection?

[ ] No formal system in place for education
[ ]1 On initial visit only
[ ]2 Well-structured education policy to update patients when there is a change in type of vascular access or catheter type

Assessment section total: _____ **Possible section total**: _2_____

Checklist of Additional Modules to be Completed for this Renal Unit

- ☐ Hand Hygiene
- ☐ Injections
- ☐ General Ward
- ☐ Intravenous Catheters
- ☐ Intravenous Fluids and Medication
- ☐ Isolation and Standard Precautions
- ☐ Sterilization and Disinfection (if instruments and equipment are disinfected or sterilized in this unit)
- ☐ Urinary Catheters
- ☐ Occupational Health Module
    - Employee exposures
    - Control of sharp instruments
    - Employee health records

RENAL UNIT ANNOTATIONS

Background

Patients undergoing haemodialysis and CAPD are at increased risk for developing infections. For most patients, the chronicity of the condition, use of intravascular catheters, and frequent hospital visits (short and long stays)—all health care associated factors—play a significant role in susceptibility to infection. The use of haemodialysis catheters is the most common factor contributing to bacteraemia in dialysis patients.

In South Africa, studies are needed on the prevalence and epidemiology of bacterial infections among chronic haemodialysis patients and the patient care practices (e.g., practices related to vascular access care and puncture) that would be most useful in preventing bacterial infections.

Infection control recommendations have been made by the US Centers for Disease Control and Prevention (CDC) for chronic haemodialysis. The South African Renal Society has also compiled guidelines to standardize practices that include clinical and infection control practices, but information on effective antimicrobial prescribing is lacking.

Complications resulting from chronic kidney disease yield a high level of antibiotic use in renal units. This encourages antibiotic resistant bacteria and health care-acquired infection. Strict antibiotic policies based on local surveillance need to be implemented to combat this problem.

Item Notes

1. To reduce the infection rate, haemodialysis catheters should be avoided in favor of arteriovenous fistulas and grafts. Rates for bacteremia per 100 patient months were 0.2 for arteriovenous fistulas, 0.5 for grafts, 5.0 for cuffed catheters, and 8.5 for noncuffed catheters (CDC 1999).

2. If temporary access is needed for dialysis, a cuffed catheter is preferable to a noncuffed catheter, even in the intensive care unit setting, when the catheter is expected to stay in place for more than three weeks (CDC 1999).

3. Scheduled guidewire exchanges of CVCs are another proposed strategy for preventing catheter-related bloodstream infections (CRBSI). The results of a meta-analysis of 12 randomized controlled trials assessing CVC management failed to prove any reduction of CRBSI rates through routine replacement of CVCs by guidewire exchange compared with catheter replacement on an as-needed basis. Thus, routine replacement of CVCs is not necessary for catheters that are functioning and have no evidence of causing local or systemic complications (CDC 1999).

6. Economic constraints dictate the reuse of dialyzers in South Africa. Health workers should inform patients that reuse is being practiced.

8. The microbiology of the water feeding dialysis machines should be monitored routinely. Monitoring during the validation phase of a new system is weekly; monitoring during the surveillance and/or maintenance phase is monthly (South African Renal Society 2006).

The Association for the Advancement of Medical Instrumentation has established chemical and microbiologic standards for the water used to prepare dialysate or substitution fluid, or to reprocess hemodialyzers for renal replacement therapy. These assays are performed by using standard quantitative methods for endotoxins in water used to reprocess hemodialyzers, for heterotrophic and mesophilic bacteria in water used to prepare dialysate, and for hemodialyzer reprocessing (CDC 2003).

9. A national surveillance of dialysis-associated diseases conducted in the United States in 2002 showed that centers that used a disposable container rather than a nondisposable container for priming the dialyzer had a significantly lower incidence of the hepatitis C virus (Finneli et al. 2005).

11. While hospitalized, HBsAg-positive chronic haemodialysis patients should undergo dialysis in a separate room and use separate machines, equipment, instruments, supplies, and medications designated for HBsAg-positive patients only. Although HBsAg-positive patients are receiving dialysis, staff members who are caring for them should not care for susceptible patients (CDC 2001).

13. In the survey in number 9, the incidence of the hepatitis B virus infection was found to be higher among patients in centers where injectable medications were prepared on a medication cart or in a medication area located in the treatment area than among patients in centers where injectable medications were prepared in a dedicated medication room. Therefore, infection control practices for haemodialysis units restrict the use of common supplies, instruments, medications, and medication trays and prohibit the use of a common medication cart.

14. A dialysis clinic has between three and five shifts of patients per day. Patients are treated for a four-hour period. The turnover between taking a patient off dialysis and getting the next patient started is approximately 30 minutes. In this 30-minute period, the following steps need to occur—

1. Stabilize the outgoing patient
2. Clean and disinfect the area
3. Set up and prepare the dialysis delivery system for the next patient
4. Ensure next patient is ready for dialysis

If the staff-to-patient ratio is limited, completing steps one to four between patients may be a challenge. The staff to patient ratio for chronic dialysis should be one to four (including nurses and clinical technologists). A registered nurse with experience in haemodialysis should be present in the dialysis unit at all times (South African Renal Society 2006).

22. Antibiotics must be used only when benefits outweigh risks. The most appropriate antibiotic must be used following all necessary investigations. Intravenous antibiotics should never be prescribed before at least one set of blood cultures has been taken. In patients with a dialysis catheter, one set of cultures should be taken through the catheter, and one set should be taken peripherally. Antibiotics for suspected soft tissue infection related to a vascular catheter, graft, or fistula should never be prescribed before blood cultures have been taken.

References

US Centers for Disease Control and Prevention. 2003. Guidelines for Environmental Infection Control in Health-Care Facilities: Recommendations of CDC and the Healthcare Infection Control Practices Advisory Committee. *MMWR* 2003;52(No. RR-10);1–42.

CDC. 2002. Guidelines for the Prevention of Intravascular Catheter-Related Infections. *MMWR* 2002;51(No. RR-10);1–26.

CDC. 2001. Recommendations for Preventing Transmission of Infections among Chronic Hemodialysis Patients. *MMWR* 2001;50(No. RR-05);1–43.

Finelli, L., J. T. Miller, J. I. Tokars, et al. 2005. National Surveillance of Dialysis-Associated Diseases in the United States, 2002. *Seminars in Dialysis* 18(1):52–61.

South African Renal Society (SARS). 2006. *Guidelines for the Optimal Care of Patients on Chronic Dialysis in South Africa*. Cape Town, South Africa: SARS.

MODULE SCORING SHEET

Name of facility: _____

Name of module: _____

Date completed: _____

Module section	1 Assessment total	2 Possible total	3 Percentage score	4 Rating based on percentage score
Total for module			**%**	

Column Notes:

1. Assessment total—sum of points for all marked responses

2. Possible total—sum of all possible points for the question

3. Percent score—(column 1/column 2) × 100

4. Rating—

More than 75% of possible points: A—recommended practices are followed consistently and thoroughly

50–75% of possible points: B—recommended practices usually followed

Less than 50% of possible points: C—training and follow-up needed on recommended practices

STERILIZATION AND DISINFECTION—EQUIPMENT AND IV FLUIDS

These questions should be completed by the person in charge of the central sterilization and disinfection unit or the person in charge of sterilization and disinfection in each location where equipment is sterilized, such as dental clinic

For each item, mark the answer that best describes your current situation by putting a tick ✓ inside the brackets [✓]. Note that some questions ask for only one answer, and others ask you to mark all answers that apply. Questions that are intended to provide contextual information only are not scored.

1. Where in the facility is equipment sterilized and disinfected?

[ ] Central unit
[ ] Labor and delivery support unit
[ ] Surgical area support unit
[ ] Other (specify) _____

2. Please indicate your background and education for this position. (Mark all that apply). If no one is formally designated as in charge, skip to question 3.

[ ] No training
[ ] On the job training
[ ]1 Lectures or seminars
[ ]2 Formal training program

Assessment section total: _____ **Possible section total:** 3

Policies and Procedures

These questions provide contextual information about your facility's sterilization and disinfection procedures and practices.

3. Are there written facility policies and procedures for sterilizing materials and equipment?

[ ] No written policies or procedures
[ ] Policies and procedures communicated verbally only
[ ]1 Written policies and procedures available in an operations manual but not generally available for daily practice
[ ]2 Written policies and procedures in a manual but also posted on walls in clinical or support areas

4. Do the written policies explicitly identify the items that require sterilization?

[ ] No written policies
[ ] No, items not explicitly identified
[ ]1 Yes

5. What is the required procedure when sterilizer failures are detected? (Mark all that apply)

[ ] No written procedure
[ ]1 Reporting of failure
[ ]1 Recall potentially contaminated items from clinical units

Assessment section total: _____ **Possible section total:** 5

Preparation of Sterile Irrigation and intravenous (IV) Fluids

The following questions identify where and how in the facility IV fluids are prepared.

6. If irrigation fluids are prepared in a central sterilization unit of the hospital, which sterilization process is used? (Mark the one that best applies)

[ ] No sterile liquids are prepared in the hospital
[ ] Boiling
[ ] Filtration
[ ] Microwave
[ ] Reverse osmosis
[ ]1 Steam sterilization (autoclave)

7. If irrigation fluids are not prepared in a central sterilization unit of the facility, where are irrigation fluids prepared? (Mark one answer)

[ ]1 Fluids are prepared in a central sterilization unit
[ ] Prepared elsewhere in the facility (Specify where:_____)
[ ] Purchased non-sterile from commercial sources
[ ]2 Purchased sterile from commercial sources

8. If IV fluids are not prepared in a central sterilization unit of the hospital, where are IV fluids prepared? (Mark one answer)

[ ] IV fluids are not prepared in a central sterilization unit of the facility
[ ] Prepared elsewhere in the facility (Specify where:_____)
[ ] Purchased non-sterile from commercial sources
[ ]2 Purchased sterile from commercial sources

9. If IV fluids are prepared in a central sterilization unit of the facility, is there a standard sterilization time required for given volumes of liquid?

[ ] IV fluids are not prepared in a central sterilization unit in the facility
[ ] No
[ ]1 Yes

Assessment section total: _____ **Possible section total:** 6

Decontamination and Cleaning of Instruments and Equipment

The following questions cover policies and practices for decontamination and cleaning of instruments and other equipment.

10. Is there a written facility policy regarding the decontamination of instruments before cleaning? (Mark one answer)

[ ] No written policies or procedures
[ ] Policies and procedures communicated verbally only
[ ]1 Written policies and procedures available in an operations manual but not generally available for daily practice
[ ]2 Written policies and procedures in a manual but also posted on walls in clinical or support areas

11. How are soiled and clean items separated from each other? (Mark one answer)

[ ] Processed in the same work area
[ ] Same room, separate areas
[ ]1 Separate utility rooms for soiled and clean items

12. Which disinfectant is usually used to decontaminate used items? (Mark the one most commonly used)

[ ] Not all used items are decontaminated
[ ]1 Iodophor
[ ]1 Formaldehyde
[ ]1 Ethyl or isopropyl alcohol
[ ]1 Glutaraldehyde
[ ]1 Phenolic
[ ]1 Hydrogen peroxide
[ ]1 Paracetic acid
[ ]2 Sodium hypochlorite or other chlorine compound

13. Does decontamination occur before cleaning or any other handling of used items?

[ ] No
[ ]1 Yes

14. How are soiled instruments usually cleaned? (Mark all that apply)

[ ] Rinsing
[ ]1 Vigorous scrubbing with brush
[ ]1 Mechanical dishwasher
[ ]1 Ultrasonic cleaner

15. Which of the following solutions is used to remove organic material from soiled instruments? (Mark one answer)

[ ] Water
[ ]1 Water with detergent
[ ]1 Protein-dissolving (enzyme) solution

16. What material is usually used to package items for sterilization? (Mark one answer)

[ ] No wrapping
[ ] Canvas
[ ]1 Cotton
[ ]1 Muslin
[ ]1 Paper
[ ]1 Newsprint

17. How many layers are used to wrap items to be sterilized? (Mark one answer)

[ ] One layer
[ ]1 Two layers

Assessment section total: _____ **Possible section total:** 12

Sterilization and Disinfection of Instruments and Equipment

The following questions ask you to identify methods used for disinfection and sterilization, and the specified methods and indicators used for sterilization, packaging, and storage. Answer the questions in sections A through E (starting on page 6) according to the methods used in your area of the facility.

18. Which methods are used to disinfect and sterilize equipment? (Mark all that apply in each row). Leave blank if equipment is not sterilized.

Equipment	Steam (autoclave)	Dry heat	Chemical sterilization	High-level disinfection	Wet heat /pasteurize	Other method**
Scalpel blades	[ ]1	[ ]1	[ ]1	[ ]	[ ]	[ ]
Metal urinary catheters	[ ]1	[ ]1	[ ]1	[ ]1	[ ]1	[ ]
Plastic urinary catheters	[ ]	[ ]	[ ]1	[ ]1	[ ]1	[ ]
IV catheters/ tubing	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Oxygen mask/ tube	[ ]	[ ]	[ ]	[ ]	[ ]1	[ ]
Laryngoscope blades	[ ]1	[ ]1	[ ]1	[ ]1	[ ]1	[ ]
Surgical/obstetric instruments	[ ]1	[ ]1	[ ]	[ ]	[ ]	[ ]
Endotracheal tubes	[ ]	[ ]	[ ]1	[ ]1	[ ]1	[ ]
Fiber-optic endoscopes	[ ]	[ ]	[ ]1	[ ]1	[ ]	[ ]
Ambu-bags	[ ]	[ ]	[ ]1	[ ]1	[ ]1	[ ]

Respiratory suction catheters	[ ]	[ ]	[ ]1	[ ]1	[ ]1	[ ]
Nebulizers	[ ]	[ ]	[ ]1	[ ]1	[ ]1	[ ]
Ventilator circuits	[ ]	[ ]	[ ]1	[ ]1	[ ]1	[ ]

**** If other method is used, describe the procedure used in the space below—**

19. Which methods are used for equipment sterilization? (Mark all that apply)

[ ] Flash steam sterilization (autoclave)
[ ] Microwave
[ ]1 Ethylene oxide
[ ]1 Plasma/gas sterilization
[ ]1 Low-temperature steam formaldehyde sterilization
[ ]1 Steam/pressure sterilization (autoclave) ***Complete Section A below***
[ ]1 Dry-heat sterilization (oven) ***Complete Section B below***
[ ]1 Chemical sterilization ***Complete Section C below***
[ ]1 High-level chemical disinfection ***Complete Section D below***
[ ]1 High-level disinfection using pasteurization ***Complete Section E below***

20. Are biological and/or chemical indicators used to monitor the success of sterilization? (Mark one answer)

[ ] Neither is used
[ ]1 Biological indicators only used (e.g., Attest)
[ ]1 Chemical indicators only used (e.g., Bowie & Dick and Strips)
[ ]2 Both indicators are used

21. How often are monitoring indicators used? (Mark one answer)

[ ] Indicators not used
[ ] Once a week
[ ] Once a month
[ ]1 Every day
[ ]2 Every cycle

22. How frequently are autoclaves checked by a service or maintenance person? (Mark one answer)

[ ] No autoclaves available in facility
[ ] Only when serviced as needed for repairs
[ ]1 Only when serviced by maintenance per service contract
[ ]1 Once a month
[ ]1 Several times a year

23. How are sterile instrument packs stored? (Mark all that apply)

[ ] Directly on shelves or carts
[ ] In cardboard boxes
[ ] In paper bags
[ ]1 In enclosed plastic or metal boxes
[ ]1 In plastic bags
[ ]1 In sterilized acceptor bags

24. Is the date of sterilization written on sterile packs?

[ ] No
[ ]1 Yes

25. In what order are sterile supplies removed from storage for use? (Mark one answer)

[ ] Newest sterile packs are used first
[ ] Randomly or as convenient
[ ]1 Oldest sterile packs are used first (first in, first out)

26. Is there a written policy regarding shelf-life after which unprotected items must be re-sterilized? (Mark one answer)

[ ] No written policy or procedures
[ ] Policy and procedures communicated verbally only
[ ]1 Written policy and procedures available in an operations manual but not generally available for daily practice
[ ]2 Written policy and procedures in manual but also posted on walls in clinical or support areas

Assessment section total: _____ **Possible section total:** 56

A. Steam/Pressure Sterilization (Autoclave)

Complete this section only if steam/pressure sterilization is used.

