

# RESPIRATORY INFECTION CONTROL IN HEALTH CARE FACILITIES

Course Notebook for Participants



Jhpiego is an international, non-profit health organization affiliated with The Johns Hopkins University. For nearly 40 years, Jhpiego has empowered front-line health workers by designing and implementing effective, low-cost, hands-on solutions to strengthen the delivery of health care services for women and their families. By putting evidence-based health innovations into everyday practice, Jhpiego works to break down barriers to high-quality health care for the world's most vulnerable populations.

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# RESPIRATORY INFECTION CONTROL IN HEALTH CARE FACILITIES

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# TRAINING APPROACH OVERVIEW

## BEFORE STARTING THIS COURSE

This course will be conducted in a way that is different from traditional training courses. First of all, it is based on the assumption that people participate in the course because they:

- Are interested in the topic
- Wish to improve their knowledge or skills, and thus their job performance
- Desire to be **actively involved** in course activities

WHAT I HEAR, I FORGET;  
WHAT I SEE, I REMEMBER;  
WHAT I DO, I UNDERSTAND.

—Confucius

To be effective, clinical trainers must use appropriate training strategies, particularly “hands-on” training techniques, which are best reflected in this ancient Chinese proverb.

The training approach used in this course stresses the importance of the cost-effective use of resources and application of relevant educational technologies including humane training techniques. The latter encompass the use of equipment used for infection prevention, or a simulation in a model isolation room, to minimize risk to the participants and patients, and also to facilitate learning.

## MASTERY LEARNING

The **mastery learning approach** assumes that all participants can master (learn) the required knowledge, attitudes or skills provided **sufficient time is allowed and appropriate learning methods are used**. The goal of mastery learning is that 100 percent of the participants will “master” the knowledge and skills on which the learning is based.

Mastery learning is used extensively in inservice training where the number of participants, who may be practicing clinicians, is often small. Although the principles of mastery learning can be applied in preservice education, it must be applied across a longer period of time and multiple skills must be tracked simultaneously.

Although some participants are able to acquire new knowledge or new skills immediately, others may require additional time or alternative

learning methods before they are able to demonstrate mastery. Not only do people vary in their abilities to absorb new material, but individuals also learn best in different ways—through written, spoken or visual means. Effective learning strategies, such as mastery learning, take these differences into account and use a variety of teaching methods.

The mastery learning approach also enables the participant to have a **self-directed learning experience**. This is achieved by having the trainer serve as facilitator and by changing the concept of testing and how test results are used. Moreover, the philosophy underlying the mastery learning approach is one of **continual assessment of learning**, in which the trainer regularly informs participants of their progress in learning new information and skills.

Mastery learning is most successful in the context of a performance improvement initiative at the participant's worksite. By approaching learning as a component of an overall strategy to **improve performance and quality of clinical care**, the learning becomes more relevant and more readily applied. When participants and health service supervisors have done an assessment of current practice and actual performance – as compared to some recognized performance standard – then gaps can be identified. If these gaps are related to a lack of knowledge or skills, then a training intervention may be the appropriate way to address this gap, and thus, improve services. With this in mind, participants come to a training course with a focused objective and a greater readiness to learn.

With the mastery learning approach, assessment of learning is:

- Competency-based, which means assessment is keyed to the learning objectives and emphasizes acquiring the essential skills and attitudinal concepts needed to perform a job, not just to acquiring new knowledge.
- Dynamic, because it enables participants to receive continual feedback on how successful they are in meeting the course objectives.
- Less stressful, because from the outset participants, both individually and as a group, know what they are expected to learn, know where to find the information and have ample opportunity for discussion with the trainer.

## **KEY FEATURES OF EFFECTIVE CLINICAL TRAINING**

Mastery learning is based on principles of adult learning. This means that learning is participatory, relevant and practical. It builds on what the participant already knows or has experienced, and provides opportunities for practicing skills. Key features of mastery learning are that it:

- Uses behavior modeling,
- Is competency-based, and
- Incorporates humanistic learning techniques.

### **Behavior Modeling**

Social learning theory states that when conditions are ideal, a person learns most rapidly and effectively from watching someone else perform (model) a skill or activity. For modeling to be successful, however, the trainer must clearly and properly demonstrate the skill or activity so that participants have a clear picture of the performance expected of them.

Behavior modeling, or observational learning, takes place in three stages. In the first stage, **skill acquisition**, the participant sees others perform the procedure and acquires a mental picture of the required steps. Once the mental image is acquired, the participant attempts to perform the procedure, usually with supervision. Next, the participant practices until **skill competency** is achieved, and s/he feels confident performing the procedure. The final stage, **skill proficiency**, occurs with repeated practice over time.

<i>Skill Acquisition</i>	Knows the steps and their sequence (if necessary) to perform the required skill or activity but <b>needs assistance</b>
<i>Skill Competency</i>	Knows the steps and their sequence (if necessary) and <b>can perform</b> the required skill
<i>Skill Proficiency</i>	Knows the steps and their sequence (if necessary) and <b>effectively performs</b> the required skill or activity

## **COMPETENCY-BASED TRAINING**

Competency-based training (CBT) is learning by doing. It focuses on the specific knowledge, attitudes and skills needed to carry out the procedure or activity. **How the participant performs** (i.e., a combination of knowledge, attitudes and, most important, skills) is emphasized rather than just the information learned. Competency in the new skill or activity is assessed objectively by evaluating overall performance.

To successfully accomplish CBT, **the clinical skill** or activity to be taught must be broken down into its **essential steps**. Each step is then analyzed to determine the **most efficient and safe way to perform and learn it**. The process is called **standardization**. Once a procedure, such as wearing protective suits, has been standardized, competency-based learning guides and evaluation checklists can be developed to make learning the necessary

steps or tasks easier and evaluating the participant's performance more objective.

An essential component of CBT is **coaching**, in which the classroom or clinical trainer first explains a skill or activity and then demonstrates it using a simulation model or other training aid, such as a video. Once the procedure has been demonstrated and discussed, the trainer then observes and interacts with participants to guide them in learning the skill or activity, monitoring their progress and helping them overcome problems.

The coaching process ensures that the participant receives feedback regarding performance:

- **Before practice**—The trainer and participants meet briefly before each practice session to review the skill/activity, including the steps/tasks that will be emphasized during the session.
- **During practice**—The trainer observes, coaches and provides feedback to the participant as s/he performs the steps/tasks outlined in the learning guide.
- **After practice**—Immediately after practice, the trainer uses the learning guide to discuss the strengths of the participant's performance and also offer feedback and specific suggestions for improvement.

## HUMANISTIC TRAINING TECHNIQUE

The use of more humane (humanistic) techniques allows the participant to learn and practice new skills in a simulation rather than during an actual situation or with a patient, which then contributes to better clinical learning. This reduces stress for the participant as well as risk of injury and discomfort to the patient or the participant. Thus, effective use of models (humanistic approach) is an important factor in improving the quality of clinical training and, ultimately, service provision.

Before a participant performs a clinical procedure at the actual clinical setting, two learning activities should occur:

- The **clinical trainer** should **demonstrate** the required skills and patient interactions several times using an anatomic model, role plays or simulations.
- Under the guidance of the trainer, the **participant should practice** the required skills and patient interactions using the model, role plays or simulations and actual instruments in a setting that is as similar as possible to the real situation.



Only when **skill competency** has been demonstrated in the classroom should participants have their first contact with a patient.

This often presents challenges in a setting where there are large numbers of participants. Before any participant provides services to a patient, however, it is important that the participant demonstrate skill competency using models, role plays or simulations, especially for core skills.

When mastery learning, which is based on adult learning principles and behavior modeling, is integrated with CBT, the result is a powerful and extremely effective method for providing clinical training. And when humanistic training techniques, such as using anatomic models and other learning aids, are incorporated, training time and costs can be significantly reduced.

## **COMPONENTS OF THE INFECTIOUS RESPIRATORY ILLNESSES COURSE PACKAGE**

This clinical course is geared toward helping practitioners change infection control practices in themselves and in the facilities in which they work. For that reason, the course content is based on the practices described in the following **two pocket guides**:

- *Respiratory Infection Control in Health Care Facilities: Summary Guidance*
- *Respiratory Infection Control in Health Care Facilities: A Quick Reference Guide*

The detailed explanation for the practices and behaviors in those pocket guides is contained in the following **technical documents**:

- *Infection Prevention and Control of Epidemic- and Pandemic-Prone Acute Respiratory Diseases in Health Care*, WHO Interim Guidelines, June 2007
- *Tuberculosis Infection-Control in the Era of Expanding HIV Care and Treatment*, Addendum to *WHO Guidelines for the Prevention of Tuberculosis in Health Care Facilities in Resource-Limited Settings*

In addition, the course package contains:

- A **participant's handbook** containing the course schedule and description, learning guides and skills checklists.
- A **trainer's notebook**, which includes all participant handbook contents plus the answer key for the questionnaire.

For the most current clinical information on avian influenza, tuberculosis and other respiratory infections, the participant and trainer are also referred to the following Web sites of the Centers for Disease Control and Prevention (CDC) and the World Health Organization (WHO):

<http://www.cdc.gov/flu/avian/>

[http://www.who.int/csr/disease/avian\\_influenza/en/](http://www.who.int/csr/disease/avian_influenza/en/)

## USING THE LEARNING RESOURCE PACKAGE

In designing the training materials for this course, particular attention has been paid to making them “user friendly” and to permitting the course participants and clinical trainer the widest possible latitude in adapting the training to the participants’ (group and individual) learning needs. For example, at the beginning of each course an assessment is made of each participant’s knowledge. The results of this pre-course assessment are then used jointly by the participants and an advanced or master trainer to adapt the course content as needed so that the training focuses on acquisition of **new** information and skills.

A second feature relates to the use of the reference manual and participant’s handbook. The **pocket guides** and the additional reference materials are designed to provide all of the essential information needed to conduct the course in a logical manner. Because they serve as the “text” for the participants and the “example of desired behaviors” for the trainer, special handouts or supplemental materials are not needed. In addition, because the manual and additional reference materials contain **only** information that is consistent with the course goals and objectives, they become an integral part of all classroom activities, such as giving an illustrated lecture or leading a discussion.

The **Course Notebook for Participants**, on the other hand, serves a dual function. First, and foremost, it is the “road map” that guides the participant through each phase of the course. It contains the course syllabus and course schedule, checklists and learning guides as well as picture job aids needed during the course.

The **Course Notebook for Trainers** contains the same material as the participant’s notebook as well as material for the trainer. In addition, it contains the answer keys to the questionnaires.

In keeping with the training philosophy on which this course is based, all training activities will be conducted in an interactive, participatory manner. To accomplish this requires that the role of the trainer continually change throughout the course. For example, the trainer is an

**instructor** when presenting a classroom demonstration; a **facilitator** when conducting small group discussions or using role plays; and shifts to the role of **coach** when helping participants practice a procedure. Finally, when objectively assessing performance, the trainer serves as an **evaluator**.

