

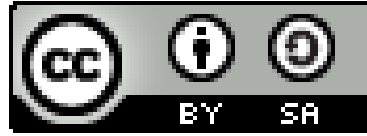
INTRODUCTION TO BIORISK MANAGEMENT

HAZARDS AND RISKS

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INTRODUCTION

The biorisk manager operates within a laboratory environment which can potentially host multiple hazards which can include, in addition to biological hazards, chemical, radiological, ergonomic, electrical and fire hazards. A competent biorisk manager must assess the risks associated with the hazards with the primary objective of minimizing the likelihood of a **breach of containment**.



LEARNING OBJECTIVES

The objectives of this lecture are to:

1. **Introduce you to the concept of hazards and risks.**
 2. Facilitate your understanding of how laboratory process transform hazards into risks.
 3. Introduce you to the process of **hazard identification** and **risk assessment**.
 4. Introduce you to the terms: **residual risk**, **accident** and **incident**.
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LEARNING OUTCOMES

Upon completion of this module you should demonstrate the ability to:

1. **Define and describe the terms hazard and risk.**
 2. Describe how laboratory processes increase the level of risk.
 3. Perform a hazard identification and risk assessment.
 4. Define the terms **residual risk, accident** and **incident**.
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INCIDENT

Event with a **potential** for causing harm.

(adapted from OHSAS 18001:2007)



ACCIDENT

Unintended event giving rise to harm.

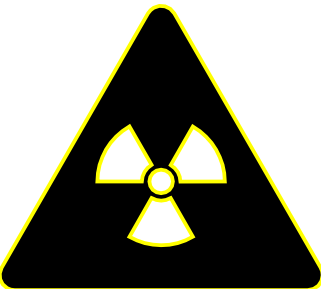
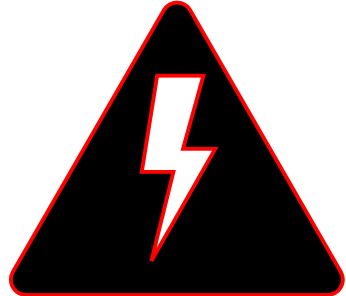


HAZARD

Source, situation, or act with a potential for causing harm.

(adapted from OHSAS 18001:2007)

HAZARDS IN
THE
LABORATORY





RISK

Combination of the **probability** of occurrence of harm and the **severity** of that harm.

(ISO/IEC Guide 51:1999)



RISK

Probability: what is the **likelihood** of the event?

Severity: what are the possible **consequences** of that event?



BIORISK

Combination of the **probability of occurrence** of harm and the **severity** of that harm where the source of harm is a biological agent or toxin.

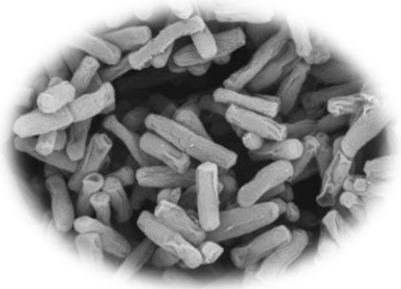
(ISO/IEC Guide 51:1999)



HAZARDS EVOLVE INTO RISKS

- Laboratory **procedures**.
 - **Shipping** of biological agents.
 - **Theft** of biological assets from a containment laboratory.
 - Breach of containment due to accidental fires or natural disasters.
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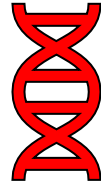
MICROBE
ISOLATED



MICROBE
CULTURED



NEW GENES
INTRODUCED



CULTURE
VOLUME
INCREASED



MICROBE
INJECTED IN
MICE



POTENTIAL FOR
TRANSMISSION?



THE RISK OF ACCIDENTAL RELEASE INCREASES AS THE EXPERIMENTS PROGRESS

THE CONSEQUENCES INCREASE AS THE EXPERIMENTS PROGRESS

HAZARD IDENTIFICATION

RISK ASSESSMENT

RISK CONTROL

RESIDUAL RISK

DECISION



HAZARD IDENTIFICATION

Process of recognizing that a hazard exists and defining its characteristics.

(OHSAS 18001:2007)



BIORISK ASSESSMENT

Process of **evaluating the biorisk(s)** arising from a biohazard(s), taking into account the **adequacy of any existing controls**, and deciding whether or not the biorisk(s) is acceptable.