27. Are written procedures available to personnel performing steam/pressure sterilization? (Mark one answer)

[ ] No written policy or procedures
[ ] Policy and procedures communicated verbally only
[ ]1 Written policy and procedures available in an operations manual but not generally available for daily practice
[ ]2 Written policy and procedures in a manual but also posted on walls in clinical or support areas

28. How often are time, temperature, and pressure monitored during the steam/sterilization process? (Mark one answer)

[ ] Once a week
[ ] Once a month
[ ] Several times a year (not regularly)
[ ] Only when serviced by maintenance per service contract
[ ] Only when serviced by maintenance as needed for repairs
[ ]1 On schedule recommended by manufacturer
[ ]1 Every day
[ ]2 Every cycle

29. How are items dried after removal from the autoclave? (Mark one answer)

[ ] No drying
[ ] Air dried
[ ]1 Dry heat (i.e., oven)
[ ]1 Forced air (i.e., fan)

Assessment section total: _____ **Possible section total:** 5

B. Dry-Heat Sterilization

Complete this section only if dry-heat sterilization is used.

30. Are written procedures available to personnel performing dry-heat sterilization? (Mark one answer)

[ ] No written policy or procedures
[ ] Policy and procedures communicated verbally only
[ ]1 Written policy and procedures available in an operations manual but not generally available for daily practice
[ ]2 Written policy and procedures in a manual but also posted on walls in clinical or support areas

31. How often are time and temperature monitored during dry-heat sterilization? (Mark one answer)

[ ] Once a week
[ ] Once a month
[ ] Several times a year (not regularly)
[ ] Only when serviced by maintenance per service contract
[ ] Only when serviced by maintenance as needed for repairs
[ ]1 On schedule recommended by manufacturer
[ ]1 Every day
[ ]2 Every cycle

Assessment section total: _____ **Possible section total:** 4

C. Chemical Sterilization

Complete this section only if chemical sterilization is used.

32. Is there a written policy for monitoring the chemical solution for efficacy? (Mark one answer)

[ ] No written policy or procedures
[ ] Policy and procedures communicated verbally only
[ ]1 Written policy and procedures available in an operations manual but not generally available for daily practice
[ ]2 Written policy and procedures in a manual but also posted on walls in clinical or support areas

33. What agents are used for chemical sterilization? (Mark one answer)

[ ]1 Hydrogen peroxide
[ ] Isopropyl alcohol
[ ] Ethyl alcohol
[ ]1 Paracetic acid
[ ]1 Paracetic acid/hydrogen peroxide
[ ]1 Glutaraldehyde
[ ]1 Glutaraldehyde/phenol
[ ]1 Chlorine
[ ]1 Orthopthaldehyde
[ ]1 Formaldehyde
[ ] Iodophor
[ ]1 Ethylene oxide

34. What is used to rinse items after chemical sterilization? (Mark one answer)

[ ] Tap water alone
[ ] Distilled water alone
[ ]1 Distilled water followed by alcohol rinse
[ ]1 Tap water followed by alcohol rinse
[ ]1 Sterile water

35. How are items dried after chemical sterilization? (Mark all that apply)

[ ] No drying
[ ] Air dried
[ ]1 Dry heat (i.e., oven)
[ ]1 Forced air (i.e., fan)

Assessment section total: _____ **Possible section total:** 6

D. High-Level Chemical Disinfection

Complete this section only if high-level disinfection with chemical agent is used.

36. What items are treated by high-level chemical disinfection? (Mark all that apply)

[ ]1 Urinary catheters
[ ]1 Intravenous catheters and tubing
[ ]1 Oxygen masks
[ ]1 Anesthesia breathing circuits
[ ]1 Laryngoscope blades
[ ]1 Surgical and obstetrical instruments
[ ]1 Endotracheal tubes
[ ]1 Endoscopes

37. Is there a written policy for monitoring the chemical disinfection solution for efficacy? (Mark one answer)

[ ] No written policy or procedures
[ ] Policy and procedures communicated verbally only
[ ]1 Written policy and procedures available in an operations manual but not generally available for daily practice
[ ]2 Written policy and procedures in a manual but also posted on walls in clinical or support areas

38. What agent is used most commonly for high-level chemical disinfection? (Mark one answer)

[ ]1 Hydrogen peroxide
[ ] Isopropyl alcohol
[ ] Ethyl alcohol
[ ]1 Paracetic pcid
[ ]1 Paracetic acid/hydrogen peroxide
[ ]1 Glutaraldehyde
[ ]1 Glutaraldehyde/phenol
[ ]1 Chlorine
[ ]1 Orthopthaldehyde
[ ]1 Formaldehyde
[ ] Iodophor
[ ]1 Ethylene oxide

39. What is used to rinse items after high-level chemical disinfection? (Mark one answer)

[ ] Tap water alone
[ ] Distilled water alone
[ ]1 Distilled water followed by alcohol rinse
[ ]1 Tap water followed by alcohol rinse
[ ]1 Sterile water

Assessment section total: _____ **Possible section total:** 12

E. High-level Disinfection by Pasteurization

Complete this section only if high-level pasteurization disinfection is used.

40. Are there written procedures for monitoring the pasteurization solution for efficacy? (Mark one answer)

[ ] No written policy or procedures
[ ] Policy and procedures communicated verbally only
[ ]1 Written policy and procedures available in an operations manual but not generally available for daily practice
[ ]2 Written policy and procedures in a manual but also posted on walls in clinical or support areas

41. What is used to rinse items after high-level pasteurization disinfection? (Mark one answer)

[ ] Tap water alone
[ ] Distilled water alone
[ ]1 Distilled water followed by alcohol rinse
[ ]1 Tap water followed by alcohol rinse
[ ]1 Sterile water

42. How are items dried after high-level pasteurization disinfection? (Mark all that apply)

[ ] No drying
[ ] Air dried
[ ]1 Dry heat (e.g., oven)
[ ]1 Forced air (e.g., fan)

Assessment section total: _____ **Possible section total:** 5

STERILIZATION AND DISINFECTION—EQUIPMENT AND IV FLUIDS ANNOTATIONS

Background

This section is devoted to practices used for the preparation of instruments used in patient care. The following terms are used in this section.

1. **Decontamination:** immersion of an instrument into a chemical solution to make it safe for handling and processing. Decontamination should inactivate the human immunodeficiency virus (HIV), hepatitis B virus (HBV), and hepatitis C virus (HCV).

2. **Cleaning:** mechanical cleaning of instruments by washing or scrubbing to remove large or visible particles or debris.

3. **High-level disinfection (HLD):** chemical treatment that eliminates nearly all microorganisms. Spore-forming gram-positive bacteria are usually spared. This treatment method is appropriate for heat-sensitive instruments that will not contact normally sterile spaces.

4. **Pasteurization:** HLD by steaming or boiling.

5. **Sterilization:** treatment that renders an instrument free of all microorganisms, including gram-positive spores. This treatment is required for surgical instruments and vascular devices that will contact normally sterile spaces.

6. **Autoclave:** a device that sterilizes instruments using pressurized steam.

Item Notes

1–4. It is best to perform all equipment cleaning, disinfection, packaging, and sterilization in a designated central area. This ensures that all procedures and practices are carried out in a uniform manner that minimizes variability and maximizes experience and comfort among the staff. Formal training and written protocols will help practices conform to recognized standards. To minimize confusion, written protocols should specifically name which items require sterilization.

5. Sterilizer failures can jeopardize the integrity of medical and surgical instruments and fluids, and all materials that may have been incompletely sterilized should be recalled. Furthermore, failure should be reported to supervisory personnel in order to make necessary repairs, log maintenance problems, and if necessary, involve the help of the manufacturer.

6–9. Sterile fluids, such as those used for intravenous administration or irrigation, can only be reliably sterilized in a steam-pressure autoclave (EngenderHealth 2004). Standard times and pressures are published for various volumes of fluid. The quality and sterility of commercially available sterile fluids are more reliable than those prepared on site. Boiling does not reliably kill all microorganisms, particularly gram-positive bacterial spores. Therefore, it should not be regarded as true sterilization, but rather HLD. Similarly, dry heat (oven) will simply bring fluids to a boil, whereas the pressure of an autoclave will allow far

more heat to be delivered to fluids before boiling occurs. Fluids that will be administered to sterile sites therefore must be sterilized in an autoclave if one is available.

10–13. Clean and soiled instruments must be separated, ideally into different rooms. This will reduce the risks of contaminating or confusing clean instruments with soiled ones. Decontamination markedly reduces the level of microbial contamination of surgical instruments. If instruments and other items are to be cleaned by hand, decontamination will minimize the risk of infection and reduce microbial contamination. Chlorine solutions made from sodium hypochlorite are the least expensive and the most rapid acting and effective products to use, although 70 percent ethyl or isopropyl alcohol and 0.5–3.0 percent phenolic compounds can also be used (Tietjen et al. 2003).The recommended process for decontaminating soiled surgical instruments, surgical gloves, and other items is to place them in a 0.5 percent chlorine solution for 10 minutes. This step rapidly inactivates HBV, HCV, and HIV, and makes the items safer for those cleaning them to handle. Dilute chlorine solutions can be prepared from liquid bleach for both decontamination and HLD.

14, 15. Neither sterilization nor HLD is effective without prior cleaning. Cleaning effectively reduces up to 80 percent of microorganisms, especially endospores that cause tetanus. The use of soap, preferably liquid, is important for effective cleaning. Thorough washing with soap and clean water physically removes organic material such as blood and body fluids. An enzymatic solution will further degrade organic material. Wearing gloves while cleaning instruments is important so that sterilization staff can avoid contact with blood-borne and other pathogens. Mechanical cleaning can be accomplished by either scrubbing with a soft brush or using a mechanical cleaner (i.e., a dishwasher or ultrasonic cleaner).

16, 17. Cotton, paper, and muslin are all acceptable packaging materials as they are durable and yet allow steam to penetrate. Canvas does not allow steam to effectively penetrate and therefore should not be used (Engender Health 2004). Two layers of wrapping material are recommended, as there are frequently small tears in individual layers. A second layer will prevent instruments from contamination before use and two layers are thin enough to allow steam to penetrate and sterilize the item.

18. Scalpel blades must be procured sterile and should not be reprocessed.

Plastic urinary catheters must be procured sterile and should not be reprocessed. Metal catheters must be sterilized using steam or dry heat.

IV catheters should never be reused. It is impossible to guarantee sterilization of the catheter lumen. Furthermore, with repeated use, microscopic defects can arise in catheter tubing, which can lead to contamination of the catheter system and bloodstream infection.

Surgical and obstetrical equipment should be truly sterilized using autoclave or dry heat. Most of these instruments, such as clamps, retractors, or surgical suction devices enter sterile body sites. Therefore they must not have any viable microbial particles, including bacterial spores. Rare exceptions include obstetrical forceps, which may be treated with HLD.

Respiratory equipment, such as nebulizers, suction catheters, ambu-bags, endotracheal tubes, ventilator circuits, and oxygen masks and tubing should be treated with HLD or pasteurization. Heat-stable equipment, such as metal laryngoscope blades, may also be treated with autoclave or dry-heat sterilization.

20, 21. Standardized biological and chemical indicators should be used as often as possible to monitor the effectiveness of equipment sterilization. Biological indicators should be used once daily, and chemical indicators (such as indicator tape) should be used with each cycle.

22. In addition to needed repairs, autoclaves should be routinely inspected and maintained by qualified personnel.

23. Sterile items should be kept either in their packaging or in a simultaneously sterilized outer container. Damage or moisture to the packaging can cause instrument contamination, so enclosed plastic or metal boxes will provide the best protection. Clean plastic bags are also acceptable and will extend the shelf life of sterilized items.

24–26.The shelf life of sterilized items is variable, depending on such factors as handling, packaging, and storage (see Tietjen et al. 2003 for further details). The date of sterilization should be written on sterile packs to ensure that the oldest packs are used first. This should be further documented as a written policy.

28, 29. Wrapped items being sterilized by steam/pressure (autoclave) should be sterilized at 121 °C (250 °F) for 30 minutes; unwrapped items can be sterilized for 20 minutes. Wait 20 to 30 minutes (or until the pressure gauge reads zero) before opening the lid or door. Time the process with a clock.

Expeditious drying is important to ensure that the integrity of packing materials is maintained and microbial colonization is minimized. The rapidity of ambient drying is variable. Although ambient drying may be sufficient in very dry climates, in more humid environments, drying may be slow or never completely achieved. Thus, dry ovens or fans are encouraged to expedite drying.

30, 31. Dry-heat sterilization is performed in a convection oven or simple oven if a thermometer is used to verify the inside temperature. The advantages of dry heat are that the heat reaches all surfaces of the instruments, even those that cannot be disassembled. This method leaves no chemical residue, is protective of sharps or instruments with cutting edges, and eliminates the “wet pack” problems in humid climates. However, plastic and rubber items cannot be sterilized by dry heat, and dry heat penetrates materials slowly and unevenly. The recommended temperature and time ratios (once the desired temperature has been reached) vary between 60 minutes at 170 °C (340 °F) to overnight at 121 °C (250 °F). Items can be wrapped in aluminum foil or placed in a metal container with a tight fitting lid. Sharps should be placed in glass tubes with cotton stoppers, and loose, unwrapped items can be placed in metal containers or on trays in the oven. Biological indicators should be used daily to monitor dry-heat sterilization. If possible, chemical indicators should be used with every cycle.

33, 34. There is evidence that biological indicators normally used for steam sterilization, such as spore survival, are also useful to monitor the effectiveness of liquid chemical sterilization (Kralovic 1993). Frequent (i.e., daily) monitoring will ensure that instruments are effectively sterilized.

Chemical sterilization is best reserved for instruments that contain material that may be sensitive to heat or pressure. Complex items, such as endoscopes, are also appropriate for

sterilization by this method. See Tietjen et al. 2003 or Engenderhealth for a more comprehensive description of items appropriate for chemical sterilization. Sterilization differs from HLD in that HLD does not necessarily kill spore-forming, gram-positive organisms. Be aware that although the same agents are often used for sterilization and HLD, sterilization may require longer immersion times.

There are several chemicals that can be used for chemical sterilization. These include glutaraldehyde (alone or in combination with phenol), paracetic acid (alone or in combination with hydrogen peroxide), hydrogen peroxide, orthopthaldehyde, chlorine, and ethylene oxide.

36, 37. HLD is a treatment process that eliminates all microorganisms with the exception of some gram-positive spores. These include species of *Bacillus* and *Clostridium*. Instruments that may be treated with chemical HLD are those that are heat-sensitive, and thus cannot be sterilized by autoclave or dry-heat sterilization. HLD differs from chemical sterilization, in which chemical treatment will afford true sterilization.

HLD is appropriate for instruments that will not enter a normally sterile space, such as tissue or blood. Flexible fiberoptic endoscopes may be treated with HLD. Although laparoscopes and arthroscopes do indeed enter sterile spaces, there remains considerable controversy regarding whether or not HLD is sufficient, or if true chemical sterilization is necessary. Thus, HLD is currently acceptable for all endoscopic devices.