**In summary**, the CBT approach used in this course incorporates a number of key features. **First**, it is based on adult learning principles, which means that it is interactive, relevant and practical. Moreover, it requires that the trainer facilitate the learning experience rather than serve in the more traditional role of an instructor or lecturer. **Second**, it involves use of behavior modeling to facilitate learning a standardized way of performing a skill or activity. **Third**, it is competency-based. This means that evaluation is based on **how well** the participant performs the procedure or activity, not just on **how much** has been learned. **Fourth**, where possible, it relies heavily on the use of anatomic models and other training aids (i.e., it is humanistic) to enable participants to practice repeatedly the standardized way of performing a skill or activity **before** working with clients. Thus by the time the trainer evaluates each participant's performance, using a checklist, **every** participant should be able to perform **every** skill or activity competently. **This is the ultimate measure of training.**

# COURSE DESCRIPTION

## COURSE DESCRIPTION

This course was developed to guide clinicians (doctors, nurses and other clinicians) and other health workers caring for patients with infectious respiratory illnesses and facility managers to implement effective infection control practices at their health care facility. The design of this course is based on the assumption that the participants are qualified service providers who have basic infection control skills and are familiar with infection control principles.

This course has three components:

- Review of infection control practices for infectious respiratory illnesses (e.g., avian influenza, tuberculosis). Clinician participants will participate in sessions on Standard Precautions and Transmission-Based Precautions, combined precautions for infectious respiratory illnesses, and caring for patients with infectious respiratory illnesses, including such procedures as handwashing, gloving and the use of personal protective equipment.
- Clinical skill practice. Opportunity is provided during the course for practice of clinical skills in a simulated environment. Individual skills relevant to caring for a patient with an infectious respiratory illness will be demonstrated and then practiced under supervision in order for the participant to gain competence in the necessary skills.
- Small group work. Participants will work in groups (by department, facility or country) to identify gaps and develop implementation and follow-up plans to prevent the spread of infectious respiratory illnesses in the health care facility.

The three components of the course may be modified or expanded depending on the composition of the group and needs of the participants.

The course builds on each participant's past knowledge and takes advantage of her/his high motivation to accomplish the learning tasks in the minimum time. Training emphasizes **doing**, not just knowing, and uses **competency-based evaluation** of performance.

The course works best when it is a component of an overall program to implement infection control standards within a clinical facility and it is linked to a measurable mechanism to improve performance of the health care team. When performance of the team in the workplace is assessed prior to this training, participants come to the course with a clear objective and purpose for their learning. Activities and learning

approaches are seen as relevant to performance and improved quality in the workplace and participants begin thinking about how they will use this information and these skills.

Specific characteristics of this course are as follows:

- *Knowledge transfer:* The trainers use a variety of adult learning techniques to present the critical information during the course, including facilitated discussions, case studies, illustrated lectures, hands-on learning and exercises. All necessary information is contained in the pocket guides and accompanying reference documents. Each participant is given a personal copy of these items for use during the course and continued reference after the course.
- *Knowledge assessment:* During the morning of the first day, participants demonstrate their knowledge of infection control by completing a written initial knowledge assessment. The trainers use that information to reinforce what is already known and to focus on new information. The trainers use a mid-course knowledge assessment to ensure that the information is learned. In addition, the clinical trainer continually carries out ongoing knowledge assessment of participants in the learning environment through question and answering.
- *Skill transfer:* Classroom and clinical sessions focus on key aspects of infection control clinical skills. Participants are given important decision-making skills as well as psychomotor skills using learning tools such as case studies, role plays, exercises and skill learning guides. Learning takes place at skill stations where each participant is given the chance to practice the necessary skills.
- *Skill assessment:* Participants work together to document progress in learning new skills by using the clinical skills learning guides. A clinical trainer uses competency-based skills checklists to evaluate each participant's performance. Continuous coaching by trainers ensures that each participant's performance is monitored and assessed.

Participants' successful completion of the course is, therefore, based on their mastery of the knowledge and skills components.

## **COURSE OVERVIEW**

**Course Description.** This 3-day course is designed to prepare participants to apply updated knowledge and skills in respiratory infection control (RIC) focusing on Standard and Transmission-Based Precautions against the transmission of infectious respiratory illnesses at their institution, through a humanistic and participative approach to learning.

**Course Goals.** To prepare competent health care workers who can provide effective care to control the spread of infectious respiratory illnesses in the health care facility.

### **Participant Learning Objectives**

By the end of the training course, the participant will be able to:

- Describe the mechanism of transmission of various infectious respiratory pathogens.
- Describe the hierarchy of respiratory infection control and the fundamentals of infection control for health care providers related to preventing transmission of infectious respiratory pathogens.
- List the issues related to case detection/identification of infectious respiratory illnesses in a health care setting.
- Describe correct placement and transportation of patients.
- Demonstrate the precautions for infection control in infectious respiratory illnesses and understand how to use them to prevent secondary transmission of infectious respiratory illnesses in health care facilities.
- Demonstrate appropriate understanding of environmental ventilation and management practices.
- Describe appropriate cough etiquette.
- Demonstrate the proper selection and use of masks.
- Describe mortuary care and infection control practices during post-mortem examination.

### **Training/Learning Methods**

- Illustrated lectures and group discussion
- Individual and group exercise
- Simulated practice with RIC equipment at skill stations
- Case studies
- Role plays

## Training Materials

- The main documents for the desired respiratory infection control practices resulting from this course are *Respiratory Infection Control in Health Care Facilities: Summary Guidance* and *Respiratory Infection Control in Health Care Facilities: Summary Guidance: A Quick Reference Guide*
- Course Notebook for Participants
- Course Notebook for Trainers
- Infection prevention equipment and materials
- PowerPoint presentations
- For reference on respiratory infection control, it is suggested that copies of the following WHO and CDC guidelines be available during the course:
  - *Infection Prevention and Control of Epidemic- and Pandemic-Prone Acute Respiratory Diseases in Health Care*, WHO Interim Guidelines, June 2007
  - *Tuberculosis Infection-Control in the Era of Expanding HIV Care and Treatment*, Addendum to *WHO Guidelines for the Prevention of Tuberculosis in Health Care Facilities in Resource-Limited Settings*

For reference on general infection prevention practices, it is suggested that copies of the following Jhpiego manual be available during the course:

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

## Participant Selection Criteria

Participants for this course may be practicing clinicians (doctors, nurses and other clinicians) and other staff (administrators, department heads, lab staff) who are capable of providing consistent institutional support for implementation of infection control practices (e.g., supplies, equipment, supervision, linkages with referral facilities, etc.).

- Participants should have the support of their supervisors or managers in order to achieve improved job performance after completing the course. In particular, participants should be prepared to communicate with supervisors or managers about the course and seek endorsement for training, encouragement for attendance and participation, and involvement in the transfer of new knowledge and skills to their jobs. Participants should also be prepared to discuss with their supervisors and managers the level of support (both administrative and material) they might need to incorporate preventive measures against

tuberculosis, avian influenza or other infectious respiratory pathogens into the health care facility practices.

### **Methods of Evaluation**

- Initial Knowledge Assessment and Course Knowledge Questionnaire
- Learning Guides and Checklists

### **Course Duration**

- Three 8-hour days, with 1-hour lunch each day

### **Suggested Course Composition**

- One facilitator for each five participants



MODEL COURSE SCHEDULE FOR RESPIRATORY INFECTION CONTROL (RIC) IN HEALTH CARE FACILITIES		DRAFT
DAY 1	DAY 2	DAY 3
<p><b>08:00–12:30</b></p> <p><b>Opening:</b></p> <ul style="list-style-type: none"> <li>Welcome and introductions</li> <li>Participant expectations</li> </ul> <p><b>Overview of the Course:</b></p> <ul style="list-style-type: none"> <li>Goals and objectives</li> <li>Review of course material</li> </ul> <p><b>Initial Knowledge Assessment</b></p> <p><b>Presentation/Discussion:</b></p> <ul style="list-style-type: none"> <li>Transmission of Tuberculosis and Influenza</li> <li>Hierarchy of Respiratory Infection Control</li> </ul> <p><b>Review</b> the Group and Individual Knowledge Matrix</p> <p><b>Exercise:</b> Infectious Disease Transmission Cycle</p> <p><b>Presentation/Discussion</b></p> <ul style="list-style-type: none"> <li>Early Recognition, Isolation and Reporting</li> <li>Screening, Education, Separation, Priority Services</li> </ul>	<p><b>08:00–12:30</b></p> <p><b>Agenda/Warm-up</b></p> <p><b>Presentation/Demonstration/Discussion:</b></p> <ul style="list-style-type: none"> <li>Hand hygiene—rationale and technique</li> <li>Personal protective equipment—rationale and technique</li> </ul> <p><b>Exercise:</b> Selecting and Using Masks</p> <p><b>Presentation/Discussion:</b></p> <ul style="list-style-type: none"> <li>Respiratory hygiene/cough etiquette</li> </ul> <p><b>Presentation/Demonstration/Discussion:</b></p> <ul style="list-style-type: none"> <li>Cleaning the patient care environment</li> <li>Linens and waste disposal</li> </ul> <p><b>Instructions for skill practice at Skill Stations</b></p>	<p><b>08:00–12:30</b></p> <p><b>Agenda and Warm-up</b></p> <p><b>Presentation/Discussion:</b></p> <ul style="list-style-type: none"> <li>Transmission-Based Precautions <ul style="list-style-type: none"> <li>Contact/Airborne/Droplet Precautions</li> </ul> </li> </ul> <p><b>Presentation/Discussion:</b></p> <ul style="list-style-type: none"> <li>Mortuary care and post-mortem examination</li> </ul> <p><b>Small Group Work:</b> Case studies</p> <p><b>Exercises:</b> Infection Control Measures for Procedures on Patients with Respiratory Infections</p> <p><b>Clinical Simulation:</b> Fast Tracking of a Patient with Coughing and Sneezing</p> <p><b>Course Knowledge Questionnaire</b></p>
<b>12:30–13:30 LUNCH</b>		

