

Course: Decontamination, Sterilization and Disinfection

Design Document



Part I: Course Overview

Course Description

Overview

Decontamination and Disposal is designed to provide participants a general overview of the various decontamination methods (physical and chemical). It offers activities for students to learn about the properties of general chemical disinfectants (bleach, iodophors, quats, etc.). Participants should complete *Orientation to Biorisk Management*; *Risk Assessment* and *Risk Mitigation strategies* prior to taking this course. An SOP development course would also be helpful prior to taking this course.

Scope

This course will provide awareness of the general properties of chemical disinfectants, why waste needs to be segregated, risks and mitigation controls for waste disposal, autoclave safety, methods for validating waste treatment and decontamination procedures.

Learning Level

based on
Bloom's taxonomy

- ✓ knowledge
- ✓ comprehension
- ✓ application
- synthesis
- evaluation

Length of Course

4 hours

Course Objectives

At the end of this course, students will be able to:

Organizational Objectives

- Discuss the various decontamination methods used for surface and area decontamination.
- Discuss the differences between disinfection, decontamination, and sterilization.
- Explain how validation of the decontamination procedure is conducted and be able to interpret the results.
- Be able to describe the process to develop standard operating procedures and validation methods.

Instructional Objectives

- Define, give examples, and demonstrate proper (based on risk assessment) techniques to decontaminate work surfaces, equipment, and waste, per lab-specific SOPs;
- Define, give examples, and demonstrate proper (based on risk assessment) techniques to segregate and contain waste, per lab-specific SOPs.
- Identify hazards and limitations of decontamination methods;
- Understand how and autoclave works to sterilize a biological load;
- Explain how validation of the decontamination procedure is

conducted and be able to interpret the results;

- Describe disinfection, decontamination, and sterilization methods;

Personal Objectives

Know

- Know the various ways and definitions associated with disinfection, decontamination and sterilization. Know that all disinfectants have their limitations. Know safety rules for autoclave use

Feel

- Competent in selection and use of appropriate disinfection and decontamination procedures

Do

- Choose and appropriate disinfectant and write a simple SOP for its use. Use various validation methods to ensure appropriate disinfection or sterilization.

Key Messages

1. Disinfection and decontamination have similar meanings. Both are less rigorous than sterilization which is the complete removal of all life.
2. No disinfectant is ideal, they all have strengths and limitations. Understanding the strengths and limitations is key to their use.
3. There are a number of factors that determines how effective a particular disinfectant is.
4. Micro-organisms have various innate resistance to disinfectants
5. Autoclaves can be used to sterilize things through wet heat and the application of appropriate time, pressure and temperature.
6. Wet heat is much more effective than dry heat.
7. Validation is a process to ensure that the decontamination, disinfection or sterilization process used was complete and achieved its requirements

Evaluation Strategy

Level 1 (satisfaction):

Students will complete a satisfaction survey about their experience with the course

Level 2 (learning):

Students will complete a “learning contract” for the next steps needed to begin biorisk management implementation

Level 3 (behavior):

Desired behavior is for students to participate in additional learning opportunities on BRM – this behavior will be evaluated three to six months post-training and may encompass additional training courses

Level 4
(organizational change):

A repeat of the training needs assessment will be performed at least annually – this annual assessment can be compared to the baseline assessment to determine improvements in biorisk management performance

Student Description (for course design purposes)

Number of students

10 to 25; small groups of 5 people each

Biorisk Management Role

- ✓ Policy Makers
- ✓ Top Management
- ✓ Biorisk Management Advisors/Advocates
- ✓ Scientific/Lab Management
- ✓ Workforce

Audience Assumptions

(assumed range is indicated by shaded cells)

		Novice		Practitioner		Expert
Education	Scientific	1	2	3	4	5
	BRM*	1	2	3	4	5
Expertise	Scientific	1	2	3	4	5
	BRM	1	2	3	4	5
Competence	Scientific	1	2	3	4	5
	BRM	1	2	3	4	5

BRM = "biorisk management". See definitions for terms in Resources section

**Language of instruction;
translation or
interpretation anticipated**

English (for design purposes)

Prerequisites

None

**Pre- or post-work required
for completion**

None

**Certificates or documents
of completion**

Certificates of completion will be provided

**Preparation for future
coursework**

This course is a pre-requisite for all other courses in the biorisk management curriculum

Anticipated next steps

Students will participate in either the management & leadership, advice & advocacy, or skills & competency biorisk management tracks, as defined by the local training needs assessment and other SME recommendations.