It should be emphasized that removable components of endoscopy equipment, such as biopsy forceps, should be treated by sterilization when possible. Other devices appropriate for HLD include gynecologic equipment (such as forceps, specula) and respiratory equipment (such as endotracheal tubes). HLD can be accomplished by chemical or thermal treatment (see pasteurization, question 40). Thorough cleaning is critical before HLD.

38, 39. Several chemicals are acceptable for HLD: glutaraldehyde (alone or in combination with phenol), paracetic acid (alone or in combination with hydrogen peroxide), hydrogen peroxide, orthopthaldehyde, chlorine, and ethylene oxide.

There are some commonly used chemicals that should not be routinely used for HLD. Alcohol (ethanol or isopropyl) is often used for HLD, but it is not active against bacterial endospores and some viruses (coxsackie viruses, echovirus). Iodophors lack activity against gram-positive spores and some fungi, and *Pseudomonas aeruginosa* is known to multiply in iodophor solutions. Formaldehyde is an effective agent for HLD, but it is noxious and potentially carcinogenic; thus it should be used only if other chemicals are unavailable. Equipment should be thoroughly rinsed with sterile water following chemical treatment. If this is not available, then it is acceptable to rinse with distilled or tap water followed by an alcohol rinse.

40–42. Pasteurization is HLD achieved by heat exposure. It is accomplished either by complete immersion of equipment in boiling water or exposing it to steam in a closed setting. This procedure is appropriate for equipment that does not require full sterilization, but will be in contact with mucus membranes. Most respiratory equipment, such as endotracheal tubes and oral airways, may be treated in this way. Drying is critical to prevent microorganisms from growing in residual moisture.

References

EngenderHealth. 2004. Infection Prevention Online Course. http://www.engenderhealth.org/res/onc/index.html#start (accessed July 17, 2006).

Kralovic, R. C. 1993. Use of Biological Indicators Designed for Steam or Ethylene Oxide to Monitor a Liquid Chemical Sterilization Process. *Infection Control and Hospital Epidemiology* 14(6):313–19.

Tietjen, L., D. Bossemeyer, and N. McIntosh. 2003. *Infection Prevention: Guidelines for Healthcare Facilities with Limited Resources*. Baltimore, MD: Jhpiego.

MODULE SCORING SHEET

Name of facility: _____

Name of module: _____

Date completed: _____

Module section	1 Assessment total	2 Possible total	3 Percentage score	4 Rating based on percentage score
Total for module			**%**	

Column notes:

1. Assessment total—sum of points for all marked responses

2. Possible total—sum of all possible points for the question

3. Percent score—(column 1/column 2) × 100

4. Rating—

More than 75% of possible points:	A—recommended practices are followed consistently and thoroughly
50–75% of possible points:	B—recommended practices usually followed
Less than 50% of possible points:	C—training and follow-up needed on recommended practices

SURGICAL ANTIBIOTIC USE AND SURGICAL EQUIPMENT PROCEDURES

This module should be completed by the unit manager of each surgical ward.

For each item, mark the answer that best describes your current situation by putting a tick ✓ inside the brackets [✓]. Note that some questions ask for only one answer, and others ask you to mark all answers that apply. Questions that are intended to provide contextual information only are not scored.

Surgical Procedures

These questions give contextual information about surgical procedures performed in this facility.

1. Which of the following types of surgery are performed in this surgical area? (Mark all that apply)

General Surgery

[ ] No general surgery is performed
[ ] Cholecystectomy
[ ] Hernia repair
[ ] Breast surgery
[ ] Splenectomy
[ ] Bowel surgery
[ ] Prostate surgery

Orthopedic Surgery

[ ] No orthopedic surgery is performed
[ ] Open reduction of fracture
[ ] Amputation

Obstetrics and Gynecology (Ob-Gyn) Surgery

[ ] No ob-gyn surgery is performed
[ ] Cesarean-section (C-section)
[ ] Abdominal hysterectomy
[ ] Vaginal hysterectomy
[ ] Abortion (elective or emergency)

Peri-Operative Antimicrobial Prophylaxis

The following questions focus on peri-operative antibiotic prophylaxis practices, including when and where they are administered, which antibiotics are administered, and the storage and availability of antibiotics in your facility.

2. Are there written policies or guidelines for peri-operative antibiotic prophylaxis for all types of surgery performed in your facility? (Mark one answer)

[ ] No written policies or guidelines
[ ] Policies and guidelines communicated verbally only
[ ]1 Written policies and guidelines available in an operations manual but not generally available for daily practice
[ ]2 Written policies and guidelines in a manual but also posted on walls in clinical or support areas

3. Do the guidelines specify when prophylaxis is to be administered?

[ ] No written policy
[ ] No, policy does not cover timing
[ ]1 Yes

4. Do the guidelines specify where in the facility prophylaxis is to be administered? (Mark one answer)

[ ] No written policy
[ ] No, policy does not cover location
[ ]1 Yes

5. Do the guidelines cover which antibiotic is to be administered? (Mark one answer)

[ ] No written guidelines
[ ] No, guidelines do not cover which antibiotic should be administered
[ ]1 Yes

6. Do the guidelines cover how many doses of the recommended antibiotic are to be administered? (Mark one answer)

[ ] No written guidelines
[ ] No, guidelines do not cover how many doses should be administered
[ ]1 Yes

7. Do the guidelines specify for which types of surgery prophylaxis is to be administered? (Mark one answer)

[ ] No written guidelines
[ ] No, guidelines do not cover how many doses should be administered
[ ]1 Yes

8. Is there a special antibiotic order form or “standing orders” for surgical antibiotic prophylaxis?

[ ] No
[ ]1 Yes

9. Is adherence to the guidelines on antibiotic prophylaxis monitored? (Mark one answer)

[ ] No written guidelines
[ ] No, guidelines do not cover how many doses should be administered
[ ]1 Yes

10. How frequently are antibiotics needed in surgery out of stock in the facility? (Mark one answer)

[ ] Always
[ ] Usually
[ ]1 Sometimes
[ ]2 Never

11. How often must antibiotics for surgical prophylaxis be purchased outside the facility by patients or families? (Mark one answer)

[ ] Always
[ ] Usually
[ ] Sometimes
[ ]2 Never

12. Where are antibiotics for surgical procedures usually stored? (Mark the most common location)

[ ] In the pharmacy
[ ] On the ward
[ ]1 In the pre-operative holding area
[ ]1 In the surgical area

13. Where are antibiotics for surgical procedures usually administered? (Mark the most common location)

[ ] On the ward
[ ]1 In the pre-operative holding area
[ ]1 In the surgical area

14. How long is antibiotic prophylaxis administered before or after the start of a surgical procedure (i.e., when the incision is made)? (Mark the most common time)

[ ] More than one hour before the time the surgical incision is made
[ ]2 Within one hour before the beginning of the surgery or two hours for vancomycin or fluoroquinolones
[ ] After the surgical procedure begins

15. Are prophylactic antibiotics repeated during a long procedure (more than 4–6 hours)?

[ ] No
[ ]1 Yes

16. How is bowel decontamination performed? (Mark all that apply)

[ ] Elective colorectal surgery is not performed
[ ] Bowel decontamination not performed
[ ] Enemas
[ ] Cathartics
[ ]1 Oral antibiotics

Assessment section total: _____ **Possible section total:** 19

Surgical Drains

The following questions cover the placement of surgical drains and bowel decontamination.

17. How are drains placed in surgical incisions?

[ ] Directly through the incision
[ ]1 Through a stab wound separate from the incision

18. Are surgical drains attached to a closed suction system?

[ ] No
[ ]1 Yes

Assessment section total: _____ **Possible section total:** 2

Reprocessing of Surgical Instruments

19. Where are surgical instruments decontaminated, cleaned, and sterilized? (Mark all that apply)

Instruments are decontaminated and cleaned:

[ ]1 In the surgical area
[ ]1 In a central sterilization area
[ ]1 Other (i.e., separate area such as sluice room)

Instruments are sterilized:

[ ] In the surgical area
[ ]1 In a central sterilization area

If surgical instruments are reprocessed in the surgical area, complete all remaining questions in this module. Then complete the appropriate Sterilization and Disinfection modules for this location. The following questions cover procedures for decontaminating and cleaning instruments and equipment.

20. Are surgeons' personal instruments cleaned and sterilized using standard facility methods?

[ ] No
[ ]1 Yes

21. Are gastrointestinal endoscopes decontaminated and cleaned (including all channels and valves) with a detergent prior to sterilization/disinfection? (Mark one answer)

[ ] Gastrointestinal endoscopes are not available
[ ] No
[ ]1 Yes

22. Are bronchoscopes decontaminated and cleaned (including all channels and valves) with a detergent prior to sterilization/disinfection? (Mark one answer) [ ] Bronchoscopes are not available in this facility [ ] No [ ]1 Yes
23. Are the arthroscopes decontaminated and cleaned (including all channels and valves) with a detergent prior to sterilization/disinfection? (Mark one answer) [ ] Arthroscopes are not available in this facility [ ] No [ ]1 Yes
24. If a contaminated critical surgical instrument is needed quickly, what is done? [ ] Not sterilized, disinfected chemically [ ]1 Flash autoclave sterilization
25. If flash sterilization (autoclave) is used, how much time (in minutes) and what temperature (in °C) are used? _____ minutes _____°C

Assessment section total: _____ **Possible section total:** 9

If any of the following equipment is re-used, complete the Sterilization and Disinfection—Equipment and IV Fluids module:

- Anesthesia breathing circuits and masks
- Endotracheal tubes
- Oxygen masks
- Laryngoscope blades

SURGICAL ANTIBIOTIC USE AND SURGICAL EQUIPMENT PROCEDURES ANNOTATIONS

Background

Appropriate, timely use of antibiotic prophylaxis is a critical component of efforts to reduce post-operative infections for many procedures.

Item Notes

2. Ideally, the appropriate use of antimicrobial agents is facilitated through an Antimicrobial Use Committee (or Infection Control Committee). This committee recommends antibiotics for the formulary, establishes prescribing policies, reviews and approves practice guidelines, audits antibiotic use, oversees education, and interacts with pharmaceutical representatives (WHO 2002, 59).

3. On the basis of published evidence, infusion of the first antimicrobial dose should begin within 60 minutes before incision. However, when a fluoroquinolone or vancomycin is indicated, the infusion should begin within 120 minutes before incision because of their pharmacokinetics and the need for slower infusions to prevent antibiotic-associated reactions. Although research has demonstrated that administration of the antimicrobial at the time of anesthesia induction is safe and results in adequate serum and tissue drug levels at the time of incision, there is no consensus that the infusion must be completed before incision. When a proximal tourniquet is required, however, the entire antimicrobial dose should be administered before the tourniquet is inflated (Bratzler et al. 2004).

4. For most procedures, scheduling prophylaxis administration at the time anesthesia is induced ensures adequate concentrations during the period of potential contamination. The exceptions are cesarean procedures, in which the antimicrobial should be administered after cross-clamping the umbilical cord, and colonic procedures, in which oral antimicrobials should be administered starting 19 hours before the scheduled time of surgery (ASHP 1999).

5. Ideally, prophylactic medicines should be directed against the most likely infecting organisms, but need not kill or inactivate all pathogens. For most procedures, an inexpensive, first generation cephalosporin such as cefazolin, which has a moderately long half-life and is active against staphylococci and streptococci, has been effective when given intravenously up to 30 minutes before surgery. Exceptions are for an appendicectomy, where cefoxitin or cefotetan is preferred because they are more active than cefazolin against bowel anaerobic organisms (Tietjen et al. 2003, 23-9).

6. Most studies comparing single-dose prophylaxis with multiple-dose prophylaxis have not shown the benefit of additional doses. Prolonged use of prophylactic antimicrobials is associated with the emergence of resistant bacterial strains. For the majority of operations, guidelines recommend that prophylaxis end within 24 hours after the operation. The single possible guideline exception is antimicrobial prophylaxis for cardiothoracic surgery for which the American Thoracic Society recommends up to 48 hours, and continuing prophylaxis for up to 72 hours after the operation (Bratzler et al. 2004).

7. Prophylactic antimicrobials are not indicated for clean surgical procedures. However, prophylaxis is justified for procedures involving prosthetic placement because of the potential for severe complications if postoperative infections involve the prosthesis. Antimicrobial prophylaxis is justified for the following types of surgical procedures: cardiothoracic, GI tract (e.g., colorectal and biliary tract operations), head and neck (except clean procedures), neurosurgical, obstetric or gynecologic, orthopedic (except clean procedures), urologic, and vascular. The use of antimicrobials for dirty and contaminated procedures is not classified as prophylaxis but as treatment for a presumed infection (ASHP 1999).

8. It is helpful to develop preprinted standing orders for antimicrobial prophylaxis for each surgical division for all operations in which prophylaxis is deemed appropriate. The forms should be developed by a joint committee of surgeons, anesthesiologists, and nurses, with participation of the hospital's surgical area, pharmacy, and therapeutics and infection control committees, and should include recommendations about the usual drug choices (Dellinger et al. 1994).

9. Compliance with the principles of prophylactic antibiotic administration should be reviewed at least annually by the hospital's infection control or quality assurance committee or by another designated body within the hospital (Dellinger et al. 1994).

13, 14. See annotation 3.

15. Current information indicates that additional intraoperative doses of an antimicrobial agent should be given at intervals of one or two times the half-life of the medicine so that adequate levels are maintained throughout the operation (Dellinger et al. 1994).

16. Before elective colorectal operations, in addition to intravenous preoperative antibiotic prophylaxis, the colon should be mechanically prepared by use of enemas and cathartic agents. Nonabsorbable oral antimicrobial agents in divided doses should be administered on the day before the operation (Mangram et al. 1999).

17. Drains placed through an operative incision increase incisional SSI (surgical site infection) risk. Many authorities suggest placing drains through a separate incision distant from the operative incision (Mangram et al. 1999).

18. If drainage is necessary, a closed suction drain should be used and it should be placed through a separate incision distant from the operative incision. The drain should be removed as soon as possible (Mangram et al. 1999).

20. All critical items that enter body cavities, tissues, and vascular system should be sterilized (WHO/AFRO et al. 2001, 114).

21. Decontamination and cleaning of equipment including endoscopes is always essential prior to sterilization or disinfection (WHO/AFRO et al. 2001, 113).

24. The Association for the Advancement of Medical Instrumentation states that "During any operation, the need for emergency (flash) sterilization of equipment may arise (e.g., to reprocess an inadvertently dropped instrument). However, flash sterilization is not intended to be used for either reasons of convenience or as an alternative to purchasing additional instrument sets or to save time" (Mangram et al. 1999).

25. Parameters for flash sterilization cycles are as follows—

- Gravity displacement
  - Minimum exposure time and temperature for nonporous items: 3 minutes at 132 ºC (270 ºF)
  - Minimum exposure time and temperature for nonporous and porous items: 10 minutes at 132 ºC (270 ºF)
- Prevacuum
  - Minimum exposure time and temperature for nonporous items: 3 minutes at 132 ºC (270 ºF)
  - Minimum exposure time and temperature for nonporous and porous items: 4 minutes at 132 ºC (270 ºF) (Mangram et al. 1999)

References

American Society of Hospital Pharmacists (ASHP) Council on Professional Affairs. 1999. ASHP Therapeutic Guidelines on Antimicrobial Prophylaxis in Surgery. *American Journal of Health-System Pharmacy* 56(18):1839–88.