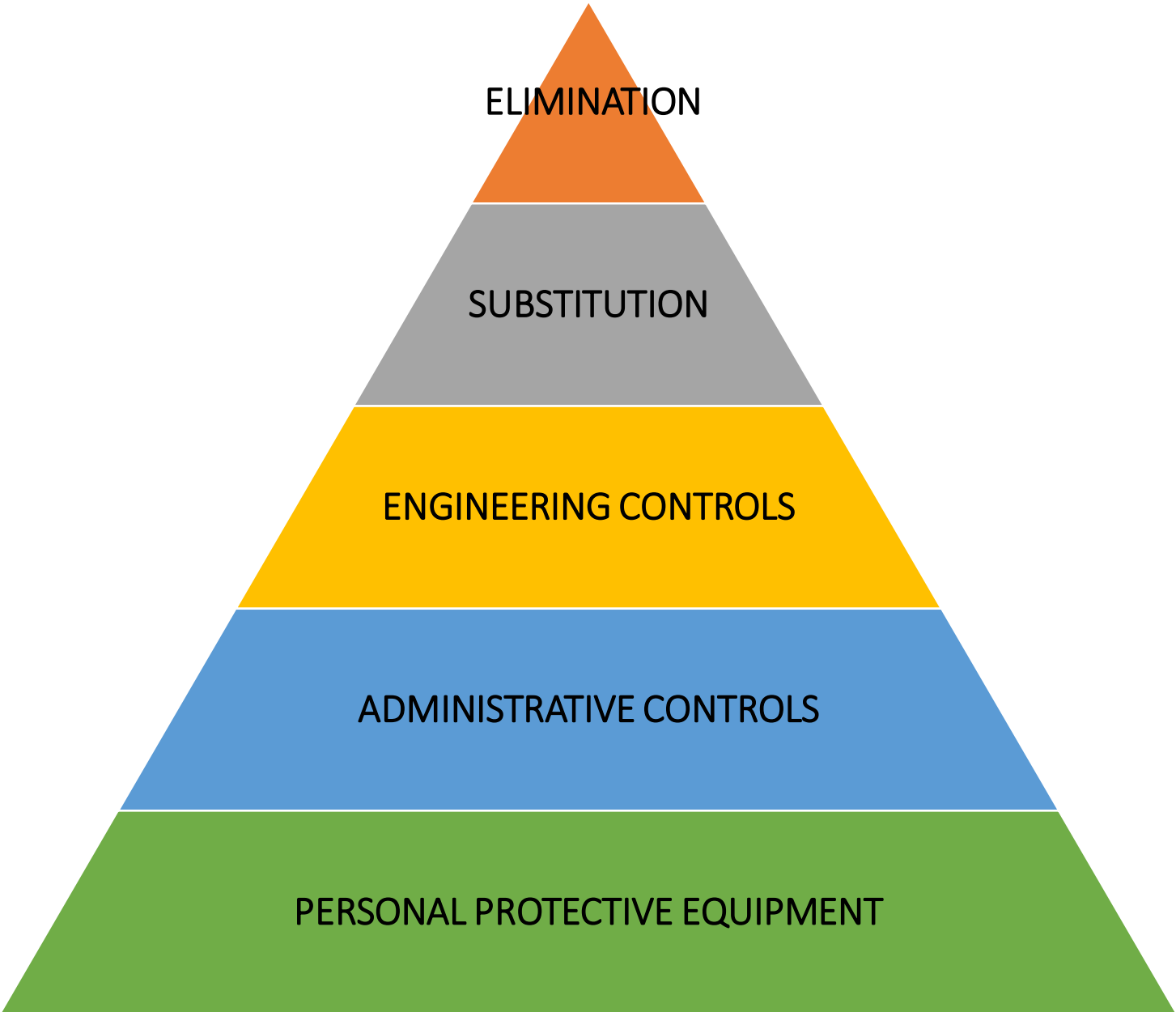
(adapted from OHSAS 18001:2007)



BIORISK CONTROL

Actions implementing biorisk management decisions.

(adapted from ISO/IEC Guide 73:2002)





RESIDUAL RISK

The informed decision to continue laboratory work given the fact that all the personell are aware of the residual risk.

RISK ASSESSMENT: CASE STUDY



BACKGROUND

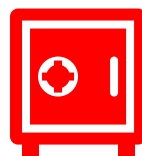
We are a team of biorisk managers and biosafety officer who are tasked with developing a laboratory management system for working with a known infectious biological agent which for which the following information is currently available.



