

*Insert Facility/Institute Logo Here*

**Program Plan *TEMPLATE***

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|  |
| Facility: |
| Document Title: *Incident Response Program Plan*  |
| Document Number: *9-00-001* | Version Number: *00*Effective Date: *MM-DD-YYY* |
| Other documents cross-referenced in this SOP (i.e., manuals, SOPs, forms, records):* Biorisk Management Manual (4-00-001)
* Spill SOP (*4-01-002*)
* *SOPs and Protocols*
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| Revision Number | Sections Changed | Description of Change | Date | Approved By |
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|  |  |
| --- | --- |
| IMPORTANT PHONE NUMBERS |   |
| Medical Emergency…………………………………… | *XXX* |
| Fire……………………………………………………… | *XXX* |
| Police……………………………………………………… | *XXX* |
| Biorisk Management Office…………………………….. | *XXX* |
| Institutional Biosafety committee………………………. | *XXX* |
| EHS emergency number……………………………….. | *XXX* |
| Health clinic……………………………………………… | *XXX* |
| Supervisor emergency number………………………… | *XXX* |
|  Medical emergency after work hours ………………… | *XXX* |
|  HAZMAT…………………………………………………. | *XXX* |
| Department/Ministry of Environment………………… | *XXX* |
|  *[insert more numbers]…………………………………* | *XXX* |

*INSTRUCTIONS: The Incident Response Plan and supporting Standard Operating Procedure (SOP) templates provide a general overview of common considerations and information that should be addressed within a biorisk management incident response program. These templates are not exhaustive, and facilities must customize each document to ensure it is locally applicable and relevant. Many procedures are too “small” to require an entire SOP in and of itself. This is where the Biorisk Management Manual and program plans serve the need to collect all these institution specific procedures in one place. If a procedure requires an SOP, it is recommended to delete the information from the Biorisk Management Manual and instead refer to where the program plan and procedure is found by title and SOP number(s).*

1. **Black text** can be considered generic text that may be appropriate for inclusion in a facility’s biorisk management manual, program plans, and SOPs. It is suggested best practices that have been implemented at similar institutions around the world. It can be modified and adapted to actual facility conditions
2. ***Red text*** should be considered guidance or examples and must be reviewed and replaced with facility-specific information.

**Supervisors Certification**

I hereby certify that I have reviewed the contents of this manual and accompanying program plans/SOPs and verify that it reflects my current operating practices.

I assure that all personnel under my supervision have received appropriate training in laboratory practices prior to working in this laboratory.

Department:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Signature:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Date:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Signature and Acknowledgement of Risk and Facility Training.**

*By signing below:*

I certify that the supervisor has explained the nature of the risks associated with the biohazardous agents that are used in the facility and the possible routes of exposure. My supervisor has provided training on risk identification, risk evaluation, and risk mitigation as well as training describing symptoms and disease presentation that could arise from such an exposure. My supervisor has provided training demonstrating the special handling, personal protective equipment (PPE), and decontamination practices and waste handling that are used in this facility.

My supervisor has discussed this Incident Response Plan with me in detail and identified any additional standard operating procedures that are relevant for my work.

I furthermore acknowledge that I understand the basics of Risk Identification, Risk Evaluation and Risk Mitigation, the purpose of standard operating procedures and why they should be followed.

**I acknowledge that my supervisor has explained risks present in the facility and procedures to be followed. By signing, I certify that I will follow all relevant procedures to the best of my ability.**

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| --- | --- | --- | --- | --- |
| Name (Print) |  | Signature |  | Date |
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fast Safety Facts

*[Insert facility-specific “ground rules.” The below listed are only examples. Delete and modify]*

|  |  |
| --- | --- |
| Rule | Exception |
| Any emergency must be addressed following procedures outlined in the Incident Response Plan | None |
| An After-Action Session will be conducted after every real emergency and simulated exercise/drill to review lessons learned and to develop a plan to address gaps | None |
| Doors must be locked outside work hours | Work doors may be opened by designated personnel when work needs to occur in the evening or other non-work hours |
| Sleeping at the institution for facility personnel is generally not permitted | Unless approved by scientific manager during special occasions (e.g. waiting for rush samples or during shift breaks during an outbreak or emergency) |
| Staff must provide supervisor with an emergency contact outside of work (such as family or neighbor)  | None |
| Staff MUST inform management about conditions/procedures that are not in accordance with the guidelines in this plan | None |
| Staff must work to the best of their capabilities in accordance with institutional SOPs and this plan | None |
| Work outside normal business hours [insert timeframe] is not permitted in the biological work areas | Unless with a colleague and manager’s approval. When staff leave, they must check in with [insert name] and inform them that work is ended. |
| Staff must notify supervisor when they are unable to perform a task due to health conditions, medications taken, or other circumstances | None |

Policies and General Management

Purpose

The purpose of this document is to provide an Incident Response Plan to describe the basic principles of biosafety, biosecurity, biorisk management, and emergency management that are applicable to all-hazards emergency situations. Standard Operating Procedures (SOPs) will be included to describe specific implementation at the *[Insert Facility Name]*. The intent is to provide a comprehensive document for all employees and visitors detailing emergency directions and answers to any questions that might arise regarding incidents while working in the facility with biological materials and related items.

This plan shall be actively consulted by personnel, management, waste handlers, operations and maintenance (O&M) engineers, and others that seek answers. Copies (of the newest revision) should be easily accessible to the staff.

This Incident Response Plan contains institutional policies, general information about facility operations, and references to applicable national and international regulations and guidelines that protect the safety and security of facility personnel and the surrounding environment from biologically hazardous materials.

The SOPs referenced within will provide a comprehensive, adaptable framework for general incident response, and the annex is specific to certain types of incidents (fire, spill, other). These plans and procedures rely on the assumptions that (1) they will be revised and updated on a regular basis from lessons learned in real-life and simulated incidents; (2) staff will be trained on them on a regular basis and as changes are made; and (3) necessary equipment will be available to address the various types of incidents that may impact *[Insert Facility Name]*.

This program supports the Biorisk Management Manual and institutional policies and is supported by a set of SOPs and attachments that describe the facility operations and detailed work processes related to the principles described in this incident response plan *[Refer to Attachments]*.

It is the policy of *[Insert Facility Name]* to comply with national regulations and guidelines, provide a healthy, safe, and secure work environment, prevent environmental contamination, and secure materials and equipment that could be used maliciously.

The guidelines and recommendations herein should improve the safety of the work environment in *[Insert Facility Name]* by minimizing (and eliminating where possible) biological hazards and ensuring that work with biological agents and toxins is conducted in a safe, secure, and reliable manner. This Incident Response Plan is applicable to all directors, managers, investigators, technicians, and staff who visit or work in the facility.

Principle

The scope of *[Insert Facility Name]*’s Incident Response Plan is to provide an overview of the programmatic requirements for preparing, responding to, and recovering from an intentional or unintentional incident. The Incident Response Plan articulates the requirements necessary to control risks associated with incidents of both a safety and security nature.

The biorisk management system and associated Incident Response Plan described herein will enable *[Insert Facility Name]* to:

* Support and evaluate the biorisk management system to control or minimize risk to acceptable levels in relation to employees, the community, and others, as well as the environment, which could be directly or indirectly exposed to biological agents, toxins, or other hazards during an emergency incident;
* Provide assurance that the necessary requirements are in place prior to an emergency incident and implemented effectively during an incident response;
* Provide a framework for training and raising awareness of facility biosafety and biosecurity incident response best practices for personnel.