Bratzler, D. W., P. M. Houck, Surgical Infection Prevention Guidelines Writers Workgroup, et al. 2004. Antimicrobial Prophylaxis for Surgery: An Advisory Statement from the National Surgical Infection Prevention Project. *Clinical Infectious Diseases* 38(12):1706–15.

Dellinger, E. P., P. A. Gross, T. R. Barrett, et al. 1994. Quality Standard for Antimicrobial Prophylaxis in Surgical Procedures. *Clinical Infectious Diseases* 18(3):422–27.

Institute for Healthcare Improvement. 100,000 Lives Campaign. http://www.ihi.org/IHI/Programs/Campaign/ (accessed July 17, 2006).

Mangram, A. J., T. C. Horan, M. L. Pearson, et al. 1999. Guideline for Prevention of Surgical Site Infections. *Infection Control and Hospital Epidemiology* 20(4):250–80.

Rutala, W. A., and A. J. Weber. 2004. Disinfection and Sterilization in Health Care Facilities: What Clinicians Need to Know. *Clinical Infectious Diseases* 39(5):702–9.

Tietjen, L., D. Bossemeyer, and N. McIntosh. 2003. *Infection Prevention: Guidelines for Healthcare Facilities with Limited Resources*. Baltimore, MD: Jhpiego.

World Health Organization (WHO). 2002. *Prevention of Hospital-Acquired Infections: A Practical Guide*. 2nd ed. WHO/CDS/CSR/EPH/2002/12. Geneva: WHO.

WHO/Regional Office for Africa, Commonwealth Regional Health Community Secretariat, and East, Central and Southern African College of Nursing. 2001. *Manual of Infection Prevention and Control Policies and Guidelines*. Prepared by U. V. Reid.

MODULE SCORING SHEET

Name of facility: _____

Name of module: _____

Date completed: _____

Module section	1 Assessment total	2 Possible total	3 Percentage score	4 Rating based on percentage score
Total for module			**%**	

Column Notes:

1. Assessment total—sum of points for all marked responses

2. Possible total—sum of all possible points for the question

3. Percent score—(column 1/column 2) × 100

4. Rating—

More than 75% of possible points:	A—recommended practices are followed consistently and thoroughly
50–75% of possible points:	B—recommended practices usually followed
Less than 50% of possible points:	C—training and follow-up needed on recommended practices

SURGICAL AREA PRACTICES

These questions should be completed by the unit manager of the operating theatre.

For each item, mark the answer that best describes your current situation by putting a tick ✓ inside the brackets [✓]. Note that some questions ask for only one answer, and others ask you to mark all answers that apply. Questions that are intended to provide contextual information only are not scored.

What is the name of this surgical area? _____

Preoperative Preparation of the Patient

The following questions focus on patient preoperative procedures such as bathing, hair removal, and antiseptic use.

1. Are there written procedures for general preoperative preparation of nonemergency surgical patients in this surgical area? (Mark one answer) [ ] No written policy or procedures [ ] Policy and procedures communicated verbally only [ ]1 Written policy and procedures available in an operations manual but not generally available for daily practice [ ]2 Written policy and procedures in a manual but also posted on walls in clinical or support areas
2. Is a shower or bath required prior to nonemergency surgery? [ ] No [ ]1 Yes
3. What type of soap or antiseptic is used during shower or bath? (Mark the most commonly used method) [ ] Nonantimicrobial soap [ ] Iodophor [ ]1 Hexachlorophene [ ]1 Chlorhexidine Gluconate
4. When is the shower or bath performed? (Mark the most common time) [ ] Morning of surgery [ ] Shortly before surgery in the preoperative area [ ]1 Night before surgery
5. Is hair removed prior to nonemergency surgery? [ ] Yes [ ]1 No

6. How is hair removed? (Mark the most commonly used method)

[ ] Hair is not removed
[ ] Razor
[ ]1 Depilatory
[ ]1 Clippers
[ ]1 Scissors

7. When is hair removed? (Mark the most common time)

[ ] Hair not removed
[ ] Night before surgery
[ ]1 Morning of surgery
[ ]1 Shortly before surgery in the preoperative area
[ ]1 Immediately before surgery in the theatre

8. Is an antiseptic applied to the skin before surgery?

[ ] No
[ ]1 Yes

9. What antiseptic is used? (Mark the most commonly used method)

[ ] Antiseptic not used
[ ] Chlorhexidine Gluconate without alcohol
[ ] Iodine without alcohol
[ ] Alcohol
[ ] Benzalkonium chloride
[ ]1 Chlorhexidine Gluconate solution containing alcohol
[ ]1 Alcohol/iodine (tincture of iodine)
[ ]1 Iodophor (povidone iodine)

10. When is the antiseptic applied to the skin? (Mark the most common time)

[ ] Antiseptic not used
[ ] Night before surgery
[ ] Morning of surgery
[ ] Shortly before surgery in the preoperative area
[ ]1 Immediately before surgery in the theatre

11. When the antiseptic solution container is empty, what happens? (Mark all that apply)

[ ] Old container cleaned but not disinfected, and refilled
[ ] Old container refilled (topped off) without cleaning or disinfection
[ ]1 Old container cleaned, disinfected, and refilled
[ ]1 New full container provided
[ ]1 Prepacked applicators used and discarded when finished

Assessment section total: _____ **Possible section total:** 14

Preoperative Scrub by Surgical Personnel

These questions cover preoperative preparations by surgical staff, including surgical scrub, use of antiseptics, and availability of equipment.

12. Is there a written standard policy for performing a preoperative surgical scrub? (Mark one answer)

[ ] No written policy or procedures
[ ] Policy and procedures communicated verbally only
[ ]1 Written policy and procedures available in an operations manual but not generally available for daily practice
[ ]2 Written policy and procedures in manual but also posted on walls in clinical or support areas

13. How frequently is there a supply of running water to be used for the surgical scrub? (Mark one answer)

[ ] Never
[ ] Sometimes
[ ]1 Usually
[ ]1 Always

14. How do personnel turn the water supply on and off? (Mark one answer)

[ ] Hand-operated faucet handle
[ ]1 Elbow-operated faucet handles
[ ]1 Foot control or leg/knee lever
[ ]1 Automatic sensor control (electronic)

15. How frequently do surgical personnel use an antiseptic for preoperative surgical scrub? (Mark one answer)

[ ] Never
[ ] Sometimes
[ ] Usually
[ ]1 Always

16. Which antiseptics are used? (Mark the most commonly used)

[ ] No antiseptic used
[ ] Chlorhexidine gluconate without alcohol
[ ] Iodine without alcohol
[ ] Benzalkonium chloride
[ ] Alcohol
[ ]1 Chlorhexidine gluconate solution containing alcohol
[ ]1 Tincture of iodine (with alcohol)
[ ]1 Iodophor (povidone iodine)

17. What is the recommended duration of surgical scrub?

[ ] 6–10 minutes with a hard brush
[ ]1 At least 2 minutes with a soft brush or sponge

18. When the antiseptic solution container is empty, what happens? (Mark all that apply)

[ ] Containers not used
[ ] Old container cleaned but not disinfected and refilled
[ ] Old container refilled (topped off) without cleaning or disinfection
[ ]1 Old container cleaned, disinfected, and refilled
[ ]1 New full container provided

19. Are brushes disposable (single use) or reusable? (Mark all that apply)

[ ] Brushes not used
[ ] Single use not containing soap or antiseptic
[ ] Reusable used multiple times before sterilization
[ ]1 Single use containing soap or antiseptic
[ ]1 Reusable (sterilized after each use)

20. How do personnel dry their hands after the preoperative surgical scrub? (Mark all that apply)

[ ] No method for drying hands available
[ ] Multiple-use, non-sterile, clean cloth towel
[ ] Single-use cloth towel (non-sterile)
[ ]1 Single-use sterile towel
[ ]1 Paper towels

Assessment section total: _____ **Possible section total:** 13

Barrier Precautions Used by Surgical Personnel

The following questions cover protective precautions by surgical personnel and glove use in surgery.

21. Please indicate the barrier precautions that are usually used by surgical personnel in this area during surgery. (Mark all that apply)

[ ] Shoe covers (e.g., booties)
[ ]1 Sterile gloves
[ ]1 Face shields or eye goggles when blood splashing is possible
[ ]1 Masks
[ ]1 Cloth gowns
[ ]1 Fluid-proof gowns
[ ]1 Caps
[ ]1 Fluid-proof shoes when extensive bleeding outside of the operative field is possible

22. Is facial hair allowed on surgical personnel, such as beard or mustache?

[ ] Yes
[ ]1 No

23. If gloves are contaminated during surgery (e.g., contamination by ungloved hand when putting on glove, touching a contaminated surface), are gloves routinely changed?

[ ] No
[ ]1 Yes

24. Are double gloves used for any surgeries?

[ ] No
[ ]1 Yes

Assessment section total: _____ **Possible section total:** 10

Cleaning of Surgical Area

These questions provide information on surgical area hygiene.

25. Is there a written policy for general hygiene and cleaning of surfaces, walls, floors, toilets, clothing, and general equipment in this surgical area?

[ ] No written policy or procedures
[ ] Policy and procedures communicated verbally only
[ ]1 Written policy and procedures available in an operations manual but not generally available for daily practice
[ ]2 Written policy and procedures in manual but also posted on walls in clinical or support areas

26. Does the written policy cover processes for decontaminating areas contaminated by spillage?

[ ] No
[ ]1 Yes

27. What procedure is followed for contaminated surgeries (e.g., drainage of an appendiceal abscess)? (Mark the answer that best describes usual practice)

[ ] No special procedures are used
[ ]1 A separate operating room is used
[ ]1 Contaminated surgery is scheduled at the end of the day

28. How often are environmental cultures done in this area? (Mark one answer)

[ ]1 Cultures are never done
[ ] Once a year
[ ] Once a month
[ ] Once a week
[ ] Every day

Assessment section total: _____ **Possible section total:** 5

Surgical Area Ventilation

The following questions on surgical area ventilation provide information on windows, screens, air pressure, and air conditioning.

29. What type of ventilation system is in this surgical area?

[ ] No windows in surgical area
[ ] Windows
[ ]1 Windows with screens
[ ]1 Central ventilation

30. Are there screens on the windows?

[ ] No windows in the area
[ ] No screens
[ ]1 Yes

31. Is there a central ventilation system in this surgical area? If yes, skip 32 and 33.

[ ] No
[ ]1 Yes

32. How does the air enter this area?

[ ] Enters low (near the floor)
[ ]1 Enters high (near the ceiling)

33. How does the air leave this area?

[ ]1 Leaves high (near the ceiling)
[ ] Leaves low (near the floor)

34. How would you characterize the pressure in this area relative to the corridor? (Mark one answer)

[ ] Cannot determine
[ ] Negative pressure
[ ] Neutral pressure
[ ]1 Positive pressure

35. Has the number of air exchanges per hour been verified by direct measurement during the last year?

[ ] No
[ ]1 Yes

36. Are there individual air conditioners in this area? (If no, go to question 39)

[ ] No
[ ] Yes

37. How often are the filters for the individual air conditioners in this area cleaned? (Mark one answer)

[ ] Not cleaned
[ ]1 Once a year or less

38. How often are the filters for the air conditioners replaced? (Mark one answer)

[ ] Not changed
[ ]1 Once a year or less

Assessment section total: _____ **Possible section total*:** 10

* The maximum possible total will vary depending on skip pattern.

Surgical Area Traffic

The following questions focus on traffic including personnel and supplies to and from surgical areas.

39. Are there written policies indicating open and restricted areas for traffic (personnel entering and leaving) in this area?

[ ] No written policy or procedures
[ ] Policy and procedures communicated verbally only
[ ]1 Written policy and procedures available in an operations manual but not generally available for daily practice
[ ]2 Written policy and procedures in a manual but also posted on walls in clinical or support areas

40. How are supplies transported to this surgical area from outside the area? (Mark one answer)

[ ] Open containers
[ ]1 Usually closed containers
[ ]1 Usually containers on covered carts

41. How are contaminated supplies from this area transported for disposal or reprocessing? (Mark one answer)

[ ] Open containers
[ ]1 Usually closed containers
[ ]1 Usually containers on covered carts

Assessment section total: _____ **Possible section total:** 4

Surgical Area Attire

The following questions ask for information about surgical attire for personnel.

42. Is surgical attire worn outside this area?

[ ] Yes
[ ]1 No

43. Is attire changed before reentering this surgical area?

[ ] No
[ ]1 Yes

44. Are there tacky mats to “decontaminate” shoes on entry to this surgical area?

[ ] Yes
[ ]1 No

45. Are the personnel required to wear special shoes in this area?

[ ]1 Yes
[ ] No

Assessment section total: _____ **Possible section total:** 4

SURGICAL AREA PRACTICES ANNOTATIONS

Background

Despite improvements in surgical area practices, instrument sterilization methods, surgical technique, and the best efforts of infection prevention practitioners, surgical site infections (SSI) remain a major cause of nosocomial infections and rates are increasing globally. Moreover, in countries where resources are limited, even basic lifesaving operations such as appendectomies and cesarean sections are associated with high infection-rates and mortality. To reduce the risk of nosocomial SSIs in developing countries, a systematic but realistic approach must be applied, with awareness that this risk is influenced by the characteristics of the patient, the operation, the health care staff, and the hospital. In theory, reducing the risk is relatively simple and inexpensive, especially when compared to the cost of the infections themselves, but in practice it requires commitment at all levels of the health care system (Tietjen et al. 2003, 23-1).

Item Notes

1. A nosocomial infection prevention manual, comprising recommended instructions and practices for patient care, is an important tool. The manual should be developed and updated by the infection control team, with review and approval by the Infection Control Committee. It must be made readily available for patient care staff and updated in a timely fashion. A systematic program for prevention of SSI includes the practice of optimal surgical technique, a clean surgical area environment with restricted staff entry, appropriate staff attire, sterile equipment, adequate preoperative preparation of the patient, appropriate use of peri-operative antimicrobial prophylaxis, and a surgical wound surveillance program (WHO 2002, 10, 39–40).

2–4. It is recommended that patients shower or bathe with an antiseptic agent the night before surgery. A preoperative antiseptic shower or bath decreases skin microbial colony counts. In a study of more than 700 patients who received two preoperative antiseptic showers, chlorhexidine reduced bacterial colony counts 9-fold, whereas povidone-iodine or triclocarban-medicated soap reduced colony counts by 1.3- and 1.9-fold, respectively. Other studies corroborate these findings (Mangram 1999).

5–7. Hair should not be removed preoperatively unless the hair at or around the incision site will interfere with the operation. If hair is removed, do so immediately before the operation, preferably with electric clippers (Mangram 1999).

8–10. An appropriate antiseptic agent should be used for skin preparation. Preoperative antiseptic skin preparation should be applied in concentric circles moving toward the periphery. The prepared area must be large enough to extend the incision or create new incisions or drain sites, if necessary. Several antiseptic agents are available for preoperative preparation of skin at the incision site. The iodophors (e.g., povidone-iodine), alcohol-containing products, and chlorhexidine gluconate are the most commonly used agents (Mangram 1999).

11. Disposable containers are preferred for liquid products. Reusable containers should be thoroughly washed and dried before refilling, and routine maintenance schedules should be followed and documented (WHO 2002, 33).

13, 14. Optimal hand hygiene requirements for surgical scrub include running water and large, low-maintenance washbasins with antisplash device and hands-free controls (WHO 2002, 31).

15–17. The warm, moist conditions inside surgical gloves provide an ideal environment for the rapid growth of microorganisms. Scrubbing with antiseptics before beginning surgical procedures will help prevent this rapid growth of microorganisms for a period of time and will reduce the risk of infections to the client if the gloves develop holes, tears, or nicks during the procedure. Antiseptic agents are used in surgical scrub because they inhibit the growth and development of microorganisms and are safe for use on the skin. A three- to five-minute (at least two minutes) surgical scrub with a soft brush and an antiseptic (such as chlorhexidine or an iodophor) and running water is recommended before a surgical procedure (EngenderHealth, "Surgical Scrub and Surgical Attire" module).