DRAFT		MODEL COURSE SCHEDULE FOR RESPIRATORY INFECTION CONTROL (RIC) IN HEALTH CARE FACILITIES		DRAFT
DAY 1	DAY 2	DAY 3		
<p><b>13:30–17:00</b></p> <p><b>Presentation/Discussion: Environmental Measures</b></p> <ul style="list-style-type: none"> <li>• Environmental ventilation</li> <li>• Patient placement and transport</li> </ul> <p><b>Exercise:</b> Environmental ventilation and patient placement</p> <p><b>Presentation/Discussion</b></p> <ul style="list-style-type: none"> <li>• Isolation rooms</li> <li>• Health care workers or family entering/exiting</li> </ul> <p><b>Exercises:</b> Early recognition and care of patients with suspected or confirmed respiratory infections</p> <p><b>Exercise:</b> Develop a job aid for screening patients</p> <p><b>Summary of Day</b></p> <p><b>Reading Assignment:</b> RIC Summary Guidance</p>	<p><b>13:30–17:00</b></p> <p><b>Skill Practice and Assessment</b></p> <p>All participants rotate among different skill stations for demonstration, discussion, practice and assessment for competency</p> <p><b>Skill Stations in</b></p> <ol style="list-style-type: none"> <li>1. Hand hygiene</li> <li>2. Donning and removing Personal Protective Equipment</li> <li>3. Cleaning and disinfecting respiratory equipment</li> </ol> <p><b>Summary of Day</b></p> <p><b>Reading Assignment:</b> RIC Quick Reference Guide</p>	<p><b>13:30–17:00</b></p> <p><b>Review Knowledge Questionnaire</b></p> <p><b>Small Group Activity:</b> Gap identification: Preparedness of your health care facility for management of infectious respiratory illnesses</p> <ul style="list-style-type: none"> <li>• Standard and Transmission-Based Precautions</li> <li>• Early recognition, screening and awareness</li> </ul> <p><b>Presentation</b> of selected individual/team implementation plans</p> <p><b>Program Summary and Discussions</b></p> <p><b>Course Evaluation</b></p> <p><b>Certificate Distribution and Closing</b></p>		

# INITIAL KNOWLEDGE ASSESSMENT

## HOW THE RESULTS WILL BE USED

The main objective of the **Initial Knowledge Assessment** is to assist both the **trainer** and the **participant** as they begin their work together in the course by finding out what the participants, individually and as a group, know about the course topics. This allows the trainer to identify topics that may need to be stressed during the course. Providing the results of the initial assessment to the participants helps them to focus on their individual learning needs. In addition, the questions show the participants the content that will be presented in the course.

The questions are given in the true/false format. A special form, the **Individual and Group Assessment Matrix**, is provided to record the scores of all course participants. Using this form, the trainer and participants can quickly chart the number of correct answers for each of the questions. By examining the data in the matrix, the group members can easily determine their collective strengths and weaknesses and jointly plan with the trainer how to best use the course time to achieve the desired learning objectives.

**For the trainer**, the results of the assessment will show which topics may need more emphasis during the learning sessions. Conversely, for the categories where 85% or more of participants answer the questions correctly, the trainer may choose to spend some of the allotted time on other content.

## INITIAL KNOWLEDGE ASSESSMENT AND ANSWER SHEET

### Instructions

In the space provided, print a capital **T** if the statement is true or a capital **F** if the statement is false.

### RESPIRATORY CONTROL PRACTICES IN HEALTH CARE FACILITIES

1. Patients who are coughing and sneezing while waiting to see the doctor should be asked to cover the nose and mouth with a cloth or tissue when coughing or sneezing. \_\_\_\_\_
2. A patient who comes to the clinic coughing and sneezing should be told to have a seat in the common waiting room until the doctor is available. \_\_\_\_\_
3. Particulate respirators provide good protection from infection, regardless of work practices or environmental controls. \_\_\_\_\_
4. Standard Precautions are designed for the care of all persons, patients, clients and staff, regardless of whether or not they are known to be infectious. \_\_\_\_\_
5. Standard Precautions include placing patients in protective isolation. \_\_\_\_\_
6. Each disease has only one route of transmission. \_\_\_\_\_
7. Transmission-Based Precautions are used instead of Standard Precautions for patients with serious respiratory infections. \_\_\_\_\_
8. Droplet precautions include the use of a mask if within 1 meter of the infected patient. \_\_\_\_\_

### USE OF MASKS AND RESPIRATORS

9. Health care workers (HCWs) should wear particulate respirators when providing routine nursing care to human cases of avian influenza. \_\_\_\_\_
10. A medical mask should be worn by all HCWs when providing routine care to patients with known tuberculosis. \_\_\_\_\_
11. When obtaining an induced sputum collection from a patient, HCWs should wear a medical mask. \_\_\_\_\_
12. When using a nebulizer on a patient, HCWs should always wear a particulate respirator. \_\_\_\_\_

### USE OF GLOVES AND HAND HYGIENE

13. Gloves must never be used as an alternative to hand hygiene. \_\_\_\_\_
14. HCWs must use an alcohol-based handrub when caring for patients with tuberculosis. \_\_\_\_\_

## **ENVIRONMENTAL VENTILATION**

15. In high-risk areas of health care facilities such as isolation rooms, the recommended minimal ventilation rate is 12 air changes per hour (ACH). \_\_\_\_\_
16. Environmental ventilation can eliminate the risk of infection from respiratory aerosols. \_\_\_\_\_

## **SAFE NEEDLE PRACTICES**

17. Before placing a disposable (single-use) needle and syringe in a puncture-proof container or box, you should first carefully recap the needle. \_\_\_\_\_

## **CLEANING RESPIRATORY EQUIPMENT**

18. Health care workers must wear gloves, gown, rubber apron, face protection and a medical mask when cleaning respiratory equipment. \_\_\_\_\_

## **MORTUARY CARE**

19. Health care workers should follow Standard Precautions when handling the body of a deceased patient. \_\_\_\_\_
20. Any kind of fluid from a dead body may transmit disease. \_\_\_\_\_

## **PATIENT PLACEMENT AND TRANSPORT**

21. Patients with avian influenza must be placed in Airborne Precaution Rooms (APRs). \_\_\_\_\_
22. When cohorting patients with the same suspected or confirmed diagnosis in one room, a distance of at least 1 meter must be maintained between each patient. \_\_\_\_\_
23. Patients with acute respiratory diseases (ARDs) must wear a medical mask while being transported outside of cohorting or isolation areas. \_\_\_\_\_

## **PROTECTING THE HEALTH OF STAFF AND VISITORS**

24. Family members who wish to view the body of a relative who has died of avian influenza should be required to wear personal protective equipment (PPE). \_\_\_\_\_
25. Hand hygiene is required after direct contact with every patient. \_\_\_\_\_

# EXERCISE SUMMARIES FOR PARTICIPANTS

## EXERCISE ONE

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### INFECTIOUS DISEASE TRANSMISSION CYCLE

#### Objectives

The purpose of this activity is to:

- Review the conditions that allow infectious diseases to be spread.
- Understand how to break the cycle according to different methods of transmission.

#### Instructions

- Each small group will be given a card inscribed with one of the following infectious diseases: influenza, tuberculosis, severe acute respiratory syndrome (SARS), hepatitis A, malaria.
- Each small group will work together to draw the transmission cycle of their specific disease on a flipchart. See Appendix A: The Disease Transmission Cycle.
- Each small group will also identify and record on a flipchart barriers or measures to break the transmission cycle and prevent the spread of the infectious disease.
- Each small group will then report back to the plenary session with their answers for a review and discussion of responses.

## EXERCISE TWO

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### ENVIRONMENTAL VENTILATION AND PATIENT PLACEMENT

#### Objectives

The purpose of this activity is to:

- Identify correct or incorrect/incomplete ventilation and patient placement practices in each photograph or diagram presented, and discuss how to implement correct practices at your own health care facility (HCF) or how to improve incorrect/incomplete practices.
- Understand the basic principles of natural, mechanical and mixed mode ventilation.
- Develop a cost-effective HCF strategy for implementation of adequate ventilation in critically important patient care areas: waiting rooms, examination rooms, corridors, procedure rooms (minor and major surgery, bronchoscopy, induced sputum collection), isolation rooms, cohorted patient wards.
- Understand important principles of patient placement that can maximize benefits of adequate environmental ventilation including location of patient beds and examination tables.

#### Instructions

- Study the photos/illustrations/diagrams, which will be either projected or distributed, and identify good or bad practices related to environmental ventilation and patient placement. During the group discussion, consider and describe why these are good or bad practices, and if bad, what simple steps can be taken to improve ventilation.
- Draw a typical examination room and a typical patient room or ward in your HCF. Identify the windows, the patient care areas and the entry/exit point for the room. During the group discussion, consider and describe ways to improve ventilation in these areas.

## EXERCISE THREE

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### EARLY RECOGNITION AND CARE OF PATIENTS WITH SUSPECTED OR CONFIRMED RESPIRATORY INFECTIONS

#### Objectives

The purpose of this activity is to:

- Review the principles of early recognition and care of a patient who presents to a typical health care facility with a suspected or confirmed respiratory infection.
- Understand how to implement precautions in different clinical settings.
- Understand how to prevent transmission of respiratory infections throughout the continuum of care in health care facilities using case scenarios that track a typical patient pathway from reception area or waiting room through triage area to admission requiring general nursing care.

#### Instructions

- Note Table 1: Early Recognition and Care of Patients with Suspected or Confirmed Respiratory Infections.
- Each small group will answer the questions related to respiratory infection control practices in one of the following scenarios:
  - Quick Reference Guide—Scenario One: Patient Arrival at the Reception Area
  - Quick Reference Guide—Scenario Two: Triage and Physical Examination
  - Quick Reference Guide—Scenario Three: General Nursing Care
- Each small group will have 10 to 15 minutes to discuss and answer the questions and record their answers on a flipchart.
- Each small group will then report back to the plenary session with their answers. During the plenary session, all scenarios will be discussed with an emphasis on similarities and differences in RIC practices in different clinical settings. See Summary Table 1.



## **Scenario One: Patient Arrival at the Reception Area**

**Scenario:** Patient arrives at the health care facility (HCF) with coughing and sneezing.

**Diagnosis is unknown.**

What types of procedures will I be undertaking on this occasion?

How close will I be to the patient during these procedures?

What is the likelihood of my having contact with any blood or body fluids during the procedures?

What measures should be in place to stop the patient from transmitting infection?

- Environment
  
  
  
  
  
  
  
  
  
  
- Patient
  
  
  
  
  
  
  
  
  
  
- HCW

What infection control supplies should be available?

## Scenario Two: Triage and Physical Examination

Scenario: Patient requires triage and physical examination.

Diagnosis is unknown.

What types of procedures will I be undertaking on this occasion?

How close will I be to the patient during these procedures?

What is the likelihood of my having contact with any blood or body fluids during the procedures?

What measures should be in place to stop the patient from transmitting infection?

- Environment

- Patient

- HCW

What infection control supplies should be available?

### **Scenario Three: General Nursing Care**

**Scenario:** Patient requires general nursing care.

**Diagnosis and risk are factors known.**

What types of procedures will I be undertaking on this occasion?

How close will I be to the patient during these procedures?

What is the likelihood of my having contact with any blood or body fluids during the procedures?

What measures should be in place to stop the patient from transmitting infection and what pieces of PPE should be available?

- Environment

- Patient

- HCW

What infection control supplies should be available?