INFORMATION

- Microorganism: VIRUS
 - Risk group classification: RISK GROUP 4
 - Mode of transmission: AEROSOL
 - Portal of entry: NASAL and OCULAR
 - Vaccine available: NO
-

PROCESS





LABORATORY PROCESSES

- Biological agent is **shipped** from the hospital to your facility.
 - **Receipt** of the sample.
 - **Storage** of the sample.
 - **Extraction** of RNA.
 - **Processing** of RNA
 - **Disposal** of waste.
 - Documentation and transfer to the hospital.
-



EXISTING CONTROLS: ADEQUACY

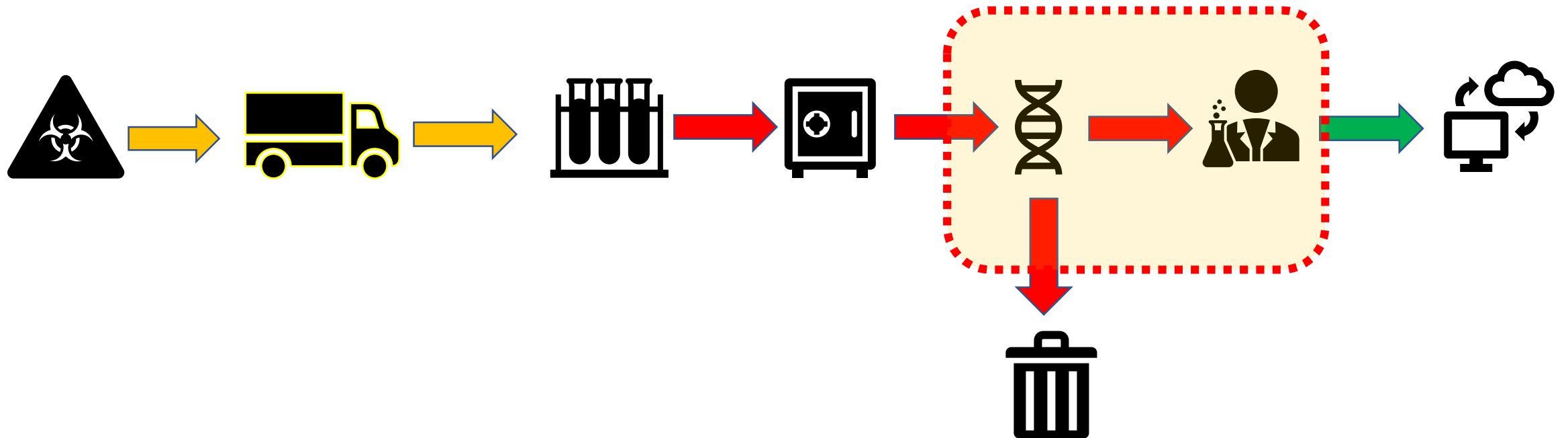
- Facilities?
 - Instrumentation?
 - Competent personnel?
 - Training?
 - Disposal?
 - Contingency plans?
-



RISK(S) WE ARE ATTEMPTING TO ASSESS?

- **Biosafety:** Risk of exposure of the laboratory personnel to the **biological agent**.
 - **Biosafety:** Risk of exposure of the community to the **biological agent**.
 - **Biosecurity:** Risk of intentional release of the **biological asset**.
-

RISK ASSESSMENT: STEP BY STEP



RISK MATRIX

RISK OF EXPOSURE OF LABORATORY PERSONNEL TO THE BIOLOGICAL AGENT DURING PROCESSING OF THE SAMPLE

CONSEQUENCES / LIKELIHOOD	LOW	MODERATE	HIGH	VERY HIGH
	LOW			
MODERATE				
HIGH				
VERY HIGH				

OVERALL RISK MATRIX

RISK OF EXPOSURE OF LABORATORY PERSONNEL TO THE BIOLOGICAL AGENT

PROCESS	RISK
SHIPPING	Yellow
RECEIPT	Orange
STORAGE	Orange
PROCESSING	Red
DISPOSAL	Red
DATA TRANSFER	Yellow

OVERALL RISK MATRIX

RISK OF EXPOSURE OF THE COMMUNITY TO THE BIOLOGICAL AGENT

PROCESS	RISK
SHIPPING	High
RECEIPT	Medium
STORAGE	Medium
PROCESSING	Medium
DISPOSAL	High
DATA TRANSFER	Medium

OVERALL RISK MATRIX

RISK OF THEFT OF THE SAMPLE

PROCESS	RISK
SHIPPING	High
RECEIPT	Medium
STORAGE	Medium
PROCESSING	Low
DISPOSAL	Low
DATA TRANSFER	Low



DECISION POINT

- What is the residual risk?
 - Adequacy: are our facilities adequate?
 - Training: will any additional training be required?
 - Risk mitigation: next step.
-



RISK MITIGATION

- The next lecture will focus on risk mitigation.
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SUMMARY



HAZARD



RISK



RISK
ASSESSMENT



RESIDUAL
RISK



CASE STUDY



RISK MATRIX



THANK YOU