19. If a brush is used, it should be cleaned and either sterilized or high-level disinfected before reuse; sponges, if used, should be discarded (Tietjen et al. 2003, 3-8).

20. Use a separate sterile or clean cloth towel for each hand to wipe from the fingertips to the elbow and then discard the towel. Use a hot air dryer if available (Tietjen et al. 2003, A-3).

21. Operating staff must wear sterile gloves. All persons entering the surgical area must wear surgical attire (scrub suits). All head and facial hair, including sideburns and neckline, must be covered (although facial hair is not a recommended practice). Full coverage of the mouth and nose area with a surgical mask is required for everyone entering the operating suite. Sterile gowns must be worn by all personnel participating directly in the operation. Waterproof gowns or aprons should be worn for procedures at high risk of contamination (WHO 2002, 40).

23. If the integrity of a glove is compromised (e.g., punctured), it should be changed as promptly as safety permits (Mangram 1999).

24. Wearing two pairs of gloves (double-gloving) has been shown to reduce hand contact with patients' blood and body fluids compared to wearing only a single pair. The following are reasonable guidelines for when to double glove (Tietjen et al. 2003, 7-7)—

- The procedure involves coming in contact with large amounts of blood or other body fluids (e.g., vaginal deliveries and cesarean sections)

- Orthopedic procedures in which sharp bone fragments, wire sutures, and other sharps are likely to be encountered

- Surgical gloves are being reused (the possibility of unapparent holes or perforations in any type of reprocessed glove is higher than with new gloves)

Double gloving is also recommended when operating on patients known to be infected with blood-borne pathogens such as HIV, hepatitis B, or hepatitis C. Gloves should be changed immediately after any accidental puncture (WHO 2002, 40).

25. Airborne bacteria must be minimized, and surfaces kept clean. A recommended schedule for cleaning and disinfection of surgical areas is—

- Every morning, before any intervention, clean all horizontal surfaces
- Between procedures, clean and disinfect horizontal surfaces and all surgical items (e.g., tables, buckets)
- At the end of the working day, completely clean the surgical area by using a recommended disinfectant cleaner
- Once a week, completely clean the operating room area, including all annexes such as dressing rooms, technical rooms, and cupboards (WHO 2002, 40).

26. Spills of blood, body fluids, and other potentially infectious fluids should be cleaned up immediately. For small spills, wear utility or examination gloves, remove visible material using a cloth soaked in a 0.5 percent chlorine solution, and then wipe clean with a disinfectant cleaning solution. For large spills, wear gloves, flood the area with a 0.5 percent chlorine solution, mop up the solution, and then clean as usual with detergent and water (Tietjen et al. 2003, 16-9).

29–35, 39.Maintain positive-pressure ventilation in the area with respect to the corridors and adjacent areas. Maintain a minimum of 15 air changes per hour, of which at least 3 should be fresh air. Filter all air, recirculated and fresh, through the appropriate filters; introduce all air at the ceiling, and exhaust near the floor. To prevent SSI, do not use UV radiation in the surgical area. Keep operating room doors closed except as needed for passage of equipment, personnel, and the patient. Consider performing orthopedic implant operations in surgical areas supplied with ultraclean air. Limit access to the operating room only to necessary personnel (Mangram 1999).

40, 41. In the context of traffic flow, rather than considering a “clean” and a “dirty” circuit, consider only circuits where the different flows can cross without risk, provided material is properly protected. Both sterile products and waste must be sealed in safe containers, and the outside of those containers must present no risk of biological contamination (WHO 2002, 47–48).

References

EngenderHealth. 2004. Infection Prevention Online Course. http://www.engenderhealth.org/res/onc/index.html#start (accessed July 17, 2006).

Mangram, A. J., T. C. Horan, M. L. Pearson, et al. 1999. Guideline for Prevention of Surgical Site Infections. *Infection Control and Hospital Epidemiology* 20(4):250–80.

Tietjen, L., D. Bossemeyer, and N. McIntosh. 2003. *Infection Prevention: Guidelines for Healthcare Facilities with Limited Resources*. Baltimore, MD: Jhpiego.

World Health Organization (WHO). 2002. *Prevention of Hospital-Acquired Infections: A Practical Guide*. 2nd ed. WHO/CDS/CSR/EPH/2002/12. Geneva: WHO.

MODULE SCORING SHEET

Name of facility: _____

Name of module: _____

Date completed: _____

Module section	1 Assessment total	2 Possible total	3 Percentage score	4 Rating based on percentage score
Total for module			**%**	

Column notes:

1. Assessment total—sum of points for all marked responses

2. Possible total—sum of all possible points for the question

3. Percent score—(column 1/column 2) × 100

4. Rating—

More than 75% of possible points:	A—recommended practices are followed consistently and thoroughly
50–75% of possible points:	B—recommended practices usually followed
Less than 50% of possible points:	C—training and follow-up needed on recommended practices

TRANSPLANT UNIT

These questions should be completed in consultation with the chief specialist or senior sister of the transplant unit.

For each item, mark the answer that best describes your current situation by putting a tick ✓ inside the brackets [✓]. Note that all questions ask for only one answer. Questions that are intended to provide contextual information only are not scored.

Prevention of Airborne Infections

1. Are all health care personnel who are in close contact with the patient immunized with the influenza vaccine? If no, skip to question 3. [ ] No [ ]1 Yes
2. Are dedicated staff appointed to supervise the above process? [ ] No [ ]1 Yes
3. Are health personnel regularly evaluated for symptoms of respiratory infection? [ ] No [ ]1 Yes
4. Are posters strategically positioned to warn visitors of the restrictions related to respiratory infection symptoms? If no, skip to question 6. [ ] No [ ]1 Yes
5. Is there active monitoring of the above precautions to prevent airborne infections? [ ] No [ ]1 Yes
6. Are fresh or dried flowers or potted plants allowed in patient-care areas? [ ]1 No [ ] Yes
7. When dust-generating activities are ongoing in the facility, are high-efficiency respiratory-protection devices (e.g., N95 respirators) used by transplant patients when they leave their rooms? [ ] No [ ]1 Yes

Assessment section total: _____ **Possible section total:** 7

Performance Measurements

8. Is there daily monitoring of positive airflow in the rooms occupied by patients? [ ] No [ ]1 Yes
9. Is there documented evidence of infection-control personnel being actively involved in all phases of a health care facility's demolition, construction, and renovation? [ ] No [ ]1 Yes
10. Is there a documented policy in place to identify and respond to water damage? [ ] No [ ]1 Yes
11(a). Are dedicated infection control personnel/microbiologists assigned to review clinicians' use of laboratory diagnostic tests (culture of appropriate respiratory specimen and the urine antigen test) for legionellosis? If no, skip question 11(b). [ ] No [ ]1 Yes
11(b). If yes, are clinicians provided with feedback on the use of these tests? [ ] No [ ]1 Yes

Assessment section total: _____ **Possible section total:** _5_____

Staffing

12. What is the staff to patient ratio? [ ]1 1 to 1 [ ] 1 to 2 or more
13. Are staff nurses adequately trained to recognize signs and symptoms of infection? [ ] No [ ]1 Yes
14. Is there close supervision of new and inexperienced staff? [ ] No [ ]1 Yes
15. Is staff competency regularly assessed? [ ] No [ ]1 Yes

Assessment section total: _____ **Possible section total:** _4_____

Audits and Policies

16. Are policies and practices regularly reviewed and changed according to the latest recommendations and standards?

[ ] No
[ ]1 Yes

17. How often are internal audits with corrective action plans carried out?

[ ] Not at all
[ ]3 Monthly
[ ]2 Quarterly
[ ]1 Annually

Assessment section total: _____ **Possible section total: 4**

Checklist of Additional Modules to be Completed for the Transplant Unit

- ☐ Hand Hygiene
- ☐ Injections
- ☐ Intravenous Catheters
- ☐ Intravenous Fluids and Medications
- ☐ Isolation and Standard Precautions
- ☐ Sterilization and Disinfection (if instruments and equipment are disinfected or sterilized in this unit)
- ☐ Urinary Catheters
- ☐ Occupational Health
  - Employee exposures
  - Control of sharp instruments
  - Employee health records

TRANSPLANT UNIT ANNOTATIONS

Item Notes

1. Inactivated influenza vaccine or live attenuated influenza vaccine may be used to vaccinate most health care personnel (CDC 2007). **Inactivated influenza vaccine** may be used for all health care personnel and is preferred for vaccinating health care personnel who have close contact with severely immunosuppressed persons (e.g., patients with hematopoietic stem cell transplants) during those periods in which the immunosuppressed person requires care in a protective environment.

3. Evaluate health care personnel, especially those in high-risk areas (e.g., intensive care units, nurseries, and organ transplant units), for symptoms of respiratory infection and perform rapid influenza tests to confirm that the causative agent is influenza and to determine whether personnel should be removed from duties that involve direct patient contact. Staff members who have been removed from duty should not provide patient care for five days following the onset of symptoms (CDC 2007).

6. Do not allow fresh flowers, dried flowers, or potted plants in patient-care areas for immunosuppressed patients (CDC 2003).

7. For prevention of health care-associated aspergillosis, the revised recommendations include the use of high-efficiency respiratory-protection devices (e.g., N95 respirators) by severely immunocompromised patients when they leave their rooms and dust-generating activities are ongoing in the facility (CDC 2004).

9. Document whether infection-control personnel are actively involved in all phases of a health care facility's demolition, construction, and renovation. Activities should include performing a risk assessment of the necessary types of construction barriers and daily monitoring and documenting of the presence of negative airflow within the construction zone or renovation area (CDC 2003).

10. Document policies to identify and respond to water damage. Such policies should result in repair and drying of wet structural or porous materials within 72 hours or removal of the wet material if drying is unlikely within 72 hours (CDC 2003).

11. Periodically review clinicians’ use of laboratory diagnostic tests (culture of appropriate respiratory specimen and the urine antigen test) for legionellosis, especially in patients who are at high risk for acquiring the disease (e.g., patients who are immunosuppressed, including recipients of hematopoietic stem cell transplantation or solid-organ transplant; patients receiving systemic steroids; patients over the age of 65; or patients who have chronic underlying disease, such as diabetes mellitus, congestive heart failure, or chronic obstructive pulmonary disease). Provide feedback on the use of these tests to clinicians (CDC 2004).

References

US Centers for Disease Control and Prevention (CDC). 2007. *Infection Control Guidance for the Prevention and Control of Influenza in Acute-Care Facilities.* Atlanta, GA: U.S. Department of Health and Human Services, CDC. http://www.cdc.gov/flu/professionals/infectioncontrol/health-carefacilities.htm (accessed January 29, 2009).

CDC. 2004. Guidelines for Preventing Health-Care–Associated Pneumonia, 2003. *MMWR Recommendations and Reports* 2004;53(No. RR-3).

CDC. 2003. Guidelines for Environmental Infection Control in Health-Care Facilities: Recommendations of CDC and the Healthcare Infection Control Practices Advisory Committee. *MMWR Recommendations and Reports* 2003; 52(No. RR-10);1–42.

MODULE SCORING SHEET

Name of facility: _____

Name of module: _____

Date completed: _____

Module section	1 Assessment total	2 Possible total	3 Percentage score	4 Rating based on percentage score
Total for module			**%**	

Column notes:

1. Assessment total—sum of points for all marked responses

2. Possible total—sum of all possible points for the question

3. Percent score—(column 1/column 2) × 100

4. Rating—

More than 75% of possible points: A—recommended practices are followed consistently and thoroughly

50–75% of possible points: B—recommended practices usually followed

Less than 50% of possible points: C—training and follow-up needed on recommended practices

PRECAUTIONS FOR TUBERCULOSIS

This module should be completed by the tuberculosis (TB) coordinator or sister in charge of the medical/TB ward.

For each item, mark the answer that best describes your current situation by putting a tick ✓ inside the brackets [✓]. Note that some questions ask for only one answer, and others ask you to mark all answers that apply. Questions that are intended to provide contextual information only are not scored.

Work Practice and Administrative Controls

The following questions focus on your facility's policies and practices for isolating TB suspects and patients to reduce risk of exposure to TB.

1. Is the national infection prevention and control policy for TB, multidrug-resistant TB (MDR-TB), and extensively drug-resistant TB (XDR-TB) available in your facility?

[ ] No
[ ]2 Yes

2. Does your facility have a formal written policy for TB infection control?

[ ] No written policy or procedures
[ ] Policy and procedures communicated verbally only
[ ]1 Written policy and procedures available in an operations manual but not generally available for daily practice
[ ]2 Written policy and procedures in a manual but also relevant posters or pamphlets posted on walls in clinical or support areas

3. Is there a written TB infection control plan?

[ ] No
[ ]2 Yes

4. What is the turnaround time for TB microscopy (acid-fast bacilli [AFB] smear results)?

[ ]2 48 hours
[ ] More than 48 hours

5. Are airborne isolation precautions clearly displayed on walls in clinical or support areas? (Mark one answer)

[ ]2 Airborne precautions are clearly displayed in all clinical or support areas
[ ]1 Airborne precautions are clearly displayed in some but not all clinical or support areas
[ ] Airborne precautions are not clearly displayed in any area

6. Do your facility's airborne precautions/guidelines include clear instructions about the following? (Mark all that apply)

[ ]1 Transporting isolated patients to other locations in facility (e.g., radiology unit)
[ ]1 Placing patients in private or specific rooms according to their resistance pattern (cohorting)
[ ]1 Always keeping the isolation room doors closed
[ ]1 Use of N95 respirators by all persons entering the isolation area
[ ]1 Limiting movement of infectious patients from isolation area to essential purposes only
[ ]1 Providing surgical masks to infectious patients who are coughing or are required to be transported from isolation to the essential services
[ ]1 Open window policy

Assessment section total: _____ **Possible section total:** 17

Screening and Triaging/Precautions for TB

The following questions cover practices in your facility for ensuring prompt recognition, separation, and isolation of TB cases and suspects; methods for screening patients pre- and post-admission for TB; and the types of TB screening tests used.

7. Which of the following describe your facility's efforts to ensure prompt recognition, separation, and isolation of cases and suspects? (Mark all that apply)

[ ] None
[ ]1 Cough counselors/marshals/officers operate in areas where queues are more likely (e.g., outpatient department)
[ ]1 Cough counselors provide health education to identified cases and suspects in cough hygiene
[ ]1 Counselors provide tissues and/or surgical masks to suspects
[ ]1 Counselors fast track the patient to required service
[ ]1 Suspects are separated from the rest of the patients as soon as they have been identified
[ ]1 Suspects and cases are directed to wait in well-ventilated areas
[ ]1 Suspects and cases are referred for immediate TB testing

8. Is there a written policy for screening patients for possible TB prior to admission to the facility (e.g., before they are allowed into a waiting room, emergency department, or holding area)? (Mark one answer)

[ ] No written policy or procedures
[ ] Policy and procedures communicated verbally only
[ ]1 Written policy and procedures available in an operations manual but not generally available for daily practice
[ ]2 Written policy and procedures in a manual but also posted on walls in clinical or support areas

9. Is there a written policy for screening patients for possible TB when they are admitted to the facility? (Mark one answer)

[ ] No written policy or procedures
[ ] Policy and procedures communicated verbally only
[ ]1 Written policy and procedures available in an operations manual but not generally available for daily practice
[ ]2 Written policy and procedures in a manual but also posted on walls in clinical or support areas

10. Which methods are used for screening patients either prior to or upon admission to the facility? (Mark all that apply)

[ ] No specific methods used for screening
[ ]1 Symptoms (specify which ones): _____
[ ]2 AFB smears performed in facility less than 12 hours after admission
[ ]1 AFB smears performed in facility more than 12 hours after admission
[ ]1 AFB smears performed outside of facility
[ ]1 Chest radiograph
[ ]1 Polymerase chain reaction or other genomic test

11. Is sputum induction (stimulated coughing) performed in the facility (including outpatient department)?

[ ] No
[ ] Yes

Skip the Next Question if Sputum Induction is Not Performed

12. Where is the sputum induction procedure usually performed? (Mark all that apply)

[ ] No special area designated
[ ] In a secluded area in the outpatient department or ward
[ ] In a room or portable enclosure with no special air handling
[ ]1 In a room or portable enclosure with special air handling
[ ]1 In a room or portable enclosure with an ultraviolet (UV) light barrier at the door
[ ]1 In a room or portable enclosure with mechanical air exhaust to the outside
[ ]1 Outdoors

Assessment section total: _____ **Possible section total:** 22

Isolation Practices

The following questions address practices in your facility for isolating TB suspects and patients.