## EXERCISE FOUR

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### DEVELOP A JOB AID FOR SCREENING PATIENTS WITH A SUSPECTED INFECTIOUS RESPIRATORY DISEASE OF POTENTIAL CONCERN

#### Objectives

The purpose of this activity is to:

- Understand how evidence-based principles of patient screening using epidemiologic and clinical clues can enhance early recognition, isolation and reporting of patients with infectious respiratory diseases of potential concern such as SARS or avian influenza.
- Develop a real life tool or *job aid* that can assist facility health care workers to screen incoming patients for acute febrile respiratory illness or prolonged duration of cough more efficiently and effectively. Specific screening criteria may vary depending on the local setting and patient population.

#### Instructions

- Each small group will develop a *job aid* that will help HCWs quickly and effectively screen and identify clients with an infectious respiratory disease of potential concern (SARS, human cases of avian influenza or novel and as yet unreported respiratory infections). *A job aid is a tool that helps health care workers do their job better, and according to some standard. Job aids give health care workers the information that they need, at the moment that they need it.*
- Each group will either draw or describe the job aid on a piece of flipchart paper.
- Show and/or demonstrate all job aids to the plenary group. Critique the job aids for: completeness, accuracy, clarity and ease of use.

## EXERCISE FIVE

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### WHAT IS RIGHT OR WRONG WITH THIS PICTURE?

#### Objectives

The purpose of this activity is to:

- Start seeing things with “different eyes”
- Identify correct or incorrect/incomplete infection control practices in each photograph presented, and discuss how to implement correct practices in their own sites or how to improve incorrect/incomplete practices

#### Instructions

- Look at the photos of the infection control practices and discuss the positive infection control practices seen and discuss how these practices are similar or different from their own HCFs. Discuss how to improve the poor practices and how to implement the positive practices in their sites.

## EXERCISE SIX

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### MATCH THE MASK TO THE ACTIVITY

#### Objectives

The purpose of this activity is to understand:

- What task or activity requires a mask
- What types of masks are preferable and acceptable for the task

#### Instructions

- Review Table 5 entitled “Match the Mask to the Activity.”
- Fill in the table by answering the questions and selecting the appropriate type of masks.
- Participate in a discussion about the rationale for the answers.

## EXERCISE SEVEN

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### SMALL GROUP WORK: CASE STUDIES

#### Instructions

- Each small group will discuss respiratory infection control practices in one of the following scenarios and prepare a response to be presented for discussion at the plenary session:
  1. Identify the triage/emergency room requirements for evaluating patients presenting with cough and fever in an area where an acute respiratory distress (ARD) of potential concern (e.g., SARS, human cases of avian flu, other new influenza viruses causing human infection, novel ARDs not previously reported that can cause large-scale outbreaks and outbreaks with high morbidity and mortality) is present.

During the discussion consider:

- How to prevent transmission between patients as well as to HCWs
  - Patient placement issues
  - Availability of PPE
  - How to prioritize service delivery
  - Staffing issues
2. Identify the types of PPE needed to care for patients with an ARD of potential concern, and the number of each item needed to care for a patient during his/her stay at the health care facility. The group should develop a plan to stockpile PPE for one patient for 7 days, based on the following considerations:
    - What physical care the patient needs (if the person needs a respirator, suctioning, assistance with activities of daily living, etc.).
    - Based on the type of physical care, how many health care providers will be assigned to this patient in a 24-hour period (needs to be limited to the minimum).
    - How often the health care provider(s) will go in and out of the isolation room when providing care.
    - Types of PPE needed and which ones can be reused.
  3. Identify the activities that a facility should conduct to prepare for the care of patients with an ARD of potential concern.

During the discussion consider:

- Advanced planning
- Staffing issues
- Training needs
- Facility capacity
- Procurement of supplies

- Reporting systems
- Role of emergency response teams
- Health care needs of HCWs during an epidemic



## EXERCISE EIGHT

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### INFECTION CONTROL MEASURES FOR PROCEDURES ON PATIENTS WITH SUSPECTED OR CONFIRMED RESPIRATORY INFECTIONS

#### Objectives

The purpose of this activity is to:

- Review infection control measures for health care workers caring for patients with suspected or confirmed respiratory infections during specific clinical procedures: nebulized drug therapy, collection of an induced sputum specimen, resuscitation/intubation/suctioning/extubation, bronchoscopy
- Understand how to implement precautions during different kinds of medical procedures.
- Understand how to prevent transmission of respiratory infections throughout the continuum of care in health care facilities using case scenarios that describe common medical procedures performed on patients with suspected or confirmed respiratory infections.

#### Instructions

- Review Table 6: Infection Control Measures for Procedures on Patients with Suspected or Confirmed Respiratory Infections.
- Each small group will answer the questions related to respiratory infection control practices in one of the following scenarios:
  - Quick Reference Guide—Scenario Four: Nebulized Drug Therapy
  - Quick Reference Guide—Scenario Five: Collection of an Induced Sputum Specimen
  - Quick Reference Guide—Scenario Six: Resuscitation, Intubation, Suctioning and/or Extubation
  - Quick Reference Guide—Scenario Seven: Bronchoscopy
- Each small group will have 10 to 15 minutes to discuss and answer the questions and record their answers on a flipchart.
- Each small group will then report back to the plenary session with their answers. During the plenary session, all scenarios will be discussed with an emphasis on similarities and differences in RIC practices during different medical procedures.
- See Summary Table 6.

## Scenario Four: Nebulized Drug Therapy

Scenario: Patient requires delivery of nebulized drug.

Patient is coughing and has a fever, but diagnosis is unknown.

What types of procedures will I be undertaking on this occasion?

How close will I be to the patient during these procedures?

What is the likelihood of my having contact with any blood or body fluids during the procedures?

What measures should be in place to stop the patient from transmitting infection?

- Environment

- Patient

- HCW

What infection control supplies should be available?

## Scenario Five: Collection of an Induced Sputum Specimen

Scenario: Non-intubated patient in any clinical setting with fever and coughing.

Diagnosis is unconfirmed.

What types of procedures will I be undertaking on this occasion?

How close will I be to the patient during these procedures?

What is the likelihood of my having contact with any blood or body fluids during the procedures?

What measures should be in place to stop the patient from transmitting infection and what pieces of PPE should be available?

- Environment

- HCW

What infection control supplies should be available?

## **Scenario Six: Resuscitation, Intubation, Suctioning and/or Extubation**

**Scenario: Intubated patient in emergency department, intensive care unit, operating theatre or equivalent setting. The patient's diagnosis and risk factors are known.**

What types of procedures will I be undertaking on this occasion?

How close will I be to the patient during these procedures?

What is the likelihood of my having contact with any blood or body fluids during the procedures?

What measures should be in place to stop the patient from transmitting infection and what pieces of PPE should be available?

- Environment

- HCW

What infection control supplies should be available?

## Scenario Seven: Bronchoscopy

**Scenario:** Sedated patient in emergency department, intensive care unit, procedure room or equivalent setting. The patient's diagnosis and risk factors are known.

What types of procedures will I be undertaking on this occasion?

How close will I be to the patient during these procedures?

What is the likelihood of my having contact with any blood or body fluids during the procedures?

What measures should be in place to stop the patient from transmitting infection and what pieces of PPE should be available?

- Environment

- HCW

What infection control supplies should be available?

## EXERCISE NINE

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### **CLINICAL SIMULATION: EFFECTIVE SCREENING AND FAST TRACKING OF A PATIENT WITH COUGHING AND SNEEZING**

#### **Objectives**

The purpose of this activity is to provide a simulated experience for learners to practice problem-solving and decision-making skills in screening patients for signs and symptoms of infectious respiratory illnesses and fast tracking their pathway through the health care facility.

#### **Instructions**

The activity should be carried out in the most realistic setting possible:

- One learner should play the role of patient and a second learner the role of the HCW. Other learners may be called on to assist the HCW.
- The trainer will give the learner playing the role of HCW information about the patient's condition and ask pertinent questions.
- The learner will be expected to think quickly and react (intervene) rapidly when the teacher provides information and asks questions.
- Initially, the teacher and learner will discuss what is happening during the simulation in order to develop problem-solving and decision-making skills. Further discussion may take place after the simulation is completed.
- As the learner's skills become stronger, the focus of the simulation should shift to providing appropriate care in a quick, efficient and effective manner. All discussion and questioning should take place after the simulation is over.

## EXERCISE TEN

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### **SMALL GROUP ACTIVITY: GAP IDENTIFICATION, IMPLEMENTATION AND FOLLOW-UP PLANNING**

Utilizing the Action Plan Form, participants will identify gaps **specific to their site**, comparing their existing situation with required respiratory infection control measures. The plans should be as detailed as possible and preferably include names and positions of people, and drawings or plans for rooms and floors of the facility.

In the process of identifying gaps and further developing their implementation plans and follow-up activities, the participants should consider the following:

- Types and quantity of PPE
- Where (source) and how (budget) they are going to get the PPE
- Availability of isolation rooms or identification of rooms/areas that can be used or adapted for isolation of patients with infectious respiratory illnesses
- Location of the isolation room(s), including handwashing and toilet facilities
- Set-up of the isolation room and required patient-care equipment (sphygmomanometers, stethoscopes, thermometers, suction equipment, oxygen, etc.)
- Number of staff required to provide care in the isolation room, type of providers (physician, nurse, housekeeper), and identification of staff by name (consider appropriateness of staff selected for such positions)
- Requirements for transporting patient, if needed
- Information the patient and the family should know for preventing the spread of infectious respiratory illnesses (type of transmission, PPE, hand hygiene, respiratory hygiene and cough etiquette) and ways of delivering this information to the patients and their families (e.g., posters, printed materials, informational lectures, TV/radio, individual counseling)

**Action Plan for  
Implementation of Improved Respiratory Infection Control Practices**

Respiratory Infection Control Goal to Be Achieved	Steps to Achieve This Goal	Who Will Be Involved	When Will This Be Done	What Is Needed To Achieve This
1.				
2.				
3.				
4.				



# LEARNING GUIDES AND CHECKLISTS FOR RESPIRATORY INFECTION CONTROL SKILLS

## USING THE LEARNING GUIDES AND CHECKLISTS

The learning guides for respiratory infection control skills contain the tasks or activities performed by the health care provider in caring for patients with infectious respiratory diseases. The learning guide breaks the task down into discrete steps so that it is easier to learn the procedure. The checklists are a summary of those key tasks, skills and activities performed by the health care provider and are meant to be used in assessment of skill competency.

The participant is not expected to perform all of the steps or tasks correctly the first time s/he practices them. Instead, the learning guides and checklists are intended to:

- Help the participant in learning the correct steps and the order in which they should be performed (skill acquisition); and
- Measure progressive learning in small steps as the participant gains confidence and skill (skill competency).

Used consistently, the learning guides and checklists help participants measure their progress and stay focused on the key steps or tasks. Furthermore, the learning guide is designed to make communication (coaching and feedback) between the participant and clinical trainer easier, more detailed and more helpful.