Biorisk management systems and incident response plans require continual improvement through a cycle of planning, implementing, reviewing, and improving the processes and actions that an organization undertakes to meet its goals. This is known as the PDCA (Plan-Do-Check-Act) principle, which also compliments the AMP (Assessment-Mitigation-Performance) model approach to biorisk management and the Preparedness Cycle for Emergency Management (**Figure 1**).

As shown in the figure and table below, the emergency management perspective is consistent with the PDCA/AMP approach (**Figure 1/Table 1**).



**Figure 1**. Illustration of Plan-Do-Check-Act Cycle aligned with AMP Model.

 The external layer shows how this approach is consistent with the Emergency Management Cycle: Exercise, Evaluate/Improve, Plan/Revise Plan, Equip & Staff, Train.

**Table 1**. Alignment of PDCA/AMP and Emergency Management Cycles [First column adapted from ISO 35001]

|  |  |  |
| --- | --- | --- |
| **Plan-Do-Check-Act** | **AMP** | **Emergency Management** |
| **Plan**: Planning, identification of hazard and risk, and establishing goals | **Assessment** | **Plan/Revise Plan**:Develop written plans, procedures to delineate steps to be taken, roles & responsibilities, communication/coordination |
| **Do**: Implementing training and operational issues | **Mitigation** | **Equip & Staff; Train:** Ensure sufficient staff, equipment available for deploying plan, and that staff are trained on their roles and responsibilities in the plans |
| **Check**: Checking, monitoring, and corrective action | **Performance** | **Exercise or Real Incident**:Staff carry out roles during real-life or fictitious incident |
| **Act**: Reviewing, process innovation, and acting to make needed changes to the management system | **Evaluate/Improve**:Following real-life event, staff meet to discuss lessons learned, conduct gap analysis during an After-Action Review (AAR). Develop an Improvement Plan based on the AAR which informs next steps for plan changes as well as training, equipping and staffing needs |

The intended application of this Incident Response Plan is at the work area level. The above models – PDCA, AMP, and Emergency Management – can be used to expand the scope of this plan and develop a broader Emergency Management Program. An Emergency Management Program may also include the facility and key community partners, such as law enforcement, medical services, public health, fire services, etc.

*[Consider developing additional plans to support this Incident Response Plan: (1) multi-year strategy; (2) coordination plan – specifying how the facility will work with local/national security, health, and other ministries/agencies; (3) communication plan – delineating who is responsible for developing and disseminating public and internal facility communication during an incident; (4) continuity of operations plan – describing how operations at the facility may be able to continue during an incident; or (5) recovery plan – describing how the facility will return to normal operations.]*

Definitions, Terminology, and Abbreviations

* **AAR (After-Action Report):** An AAR is a qualitative review of actions taken in response to an event of public health concern. An AAR is a means of identifying and documenting best practices and challenges demonstrated by the response to the event. An AAR seeks to identify:
	+ actions that need to be implemented immediately, to ensure better preparation for the next event;
	+ medium- and long-term actions needed to strengthen and institutionalize the necessary capabilities of the public health system [4].
* **Accident**- An inadvertent occurrence that results in actual harm such as infection, illness, injury in humans or contamination of the environment.
* **Biohazard**-potential source of harm caused by biological materials [5]
* **Biological** **agent**- A microorganism, virus, biological toxin, particle or otherwise infectious material, either naturally occurring or genetically modified, which may have the potential to cause infection, allergy, toxicity or otherwise create a hazard to humans, animals, or plants.
* **Biorisk**-effect of uncertainty expressed by the combination of the consequences of an event (including changes in circumstances) and the associated “likelihood” of occurrence, where biological material is the source of harm. The harm can be the consequence of an unintentional exposure, accidental release, or loss, theft, misuse, diversion, unauthorized access, or intentional unauthorized release. [5]
* **Biorisk management system**- Coordinated activities to direct and control an organization with regard to biorisk [1]
* **Biosafety**- Containment principles, technologies and practices that are implemented to prevent unintentional exposure to biological agents or their inadvertent release
* **Biosecurity**- Principles, technologies and practices that are implemented for the protection, control and accountability of biological materials and/or the equipment, skills and data related to their handling. Biosecurity aims to prevent their unauthorized access, loss, theft, misuse, diversion or release.
* **BRMA**: Biorisk Management Advisor. An individual designated to advise upon facility or organizational biosafety and biosecurity programs. This is an update to the position of the Biosafety Officer.
* **Decontamination** - Reduction of viable biological agents or other hazardous materials on a surface or object(s) to a pre-defined level by chemical and/or physical means
* **Disinfection**- A process to eliminate viable biological agents from items or surfaces for further safe handling or use.
* **Doff**: To take clothes/Personal Protective Equipment (PPE) off (“do off”)
* **Don**: To put clothes/PPE on (“do on”)
* **Incident-** An occurrence that has the potential to, or results in, the exposure of facility personnel to biological agents and/or their release into the environment that may or may not lead to actual harm.
* **Near miss**: An event that could have evolved into an incident or accident.
* **LAI**: Laboratory acquired infection. All infections acquired through laboratory or laboratory-related activities
* **Personal protective equipment (PPE)** - Equipment and/or clothing worn by personnel to provide a barrier against biological agents, thereby minimizing the likelihood of exposure. PPE includes, but is not limited to, laboratory coats, gowns, full-body suits, gloves, protective footwear, safety glasses, safety goggles, masks and respirators.
* **Risk Assessment (RA)** - A systematic process of gathering information and evaluating the likelihood and consequences of exposure to or release of workplace hazard(s) and determining the appropriate risk control measures to reduce the risk to an acceptable risk.
* **SLIPTA**: Stepwise Laboratory Quality Improvement Process Towards Accreditation
* **Sterilization –** A process that kills and/or removes all biological agents including spores.
* **Toxin** - the toxic material of plants, animals, microorganisms, viruses, fungi, or infectious substances, or a recombinant molecule, whatever its origin or method of production, including:
	+ Any poisonous substance or biological product that may be engineered as a result of biotechnology produced by a living organism;
	+ Any poisonous isomer or biological product, homolog, or derivative of such a substance [4]
* *Others to be determined by facility*

# ROLES AND RESPONSIBILITIES

*[Adapted from WHO Laboratory Biosafety Manual 4th Edition definitions, include additional roles relevant to your facility]*

The responsibility for assuring safe and secure handling of biohazardous materials and effective response to all-hazards emergency incidents is shared between the employee, their supervisor (scientific management), top/senior management, and the *[Insert Facility Name]’s* Biorisk Management Committee. These responsibilities are described in general terms below. More specific duties are outlined within the relevant SOP.