13. Are TB suspects and patients usually placed on special isolation precautions?

[ ] No
[ ]1 Yes

14. Where are TB suspects and patients usually isolated? (Mark all that apply)

[ ] TB suspects and patients are not isolated
[ ]1 In a secluded area of a general ward
[ ]2 In a separate single-bed room
[ ]1 In a separate room in which other patients with the same sensitivity profile are cared for
[ ]1 In a separate ward or building reserved for patients with TB

15. How long are TB patients and suspects isolated (Mark all that apply)

[ ] Until 3 consecutive negative sputum smear results have been obtained on 3 separate days with at least 1 specimen taken in the morning
[ ] Until the patient shows maintained clinical improvement
[ ] Until the cough has been resolved
[ ]2 All of the above
[ ] TB patients and suspects are not isolated
[ ] For 24 hours after treatment initiation
[ ] For 48 hours after treatment initiation

16. How often are the number of isolation rooms and/or the capacity of the airborne diseases ward sufficient for the number of patients requiring isolation? (Mark one answer)

[ ] Patients with other airborne diseases are not isolated
[ ] Never
[ ] Sometimes
[ ]1 Usually
[ ]2 Always

17. Who is responsible for placing a patient on isolation precautions? (Mark one answer)

[ ] There is no formal policy for whom should place a patient on isolation precautions
[ ] Only doctors
[ ]1 Doctor
[ ]1 Nurse

18. When TB patients are not isolated, which of the following best describes the ventilation of the ward on which they are placed? (Mark one answer)

[ ] No special ventilation
[ ] Window ventilation that allows fresh (outside) air to enter the room in some seasons only
[ ] UV lights without extractor fans
[ ]2 Natural window ventilation that allows fresh (outside) air to enter the room in all seasons
[ ]1 Negative pressure room fixtures
[ ]1 Room fans that circulate air in the ward
[ ]1 Extractor fans that draw air out of the ward
[ ]1 Ceiling mounted ultraviolet germicidal irradiation lights, shielded from direct eye sight, used in conjunction with extractor fans that encourage circulation of air to the level of the light
[ ]1 Air conditioning with high efficiency particulate air filters

19. Are up-to-date records of regular monitoring of the environmental controls in place?

[ ] No
[ ]1 Yes

20. Are up-to-date records of regular maintenance of the environmental controls in place?

[ ] No
[ ]1 Yes

21. If pulmonary TB is suspected, but not yet confirmed by a diagnostic test, is the patient isolated or placed on special precautions to prevent spread to other patients?

[ ] No
[ ]2 Yes

22. If pulmonary TB is documented by a diagnostic test, is the patient isolated or placed on special precautions to prevent spread to other patients?

[ ] No
[ ]2 Yes

23. When TB patients are isolated, which of the following best describes the ventilation in this isolation area? (Mark one answer)

[ ] TB patients are not isolated
[ ] No special ventilation in isolation area
[ ] Room fans that circulate air within the room/ward/building
[ ] Window ventilation that allows fresh (outside) air to enter the room in some seasons only
[ ] Window ventilation that allows fresh (outside) air to enter the room in all seasons
[ ]1 Window or through-wall fan blowing air outdoors
[ ]2 Mechanical ventilation designed to keep the room/ward at negative pressure with respect to the corridor, rest of ward, or building

24. When TB patients are placed in isolation, does the room or ward have the following? (Mark all that apply)

[ ] TB patients are not isolated
[ ]1 An anteroom
[ ]1 A dedicated toilet or latrine
[ ]1 UV light barrier in the doorway

Assessment section total: _____ **Possible section total:** 24

Health Worker Protection

The following questions focus on measures taken by your facility to protect health workers from TB, MDR-TB, and XDR-TB exposure and infection.

25. Which of the following statements are true for your facility's health worker protection program for TB? (Mark all that apply)

[ ]1 There is a documented disease-monitoring program for protecting health care workers against TB
[ ] There is no specific documented disease-monitoring program for protecting health care workers against TB
[ ]1 Risk assessment for TB has been conducted to identify the categories of risk in all areas
[ ]1 The health care workers in all the sections have been informed about the category of risk they are exposed to
[ ]1 There are records of ongoing education and training on transmission and pathogenesis of TB and the consequences of MDR-TB and XDR-TB
[ ]1 Free HIV voluntary counseling and testing is available on site for health care workers
[ ]1 There are up-to-date quarterly records of weight for health care workers allocated in high-risk areas
[ ]1 There are up-to-date quarterly records of health status assessments (or completed questionnaires) for health care workers allocated in high-risk areas
[ ]1 There are up-to-date annual records of chest x-ray results for health care workers allocated in high-risk areas
[ ]1 Every health care worker has a confidential disease-monitoring file in which screening procedures and all other related information is recorded
[ ]1 Every health care worker has baseline records (including chest X-ray) of investigations related to occupational diseases
[ ]1 Post-exposure monitoring is conducted for health care workers who have been exposed for two or more hours to aerosolized MDR-TB or XDR-TB infected material (e.g., in bronchoscopy or autopsy rooms)
[ ]1 Health care workers are encouraged to disclose their TB or HIV status for proper placement

Assessment section total: _____ **Possible section total:** 12

Supplies for Isolation Precautions

This question seeks information on supplies available for isolation precautions related to TB.

26. Which of the following items needed for isolation precautions are usually available in adequate supply? (Mark all that apply)

[ ]1 Standard surgical masks
[ ]1 Special respirator masks (such as N95)
[ ]1 Tissues

Assessment section total: _____ **Possible section total:** 3

TUBERCULOSIS PRECAUTIONS ANNOTATIONS

Background

Drug-susceptible TB, MDR-TB, and XDR-TB can be spread from person to person through airborne transmission. The high incidence and prevalence of TB fueled by the HIV/AIDS epidemic and its mode of spread create a significant health hazard, especially in health care settings.

People living with HIV are particularly vulnerable to TB, and they constitute a very significant population of health care users and health care workers. Effort must be taken to avoid contact between HIV-positive persons and those with active TB. HIV increases the chance of relapse in previously treated TB patients. This makes TB infection prevention and control practices (IPC) very critical to every health care setting. Early detection, diagnosis, adequate treatment, and prevention of TB must be prioritized.

Item Notes

1. The national TB infection control guidelines are the primary reference source for TB infection control in South African health care facilities.

2. Each health care facility must have an infection control file, which includes a TB infection prevention and control policy.

3. The South African national TB infection control guidelines prescribe that each health care facility must have a TB IPC plan that outlines a protocol for prompt recognition and separation of patients with suspected or confirmed TB, initiation of treatment, TB investigation, and patient referral.

4. Reduction in turnaround time for detection and identification of *Mycobacterium tuberculosis* from pulmonary specimens plays a very important role in limiting exposure of health care users and health care workers to TB.

5, 6. Airborne precautions are used for patients known or suspected to be infected with epidemiologically important pathogens that can be transmitted by air (e.g., TB, chickenpox, measles). The following conditions are ideal: an individual room with adequate ventilation, including, where possible, negative pressure, closed door, at least six air exchanges per hour, exhaust to the outside away from intake ducts, staff wearing high efficiency masks in the room, and isolation of patient in the room (WHO 2002, 45). When a private room is not available, place the patient in a room with a patient who has an active infection with the same microorganism but no other infection, unless otherwise recommended (CDC 1996).

7, 8, 9, 10. Health care users must be screened immediately upon arrival to a health care facility to minimize exposure of other health care users and workers to TB. Health care users who have had a cough for more than two weeks, or who report being under investigation or treatment for TB, should not be allowed to wait in the line with other users.

11, 12. Sputum collection and sputum induction are high-risk procedures for TB transmission. Sputum collection from patients who are expectorating should preferably be done in outdoor settings. Sputum induction done on patients who are not expectorating must be done in an enclosure or chamber with sufficient mechanical environmental controls. Health care workers performing sputum induction must adhere to infection control practices required for airborne transmission.

13–17, 21–24. Isolation precautions for airborne transmission must be implemented for TB suspects and cases. The isolation precautions must continue until three consecutive negative sputum smear results have been obtained on three separate days with at least one specimen taken in the morning. Suspects must be isolated from confirmed cases. Patients with identical susceptibility patterns may be cohorted.

18–20. Natural ventilation is recommended if it is adequate (at least nine air changes per hour). Environmental controls are used to reduce the concentration of droplet nuclei in the air, thereby reducing the possibility of TB transmission. Environmental control measures can not be sufficient on their own for prevention of TB transmission.

The environmental controls must always be used in conjunction with administrative controls and personal respiratory protection. The efficiency and maintenance of environmental controls must be monitored regularly.

25. The national TB infection control guidelines specify actions that must be taken to protect health care workers and staff. These include increasing awareness of health care workers and staff, increasing access to voluntary HIV counseling, and implementing a personal respiratory protection program.

References

US Centers for Disease Control and Prevention (CDC). 1994. Guidelines for Preventing the Transmission of Mycobacterium Tuberculosis in Healthcare Facilities. *MMWR* 1994;43(No. RR-13):1–131.

CDC. 1996. Guideline for Isolation Precautions in Hospitals. Part II. Recommendations for Isolation Precautions in Hospitals. Hospital Infection Control Practices Advisory Committee. *American Journal of Infection Control* 24(1):32–52.

National Department of Health, South Africa. 2007. *National TB Infection Control Guidelines.*

Tietjen, L., D. Bossemeyer, and N. McIntosh. 2003. *Infection Prevention: Guidelines for Healthcare Facilities with Limited Resources*. Baltimore, MD: Jhpiego.

World Health Organization (WHO). 2002. *Prevention of Hospital-Acquired Infections: A Practical Guide*. 2nd ed. WHO/CDS/CSR/EPH/2002/12. Geneva: WHO.

WHO and CDC. 1998. *Infection Control for Viral Hemorrhagic Fevers in the African Health Care Setting*. Geneva: WHO and CDC. http://www.cdc.gov/ncidod/dvrd/spb/mnpages/vhfmanual.htm (accessed July 19, 2006).

WHO/Regional Office for Africa (AFRO), Commonwealth Regional Health Community Secretariat (CRHCS), and East, Central and Southern African College of Nursing (ECSACON). 2001. *Manual of Infection Prevention and Control Policies and Guidelines*. Prepared by U. V. Reid.

MODULE SCORING SHEET

Name of facility: _____

Name of module: _____

Date completed: _____

Module section	1 Assessment total	2 Possible total	3 Percentage score	4 Rating based on percentage score
Total for module			**%**	

Column Notes:

1. Assessment total—sum of points for all marked responses

2. Possible total—sum of all possible points for the question

3. Percent score—(column 1/column 2) × 100

4. Rating—

More than 75% of possible points:	A—recommended practices are followed consistently and thoroughly
50–75% of possible points:	B—recommended practices usually followed
Less than 50% of possible points:	C—training and follow-up needed on recommended practices

URINARY CATHETERS

These questions should be completed by the unit manager for each clinical area in the assessment where urinary catheters are used.

For each item, mark the answer that best describes your current situation by putting a tick ✓ inside the brackets [✓]. Note that some questions ask for only one answer, and others ask you to mark all answers that apply. Questions that are intended to provide contextual information only are not scored.

What is the name of this unit? _____

Types of Catheter Used in this Unit

These questions provide contextual information about the use of urinary catheters in your facility.

1. Are straight (i.e., "in-out," not indwelling) urinary catheters used in this unit? [ ] No [ ]1 Yes
2. Are straight urinary catheters reused? (Mark one answer) [ ] Straight urinary catheters are never used [ ] Yes, they are reused [ ]1 No, they are not reused
3. How frequently are indwelling urinary catheters used in this unit? (Mark one answer) [ ] Never [ ] Occasionally [ ] Frequently [ ] Always

Assessment section total: _____ **Possible section total:** 2

Procedures for Use of Indwelling Urinary Catheters

The following questions examine indicators for use of indwelling urinary catheters, as well as procedures for changing, and movement of patients.

4. What are the indications for using indwelling urinary catheters? (Mark all that apply)

[ ]1 Urine drainage during surgery and immediate post-operative period
[ ]1 Acute urethral obstruction
[ ]1 Monitor urine output in critically ill patients
[ ] To obtain urine specimens
[ ] Incontinence
[ ] Routine irrigation
[ ]1 Irrigation for bleeding or blood clots
[ ] Prevent/manage bedsores
[ ] Clamped or plugged catheters

5. What types of indwelling urinary catheters are used? (Mark all that apply)

[ ] Feeding tube
[ ]1 Commercially manufactured indwelling urinary catheter impregnated with antimicrobials (e.g., silver)
[ ]1 Commercially manufactured indwelling urinary catheter without antimicrobials

6. Is the supply of indwelling urinary catheters adequate and reliable? (Mark one answer)

[ ] Never
[ ] Sometimes
[ ]1 Usually
[ ]1 Always

7. Is there is a policy to routinely change indwelling urinary catheters?

[ ] Yes
[ ]1 No

8. How frequently are indwelling urinary catheters reused?

[ ]2 Never
[ ] Usually
[ ] Always

9. What are the indications for opening an indwelling catheter system? (Mark all that apply)

[ ] Routine irrigation
[ ] Obtaining urine for analysis or culture
[ ]1 Not draining
[ ]1 Irrigation for bleeding/clots
[ ]1 Never opened

10. If a urine sample must be obtained from a patient with an indwelling urinary catheter for analysis or culture, how is this done? (Mark all that apply)

[ ] Disconnection of catheter from collection tubing
[ ] From collection container
[ ]1 Aspirate through special aspiration port
[ ]1 Aspirate through catheter or collection tubing

Assessment section total: _____ **Possible section total:** 15

Procedures for Insertion and Maintenance of Urinary Catheters

The following questions look at your procedures for insertion and maintenance of urinary catheters.