Because the learning guide is used to help in developing skills, it is important that the rating (scoring) be done as carefully and objectively as possible. The participant's performance of each step is rated on a three-point scale as follows:

1. **Needs Improvement:** Step or task not performed correctly and/or out of order (if necessary) or is omitted
2. **Competently Performed:** Step or task performed correctly in correct order (if necessary), but participant does not progress from step to step efficiently
3. **Proficiently Performed:** Step or task efficiently and precisely performed in the correct order (if necessary)

The checklist focuses only on the key tasks performed and skills and activities used. The checklist can be used during role play simulations by an observer, by the participant as a self-assessment form, or by the clinical trainer to evaluate the participant's performance and achievement of skill competency before the end of the course. The rating scale used is described below:

**Competent:** Performs the step according to the standard procedure or guidelines.

**Not Competent:** Unable to perform the step according to the standard procedure or guidelines, or does not perform the step at all.

## LEARNING GUIDE ONE

### HANDWASHING

(To be used by **Participants**)

Rate the performance of each step or task observed using the following rating scale:

- 1 Needs Improvement:** Step or task not performed correctly or out of sequence (if necessary) or is omitted
- 2 Competently Performed:** Step or task performed correctly in proper sequence (if necessary), but participant does not progress from step to step efficiently
- 3 Proficiently Performed:** Step or task efficiently and precisely performed in the proper sequence (if necessary)

LEARNING GUIDE FOR HANDWASHING WITH SOAP AND WATER					
STEP/TASK	CASES				
<b>PREPARATION</b>					
1. Examine hands for visible dirt or contamination with proteinaceous material.					
2. If hands are visibly dirty (or if alcohol-based handrub is unavailable), locate hand soap. Antiseptic is not required.					
3. Identify source of clean water (tap or other source).					
4. Check flow of the water (tap, shower) and waste water container if no drains.					
5. Use personal towel or a single-use paper towel (if available).					
6. Prepare waste basket for used paper towel.					
<b>WASHING HANDS</b>					
7. Turn on tap and maintain straight stream of water.					
8. Avoid splashing clothes or other parts of the body.					
9. Thoroughly rinse both hands.					
10. Apply enough soap to cover all hand surfaces. Vigorously rub all areas of hands and fingers together for at least 10–15 seconds, paying close attention to areas under fingernails and between fingers in the following manner:					
11. Rub hands, palm to palm.					
12. Rub right palm over back of left hand with interlaced fingers.					
13. Rub left palm over back of right hand with interlaced fingers.					
14. Rub palm to palm with fingers interlaced.					
15. Rub back of fingers of right hand over palm of left hand with fingers interlocked.					
16. Rub back of fingers of left hand over palm of right hand with fingers interlocked.					
17. Rotationally rub right thumb while clasped in left palm.					
18. Rotationally rub left thumb while clasped in right palm.					

LEARNING GUIDE FOR HANDWASHING WITH SOAP AND WATER				
STEP/TASK	CASES			
19. Rotationally rub backwards and forwards with clasped fingers of right hand in left palm.				
20. Rotationally rub backwards and forwards with clasped fingers of left hand in right palm.				
21. Rinse hands thoroughly with clean water.				
22. Dry hands with a single-use or personal towel and use the towel to turn off the faucet, or air dry hands.				
23. Throw paper towel into the basket (if using personal towel, hang and allow it to air dry).				
24. Wait 40 to 60 seconds and make sure hands are dry before proceeding with next task.				

**Notes:**

- DO NOT use alcohol-based hand products when hands are visibly soiled or after exposure of non-intact skin to blood or body fluids.
- If bar soap is used, provide small bars and soap racks that drain. Cut a large bar of soap into small, matchbox-size pieces.
- Avoid dipping hands into basins containing standing water. Even with the addition of an antiseptic agent, such as Dettol® or Savlon®, microorganisms can survive and multiply in these solutions.
- Do not add soap to a partially empty liquid soap dispenser. This practice of “topping off” dispensers may lead to bacterial contamination of the soap.
- When no running water is available, use a bucket with a tap that can be turned off to lather hands and turned on again for rinsing, or use a bucket and pitcher.
- Ensure hands are dry before starting any activity.

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**Note:** Used water should be collected in a basin and discarded in a latrine if a drain is not available.

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## LEARNING GUIDE TWO

### HANDRUB WITH ALCOHOL-BASED FORMULATION

(To be used by **Participants**)

Rate the performance of each step or task observed using the following rating scale:

- 1 Needs Improvement:** Step or task not performed correctly or out of sequence (if necessary) or is omitted
- 2 Competently Performed:** Step or task performed correctly in proper sequence (if necessary), but participant does not progress from step to step efficiently
- 3 Proficiently Performed:** Step or task efficiently and precisely performed in the proper sequence (if necessary)

LEARNING GUIDE FOR HANDRUB WITH ALCOHOL-BASED FORMULATION					
STEP/TASK	CASES				
<b>PREPARATION</b>					
1. Examine hands for visible dirt or contamination with proteinaceous material.					
2. If hands not visibly dirty, locate alcohol-based handrub container.					
<b>CLEANING HANDS</b>					
3. Turn on tap and maintain straight stream of water. Apply a palmful of handrub product in a cupped hand, and spread out to cover all surfaces.					
4. Rub hands, palm to palm.					
5. Rub right palm over back of left hand with interlaced fingers.					
6. Rub left palm over back of right hand with interlaced fingers.					
7. Rub palm to palm with fingers interlaced.					
8. Rub back of fingers of right hand over palm of left hand with fingers interlocked.					
9. Rub back of fingers of left hand over palm of right hand with fingers interlocked.					
10. Rotationally rub right thumb while clasped in left palm.					
11. Rotationally rub left thumb while clasped in right palm.					
12. Rotationally rub backwards and forwards with clasped fingers of right hand in left palm.					
13. Rotationally rub backwards and forwards with clasped fingers of left hand in right palm.					
14. Continue handrubbing until all handrub solution is absorbed.					
15. Wait 20 to 30 seconds before proceeding with next task.					

**Note:** Do not use alcohol-based hand products when hands are visibly soiled or after exposure of non-intact skin to blood or body fluids. In these cases, wash hands with soap and water, and dry.

## LEARNING GUIDE THREE

### DONNING AND REMOVING PPE

(To be used by **Participants**)

Rate the performance of each step or task observed using the following rating scale:

- 1 Needs Improvement:** Step or task not performed correctly or out of sequence (if necessary) or is omitted
- 2 Competently Performed:** Step or task performed correctly in proper sequence (if necessary), but participant does not progress from step to step efficiently
- 3 Proficiently Performed:** Step or task efficiently and precisely performed in the proper sequence (if necessary)

LEARNING GUIDE FOR DONNING AND REMOVING PPE					
STEP/TASK	CASES				
<b>DONNING PPE</b>					
<b>Preparation</b>					
1. After assessing potential risk of exposure to an infectious disease, don appropriate PPE before contact with the patient, generally before entering the room.					
2. Check that you have all the PPE you need (gloves, gown, goggles or face shield, and mask or respirator) and a waste container/laundry bin for disposal of PPE after removal.					
3. Wash hands with soap or use alcohol-based handrub if no visible soiling of hands.					
<b>Gown</b>					
4. Fully cover torso from neck to knees, arms to end of wrists, and wrap it around the back.					
5. Fasten at the back of the neck and waist.					
<b>Mask or Particulate Respirator</b>					
6. Secure ties or elastic bands at middle of head and neck.					
7. Fit flexible band to nose bridge.					
8. Fit snugly to face and below chin.					
9. Check fit/seal of respirator.					
<b>Protective Eyewear: Eye Visors, Face Shields or Goggles</b>					
10. Place face shield over mouth, nose, face and eyes and adjust to fit. If shield not available, cover eyes with goggles or visors.					
<b>Gloves</b>					
11. Extend them to cover wrists/cuffs of isolation gown.					

LEARNING GUIDE FOR DONNING AND REMOVING PPE					
STEP/TASK	CASES				
<b>REMOVING PPE</b>					
<b>Preparation</b>					
1. Stand at patient's room doorway or in anteroom.					
<b>Gloves (Remember that the outside of the gloves is contaminated!)</b>					
2. Grasp the outside of glove with opposite gloved hand; peel off, turning glove inside out.					
3. Hold removed glove in gloved hand.					
4. Slide fingers of ungloved hand under remaining glove at wrist.					
5. Peel glove off over first glove.					
6. Discard gloves in appropriate waste container.					
<b>Protective Eyewear: Eye visors, Face Shields or Goggles (Remember that the outside of the visor, face shield or goggles is contaminated!)</b>					
7. To remove, handle by headband or ear pieces from behind.					
8. Place in designated receptacle for reprocessing or in waste container.					
<b>Gowns</b>					
9. Unfasten tie of re-usable gown.					
10. Pull away from neck and shoulders, touching inside of gown only.					
11. Turn gown inside out.					
12. Fold or roll into a bundle and place safely in laundry bin for processing in laundry facility.					
<b>Mask or Respirator (Remember, the front of the mask or respirator is contaminated—DO NOT TOUCH!)</b>					
13. Leave the patient's room and close the door.					
14. Grasp the bottom, then the top ties or elastics and remove.					
<b>Hand Hygiene</b>					
15. Wash hands with soap or use alcohol-based handrub if no visible soiling.					

**Note:** Combination of PPE will affect sequence—be practical!

### General PPE Guidelines

- Hand hygiene should always be performed, despite PPE use.
- Remove and replace if necessary any damaged or broken pieces of re-usable PPE as soon as you become aware that they are not in full working order.
- Remove all PPE as soon as possible after completing the care and avoid contaminating:
  - The environment outside the isolation room;
  - Any other patient or worker; and
  - Yourself.