*[Insert your facility’s organizational chart here]*



### Members of the workforce

*Will take responsibility for their own safety and follow the institution’s guidelines, policies, and SOPs to the best of their capability. The credos: “Think before you act” and “If you do not know or understand, …. Ask” should guide any facility worker at this institution (including students).*

* Participates in appropriate training and follows instructions
* Asks a supervisor when they have questions or if instructions are not clear
* Are encouraged to report any condition or change in health status which may increase risk or consequences of a occupationally acquired infection (e.g. pregnancy, medical conditions, medications, or treatments which compromise immunity, etc.) to *[Insert department, nam*e] since personal health status may impact an individual’s susceptibility to infection or ability to receive immunizations or prophylactic interventions
* Reviews and complies with biosafety and biosecurity procedures described in the Biorisk Management Manual and this Incident Response Plan
* Reviews and complies with all SOPs relevant for the work
* Reports all accidents, major spills, or exposure incidents immediately to the supervisor
* *[Insert more responsibilities]*

### TOP AND SENIOR MANAGEMENT

*Will aid an organization to develop a biorisk management program: a set of tools, information and associated actions that are overseen, enforced and continuously improved upon by an organization’s senior management. This will ensure that a biorisk management system is properly implemented and maintained.*

* Is committed to ensuring a safe workplace by allocating appropriate resources (money and time) to enable complete implementation of this incident response plan and all associated procedures.
* Is committed to ensuring that dangerous agents and equipment with dual-use potential is kept secure and out of reach from people with malicious intent
* Is responsible for the implementation and maintenance of safe practices and procedures in the department
* Oversees planning and implementation of program plans
* Acts on incidents, accidents, and near misses
* *[Insert more responsibilities]*

### BIORISK MANAGEMENT COMMITTEE

*A biorisk management committee is an institutional committee created to act as an independent review group for biosafety issues; it reports to senior management. The membership of the biosafety committee should reflect the different occupational areas of the organization as well as its scientific expertise. This committee is often commonly referred to as an “****Institutional Biosafety Committee****” and may expand its scope to address any additional safety-related issues (e.g., Chemical and/or Occupational Health and Safety).*

* *[Insert institutionally relevant responsibilities]*

### BIORISK MANAGEMENT ADVISOR/PROFESSIONAL/OFFICER

*An individual designated to advise upon facility or organizational biosafety and biosecurity programs. The role and knowledge of the biorisk advisor is key to advising on the development, implementation, maintenance and continual improvement of a biosafety and biosecurity program based on a management system. The advisor should be competent to perform the role and allocated sufficient time and other resources to do the job effectively.*

* Resolves biorisk management issues within the organization (e.g. management, biorisk management committee, occupational health department, security)
* Advises on safe methods for new procedures
* Advises, responds to, and follows up on any large or high hazard biological or chemical spills
* Assists the scientific leadership regarding corrective actions and emergency procedures
* Ensures biorisk authorizations for work are in place
* Develops and/or delivers biorisk training activities
* Completes reports, investigations, and follow-up of accidents / incidents
* Prepares year-end accident/incident trend report to top management
* *[Other functions to be determined]*

### OUTSIDE RESPONDERS/LAW ENFORCEMENT

*Serve the community as first responders and law enforcement (FR/LE) for a variety of incidents, to include biological facility emergencies. FR/LE agencies will likely need to develop specialized operations, plans, and tactics to respond to a unique facility such as a biological facility. It will be therefore imperative that the biorisk advisor/professional/officer conduct frequent liaisons with FR/LE agencies to coordinate response activities that involve [Insert facility name]. Examples of biological facility emergencies include, but is not limited to: fires, pathogen/sample theft, break-ins, vandalism, medical emergencies, large scale spills, mass exposures of staff to biological/chemical/radiological hazards, and explosions.*

* Coordinates with Facility Manager/BSO/Security Manager to ensure safe, secure, and efficient response to a wide variety of incident types
* Ensures all responders are trained on emergency response plans for *[Insert facility name]*
* Prepares communication plan with facility staff
* Trains facility staff on immediate response techniques such as fire suppression, first aid, and facility evacuation
* Participates in joint exercises

### SCIENTIFIC MANAGEMENT

*In addition to management of the scientific program, will also be designated with responsibilities relevant to biorisk management such as ensuring safety and security policies, guidelines, and procedures are followed, and communicates biorisks to supervising employees.*

* Ensures that personnel demonstrate proficiency in standard and special microbiological practices before working directly on biohazardous agents
* Ensures that all personnel receive appropriate face-to-face training for the potential hazards associated with the work involved, the necessary precautions to prevent exposures, and post-exposure evaluation procedures
* Ensures that relevant risk assessments (RA) have been performed, documented, and appropriate mitigation measures are selected and implemented
* Establishes policies and procedures in close collaboration with the Biorisk Management Officer
* Enforces policies and procedures
* Ensures that biosafety and biosecurity procedures are incorporated into standard SOPs for the facility.
* Ensures PPE and necessary safety equipment is provided and used
* Ensures compliance by facility personnel with the relevant national/international regulations, guidelines, and policies, with help from Biorisk Management Advisor
* Reviews and updates this BRM as needed and documents when review is done
* Works with emergency manager and other applicable staff to ensure appropriate emergency management and incident response plans are in place
* Notifies the *[Insert department]* concerning:
* Any accidents that result in percutaneous inoculation, mucous membrane exposure, ingestion, or inhalation of biohazardous materials
* Any accident involving chemicals, biological agents, or modified genetic agents that leads to personal injury or illness, or to a breach in containment resulting in exposure to the outside environment, human, or animal community
* Minor spills not involving a breach of the biological safety cabinet (BSC) or other primary containment device that were properly cleaned and decontaminated generally do not need to be reported to upper management
* However, it should be noted in an accident/incident log to achieve a robust risk management system
* Any problems pertaining to operation and implementation of biological and physical containment safety procedures or equipment or facility failure
* *[Insert more responsibilities]*

### OCCUPATIONAL HEALTH

*The organization will have access to appropriate occupational health expertise and establish an occupational health program commensurate with the activities and risks of the facility.*

* Recommend vaccinations depending on pathogen risks present
* Establish health management and monitoring programs
* Participate in respiratory protection program; conduct or approve fit testing and medical clearance for respirator use
* Respond to and record incidents of health concern
* Perform post-exposure testing and monitoring
* *[Insert relevant responsibilities]*

### FACILITIES MANAGER(S)

*Will be appointed with responsibilities relevant to facilities and equipment, typically an engineer with an in-depth knowledge of the facilities, containment equipment and buildings, coordinating building and maintenance work, and liaising with contractors.*

* Ensure safe operation of facility repairs
* Develop and implement Operations and Maintenance Manual
* Schedule external technicians and ensure appropriate safety and security for visiting mechanics
* Understand emergency operations requirements for proper stand-down of facilities
* Collaborate with biorisk management advisors to ensure biorisk management addressed by facility operations and maintenance.
* *[Insert relevant responsibilities]*

### EMERGENCY MANAGER(S)

*Will be appointed to work with all staff to develop plans and procedures related to emergency management and incident response, will design and conduct drills and exercises to strengthen incident preparedness and response, will conduct After-Action Sessions to review incidents which occur on site to develop identified lists of strengths and gaps needing addressing. They may coordinate or have overlapping duties with the biorisk advisor/professional/officer.*

* Develop and implement Incident Response Plan
* Develop and conduct table-top and full-scale exercises to drill personnel on emergency procedures
* Coordinate with biorisk management advisors to ensure appropriate biorisk management considered for incident response efforts
* Develop and maintain relationships with external organizations vital to emergency response
* Review and revise emergency response plans on a regular basis and following exercises
* *[Insert relevant responsibilities]*

### SECURITY MANAGER

*Will be designated with responsibilities to implement effective and proportionate biosecurity measures, based on the biological risk. This position requires an in-depth knowledge of biological facility security.*