11. Do personnel usually wear gloves when they insert the urinary catheters? (Mark the answer that best applies)

[ ] No gloves are worn
[ ] Non-sterile gloves
[ ]2 Sterile gloves

12. What type of antiseptic is usually used to prepare the urinary catheter insertion area? (Mark one answer)

[ ] Benzalkonium chloride
[ ] Plain soap and non-sterile water (no antiseptic used)
[ ] Plain soap and sterile water (no antiseptic used)
[ ]1 Chlorhexidine
[ ]1 Iodine
[ ]1 Iodophor (povidone iodine)

13. Is antimicrobial ointment or cream applied to the meatus at the urinary catheter insertion site?

[ ] Yes
[ ]1 No

14. Are antiseptics or antimicrobial agents routinely added to urinary drainage bags?

[ ] Yes
[ ]1 No

15. Where does the bag generally hang during use?

[ ] Same level as patient
[ ]1 Below the bed

16. Is the urinary drainage system a closed or open system?

[ ] Open system (i.e., drains into an open bottle)
[ ]2 Closed system (i.e., drains into a closed container or bag)

17. If the system is closed, are the indwelling catheter and the drainage system compatible (i.e., fit snugly at the connection)? [ ] No [ ]1 Yes
18. When patients are moved, what is usually done with the urine collection system? (Mark one answer) [ ] Disconnected from the urinary catheter [ ] Kept connected with bag placed on bed/stretcher or wheelchair [ ]1 Kept connected with bag left hanging below level of patient's bladder

Assessment section total: _____ **Possible section total:** 10

URINARY CATHETERS ANNOTATIONS

Background

Urinary tract infections (UTIs) are the most common type of nosocomial infections, accounting for 40 percent of all infections in hospitals each year. Several studies have reported that about 80 percent of nosocomial UTIs occur following instrumentation, primarily catheterization. Because nearly 10 percent of all hospitalized patients are catheterized, preventing UTIs is a major factor in decreasing nosocomial infections (Tietjen et al. 2003, 22-1).

Item Notes

3. Urethral catheters should be avoided unless there is a compelling indication (WHO 2002, 38).

4. Generally, urinary catheterization is indicated to relieve urinary tract obstruction, to permit urinary drainage in patients with neurogenic bladder dysfunction and urinary retention, to aid in urologic surgery or other surgery on contiguous structures, and to obtain accurate measurements of urinary output in critically ill patients. Urinary catheterization should be discouraged as a means of obtaining urine for culture or certain diagnostic tests such as urinary electrolytes when the patient can voluntarily void or as a substitute for nursing care in the incontinent patient (Wong 1983). Loss of control (incontinence) or inability to void (retention) may be managed better by straight (in and out) catheterization several times daily rather than by putting in an indwelling catheter. In addition, some patients can be trained to catheterize themselves for long-term care and can clean and high-level disinfect their own catheter by steaming it in a rice cooker or boiling it in a pot (Tietjen et al. 2003, 22-4).

5. Silver is a highly effective antibacterial substance that can be applied to various types of catheters. Silver-coated urinary catheters may be beneficial in preventing UTIs. Using a silver alloy catheter could be considered in patients at high risk for complications of catheter-associated bacteriuria (Saint et al. 1999).

7. Indwelling catheters should not be changed at arbitrary fixed intervals (Wong 1983).

9. The catheter and drainage tube should not be disconnected unless the catheter must be irrigated. Irrigation should be avoided unless obstruction is anticipated (e.g., as might occur with bleeding after prostatic or bladder surgery) (Wong 1983).

10. If small volumes of fresh urine are needed for examination, the distal end of the catheter, or preferably the sampling port if present, should be cleansed with a disinfectant, and urine then aspirated with a sterile needle and syringe. Larger volumes of urine for special analyses should be obtained aseptically from the drainage bag (Wong 1983).

11. Sterile gloves should be worn for insertion of urinary catheters (WHO 2002, 39).

13. Applying topical antibiotics to the perineal area (the urethra for women and the head of penis for men) does not reduce the risk of catheter-associated UTIs (Tietjen et al. 2003, 22-8).

14. Bladder irrigation and antibacterial instillation in the drainage bag have not been clearly shown to prevent bacteriuria and should not be used (Saint et al. 1999).

15. The collection bag should not be raised above the level of the bladder (Tietjen et al. 2003, 39).

16, 17. The catheter collection system should remain closed and should not be opened unless absolutely necessary for diagnostic or therapeutic purposes (Tietjen et al. 2003, 39).

18. Raising the collection bag above the level of the bladder should be avoided. If it becomes necessary to raise the bag above the level of the patient's bladder during transfer of the patient, the tubing should be clamped and all urine should be drained from the tubing into the bag before the patient stands up (Tietjen et al. 2003, 37).

References

Saint, S., and B. A. Lipsky. 1999. Preventing Catheter-Related Bacteriuria. Should We? Can We? How? *Archives of Internal Medicine* 159(8):800–808.

Tietjen, L., D. Bossemeyer, and N. McIntosh. 2003. *Infection Prevention: Guidelines for Healthcare Facilities with Limited Resources*. Baltimore, MD: Jhpiego.

Wong, E. S. 1983. CDC Guideline for Prevention of Catheter-Associated Urinary Tract Infections. *American Journal of Infection Control* 11(1):28–36. http://www.cdc.gov/ncidod/dhqp/gl_catheter_assoc.html

World Health Organization (WHO). 2002. *Prevention of Hospital-Acquired Infections: A Practical Guide*. 2nd ed. WHO/CDS/CSR/EPH/2002/12. Geneva: WHO.

MODULE SCORING SHEET

Name of facility: _____

Name of module: _____

Date completed: _____

Module section	1 Assessment total	2 Possible total	3 Percentage score	4 Rating based on percentage score
Total for module			**%**	

Column notes:

1. Assessment total—Sum of points for all marked responses

2. Possible total—sum of all possible points for the question

3. Percent score—(column 1/column 2) × 100

4. Rating—

More than 75% of possible points:	A—recommended practices are followed consistently and thoroughly
50–75% of possible points:	B—recommended practices usually followed
Less than 50% of possible points:	C—training and follow-up needed on recommended practices

WASTE MANAGEMENT

These questions should be completed by staff familiar with waste management practices throughout the facility, including surgical areas, wards, patient care areas, laboratories, and support facilities.

For each item, mark the answer that best describes your current situation by putting a tick✓ inside the brackets [✓]. Note that some questions ask for only one answer, and others ask you to mark all answers that apply. Questions that are intended to provide contextual information only are not scored.

Policies Regarding Contaminated Waste

The following questions provide contextual information on hospital policies and guidelines for handling contaminated waste and on staff training.

1. Is there a written facility policy about the handling of contaminated waste?

[ ] No written policy or procedures
[ ] Policy/procedures communicated verbally only
[ ]1 Written policy/procedures available in an operations manual but not generally available for daily practice
[ ]2 Written policy/procedures in a manual but also posted on walls in clinical or support areas

2. Which facility staff are trained in the handling/disposal of contaminated waste? (Mark all that apply)

[ ] Nobody
[ ]1 All clinical staff (including physicians, nurses, and laboratory personnel)
[ ]1 All custodial and facilities maintenance staff

Assessment section total: _____ **Possible section total:** 4

Separation of Contaminated Waste

3. Is infectious/contaminated waste stored separately from routine waste?

[ ] No
[ ]1 Yes

4. Are clearly labeled or designated receptacles or containers used to store contaminated waste?

[ ] No
[ ]1 Yes

5.	How do contaminated waste containers differ from routine waste containers? (Mark all that apply)
[ ]	No separate receptacles or containers are used
[ ]	Containers have no special labeling
[ ]1	Contaminated waste containers meet international World Health Organization (WHO) standards (bright red or orange container and/or standard international biohazard label)
[ ]1	Contaminated waste containers meet South African National Standards (SANS)
6.	How many contaminated waste containers are found in inpatient units? (Mark one answer)
[ ]	No contaminated waste containers are used
[ ]	Fewer than one container per six inpatient beds (per two patient beds if intensive care unit)
[ ]1	One or more containers per six inpatient beds (per two patient beds if intensive care unit)
7.	In addition to inpatient units, where are contaminated waste containers found in the facility? (Mark all that apply)
[ ]	No contaminated waste containers are used
[ ]1	Easily accessible in outpatient care areas
[ ]1	In all procedure and operating rooms
[ ]1	In all clinical laboratories
[ ]1	In central supply/sterilization facility

Assessment section total: _____ **Possible section total:** 9

Waste Disposal

These questions focus on disposal procedures for non-infectious and contaminated waste.

8.	Where is non-infectious waste (e.g., paper, food remains, unsoiled plaster of Pairs) usually disposed of?
[ ]	Disposed of on-site (within the hospital premises)
[ ]1	Disposed of off-site (outside the hospital premises)
9.	Where is contaminated solid waste usually disposed of? (Mark one answer)
[ ]	Disposed on-site
[ ]1	Disposed off-site

Assessment section total: _____ **Possible section total:** 2

Postmortem Room and Mortuary

The following questions focus on policies and practices in the postmortem room and mortuary.

10. Are staff working in the postmortem room or mortuary required to wear special protective clothing such as gloves, gowns, plastic aprons, boots, and masks? [ ] No [ ]1 Yes
11. Is there a written policy for surface cleaning of these areas? (Mark one answer) [ ] No written policy or procedures [ ] Policy/procedures communicated verbally only [ ]1 Written policy/procedures available in an operations manual but not generally available for daily practice [ ]2 Written policy/procedures in a manual but also posted in the post mortem room and mortuary
12. Does the policy cover processes for disinfecting instruments and rooms? [ ] No [ ]1 Yes
13. Is there a written policy on the use of personal protective equipment in the mortuary? (Mark one answer) [ ] No written policy or procedures [ ] Policy/procedures communicated verbally only [ ]1 Written policy/procedures available in an operations manual but not generally available for daily practice [ ]2 Written policy/procedures in a manual but also posted in the post mortem room and mortuary

Assessment section total: _____ **Possible section total:** 6 _____

WASTE MANAGEMENT ANNOTATIONS

Background

The proper identification and disposal of potentially infectious waste is essential to prevent infection and injury to patients, clinical and custodial staff, and persons in the community.

Item Notes

1. There should be an explicit protocol that defines what contaminated waste is and how it should be handled, i.e., clearly separated from routine waste as soon as it is generated, handled in a way that prevents further contamination, and disposed of in a manner that will both inactivate microorganisms and prevent environmental contamination.

2. Anyone responsible for generating, handling, or transporting contaminated waste must be trained. Training should occur at the time of employment and be refreshed periodically. The staff who must be trained include the following—

- Clinical staff (e.g., doctors and nurses)
- Laboratory staff (including microbiology, hematology, chemistry, and pathology personnel)
- Facilities staff (including personnel responsible for linens, central sterilization, and custodial staff)

3. Contaminated waste is defined as any disposable material or object that may have been in contact with human pathogens. It includes—

- Waste products, body fluids, and tissue specimens from patients
- Objects that have been in contact with patients, including intravenous catheters, nasogastric and bladder catheters, wound dressings, endotracheal tubes, and gloves that have been in contact with body fluids or tissues
- Sharp instruments, such as scalpels and needles
- Microbiology specimens, including liquid and plated cultures

4. Clearly labeling receptacles of infectious (contaminated) waste will both prevent contamination of routine waste and reduce costs by lowering the overall quantity of material that has to be treated as infectious waste.

5. The optimal labeling process is an internationally accepted standard supported by WHO. Contaminated waste containers must meet SANS and/or WHO standards.

6, 7. Containers for contaminated waste should be easily accessible in any area where such waste might be generated. This includes all inpatient and outpatient care areas, including

procedure and operating rooms, laboratories where potentially contaminated specimens are handled, and linen and supply areas where reusable items are sterilized. In large wards with multiple patients, clinicians should have immediate access to a receptacle from all patient beds.

8, 9. On-site solid waste disposal (infectious and non-infectious) minimizes the dangers of handling and transport to off-site locations and minimizes the risk of attracting insects, rats, mice, dogs, and vultures, as well as standing pools of water that could breed mosquitoes. If non-infectious waste is transported to a municipal dumping site, the problem is minimized.

MODULE SCORING SHEET

Name of facility: _____

Name of module: _____

Date completed: _____

Module Section	1 Assessment Total	2 Possible Total	3 Percent Score	4 Rating Based on Percent Score
Total for Module			**%**	

Column Notes:

1. Assessment Total—Sum of points for all marked responses

2. Possible Total—Sum of all possible points for the question

3. Percent Score—(Column 1/Column 2) × 100

4. Rating—

More than 75% of possible points:	A—recommended practices are followed consistently and thoroughly
50–75% of possible points:	B—recommended practices usually followed
Less than 50% of possible points:	C—training and follow-up needed on recommended practices

Part III: Infection Control Assessment Tool Observation Checklists

FACILITY CHECKLIST FOR ALCOHOL HAND ANTISEPTIC

Facility: _____ Ward/area: _____

Date: _____ Time: _____

For each hand washing station, write the answer in the space provided. For multiple choice questions, mark the answer that best describes the current situation by putting an "X" through the circle in front of the appropriate response(s).

1. How many beds are there in the ward/area? _____

2. How many patients are there in the ward/area? _____

3. How many health care workers are there in the ward/area currently?
   (Please include nursing officers, doctors, nurse's aides, etc.)
   _____

4. Is alcohol hand antiseptic currently available in the ward/area?

   ○ No (end of survey)
   ○ Yes

5. If YES, how many bottles are there? (not empty) _____

6. Is the antiseptic easily accessible to everyone working in the ward?

   ○ No
   ○ Yes

FACILITY CHECKLIST FOR HAND WASHING SUPPLIES

Facility: _____ Ward/area: _____

Date: _____ Time: _____

For each hand washing station, mark the answer that best describes the current situation by putting an "X" through the circle in front of the appropriate response(s).

7. Is there a hand washing station in the ward or area?

   ○ No (stop, go to a different ward or area)
   ○ Yes

8. If YES, what type of hand washing station is it?

   ○ Regular bowl, tank, or container with water
   ○ Sink with running water tap
   ○ Station with gravity-flow running water

9. Is there running water currently available at the station?

   ○ No
   ○ Yes

10. Is there soap available at the station?

    ○ No (go to question 6)
    ○ Yes

11. If soap is available, what kind of soap is it?

    ○ Bar without rack
    ○ Bar with rack
    ○ Liquid soap in a container (plastic bottle or on the wall)

12. Are there paper towels available to dry hands?

    ○ No
    ○ Yes

OBSERVATION CHECKLIST FOR HAND HYGIENE PRACTICES

Facility: _____ Ward/area: _____ Date: _____

For **each** observation, choose the answer that best describes the situation by marking the applicable box with an "X" in the appropriate column. **Use the same sheet for the ward for as many observations as possible.** At the end of the sheet, add up the total of each column.