## LEARNING GUIDE FOUR

### CLEANING AND DISINFECTING REUSABLE RESPIRATORY EQUIPMENT

(To be used by **Participants**)

Rate the performance of each step or task observed using the following rating scale:

- 1 Needs Improvement:** Step or task not performed correctly or out of sequence (if necessary) or is omitted
- 2 Competently Performed:** Step or task performed correctly in proper sequence (if necessary), but participant does not progress from step to step efficiently
- 3 Proficiently Performed:** Step or task efficiently and precisely performed in the proper sequence (if necessary)

LEARNING GUIDE FOR CLEANING AND DISINFECTING REUSABLE RESPIRATORY EQUIPMENT					
STEP/TASK	CASES				
<b>PREPARATION</b>					
1. Identify and collect respiratory equipment that requires processing (decontamination, cleaning, and/or disinfection) between uses. Avoid any contact between a used piece of equipment and skin, mucosa or clothing. Determine whether the piece of respiratory equipment is reusable or single-use.					
2. Dispose of single-use respiratory equipment in an appropriate container with lid.					
3. If processing re-usable respiratory equipment, identify clean water source and soap/detergent container or dispenser for cleaning.					
4. Prepare a 0.5% chlorine solution for decontamination if required. See Tables 3 and 4 for guidelines for preparation of dilute chlorine solutions from liquid and powdered bleach. See Table 2 for decontamination guidelines for common types of respiratory equipment.					
5. For re-usable respiratory equipment, cleaning followed by high-level disinfection may be required. Using the guidance in Table 2, select the most appropriate method for cleaning and processing each of the following items: <ul style="list-style-type: none"> <li><input type="checkbox"/> plastic airway</li> <li><input type="checkbox"/> ambu bag</li> <li><input type="checkbox"/> CPR face mask</li> <li><input type="checkbox"/> rubber suction catheter</li> <li><input type="checkbox"/> plastic suction catheter</li> <li><input type="checkbox"/> ventilator tubing</li> </ul> <b>Note to trainer:</b> Ensure that participant demonstrated correct procedure for processing each of the above items.					
6. Select an appropriate method of high-level disinfection (HLD).					



LEARNING GUIDE FOR CLEANING AND DISINFECTING REUSABLE RESPIRATORY EQUIPMENT					
STEP/TASK	CASES				
7. Check that you have all the PPE you need (rubber gloves, gown, rubber apron, goggles or face shield, and mask) to protect against splashing, spraying or aerosols.					
<b>PROCESSING REUSABLE RESPIRATORY EQUIPMENT</b>					
1. Perform routine hand hygiene					
2. Put on appropriate PPE: <input type="checkbox"/> a gown <input type="checkbox"/> a rubber apron <input type="checkbox"/> face protection such as a full face shield or an eye protector such as a visor or goggles <input type="checkbox"/> a medical mask <input type="checkbox"/> rubber gloves					
3. Using technical guidance in Table I, determine the correct procedure and appropriately decontaminate each of the following pieces of equipment: <input type="checkbox"/> plastic airway <input type="checkbox"/> ambu bag <input type="checkbox"/> CPR face mask <input type="checkbox"/> rubber suction catheter <input type="checkbox"/> plastic suction catheter <input type="checkbox"/> ventilator tubing					
4. Rinse equipment immediately after decontamination where applicable.					
5. Separate all parts or pieces of equipment to allow access to all surfaces.					
6. Using technical guidance in Table I, determine the correct procedure and appropriately wash and clean each of the following pieces of equipment with soap or detergent (liquid dish soap) and clean water until all visible signs of soiling are removed: <input type="checkbox"/> plastic airway <input type="checkbox"/> ambu bag <input type="checkbox"/> CPR face mask <input type="checkbox"/> rubber suction catheter <input type="checkbox"/> plastic suction catheter <input type="checkbox"/> ventilator tubing					
7. Using technical guidance in Table I, determine the correct procedure and, appropriately rinse each of the following pieces of equipment completely with clean water inside and out: <input type="checkbox"/> plastic airway <input type="checkbox"/> ambu bag <input type="checkbox"/> CPR face mask <input type="checkbox"/> rubber suction catheter <input type="checkbox"/> plastic suction catheter <input type="checkbox"/> ventilator tubing					

**LEARNING GUIDE FOR CLEANING AND DISINFECTING  
REUSABLE RESPIRATORY EQUIPMENT**

STEP/TASK	CASES			
<p>8. Using technical guidance in Table I, determine the correct procedure and, appropriately disinfect each of the following pieces of equipment:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> plastic airway</li> <li><input type="checkbox"/> ambu bag</li> <li><input type="checkbox"/> CPR face mask</li> <li><input type="checkbox"/> rubber suction catheter</li> <li><input type="checkbox"/> plastic suction catheter</li> <li><input type="checkbox"/> ventilator tubing</li> </ul>				
<p>9. Dry all cleaned and disinfected equipment before storage. Equipment parts may also be air dried on a clean towel or cloth.</p>				
<p>10. Store all cleaned and disinfected equipment dry in closed individual packages.</p>				

## CHECKLIST ONE

### HANDWASHING

Place a “**C**” in case box if step is performed **competently** or an “**N**” if it is **not** performed **competently** or is omitted.

**Competent:** Performs the step according to the standard procedure or guidelines.

**Not Competent:** Unable to perform the step according to the standard procedure or guidelines, or does not perform the step at all.

CHECKLIST FOR HANDWASHING WITH SOAP AND WATER					
STEP/TASK	CASES				
<b>PREPARATION</b>					
1. Check flow of clean water (tap, shower) and waste water container if no drains. <b>Note:</b> Used water should be collected in a basin and discarded in a latrine if a drain is not available.					
2. Ready personal towel or a single-use paper towel.					
3. Locate soap.					
<b>SKILL/ACTIVITY PERFORMED SATISFACTORILY</b>					
<b>WASHING HANDS</b>					
4. Moisten hands thoroughly with soap and running water.					
5. Thoroughly wash all areas of hands and fingers for at least 10–15 seconds.					
6. Rub hands palm to palm.					
7. Rub right palm over back of left hand with interlaced fingers.					
8. Rub left palm over back of right hand with interlaced fingers.					
9. Rub palm to palm with fingers interlaced.					
10. Rub back of fingers of right hand over palm of left hand with fingers interlocked.					
11. Rub back of fingers of left hand over palm of right hand with fingers interlocked.					
12. Rotationally rub right thumb while clasped in left palm.					
13. Rotationally rub left thumb while clasped in right palm.					
14. Rotationally rub backwards and forwards with clasped fingers of right hand in left palm.					
15. Rotationally rub backwards and forwards with clasped fingers of left hand in right palm.					
16. Rinse hands thoroughly with clean water.					
17. Dry hands with a personal towel or a single-use paper towel and use the towel to turn off the faucet, or air dry hands.					
18. Throw paper towel into the basket (if using personal towel, hang and allow to air dry).					
<b>SKILL/ACTIVITY PERFORMED SATISFACTORILY</b>					

## CHECKLIST TWO

### HANDRUB WITH ALCOHOL-BASED FORMULATION

Place a “**C**” in case box if step is performed **competently** or an “**N**” if it is **not** performed **competently** or is omitted.

**Competent:** Performs the step according to the standard procedure or guidelines.

**Not Competent:** Unable to perform the step according to the standard procedure or guidelines, or does not perform the step at all.

CHECKLIST FOR HANDRUB WITH ALCOHOL-BASED FORMULATION					
STEP/TASK	CASES				
<b>PREPARATION</b>					
1. If hands not visibly dirty, locate alcohol-based handrub container.					
<b>SKILL/ACTIVITY PERFORMED SATISFACTORILY</b>					
<b>WASHING HANDS</b>					
2. Apply a palmful of handrub product in a cupped hand and spread out to cover all surfaces.					
3. Rub hands, palm to palm.					
4. Rub right palm over back of left hand with interlaced fingers.					
5. Rub left palm over back of right hand with interlaced fingers.					
6. Rub palm to palm with fingers interlaced.					
7. Rub back of fingers of right hand over palm of left hand with fingers interlocked.					
8. Rub back of fingers of left hand over palm of right hand with fingers interlocked.					
9. Rotationally rub right thumb while clasped in left palm.					
10. Rotationally rub left thumb while clasped in right palm.					
11. Rotationally rub backwards and forwards with clasped fingers of left hand in right palm.					
12. Rotationally rub backwards and forwards with clasped fingers of left hand in right palm					
<b>SKILL/ACTIVITY PERFORMED SATISFACTORILY</b>					

## CHECKLIST THREE

### DONNING AND REMOVING PPE

Place a “**C**” in case box if step is performed **competently** or an “**N**” if it is **not** performed **competently** or is omitted.

**Competent:** Performs the step according to the standard procedure or guidelines.

**Not Competent:** Unable to perform the step according to the standard procedure or guidelines, or does not perform the step at all.

CHECKLIST FOR DONNING AND REMOVING PPE					
STEP/TASK	CASES				
<b>DONNING PPE</b>					
1. Don before contact with the patient.					
2. Check that all PPE and disposal bins are available.					
3. Wash hands with soap or use alcohol-based handrub.					
4. Don PPE in the following sequence: <ul style="list-style-type: none"> <li>• Gown first</li> <li>• Mask or respirator covering nose and mouth</li> <li>• Protective eyewear: visor, face shield or goggles</li> <li>• Gloves</li> </ul>					
<b>SKILL/ACTIVITY PERFORMED SATISFACTORILY</b>					
<b>REMOVING PPE</b>					
1. Stand at patient’s room doorway.					
2. Remove PPE in the following sequence (not touching contaminated parts): <ul style="list-style-type: none"> <li>• Gloves</li> <li>• Protective eyewear</li> <li>• Gown</li> </ul>					
3. Discard PPE in waste container.					
4. Leave the patient’s room and close the door.					
5. Remove mask or respirator.					
6. Wash hands with soap or use alcohol-based handrub.					
<b>SKILL/ACTIVITY PERFORMED SATISFACTORILY</b>					

**Note:** Combination of PPE will affect sequence—be practical!

## CHECKLIST FOUR

### CLEANING AND DISINFECTING REUSABLE RESPIRATORY EQUIPMENT

Place a “**C**” in case box if step is performed **competently** or an “**N**” if it is **not** performed **competently** or is omitted.

**Competent:** Performs the step according to the standard procedure or guidelines.

**Not Competent:** Unable to perform the step according to the standard procedure or guidelines, or does not perform the step at all.