* Participate in development and implementation of Incident Response Plan, especially as it applies to security incidents
* Train security staff on daily and emergency procedures
* Participate in drills and exercises, including joint exercises with external FR/LE
* *[Insert relevant responsibilities]*

### ANIMAL CARE MANAGER

*Will be designated with responsibilities determined in accordance with country-specific requirements for proper animal care and use in facilities where animals are maintained. This position requires an-depth knowledge of animal handling and zoonotic and animal diseases with a qualified veterinarian available for additional advice.*

* *[Insert relevant responsibilities]*

### OUTSIDE RESEARCHERS/GUEST PROFESSORS

*Will take responsibility for own safety and follow the institution’s guidelines, policies, and SOP’s to the best of their capability. While outside researchers and guest professors often have extensive knowledge and skills, they still need to learn the safety and security procedures specific to this facility/institution they are visiting. Therefore, they need to complete an initial introduction and training program to ensure that they know the facility’s safety and security procedures and are as safe as the rest of the team.*

* Introductory training to learn about the facility/institution
* Training in emergency, safety, security, procurement procedures
* Training in equipment types/makes/models that might be different from previous workplace
* *[Insert more responsibilities]*

# ASSESSMENT, PREPAREDNESS, AND MITIGATION

Even the most well-prepared facility may experience accidental or intentional incidents or emergencies such as fire, biological release, chemical spill, or minor workplace injuries despite existing prevention or mitigation measures. Effective incident response is a mitigation strategy that may reduce the consequences from these unknown events through planning and preparing for potential incidents, as well as detecting, communicating, assessing, responding to, and recovering from actual events. Facilities should have a documented contingency plan for incident or emergency identification and response. Plans should be developed at a senior management level and incorporate feedback from frontline staff.

Written plans are critical for ensuring consistent practices are undertaken during an incident response. Ideally, incident response plans provide details to ensure an effective response. The following steps are necessary for plan development: (1) hazard identification, risk assessment, and consequence evaluation; (2) hazard mitigation plan development; (3) planning; (4) evaluating readiness; (5) preparing for communication in emergency operations.

## STEP 1 – HAZARD IDENTIFICATION, RISK ASSESSMENT, AND CONSEQUENCE EVALUATION

Not all facilities will be impacted the same way by the same types of incidents—for example, not all facilities are in an earthquake-zone and not all store high-consequence pathogens. Therefore, identifying the priority hazards and conducting a risk assessment should be the first step in the development of an Incident Response Plan. Once this assessment is completed, specific plans and trainings need to be developed to best prepare for priority hazards. Depending on the size of the institution, this may be done by the Emergency Manager, biorisk management advisor, and/or others who have been designated to oversee emergency and incident management programs *[Insert responsible staff member(s)]*.

## Step 2 – HAZARD MITIGATION PLAN DEVELOPMENT

Emergency managers – working with the facility scientific staff – can develop a plan for mitigation of hazards. The plan should include roles, responsibilities, timelines, and specific actions. It is recommended that emergency managers work with facility leadership to designate resources and funding necessary for effective incident response. Early in the planning process, it is necessary to define key words and concepts that are integral to incident response.

### EVENT OCCURRENCE AND DEFINITION

Incidents can be small or large and could require immediate action or may self-resolve. During the planning and preparation stages, a consensus must be reached to define an emergency and what differentiates a large incident from a small incident. Events can also include breaches and potential breaches in the facility security program. *[Provide additional details below about your facility’s definition of potential safety and security incidents and emergencies. Refer to facility-specific risk assessment.]*

### ALERT, ASSESSMENT, AND MOBILIZATION

The facility’s incident response plan should identify which individual(s) to alert after an incident occurs or while it is occurring so that information can be used to initiate a response. The alert should occur simultaneously with an assessment of the type and severity of the incident which will also provide information to guide the response. For problems that require a response, mobilization is the activation of the personnel and equipment necessary to respond to the incident and resolve it quickly.

## Step 3 – PLANNING

The emergency management plan should designate a lead for plan development (i.e. emergency manager) who will identify planning needs (from Step 1) and who will work with the institution, the emergency manager, and BRMA to identify who should be part of planning teams. Written plans specifying actions to be taken, contingencies, roles, responsibilities, timelines, and guidance are critical for ensuring that anyone involved in an emergency has a clear understanding of his/her role and how that role is expected to coordinate with colleagues. Without written plans and procedures, optimized approaches to addressing emergencies often do not happen, steps may be missed or duplicated, critical points of coordination may not occur—potentially increasing the health risks to people, animals, and the environment. Plans may be developed through scenario-based workshops or planning seminars/workshops and may focus on a strategic, operational, and tactical level. Plans will need to describe roles, responsibilities, timelines, resources, and specific steps and contingencies.

Acquisition of resources, storage of equipment, and provision of personnel training and facility drills is essential in preparing for and managing an incident or emergency. *[Provide additional details about your Emergency and Incident Planning process below or write supporting SOP to be referenced.]*

* + *Determine the signal for emergency operations*
	+ *Identify high-risk agents and assets*
	+ *Identify high-risk areas (work areas, storage areas, facilities)*
	+ *Identify at-risk personnel and populations*
	+ *Identify responsible personnel and their associated roles and responsibilities during an emergency or incident response [Refer to Roles and Responsibilities section]*
	+ *Identify agreements necessary to coordinate with local emergency, fire, and first response entities*
	+ *Assess approximate response time of FR/LE agencies*
	+ *Determine escorting/access control procedures and responsibilities*
	+ *Identify local or national regulations that might impact response to an incident or emergency*
	+ *Locate emergency first aid kits and other tools such as spill kits and personal protective equipment*
	+ *Determine the signal to return to normal operations*

### KEEPING PLANS UP TO DATE

Plans should be reviewed and updated after every incident and every exercise (at least annually). Plan updates will incorporate the information garnered through drills and incident reports and investigations. Plans should take into consideration the steps between event occurrence and identification and reporting. A standard reporting chain should exist to facilitate reporting. Incident report forms provide an opportunity for investigation, root cause analysis, corrective action, and process improvement (refer to Chapter XXI of the BRM Manual: Emergency and Incident Response, Reporting and Investigation).

## STEP 4 – EVALUATING READINESS AND PERFORMANCE

Plans are living documents and need frequent updates and revisions based on lessons learned during actual incidents or exercises and drills. Exercises and drills simulate emergency incidents for staff to practice emergency response and to provide a means for evaluating overall readiness for an event. Ideally, After-Action Sessions and Improvement Plans will be developed after each real-life incident as well as after each exercise.

After a plan is developed, the facility will need to train staff on the plan and ensure sufficient resources are present to implement the plan. Once trained, the staff may participate in an exercise or drill to evaluate readiness. Exercises and drills demonstrate how well staff are trained on the plan and show whether or not a plan needs to be amended or updated based on a lesson learned in the exercise. This process is consistent with the Plan-Do-Check-Act (PDCA), Assessment-Mitigation-Performance (AMP), and Emergency Management cycles shown in **Figure 1/Table 1**.

Several types of exercises may be undertaken to prepare for an incident. Exercises and drills focus on specific risks/threats identified in an assessment and are designed to evaluate specific objectives (i.e. testing communication, evaluating PPE use during a spill in the work area). Evaluation using exercises is most effective using a progressive approach: from discussion-based table-top exercises that work out and refine plans to later, more hands-on full-scale exercises and drills that ensure the execution of the refined plans goes as expected. Exercises may be evaluated by external subject matter experts, by the participants themselves, or a combination thereof.