Patient contact number	Type of health worker			Type of hand hygiene before patient contact			Type of hand hygiene after patient contact			Type of hand hygiene after body fluid exposure			Type of hand hygiene after contact with patient surroundings			Type of hand hygiene before an aseptic procedure		
	Doctor	Nurse	Other	Hand washing	Alcohol rub	None	Hand washing	Alcohol rub	None	Hand washing	Alcohol rub	None	Hand washing	Alcohol rub	None	Hand washing	Alcohol rub	None
1	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
2	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
3	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
4	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
5	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
6	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
7	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
8	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
9	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
10	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
11	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
12	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
13	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
14	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
15	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Total																		
% (see below)	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**

% = (total # of Xs in each column/total # of encounters) × 100

CHECKLIST FOR INJECTION ADMINISTRATION

Facility: _____ Ward/area: _____ Date: _____

Circle the appropriate code (see below) in each column. Tally the number of Y or NA for each column (see below) and calculate the percentage. **Use the same sheet for as many observations as possible.**

Patient encounter #	Doctor (D), nurse (N), other (O) giving injection	Was hand hygiene practiced before injection?*	Were sterile needle & syringe used?	Was vial disinfected with alcohol?	Was sterile cotton or gauze used to break ampoule?	Is there closed storage of multidose vial after use?†	Were clean, single-use gloves used for IV injection?‡	Were the skin & IV port disinfected with alcohol?	Were sharps disposed of in a yellow sharps container?	Was hand hygiene practiced after injection was administered?*	If all columns are Y or NA, mark Y; if any column is N, mark N

1	D N O	Y N	Y N	Y N NA	Y N NA	Y N NA	Y N NA	Y N	Y N	Y N	Y N
2	D N O	Y N	Y N	Y N NA	Y N NA	Y N NA	Y N NA	Y N	Y N	Y N	Y N
3	D N O	Y N	Y N	Y N NA	Y N NA	Y N NA	Y N NA	Y N	Y N	Y N	Y N
4	D N O	Y N	Y N	Y N NA	Y N NA	Y N NA	Y N NA	Y N	Y N	Y N	Y N
5	D N O	Y N	Y N	Y N NA	Y N NA	Y N NA	Y N NA	Y N	Y N	Y N	Y N
6	D N O	Y N	Y N	Y N NA	Y N NA	Y N NA	Y N NA	Y N	Y N	Y N	Y N
7	D N O	Y N	Y N	Y N NA	Y N NA	Y N NA	Y N NA	Y N	Y N	Y N	Y N
8	D N O	Y N	Y N	Y N NA	Y N NA	Y N NA	Y N NA	Y N	Y N	Y N	Y N
9	D N O	Y N	Y N	Y N NA	Y N NA	Y N NA	Y N NA	Y N	Y N	Y N	Y N
10	D N O	Y N	Y N	Y N NA	Y N NA	Y N NA	Y N NA	Y N	Y N	Y N	Y N
11	D N O	Y N	Y N	Y N NA	Y N NA	Y N NA	Y N NA	Y N	Y N	Y N	Y N
12	D N O	Y N	Y N	Y N NA	Y N NA	Y N NA	Y N NA	Y N	Y N	Y N	Y N
13	D N O	Y N	Y N	Y N NA	Y N NA	Y N NA	Y N NA	Y N	Y N	Y N	Y N
14	D N O	Y N	Y N	Y N NA	Y N NA	Y N NA	Y N NA	Y N	Y N	Y N	Y N
15	D N O	Y N	Y N	Y N NA	Y N NA	Y N NA	Y N NA	Y N	Y N	Y N	Y N
16	D N O	Y N	Y N	Y N NA	Y N NA	Y N NA	Y N NA	Y N	Y N	Y N	Y N
17	D N O	Y N	Y N	Y N NA	Y N NA	Y N NA	Y N NA	Y N	Y N	Y N	Y N
18	D N O	Y N	Y N	Y N NA	Y N NA	Y N NA	Y N NA	Y N	Y N	Y N	Y N
19	D N O	Y N	Y N	Y N NA	Y N NA	Y N NA	Y N NA	Y N	Y N	Y N	Y N
20	D N O	Y N	Y N	Y N NA	Y N NA	Y N NA	Y N NA	Y N	Y N	Y N	Y N
21	D N O	Y N	Y N	Y N NA	Y N NA	Y N NA	Y N NA	Y N	Y N	Y N	Y N
	%	%	%	%	%	%	%	%	%	%	%

* Record Y for hand hygiene if either hand washing with soap and water or use of alcohol hand rub was practiced
† Record NA if multidose vial was not used
† and ‡ NA is equivalent to Y when determining the tally and calculating the percentage

CHECKLIST FOR WASTE DISPOSAL AFTER DELIVERY

Facility: _____ Ward/area: _____ Date: _____

Circle the appropriate code (see below) in each column. Tally the number of Y responses for each column and calculate the percentage

	Was the placenta disposed of in a bucket?	Were sharps disposed of in a yellow sharps container?	Were gloves disposed of in a red container for contaminated materials?	Were swabs and other contaminated materials disposed of in a red container for contaminated materials?	Were noncontaminated materials disposed of in a container designated for general waste?	If all columns are Y, mark Y; if any column is N, mark N
1	Y N	Y N	Y N	Y N	Y N	Y N
2	Y N	Y N	Y N	Y N	Y N	Y N
3	Y N	Y N	Y N	Y N	Y N	Y N
4	Y N	Y N	Y N	Y N	Y N	Y N
5	Y N	Y N	Y N	Y N	Y N	Y N
6	Y N	Y N	Y N	Y N	Y N	Y N
7	Y N	Y N	Y N	Y N	Y N	Y N
8	Y N	Y N	Y N	Y N	Y N	Y N
9	Y N	Y N	Y N	Y N	Y N	Y N
10	Y N	Y N	Y N	Y N	Y N	Y N
11	Y N	Y N	Y N	Y N	Y N	Y N
12	Y N	Y N	Y N	Y N	Y N	Y N
13	Y N	Y N	Y N	Y N	Y N	Y N
14	Y N	Y N	Y N	Y N	Y N	Y N
15	Y N	Y N	Y N	Y N	Y N	Y N
16	Y N	Y N	Y N	Y N	Y N	Y N
17	Y N	Y N	Y N	Y N	Y N	Y N
18	Y N	Y N	Y N	Y N	Y N	Y N
19	Y N	Y N	Y N	Y N	Y N	Y N
20	Y N	Y N	Y N	Y N	Y N	Y N
21	Y N	Y N	Y N	Y N	Y N	Y N
22	Y N	Y N	Y N	Y N	Y N	Y N
23	Y N	Y N	Y N	Y N	Y N	Y N
24	Y N	Y N	Y N	Y N	Y N	Y N
25	Y N	Y N	Y N	Y N	Y N	Y N
	%	%	%	%	%	%

REFERENCES

American Society of Hospital Pharmacists (ASHP) Council on Professional Affairs. 1992. ASHP Guidelines on Formulary System Management. *American Journal of Health-System Pharmacy* 49(3):648–52.

ASHP Council on Professional Affairs.1995. ASHP Guidelines: Minimum Standard for Pharmacies in Hospitals. *American Journal of Health-System Pharmacy* 52(23):2711–17.

ASHP Council on Professional Affairs. 1999. ASHP Therapeutic Guidelines on Antimicrobial Prophylaxis in Surgery. *American Journal of Health-System Pharmacy* 56(18):1839–88.

ASHP Council on Professional Affairs. 2000. ASHP Guidelines on Quality Assurance for Pharmacy-Prepared Sterile Products. *American Journal of Health-System Pharmacy* 57(12):1150–69.

Bolyard, E. A., O. C. Tablan, W. W. Williams, et al. 1998. Guideline for Infection Control in Healthcare Personnel. *Infection Control and Hospital Epidemiology* 19(6):407–63.

Bratzler, D. W., P. M. Houck, Surgical Infection Prevention Guidelines Writers Workgroup, et al. 2004. Antimicrobial Prophylaxis for Surgery: An Advisory Statement from the National Surgical Infection Prevention Project. *Clinical Infectious Diseases* 38(12):1706–15.

U.S. Centers for Disease Control and Prevention (CDC). 1994. Guidelines for Preventing the Transmission of Mycobacterium Tuberculosis in Healthcare Facilities. *MMWR* 1994;43(No. RR-13):1–132.

CDC. 1996. Guideline for Isolation Precautions in Hospitals. Part II. Recommendations for Isolation Precautions in Hospitals. Hospital Infection Control Practices Advisory Committee. *American Journal of Infection Control* 24(1):32–52.

CDC. 2001. Recommendations for Preventing Transmission of Infections among Chronic Hemodialysis Patients. *MMWR* 2001;50(No. RR-05);1–43.

CDC. 2001. Updated U.S. Public Health Service Guidelines for the Management of Occupational Exposures to HBV, HCV, and HIV and Recommendations for Postexposure Prophylaxis. *MMWR* 2001;50(No. RR-11):1–52.

CDC. 2002. Guideline for Hand Hygiene in Health-Care Settings: Recommendations of the Healthcare Infection Control Practices Advisory Committee and the HICPAC/SHEA/APIC/IDSA Hand Hygiene Task Force. *MMWR* 2002;51(No. RR-16):1–44.

CDC. 2002. Guidelines for the Prevention of Intravascular Catheter Related Infections. *MMWR* 2002;51(No. RR-10):1–29.

CDC. 2003. Guidelines for Environmental Infection Control in Healthcare Facilities: Recommendations of CDC and the Healthcare Infection Control Practices Advisory Committee. *MMWR* 2003;52(No. RR-10):1–43.

CDC. 2004. Guidelines for Preventing Health-Care–Associated Pneumonia, 2003: Recommendations of CDC and the Healthcare Infection Control Practices Advisory Committee. *MMWR* 2004;53(No. RR-35).

CDC. 2007. *Infection Control Guidance for the Prevention and Control of Influenza in Acute-Care Facilities.* Atlanta, GA: U.S. Department of Health and Human Services, CDC. <http://www.cdc.gov/flu/professionals/infectioncontrol/health-carefacilities.htm> (accessed January 29, 2009).

Culver, D. H., Horan T. C., Gaynes R. P., et al. 1991. Surgical Wound Infection Rates by Wound Class, Operative Procedure and Patient Risk Index. National Nosocomial Infections Surveillance System. *The American Journal of Medicine* 91(Suppl. 3B):152S–157S.

Dellinger, E. P., P. A. Gross, T. R. Barrett, et al. 1994. Quality Standard for Antimicrobial Prophylaxis in Surgical Procedures. *Clinical Infectious Diseases* 18(3):422–27.

Duncan, R. A. 1998. Controlling Use of Antimicrobial Agents. In *A Practical Handbook for Hospital Epidemiologists*, edited by L. A. Herwaldt and M. Decker. Thorofare, NJ: SLACK Incorporated. p.286

Emori T. G., and R. P. Gaynes. 1993. An Overview of Nosocomial Infections, Including the Role of Microbiology Laboratory. *Clinical Microbiology Reviews* 6(4):428–42. EngenderHealth. 2004. Infection Prevention Online Course. <http://www.engenderhealth.org/res/onc/index.html#start> (accessed July 17, 2006).

Falk, P. S. 2004. Infection Control and the Employee Health Service. In *Hospital Epidemiology and Infection Control*, 3rd ed., edited by C. G. Mayhall. Philadelphia: Lippincott, Williams & Wilkins. Finelli, L., J. T. Miller, J. I. Tokars, et al. 2005. National Surveillance of Dialysis-Associated Diseases in the United States, 2002. *Seminars in Dialysis* 18(1):52–61.

Garner, J. S. 1996. Guideline for Isolation Precautions in Hospitals. The Hospital Infection Control Practices Advisory Committee. *Infection Control and Hospital Epidemiology* 17(1):53–80.

Gerding, D. N. 2000. Antimicrobial Cycling: Lessons Learned from the Aminoglycoside Experience. *Infection Control and Hospital Epidemiology* 21, Suppl. no. 1:S12–S17.

Hopkins, C. C. 2004. Pharmacy Service. In *Hospital Epidemiology and Infection Control*, 3rd ed., edited by C. G. Mayhall, 1315. Philadelphia: Lippincott, Williams & Wilkins. Institute for Healthcare Improvement. 100,000 Lives Campaign. <http://www.ihi.org/IHI/Programs/Campaign/> (accessed July 17, 2006).

Joint Commission International (JCI). 2002. Care of Patients in *Joint Commission International Accreditation Standards for Hospitals*. 2nd ed. Oak Brook, IL: JCI.

Kralovic, R. C. 1993. Use of Biological Indicators Designed for Steam or Ethylene Oxide to Monitor a Liquid Chemical Sterilization Process. *Infection Control and Hospital Epidemiology* 14(6):313–19.

Mangram, A. J., T. C. Horan, M. L. Pearson, et al. 1999. Guideline for Prevention of Surgical Site Infections. *Infection Control and Hospital Epidemiology* 20(4):250–80.

National Department of Health, South Africa. 2007. *National Infection Prevention and Control Policy*.

National Department of Health, South Africa. 2007. *National TB Infection Control Guidelines.*

Oh, T. E. 1997. Design and Organization of Intensive Care Units. In *Intensive Care Manual*, 4th ed., edited by T. E. Oh, 3–9. Boston: Butterworth-Heinemann

Medical.Roy, M. C. 2003. Modern Approaches to Preventing Surgical Site Infections. In *Prevention and Control of Nosocomial Infections*, 4th ed., edited by R. P. Wenzel, 377–78. Philadelphia, PA: Lippincott, Williams & Wilkins.

Rutala, W. A., and A. J. Weber. 2004. Disinfection and Sterilization in Health Care Facilities: What Clinicians Need to Know. *Clinical Infectious Diseases* 39(5):702–9.

Saiman, L. 2003. Preventing Infections in the Neonatal Intensive Care Unit. In *Prevention and Control of Nosocomial Infections*, 4th ed., edited by R. P. Wenzel, 356–57. Philadelphia, PA: Lippincott, Williams & Wilkins.

Saint, S., and B. A. Lipsky. 1999. Preventing Catheter-Related Bacteriuria. Should we? Can we? How? *Archives of Internal Medicine* 159(8):800–808.

Scheckler, W.E., D. Brimhall, A. S. Buck, et al. 1998. Requirements for Infrastructure and Essential Activities of Infection Control and Epidemiology in Hospitals: A Consensus Report. SHEA Position Paper. *Infection Control and Hospital Epidemiology* 19(2):114–24.

Shlaes, D. M., D. N. Gerding, J. F. John Jr., et al. 1997. Society for Healthcare Epidemiology of America and Infectious Diseases Society of America Joint Committee on the Prevention of Antimicrobial Resistance: Guidelines for the Prevention of Antimicrobial Resistance in Hospitals. *Infection Control and Hospital Epidemiology* 18(4):275–91.

South African Renal Society (SARS). 2006. *Guidelines for the Optimal Care of Patients on Chronic Dialysis in South Africa*. Cape Town, South Africa: SARS.

Tietjen, L., D. Bossemeyer, and N. McIntosh. 2003. *Infection Prevention: Guidelines for Healthcare Facilities with Limited Resources*. Baltimore, MD: Jhpiego.

World Health Organization (WHO). 2002. *Prevention of Hospital-Acquired Infections: A Practical Guide*. 2nd ed. WHO/CDS/CSR/EPH/2002/12. Geneva: WHO.

WHO and CDC. 1998. *Infection Control for Viral Hemorrhagic Fevers in the African Health Care Setting*. Geneva: WHO and CDC. <http://www.cdc.gov/ncidod/dvrd/spb/mnpages/vhfmanual.htm> (accessed July 19, 2006).

WHO, Safe Injection Global Network (SIGN). 2003. Department of Blood Safety and Clinical Technology Recommendations. *Guiding Principles to Ensure Injection Device Safety*. WHO/BCT/03.12. Geneva: WHO. <http://www.who.int/injection_safety/toolbox/docs/en/Guiding_Principle_Inj.pdf> (accessed Aug. 17, 2006).

WHO, SIGN, International Council of Nurses. 2001. *Best Infection Control Practices for Skin-Piercing Intradermal, Subcutaneous, and Intramuscular Needle Injections*. Geneva: WHO.

WHO/Regional Office for Africa (AFRO), Commonwealth Regional Health Community Secretariat (CRHCS), and East, Central and Southern African College of Nursing (ECSACON). 2001. *Manual of Infection Prevention and Control Policies and Guidelines*. Prepared by U. V. Reid.

Wiblin, R. T., and R. P. Wenzel. 1998. The Infection Control Committee. In *A Practical Handbook for Hospital Epidemiologists*, edited by L. A. Herwaldt and M. Decker. Thorofare, NJ: SLACK Incorporated.

Widmer, A. F. 1994. Infection Control and Prevention Strategies in the ICU. *Journal of Intensive Care Medicine* 20, Suppl. no. 4:S7–S11.

Wong, E. S. 1983. CDC Guideline for Prevention of Catheter-Associated Urinary Tract Infections. *American Journal of Infection Control* 11(1):28–36. <http://www.cdc.gov/ncidod/dhqp/gl_catheter_assoc.html>.