CHECKLIST FOR CLEANING AND DISINFECTING REUSABLE RESPIRATORY EQUIPMENT					
STEP/TASK	CASES				
<b>PREPARATION</b>					
1. Perform routine hand hygiene.					
2. Put on the proper PPE: <ul style="list-style-type: none"> <li>• a gown</li> <li>• a rubber apron</li> <li>• face shield or medical mask and protective eyewear</li> <li>• rubber utility gloves</li> </ul>					
<b>SKILL/ACTIVITY PERFORMED SATISFACTORILY</b>					
<b>CLEANING AND DISINFECTING SUCTION CATHETERS</b>					
1. Fill a plastic container (or utility sink) with clean water.					
2. Using a brush and liquid or powder detergent, scrub tubing under the surface of the water, removing all blood and other foreign matter.					
3. Pass soapy water through the catheters three times.					
4. Thoroughly rinse the instruments and other items with clean water three times (inside and outside).					
5. Select an appropriate method of HLD					
6. Air dry before use or storage.					
<b>SKILL/ACTIVITY PERFORMED SATISFACTORILY</b>					
<b>CLEANING AND DISINFECTING PLASTIC AIRWAYS</b>					
1. Wash all surfaces with soap and water.					
2. Rinse with clean water until no soap remains.					
3. Select an appropriate method of HLD.					
4. Air dry before use or storage.					
<b>SKILL/ACTIVITY PERFORMED SATISFACTORILY</b>					

CHECKLIST FOR CLEANING AND DISINFECTING REUSABLE RESPIRATORY EQUIPMENT					
STEP/TASK	CASES				
<b>CLEANING AND DISINFECTING VENTILATOR TUBING</b>					
1. Using a brush, wash with soap and water.					
2. Rinse in clean water until no soap remains.					
3. Select an appropriate method of HLD.					
4. Air dry before use or storage.					
<b>SKILL/ACTIVITY PERFORMED SATISFACTORILY</b>					
<b>CLEANING AND DISINFECTING AMBU BAGS AND CPR FACE MASKS</b>					
1. Wipe exposed surfaces with a gauze pad soaked in 60–90% alcohol or 0.5% chlorine. If surfaces are soiled with organic substances such as blood or other body fluids, use 0.5% chlorine solution. Alcohol is not effective in the presence of organic matter.					
2. Rinse immediately.					
3. Wash exposed surfaces with soap and water.					
4. Rinse with clean water.					
5. Select an appropriate method of HLD.					
6. Air dry before use or storage.					
<b>SKILL/ACTIVITY PERFORMED SATISFACTORILY</b>					
<b>PPE AND HAND HYGIENE AFTER CLEANING</b>					
1. Remove all PPE without touching contaminated areas.					
2. Wash hands with soap and running (or poured) water. Dry with a clean, individual towel or paper towel, or allow hands to air dry. OR Rub hands with an alcohol-based solution until the hands are dry (if hands <b>are not</b> visibly soiled).					
<b>SKILL/ACTIVITY PERFORMED SATISFACTORILY</b>					

# TABLES

**TABLE 1: EARLY RECOGNITION AND CARE OF PATIENTS WITH SUSPECTED OR CONFIRMED RESPIRATORY INFECTIONS**

Scenario: <i>A patient arrives at the HCF with coughing and fever</i>	Reception	Physical Exam/Triage	Nursing Care
<b>Expected types of procedures/patient interactions</b>			
<b>Proximity to patient</b>			
<b>Likelihood of contact with body fluids</b>			
<b>Measures to stop transmission of infection</b>			
<b>Infection control supplies required</b>			



**TABLE 2: GUIDELINES FOR CLEANING AND DISINFECTING REUSABLE RESPIRATORY EQUIPMENT<sup>1</sup>**

<b>Process</b>	<b>Decontamination is the first step in handling used items; it reduces risk of HBV, HCV and HIV viruses.</b>	<b>Cleaning removes all visible blood, body fluids and dirt.</b>	<b>Sterilization destroys all microorganisms, including endospores.</b>	<b>High-Level Disinfection destroys all viruses, bacteria, parasites, fungi and some endospores.</b>
<b>INSTRUMENTS OR OTHER ITEMS</b>	<b>DECONTAMINATION</b>	<b>CLEANING</b>	<b>STERILIZATION<sup>a</sup></b>	<b>HIGH-LEVEL DISINFECTION<sup>b</sup></b>
<b>AIRWAYS (PLASTIC)</b>	Soak in a 0.5% chlorine solution for 10 minutes prior to cleaning. Rinse and wash immediately.	Wash with soap and water. Rinse with clean water, air or towel dry.	Not necessary.	<ul style="list-style-type: none"> <li>• HLD recommended. Methods vary regionally.</li> <li>• Air dry before use.</li> </ul>
<b>AMBU BAGS AND CPR FACE MASKS</b>	Wipe exposed surfaces with gauze pad soaked in 60–90% alcohol or 0.5% chlorine; rinse immediately. If masks are soiled with organic substances such as blood or other body fluids, use 0.5% chlorine solution. Alcohol is not effective in the presence of organic matter.	Wash with soap and water. Rinse with clean water, air or towel dry.	Not necessary.	<ul style="list-style-type: none"> <li>• HLD recommended.</li> <li>• Methods vary regionally.</li> <li>• Air dry before use.</li> </ul>
<b>SUCTION CATHETERS (RUBBER OR PLASTIC)</b>	Soak in 0.5% chlorine solution for 10 minutes prior to cleaning. Rinse or wash immediately.	Pass soapy water through catheter three times. Rinse three times with clean water (inside and outside).	Not recommended. (Heat from autoclaving or dry-heat ovens will damage plastic catheters; rubber catheters can be autoclaved.)	<ul style="list-style-type: none"> <li>• HLD recommended.</li> <li>• Methods vary regionally.</li> <li>• Air dry before use.</li> </ul>
<b>VENTILATOR TUBING</b>	Not necessary.	Using a brush, wash with soap and water. Rinse with clean water and air dry.	Not possible using an autoclave or dry heat oven.	<ul style="list-style-type: none"> <li>• HLD recommended. Methods vary regionally.</li> <li>• Air dry before use.</li> </ul>

<sup>1</sup> Adapted from: Tietjen L, Bossemeyer D and McIntosh N. 2003. *Infection Prevention Guidelines for Healthcare Facilities with Limited Resources*. Jhpiego: Baltimore, MD.

**TABLE 3: PREPARING DILUTE CHORINE SOLUTIONS FROM LIQUID BLEACH (SODIUM HYPOCHLORITE SOLUTION) FOR DECONTAMINATION AND HIGH-LEVEL DISINFECTION**

TYPE OR BRAND OF BLEACH (BY COUNTRY)	CHLORINE % Available	PARTS WATER TO 1 PART BLEACH <sup>a</sup>	
		0.5%	0.1% <sup>b</sup>
8 °chlorum <sup>c</sup>	2.4%	4	23
JIK (Kenya), Robin Bleach (Nepal)	3.5%	6	34
12 °chlorum	3.6%	6	35
Household bleach (USA, Indonesia), ACE (Turkey), Eau de Javal (France) (15 °chlorum)	5%	9	49
Blanquedor, Cloro (Mexico)	6%	11	59
Lavandina (Bolivia)	8%	15	79
Chloros (UK)	10%	19	99
Chloros (UK), Extrait de Javel (France) (48 °chlorum <sup>c</sup> )	15%	29	149

<sup>a</sup> Read as one part (e.g., cup or glass) concentrated bleach to x parts water (e.g., JIK [0.5% solution]—mix 1 cup bleach with 6 cups water for a total of 7 cups).  
<sup>b</sup> Use boiled water when preparing a 0.1% chlorine solution for HLD because tap water contains microscopic organic matter that inactivates chlorine.  
<sup>c</sup> In some countries, the concentration of sodium hypochlorite is expressed in chlorometric degrees (°chlorum); one °chlorum is approximately equivalent to 0.3% available chlorine.  
*Adapted from: WHO 1989.*

**Notes:**

**How to Make a Dilute Chlorine Solution<sup>2</sup>**

Chlorine solutions made from sodium hypochlorite generally are the least expensive and the most rapid acting and effective products to use for decontamination.

**Formula for Making a Dilute Solution from a Concentrated Solution**

- Check concentration (% concentrate) of the chlorine product you are using. Determine total parts water needed using the formula below.

$$Total\ Parts\ (TP)\ water = \left[ \frac{\% Concentrate}{\% Dilute} \right] - 1$$

- Mix 1 part concentrated bleach with the total parts water required.

**Example:** Make a dilute solution (0.5%) from 5% concentrated solution.

**STEP 1:** Calculate TP water:  $\left[ \frac{5.0\%}{0.5\%} \right] - 1 = 10 - 1 = 9$

**STEP 2:** Take 1 part concentrated solution and add to 9 parts water.

<sup>2</sup> Adapted from: Tietjen L, Bossemeyer D and McIntosh N. 2003. *Infection Prevention Guidelines for Healthcare Facilities with Limited Resources*. Jhpiego: Baltimore, MD.

**TABLE 4: PREPARING DILUTE CHORINE SOLUTIONS  
FROM DRY POWDERS**

AVAILABLE CHLORINE REQUIRED	0.5%	0.1% <sup>b</sup>
Calcium hypochlorite (70% available chlorine)	7.1 g/L <sup>a</sup>	1.4 g/L
Calcium hypochlorite (35% available chlorine)	14.2 g/L	2.8 g/L
NaDCC <sup>c</sup> (60% available chlorine)	8.3 g/L	1.5 g/L
Chloramine <b>tablets</b> <sup>d</sup> (1 g of available chlorine per tablet)	20 g/L (20 tablets/liter) <sup>d</sup>	4 g/L (4 tablets/liter) <sup>d</sup>
NaDCC-based <b>tablets</b> (1.5 g of available chlorine per tablet)	4 tablets/liter	1 tablet/liter

<sup>a</sup> For dry powders, read x grams per liter (example: Calcium hypochlorite—7.1 grams mixed with 1 liter water).

<sup>b</sup> Use boiled water when preparing a 0.1% chlorine solution for HLD because tap water contains microscopic organic matter that inactivates chlorine.

<sup>c</sup> Sodium dichloroisocyanurate

<sup>d</sup> Chloramine releases chlorine at a slower rate than does hypochlorite. Before using the solution, be sure the tablet is completely dissolved.

*Adapted from: WHO 1989.*

**Notes:**

**Formula for Making Chlorine Solutions from Dry Powders**

Check concentration (% concentrate) of the powder you are using. Determine grams bleach needed using the formula below.

$$\text{Grams/Liter} = \left[ \frac{\% \text{ Dilute}}{\% \text{ Concentrate}} \right] \times 1000$$

Mix measured amount of bleach powder with 1 liter of water.

**Example:** Make a dilute chlorine-releasing solution (0.5%) from a concentrated powder (35%).

**Step 1:** Calculate grams/liter:  $\left[ \frac{0.5\%}{35\%} \right] \times 1000 = 14.2 \text{ g / L}$

**Step 2:** Add 14.2 grams (~14 g) to 1 liter of water.

The approximate amounts (grams) needed to make 0.1% and 0.5% chlorine-releasing solutions from several commercially available chlorine-releasing compounds (dry powders) are listed in Table 4.

**TABLE 5: “MATCH THE MASK TO THE ACTIVITY”**

<b>Task or Activity</b>	<b>Are Masks Needed?</b>	<b>Preferred Masks</b>
Blood pressure check by HCW on patient with no ARD symptoms in region with outbreak of avian flu.		
Temperature check by HCW on patient who is coughing and sneezing.		
Patient with no ARD symptoms who is undergoing outpatient treatment for tuberculosis comes to district clinic for routine checkup with HCW.		
Physical examination by HCW of patient with active tuberculosis in airborne precaution room.		
Transport of patient hospitalized with known avian flu outside of isolation area for chest x-ray.		
HCW enters well-ventilated private room of patient with seasonal influenza virus.		
Patient is coughing and sneezing while sitting in the waiting room waiting to see the doctor.		
Patient is admitted to the hospital with cough and fever. The HCW obtains an induced sputum collection.		
Patient is admitted to the hospital with asthma and ARD symptoms. The HCW administers nebulized drug therapy.		
Patient is brought into the emergency department in cardiac arrest and undergoes resuscitation including intubation.		
HCW performs temperature check on patient with documented streptococcal pneumonia.		
There has been an outbreak of influenza associated with high mortality in the region. A patient who is coughing and sneezing is standing in line waiting to be seen by a HCW.		