### TABLETOP EXERCISE

A discussion-based tabletop exercise usually involves “players” (staff who would play a role during a real incident) discussing the actions they would take during a simulated emergency incident. Actions are recorded, and at the end of the exercise, an evaluation or After-Action Session is completed to identify strengths and gaps in the simulated response. An After-Action Report is developed from the After-Action Session and an Improvement Plan is developed to outline any steps needed to address gaps identified in the After-Action Session. For complex and larger scale scenarios, a series of progressively more complicated scenarios are recommended to evaluate all uncertainties in a response. Once players have discussed responses and plans have been updated on any lessons learned, staff should be trained, and resources/equipment should be made available.

*(Provide additional details of your facility’s framework for tabletop exercises.)*

* *Who is involved? [Refer to Roles and Responsibilities section]*
* *How often are tabletop exercises conducted?*
* *Where is the After-Action Report template located?*

### DRILL OR FULL-SCALE EXERCISE

The next step is hands-on practice during a drill and/or full-scale exercise. It is important to have the tabletop or discussion-based exercise first to make sure the plan is set and that staff understand the order of operations during an incident.

A drill is a hands-on simulation of one standard operating procedure. Drills may involve evaluating timeframes in response. Drills usually are shorter activities that review a small piece of the overall response (1-2 objectives). Full-scale exercises may be used to test more objectives or a larger part of the system involved in response to an incident. Full-scales are also hands-on simulations. Drills and Full-Scale Exercises—like tabletop exercises—require a follow-on After Action Session to identify lessons learned and improvements needed.

*(Provide additional details of your facility’s framework for drills and full-scale exercises.)*

* *Who is involved?*
* *What resources are needed to conduct a drill or full-scale exercise?*
* *What standard operating procedure(s) will be tested?*

### EVALUATING REAL-LIFE INCIDENTS

After-Action Review sessions will need to occur in a timely manner following real-life incidents. Plans will need to be revised following AARs, based on lessons learned.

Multiyear Strategies may require updates to specify new trainings needed or additional exercises/drills/planning workshops noted in the Improvement Plan.

*(Provide additional details of your facility’s framework for evaluating real-life incidents.)*

* *When will the After-Action Review session occur?*
* *Who is responsible for revising the plans and multiyear strategies?*

### ACCIDENTS, INCIDENTS, AND NEAR MISSES

These types of events will eventually happen in the facility if work goes on. What is important in relation to these events is to learn as much from each event as possible to prevent a similar occurrence in the future. Therefore, *[Insert Facility Name]* monitors these events closely, follows up on them, and evaluates them. At *[Insert Facility Name]*, we believe in a “no-blame” culture, where it is the circumstances that led to the incident that is being evaluated and not the employee that was involved.

Incidents that did not end up as real exposure incidents are also encouraged to be reported. The goal is to monitor all procedures that could have resulted in a real accident or incident and evaluate the root cause to prevent similar incidents in the future.

## STEP 5 – PREPARING FOR COMMUNICATION IN EMERGENCY OPERATIONS

Successful biorisk management and emergency management depends upon clear, concise, and timely communication. The audience for these communications can include both internal (e.g. employees, management, contractors) and external (e.g. regulatory agencies, community representatives) stakeholders based on the scenario.

Communication includes but is not limited to: reporting, team meetings, briefings, formal training sessions, requests, inquiries, notifications, information sharing, risk communication, and crisis communication.

Person(s) in each level of an organization have different responsibilities in communication and should be informed of their role in communication. Communication strategy including the types of information to be communicated and methods of communication should be planned for and included in training. Communication recordings or documentation should be retained and maintained by the facility according to national policies where applicable.

Formal plans should incorporate communication pathways and alternate communication pathways (backup approaches) to use during incidents. Exercises and drills test and improve these pathways and systems prior to an incident occurring.

Basic crisis communication is similar to risk communication. However, situations change quickly in a crisis; the unknown can cause fear or panic, and personal safety is of concern. Messages need to be timely, clear, concise, transparent, and include practical information. Crisis communication messages and decision processes should be planned and prepared in advance as a part of contingency plan. Roles and responsibility also should be clarified to avoid confusion under crisis.

Proactive communication and consultation processes (e.g. committees, open forums, written communiqués) should be encouraged to obtain participation from all those affected by the facility’s operations. It should be used to improve biorisk reduction practices and support biorisk policies and objectives within the facility. These consultations should include employee involvement in identifying hazards, risk assessment, development of biorisk objectives, and risk mitigation strategies. The biorisk manager or team should meet with employees to discuss these topics and solicit suggestions. The frequency of the communications should be based on the needs of both internal (e.g. employee) and external (e.g. community) stakeholders to be informed of the issues. These engagements could lead to the development of a communication program that provides information on biological risk and biosafety to all impacted and interested groups.

***FAST FACTS:***Communication is considered a two-way process. Information senders should include a feedback mechanism to verify the audience received and understood the intended message.

### COMMUNICATION PLANNING

It is the responsibility of senior management *[Replace with identified person or position title]* to implement a communication mechanism that ensures relevant and current biorisk information related to activities in facility with the potential to affect workers and others *[Add relevant parties]* is communicated effectively at appropriate intervals. The inclusion of feedback methods ensures affected parties can communicate their understanding of the provided risk information.

Communication plans should address:

* Internal communication among facility employees
* External communication with other agencies, emergency responders, etc.
* Visitors
* Public communication to address media, social media, and community inquiries

The Communication Lead (or designee) will play key roles in external and internal risk communication. The following lists the responsibilities which the lead will need to carry out or will need to designate to another responsible party.

INTERNAL COMMUNICATION:

* Notification of drills, exercises, and planning activities for staff awareness
* Prior notification of potential emergencies with contingency action recommendations and points of contact for natural disasters and other instances for which prior notification is feasible
* Response notification during events for situational awareness and recommendations on actions staff will need to take
* Other communication related to continuity of operations during longer incidents and related to recovery processes specific to an event
* Format for feedback from staff to emergency managers/facility managers related to emergency response

EXTERNAL COMMUNICATION:

* Notification of drills, exercises and planning activities as appropriate for community awareness
* Prior notification of potential emergencies with contingency action recommendations and points of contact for natural disasters and other instances for which prior notification is feasible
* Development of draft messages for likely disasters in advance of an incident, and where appropriate, in coordination with other response entities
* Active participation in coordination and communication planning with external partners
* Plan for ongoing media education and outreach to improve public awareness of facility activities prior to a disaster
* Work with the media during a response and recovery and lead public outreach
* Advise facility managers on messaging family members of staff impacted by an incident

Plans should include:

* Topics to inform stakeholders
* Timelines detailing reporting guidelines and expected response times
* Methods of information sharing
* Lists including directions for communication, designated roles, and names/numbers/emails of who to contact. Contact lists should exist for:
	+ Workers within the facility
	+ Contractors, suppliers to the workplace (e.g. cleaners, maintenance providers, security personnel)
	+ External or interested parties (e.g. local, national, and international governmental organizations, relevant regulatory agencies, certifiers, local emergency services and healthcare providers) *[List relevant parties to facility biorisk management program]*
	+ Visitors at the facility
* A process to receive, record, maintain, document, and respond to communications
* Guidance for when to share information
* If possible, pre-written scripts for the general public and media may be developed in advance of a possible incident to expedite communication to the public. This is particularly useful for potentially fast-paced events which may lead to community exposures (to ensure safety messaging is ready to go and has been reviewed), and events which may be high profile for other reasons. Pre-written messaging also allows for consistent message planning among agencies.