Instructional Environment

Number of Instructors/Staff required TBD depending on number of students – optimal ratio is 1 instructor per no more than 12 students

Instructor Qualification Instructors must have completed BRM Curriculum Orientation, which includes this course, and be enrolled in the BRM training network.

Learning Environment

Media Instructor-led

Exercises & Activities

Experience (Activists) Students will be asked to consider their experiences with their work in regard to safe and secure handling of biological agents and toxins

Reflection (Reflectors) Students will be asked to reflect on those experiences to help develop a model for effective safe and secure handling of biological agents and toxins; students will be asked to reflect on the next steps for working towards biorisk management in their work

Models (Theorists) Students will be introduced, through their own experiences and reflections, to management system models (Plan – Do – Check – Act) and to the biorisk management AMP (Assessment, Mitigation, Performance) model

Practice (Pragmatists) Students will be given the opportunity to develop examples of the PDCA and AMP models, as well as describe next steps for applying these models in their facility.

On-Site Specifics

Location TBD

Room organization Clusters of tables to facilitate small group (no more than 5 students per group)

Dress code and/or important cultural considerations TBD

Instructional Materials

Equipment & Supplies Instructor will need to print out the scenario from the notes section of slide 17 to handout to students. Also, each small group or participant should have access to a copy of the WHO Laboratory Biosafety Manual (or at least a copy of Chapter 14 of the manual)

Student Student notes
Glossary

Resources*Dependencies*

WHO Biorisk Management course

*Authorities**References*

CWA 15793
CEN WS 55, 53
WHO Laboratory Biosafety Manual
Glossary of terms (in development)

Terms used in this document

- Knowledge
 - Comprehension
 - Application
 - Synthesis
 - Evaluation
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- Novice – a person who is new to the circumstances, work, etc. in which s/he is placed; beginner
 - Practitioner – a person engaged in the practice of a profession; a person who practices something specified
 - Expert – a person who has special skill or knowledge in some particular field; specialist; authority; trained by practice
 - Education – the act of acquiring particular knowledge or skills, as for a profession
 - Expertise – the process of personally observing, encountering or undergoing something; knowledge or practical wisdom gained from what one has observed, encountered, or undergone
 - Competence – Possession of a suitable or sufficient skill, knowledge, experience, etc. for some specified purpose; properly qualified

Part II: Course Outline/Schedule

Day	Segment time (min)	Time	Topic	Instructional Method	Slide#	KM #	T/F
1	20	00:00	Welcome & Introductions	Lecture, student introductions, course objectives discussions	1-5		T/F
	15	00:20	Biorisk Management	Lecture	6-9		T
	10	00:35	Definitions & Methods of Decontamination	Lecture	10-12	1	T
	35	00:45	Chemical Disinfectants	Small group activities	13-19	2-4	F
	10	01:20	BREAK				
	60	01:30	Properties & Selection of Chemical Disinfectants	Small group activities, plenary discussion	20-25	2	F
	10	02:30	BREAK				
	40	02:40	Additional Methods of Disinfection	Small group activity, plenary discussion	26-37	5	F
	10	03:20	BREAK				
	10	03:30	Validation of Decontamination	Lecture	38	7	T
	20	03:40	Review	Lecture, plenary discussion	39-43		T
		04:00	End of Course				

KM = key messages ; T/F = teaching versus facilitation (instructor-based versus student-based)