**TABLE 6: INFECTION CONTROL MEASURES FOR PROCEDURES ON PATIENTS WITH SUSPECTED OR CONFIRMED RESPIRATORY INFECTIONS**

<i>Scenario:</i> <i>A patient with a respiratory infection undergoes a medical procedure</i>	<b>Nebulized Drug Therapy</b>	<b>Collection of an Induced Sputum Specimen</b>	<b>Resuscitation, Intubation, Suctioning and/or Extubation</b>	<b>Bronchoscopy</b>
<b>Expected types of procedures/patient interactions</b>				
<b>Proximity to patient during the procedure</b>				
<b>Likelihood of contact with blood or body fluids</b>				
<b>Measures to stop transmission of infection including types of PPE available</b>				
<b>Infection control supplies required</b>				

**TABLE 7: INFECTION CONTROL MEASURES FOR HEALTH CARE WORKERS CARING FOR PATIENTS WITH FEBRILE ACUTE RESPIRATORY DISEASES IN SPECIFIC CLINICAL SETTINGS AND PROCEDURES**

SETTING OR PROCEDURE	INFECTION CONTROL MEASURES							
	Hand hygiene	Gloves	Gown	Medical mask for HCW	Particulate respirator for HCW	Eye protection	Respiratory etiquette	Adequately ventilated <u>single</u> room ( $\geq 12$ ACH) <sup>a</sup>
Reception <sup>b</sup>								
Physical exam/triage								
General nursing care								
Specimen collection (blood)								
Nebulization								
Specimen collection (induced sputum)								
Aerosol-generating procedure								

HCW: Health care worker; ACH: Air changes per hour

<sup>a</sup> All spaces in the health facility should be well-ventilated, not only the single rooms used for isolation purposes.

<sup>b</sup> Without any direct contact with patient.

**Explanatory notes**

	No anticipated close contact with the patient.
	Involves close contact (< 1 meter) with patient.
	Aerosol-generating procedure associated with pathogen transmission—e.g., intubation; cardiopulmonary resuscitation and related procedures (e.g., manual ventilation, suction); bronchoscopy; and autopsy or surgery involving the use of high-speed devices.

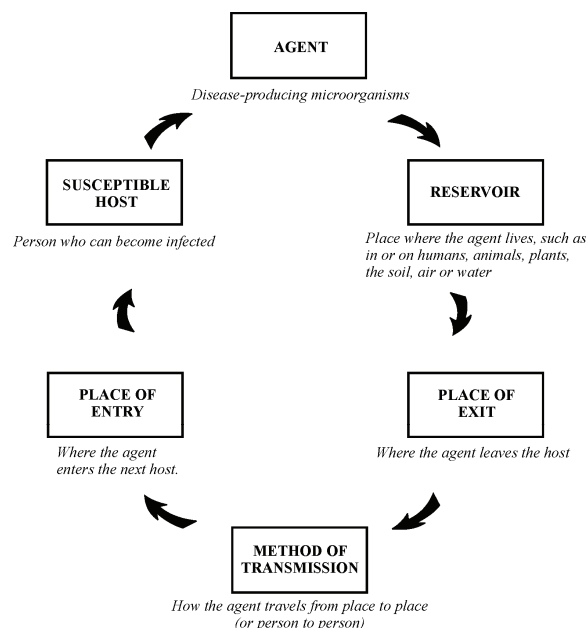
# APPENDIX A: THE DISEASE TRANSMISSION CYCLE, TRANSMISSION TYPES AND PREVENTION

Microorganisms live everywhere in our environment. Humans normally carry them on their skin and in the upper respiratory, intestinal and genital tracts. In addition, microorganisms live in animals, plants, soil, air and water. Some microorganisms, however, are more **pathogenic** than others, that is, they are more likely to cause disease. Given the right circumstances, **all** micro-organisms may cause infection, such as when transmitted to an immuno-compromised patient with AIDS.

All humans are susceptible to bacterial infections and also to most viral agents. The number (dose) of organisms necessary to produce infection in a susceptible host varies with the location. When organisms come in contact with bare skin, infection risk is quite low, and all of us touch materials that contain some organisms every day. When the organisms come in contact with mucous membranes or nonintact skin, infection risk increases. Infection risk increases greatly when organisms come in contact with normally sterile body sites, and the introduction of only a few organisms may produce disease.

For bacteria, viruses and other infectious agents to survive and spread, certain factors or conditions must exist. The essential factors in the transmission of disease-producing microorganisms from person to person are illustrated and defined in **Figure 1**.

**Figure 1. The Disease Transmission Cycle**



Source: APIC 1983; WHO/WPRO 1990.

As shown in the above figure, a disease must have certain conditions in order to spread (be transmitted) to others:

- There must be an **agent**—something that can cause illness (virus, bacteria, etc.).
- The agent must have a place it can live (**host** or **reservoir**). Many microorganisms that cause disease in humans (pathogenic organisms) multiply in humans and are transmitted from person to person. Some are transmitted through contaminated food or water (typhoid), fecal matter (hepatitis A and other enteric viruses) or the bites of infected animals (rabies) and insects (malaria from mosquitoes).
- The agent must have the right environment outside the host to survive. After the microorganism leaves its host, it must have a suitable environment in which to survive until it infects another person. For example, the bacteria that cause tuberculosis can survive in sputum for weeks, but will be killed by sunlight within a few hours.
- There must be a person who can catch the disease (**susceptible host**). People are exposed to disease-causing agents every day but do not always get sick. For a person to catch an infectious disease (e.g., mumps, measles or chicken pox), he or she must be susceptible to that disease. The main reason most people do not catch the disease is that they have been previously exposed to it (i.e., vaccinated for it or previously had the disease) and their body's immune system now is able to destroy the agents when they enter the body.
- An agent must have a way to move from its host to infect the next susceptible host. Infectious (communicable) diseases are spread mainly in the following ways:

**CONTACT TRANSMISSION**, the most important and frequent mode of transmission of nosocomial infections, is divided into two subgroups: direct-contact transmission and indirect-contact transmission.

a) **Direct-contact transmission** involves a direct body surface-to-body surface contact and physical transfer of microorganisms between a susceptible host and an infected or colonized person, such as occurs when a person turns a patient, gives a patient a bath or performs other patient care activities that require direct personal contact. Direct-contact transmission can also occur between two patients, with one serving as the source of the infectious microorganisms and the other as a susceptible host.

b) **Indirect-contact transmission** involves contact of a susceptible host with a contaminated intermediate object, usually inanimate, such as contaminated instruments, needles or dressings, or contaminated hands that are not washed and gloves that are not changed between patients.

2. **DROPLET TRANSMISSION** theoretically, is a form of contact transmission. However, the mechanism of transfer of the pathogen to the host is quite distinct from either direct- or indirect-contact transmission. Droplets are generated from the source person primarily during coughing, sneezing and talking, and during the performance of certain procedures such as suctioning and bronchoscopy. Transmission occurs when droplets containing microorganisms generated from the infected person are propelled a short distance (within 1 meter or 3 feet) through the air and deposited on the host's conjunctivae, nasal mucosa or mouth. Because droplets do not remain suspended in the air, special air handling and ventilation are not required to prevent droplet transmission; that is, droplet transmission must not be confused with airborne transmission.



### **3. AIRBORNE TRANSMISSION**

particle residue [5 µm or smaller in size] of evaporated droplets containing microorganisms that remain suspended in the air for long periods of time) or dust particles containing the infectious agent. Microorganisms carried in this manner can be dispersed widely by air currents and may become inhaled by a susceptible host within the same room or over a longer distance from the source patient, depending on environmental factors; therefore, special air handling and ventilation are required to prevent airborne transmission.

Microorganisms are transmitted in hospitals by several routes, and the same microorganism may be transmitted by more than one route. Transmission-Based Precautions are designed to prevent transmission of microorganisms by these routes in hospitals. Because agent and host factors are more difficult to control, interruption of transfer of microorganisms is directed primarily at transmission.

## **PREVENTING TRANSMISSION OF INFECTION**

Preventing the spread of infectious diseases requires removing one or more of the conditions necessary for transmission of the disease from host or reservoir to the next susceptible host by:

- Inhibiting or killing the agent (e.g., applying an antiseptic agent to the skin before surgery);
- Blocking the agent's means of getting from an infected person to a susceptible person (e.g., handwashing or using a waterless, alcohol-based antiseptic handrub to remove bacteria or viruses acquired through touching an infected patient or contaminated surface);
- Making sure that people, especially health care workers, are immune or vaccinated; and
- Providing health care workers with the appropriate protective equipment to prevent contact with infectious agents (e.g., masks, face shields, gowns, heavy-duty gloves for housekeeping and waste removal staff).



# COURSE EVALUATION

(To be completed by **Participants**)

Please indicate on a 1–5 scale your opinion of the following course components:

5–Strongly Agree	4–Agree	3–No Opinion	2–Disagree	1–Strongly Disagree
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COURSE COMPONENT	RATING
1. The initial knowledge assessment helped me to study more effectively.	
2. The case studies were helpful in learning respiratory infection control practices.	
3. I am now confident in applying respiratory infection control practices for avian or pandemic influenza.	
4. I am now confident in applying respiratory infection control practices for tuberculosis.	
5. There was sufficient time scheduled for development of a plan for prevention of transmission of avian or pandemic influenza in my health care facility.	
6. There was sufficient time scheduled for development of a plan for prevention of transmission of tuberculosis in my health care facility.	
7. The training approach used in this course made it easier for me to learn infection prevention and control practices for avian or pandemic influenza.	
8. The training approach used in this course made it easier for me to learn infection prevention and control practices for tuberculosis.	
9. The trainers clearly stated the learning objectives.	
10. The trainers communicated clearly and effectively.	
11. The information presented in the course was new to me.	
12. The trainers were interested in the subjects they taught.	
13. The course content (or the content of the sessions) had sufficient theoretical knowledge.	
14. The sessions were well organized.	
15. The trainers asked questions and involved me in the sessions.	
16. The content of the course was useful to my work.	
17. The course made me feel more competent or skillful in my work.	
18. I feel prepared for working with avian or pandemic influenza patients and know what needs to be done to prevent transmission of avian or pandemic influenza in my facility.	
19. I feel prepared for working with tuberculosis patients and know what needs to be done to prevent transmission of tuberculosis in my facility.	

**Additional Comments** (use additional pages if needed)

1. What topics, if any, should be added to improve the course? Why?

2. What topics, if any, should be deleted to improve the course? Why?

3. The length of the course (3 days) was: (circle one)

- Too long
- Too short
- Just right