In case of facility activity interruption (e.g. equipment failure, out-of-stock events, staff availability, etc.), timely and documented communication with stakeholders is essential to retain reputation and trust.

* In case of accidental and intentional release of a pathogen and other accidents, timely distribution of an initial statement is essential. Preparation includes: risk assessment based possible scenario analysis, establishing a message template and response plan, decision trees, and others. Drills and training will improve prompt communication.
* The facility should consider the audience needs (e.g. language, culture, literacy, disability) when disseminating information and communication needs when providing information to staff or the public.
* When determining the need for communication with external interested parties, the organization should consider both its normal operations and potential emergency situations; pre- identifying designated contact individuals and contact numbers assure consistent communication.

*(Provide additional details of your facility’s internal communication plan)*

* *How will the facility ensure effective communication with staff and users of the facility?*
* *Is a communication plan in place? Have appropriate staff been trained on the plan?*
* *What needs to be communicated by whom? to which audience will this information be communicated?*

 *- Policy, objectives, manuals, and SOPs*

 *- Facility communication plan and updates*

 *- Employee consultations*

 *- Visitations or other work at the facility*

*- Public or community-based meeting*

*- Review of activities in the workplace (both proactive and reactive)*

*- Risk assessment results*

*- Quality management information*

*- Incident reporting (insert reference to incident report procedures)*

*- Incident investigation and follow-up procedures (insert reference to incident investigation and follow-up procedures)*

*- Training programs*

*- Changes in facility equipment or procedures*

*- Signage (e.g. labels, postings, notices)*

* *Who is responsible for which communications and record keeping? (Provide details from your facility’s communication plan)*
* *How are staff suggestions for improvement handled by the facility?*
* *How to communicate?*

 *-What methods of communication are available in the facility?*

*-What is the best communication method (e.g. facility and equipment use, change of procedures, emergency, incidents, etc.) (e.g. regular, occasional, as needed)?*

*-How to take into account diversity aspects (for example language, culture, literacy, disability)*

* *How to record communications (e.g. e-mail, verbal discussion, team meeting minutes, requests and inquiries)?*
* *What should be considered for risk communication?*
	+ - * *Internal risk communication is an extension of the communication. Topics should focus on biological risks, and all personnel have a role. [identify positions and personnel in your facility]*

 *-Who communicates (e.g. management, BSO, workers)?*

*-Biorisk management advisor/professional/officer: act as communicator to liaise with management, workers, and contractors. Provide expert opinion to management as primary risk assessor, at the same time heavily depend on feedback and proactive communication from frontline workers and contractors.*

*-Scientific Director/Scientific Manager: provide scientific information for risk assessment, proactive communications to biorisk advisor/professional/officer and management on improvement of operations*

*-Security personnel: provide expert opinion for risk assessment, communicate to workers on security rules*

*-Contractors: provide feedback to biorisk advisor/professional/officer and director/manager*

*-Executive management: decision maker and main communicator of the facility. Require support from experts like biorisk advisor/professional/officer.*

*-Administrator: communication receiver with limited biorisk knowledge*

* *What biohazards does your facility have and what is the risk associated with them?*

*- Information source for hazard characteristics [reference pathogen safety data sheets (PSDS)]*

*- Risk assessment results*

*- Information on current control measures*

*- Knowledge and training on contingency plan*

*- Reporting and information mechanism*

* *How to evaluate effectiveness of communication program?*

*- Objective of the communication met?*

*- Biosafety and biosecurity impact/improvement?*

*- Revision of the plan*

*Provide details on your facility’s external communication plan:*

* *Awareness program on risks in the facility should be provided for contractors, temporary workers, and visitors, etc., to which they are exposed or possibly exposed*
* *Management should consider including contractors and temporary workers in relevant team meetings and briefings*
* *Risk communication responsible personnel need to be identified by the scientific management [add your communicator], and regular updates of the risks in the facility should be provided to stakeholders through these personnel. Often executive management is in this position with limited technical understanding. Regular communication with community stakeholders and media on facility activities under communication plan will help the communicator understand public concern and perceptions in advance. Establish framework for the incident and/or emergency situation; planning strategic risk communication in advance helps avoid unnecessary misunderstanding and disruption. Planning includes:*
	+ - *Communicator designation*
		- *Study of the community characteristics of location, interests/concerns, perception of stakeholders*
		- *Identify Safety Data Sheets (SDSs ) for chemical hazards and Pathogen Safety Data Sheets (PSDSs) for biological agents (reference* <http://www.phac-aspc.gc.ca/lab-bio/res/psds-ftss/index-eng.php>*) present in the facility*
		- *Technical skill training for communication and case study for biorisk management advisor/professional/officer, management, and communicators*
		- *Preparation of message sheet template according to the type of media (mail, website, news, radio, and others) for timely release, including existing mitigation measures and risk assessment results for public release*
		- *Identification of decision-making process and timing for information release*
		- *Response choices accounting for negative/positive perception of the facility in the community*

## INCIDENT REPORTING, INVESTIGATION, AND FOLLOW-UP

***FAST FACTS:*** Accident and incident reports at the *[Insert Facility Name]* shall be completed by employees assisted by the scientific manager, BRMA, and emergency manager in collaboration. An incident should preferably be reported same day as it occurs.

 All sections in the template must be addressed. The template can be found *[Insert location].* When the form has been filled out, send it immediately to *[Scientific manager, biorisk advisor/professional/officer, add other entities as appropriate]*.

Reporting and feedback are an important aspect of emergency and incident planning because it informs the planning and preparation stage and provides information on what worked and what did not. Results from incident investigations should be used to update emergency response plans. Feedback can be obtained from the incident reports and questions (refer to Attachment: Incident Response Form Template). *[Provide additional details about your facility’s incident investigation and follow-up procedures below]*

* *What occurred leading up to the incident?*
* *What steps were taken to reduce the impact of the incident?*
* *Was there reasonable preparation to prevent the accident (e.g., was appropriate PPE or engineering controls used)?*
* *Did detection occur promptly? If not, why?*
* *Was the incident sufficiently contained?*
* *Was communication adequate?*
* *What issues were encountered during the response (e.g., expired supplies, insufficient PPE stocked, emergency systems not operating as expected)?*
* *What opportunities for improvement were identified?*
* *How are corrective measures implemented and evaluated?*
* *Are there consequences for deliberate safety and security violations?*

# ANNEX

This annex contains additional guidance and best practices for common incident types. Specific SOPs should be designed to inform incident response with details beyond the general guidance of this plan. These incidents may include but will not be limited to (and would be informed by Step 1):

* Fire and natural disasters
* Injury
* Exposure (biological and chemical)
* Occupationally acquired infections
* Security Incidents
* Spills
* *Insert additional sections appropriate to your facility (emergency need for surge capacity, power outages, protestor activity, etc.)*

## FIRE AND NATURAL DISASTERS

In case of small fire, conduct fire containment procedures *[Fire extinguisher protocol].* In case of large fire, *activate the fire alarm pull station,* and evacuate immediately. *[Describe fire siren sound.]* Judgment should be exercised in deciding whether to attempt to store or contain any hazardous materials prior to evacuation. Remove contaminated protective garments and gloves before leaving work area if possible. Go to designated evacuation meeting site *[Insert specific place],* conduct personnel accountability procedures *or refer to [Fire-SOP].*

*If other sirens and alarms are installed at the facility, describe the way these sounds are different from the fire alarm (cold room alarms for trapped in personnel, earthquake, flooding, storm, etc.) Other natural disasters to develop response plans include tornado, tsunami, hurricane, earthquake, power outages, and others.*

consider these questions:

* *What is the response to fire and natural disasters?*
* *Who is on the emergency contact roster for the facility?*
* *Who is the emergency service provider point of contact?*
* *What emergency equipment is made available on site (e.g., first aid kits, fire extinguishers, generators (and fuel), protective clothing, respiratory protection, disinfectants, tools)?*
* *Are there special response procedures for chemical, radiological, or other hazards?*
* *Are personnel trained on how to respond to different alarms (e.g., evacuate, shelter in place)?*
* *Are there time-based responses relevant to this emergency (e.g., operational stand-down and start-up, generator fuel on-hand, settling period for aerosols from large spills, all-clear from security manager, etc.)?*
* *What natural disasters are possible or probable that will impact facility operations?*
* *What are the mechanisms to maintain biosafety and biosecurity during a fire or natural disaster response?*

## INJURY

If an injury is life threatening, call *[National emergency number].* For less serious injuries, treatment should be sought at the *[Insert nurse station or department with doctors]* or refer to *[Injury-SOP].* Reports should be made to the Occupational Health department. Puncture wounds, cuts, and abrasions must be treated by *[Occupational Health department]*. Refer to Exposure plans for needle-stick or other injuries associated with potential exposure to hazardous material.

consider these questions:

* *What is the response to incidents with injuries?*
* *Who is on the incident contact roster for injuries?*
* *Who is the emergency service provider point of contact?*
* *What emergency equipment is made available on site (e.g., first aid kits, protective clothing, respiratory protection, disinfectants, tools)?*
* *Are there time-based responses relevant to this emergency (e.g., time for injury treatment, incident reporting, etc.)?*

## EXPOSURE TO…

### BIOHAZARDOUS MATERIAL

An exposure is defined as biohazardous material contacting broken skin, eyes, nose, mouth, respiratory tract via inhalation, or other mucous membranes; a percutaneous injury with a contaminated sharp or contact with an infectious agent over apparently intact skin.

### CHEMICALS

An exposure is defined as a direct contact of a hazardous chemical to skin, eyes, nose, mouth, or other mucous membranes or contact through inhalation of vapor, fumes, dust, or mist. There are two aspects of the exposure, quantity and concentration, as well as two types of exposure, acute and chronic. Furthermore, there are highly toxic chemicals versus less toxic chemicals.

### ACTIONS

In reality, an exposure is often a mix of a biological and a chemical material.

If exposed:

* **Percutaneous:** Remove gloves; wash the area with soap and water.
* **Face:** Flush eyes, nose, or mouth with water for 15 minutes.
* **Aerosol:** Hold your breath and immediately leave room, closing the door behind you. Remove PPE carefully. When removing PPE, make sure not to touch exposed areas with your bare hands, face, or similar. Remove gloves, wash hands well with soap and water. Post spill sign on work area entry; work area should be evacuated for at least 30 minutes. Supervisor must clear work area for re-entry.

Contact *[Insert name, department, phone number]* for medical assistance/first aid or refer to *[First aid SOP]*. During night and weekend hours, treatment may be sought at the *[Insert department, name, phone number]*.

All exposures must be reported to the immediate supervisor.

Together with the supervisor, review and discuss safety data sheets (SDS) with special focus on symptomatic signs of disease caused by the pathogen/chemical.

Fill in accident/incident report *[Insert where this template report can be found].*

Supervisor is responsible for reporting exposure incidents to the *[Insert department, name, phone number],* who will perform a follow-up investigation of the incident and report findings to the *[Insert department, name, phone number].* The goal of the investigation is the prevention of similar accidents as well as obtaining information concerning the circumstances and the number of employees who have been exposed to the pathogen/chemical in question.

If a private physician is consulted, bring a copy of the safety data sheet (SDS) and incident report to the consultation.

 *[Leave the section here or move to [Injury-SOP] and instead refer to where this can be found].*

consider these questions:

* *What is the response to exposure to hazardous materials?*
* *Is there a procedure for the handling of a contaminated worker?*
* *Are fellow personnel trained on, and do they have access to, life-supporting measures they can safely apply to the exposed employee if required while first responders are in route?*
* *Are there emergency treatment plans, developed with medical professionals, for first responders to follow during transport?*
* *Is there a policy for the quarantine/isolation of personnel potentially exposed to high consequence pathogens?*
* *Who is on the emergency contact roster for the facility?*
* *Who is the emergency service provider point of contact?*
* *What emergency equipment is made available on site (e.g., first aid kits, spill kits, protective clothing, respiratory protection, disinfectants, tools)?*
* *Are there special response procedures for chemical, radiological, or other hazards (e.g. broken glass, sharps, etc.)?*
* *Are personnel trained on how to respond to different alarms (e.g., evacuate, shelter in place)?*
* *Are there time-based responses relevant to this emergency (e.g. settling period for aerosols from large spills, treatment times, reporting times, scheduled follow-up from occupational health, etc.)?*

## OCCUPATIONALLY ACQUIRED INFECTIONS

Fill in the accident report form and act according to procedures. *[Insert where this template report can be found].*

Prevention of occupationally acquired infections should be of high priority at each and every workplace. Historical data on occupationally acquired infections from labs all over the world are indicators of laboratory procedure hazards that have resulted in disease.

Twenty percent of LAIs arise from parenteral inoculations with syringe needles or other contaminated sharps; spills and splashes onto skin and mucous membranes; ingestion or exposure through mouth pipetting or touching mouth or eyes with fingers or contaminated objects.

Eighty percent arise from infectious aerosols and droplets or hand contamination.

It is recommended to search the literature/internet for historic cases on any given agent in addition to the SDS on the pathogen before a final risk assessment is concluded. Information from past incidents can inform relevant risk mitigation measures, etc. Remember that the nature and severity of disease caused by an occupationally acquires infection and the probable route of transmission of the infectious agent may differ from the route of transmission and severity associated with the naturally acquired disease.

consider these questions:

* *What is the response for exposures resulting in occupationally acquired infections?*
* *Are there time-based responses relevant to this emergency (e.g., reporting within facility, reporting to national or international organizations such as WHO or nationally reportable diseases, etc.)?*

## SECURITY INCIDENTS

Security incidents such as suspicious visitors, missing chemicals, or missing biological agents must be promptly reported to the supervisor and security manager, who will notify *[Insert department, name, phone number],* or refer to *[Report template or emergency incident plan].* It will be important to keep all personnel clear of the incident site to preserve the crime scene for criminal investigative units. Procedures must be developed for response to other security breaches or incidents including crime, arson, terrorism, vandalism, civil disobedience, and others.

consider these questions:

* *What is the response for security incidents?*
* *Who is on the emergency contact roster for the facility?*
* *Who is the emergency service provider point-of-contact?*
* *What emergency equipment is made available on site (e.g., first aid kits, fire extinguishers, generators (and fuel), protective clothing, respiratory protection, disinfectants, tools)?*
* *Are there special response procedures for security events involving biological, chemical, radiological, or other hazards?*
* *Are personnel trained on how to respond to different alarms (e.g., evacuate, shelter-in-place)?*
* *Are there time-based responses relevant to this emergency (e.g., operational stand-down and start-up, generator fuel on-hand, settling period for aerosols from large spills, all-clear from security manager, etc.)?*

## SPILLS

***FAST FACTS:*** All persons should immediately vacate the affected area, and any exposed persons should be referred for medical advice. The scientific manager and the biorisk management advisor should be informed at once. No one should enter the room for an appropriate amount of time (e.g. 1 h), to allow aerosols to be carried away and heavier particles to settle. If the facility does not have a central air exhaust system, entrance should be delayed (e.g. for 24 h). Signs should be posted indicating that entry is forbidden. After the appropriate time, decontamination should proceed, supervised by the biorisk management advisor.

***Decontamination must be done with a disinfectant effective against the agents of concern and must allow sufficient contact time for the disinfectant to work.***Appropriate protective clothing and respiratory protection should be worn *(i.e. a lab coat/gown/suit and gloves. A face shield, shoe covers, or a respirator may be required).* *All spills must be reported to the supervisor*. Contact *[Insert name, department, phone number]* for further information and training in spill handling.

Only trained employees should attempt to clean up a larger spill. If the person who created a spill and is not adequately trained, that person should not attempt to clean the spill up by just reading the stepwise description in a SOP. Contact supervisor or trained colleague.

In case the agent is contagious and demands vaccination to handle it in a safe way, make sure all vaccinations are current.

Remember that you can become a healthy carrier, and unvaccinated minors at home or older family members might be at risk.

Industrial-sized spills will likely require a governmental response. The scientific manager should have readily available the contact information for large-scale spill response agencies. See section below titled “*Biological/Radiological Spills/Emergencies*” for more information.

### SPILL KIT

Facilities should prepare and maintain a biological spill kit. A spill kit is an essential safety item for facilities working with microbiological agents. A basic spill kit should include:

* Concentrated household bleach
* A spray bottle for making 10% bleach solutions
* Graduated cylinder for preparing solution
* Forceps, autoclavable broom and dustpan, or other mechanical device for handling sharps
* Paper towels or other suitable absorbent
* Biohazard autoclave bags for the collection of contaminated spill clean-up items and closures
* Utility gloves and medical examination gloves (latex)
* Face protection (eye wear and mask, or full-face shield
* Labels, pen
* List of emergency contact information

*[Provide additional details about your facility’s emergency and spill response procedures below or reference the Spill SOP].*

### SPILLS OUTSIDE A CONTAINMENT DEVICE

* *[Suggested procedure, keep here or refer to SOP]*
* The spill is not inside a BSC, centrifuge, refrigerator, incubator, freezer, lab instrument, etc.
* If anyone is potentially harmed, please call for emergency medical assistance immediately. If it is not safe to call from the location of the spill, call or ask someone in a safer location to make that call.
* If there is a security threat, please contact security assistance if safe to do so.
* Close off the spill area to traffic and notify coworkers.
* If the spill may involve an aerosol, (e.g. event involving dropping material onto floor, high mechanical force, a forceful expulsion of liquid) leave the room for 30 minutes to allow aerosols to settle.
* Remove contaminated lab coat and wash exposed skin.
* Put on clean gloves, glasses, and gown/spill handling suit.
* Prepare effective disinfectant. Prepare enough solution to saturate the entire contaminated area.
* Cover the spill with paper towels or other absorbent materials. If the spill is covered, aerosols will not be generated when pouring disinfectant solution.
* Pour/spray/flood the spill area with disinfectant solution and allow to remain in contact for required time: *[suggested disinfectant time as recommended by an agent’s SDS]*
* Push absorbent material at the edge of the spill into the spill’s center. Add absorbent as needed. If glass is present, use tongs and forceps followed by a dustpan to remove remaining shards.
* Discard the paper towels into chemical waste container. Autoclave an overtly contaminated lab coat prior to placing into a laundry bag.
* Report incident to the supervisor.

### SPILLS INSIDE A BIOSAFETY CABINET (BSC)

* *[Suggested procedure, keep here or refer to SOP]*
* Leave the BSC on.
* Put on gloves, glasses, and lab coat/gown/spill handling suit and gather paper towels for cleaning.
* Prepare an effective disinfectant.
* Pour/spray/flood the spill area with disinfectant solution and allow to remain in contact for required time: *[suggested disinfectant time as recommended by an agent’s SDS]*
* Spray and wipe down the cabinet interior and any items inside the BSC with a towel dampened with disinfectant.
* Discard all contaminated disposable items and towels used for cleaning into a chemical waste container or autoclave according to institutional guidelines.
* Spills large enough to result in liquids flowing through the front or rear grilles require more extensive decontamination. If such a spill has occurred, do not turn the BSC off. Consult *[Insert name, department, phone number]*.
* Report the incident to a supervisor.

### SPILLS IN A CENTRIFUGE

*[Suggested procedure, keep here or refer to SOP]*

Biohazardous spills in centrifuges can be difficult to disinfect. Some but not all centrifuges have closed rotors, buckets, or other carriers with leak proof lids, designed to contain spills, allow efficient, safe emptying, and decontamination. However, not all centrifuges are equipped with these containment devices. A spill resulting from primary container breakage requires immediate suspension of use. Notify supervisor. If unusual sounds from a centrifuge suggest that breakage and a spill has occurred, or, if breakage and a spill is discovered after the machine has stopped, wait at least 30 minutes before opening. This will allow hazardous aerosols to settle in the centrifuge.

* Don lab coat, double gloves, face shield, and respirator and then open centrifuge carefully to assess the situation.
* Attempt to determine if the spill is contained in a closed cup, bucket, or tray carrier or within a closed rotor.
* If the spill is contained as described above, spray the exterior with disinfectant and allow adequate contact time.
* Take the carrier to the nearest BSC approved for use with the agent.
* If a BSC is not available of if the rotor cannot be removed, the centrifuge should remain closed. Post a sigh indicating “contaminated – do not use”. Notify supervisor and contact (insert name, department, phone no) for assistance.
* Obtain and place containers suitable for holding tubes, broken glass, or other containers into the BSC while cleaning centrifuge components.
* Carefully retrieve unbroken tubes, wipe outside with disinfectant, and place them into an empty container in the BSC, out of the way. The broken glass tube(s) must be removed with a forceps or other instrument and immersed in a beaker of disinfectant solution for a time appropriate to achieve disinfection. The pieces can then be disposed of in a sharps container.
* After proper decontamination, carriers, rotors etc. can be washed with a mild detergent according to the manufacturer’s instructions.
* Thoroughly wipe the inside of the centrifuge chamber with disinfectant saturated towels. Allow for adequate contact time before wiping up excess liquid.

### BIOLOGICAL/RADIOACTIVE EMERGENCIES/SPILLS

*[Suggested procedure and refer to longer “large-scale spill” SOP]*

The *[Insert agency/department]* must be notified and will assist in the cleanup of a biological/radioactive spill. Determine if anyone has been contaminated, remove contaminated clothing, and wash contaminated skin with soap and water. Proceed with clean up as instructed by the radiological security officer.

The infectious agent will be neutralized first, taking care in choosing a disinfecting agent to avoid chemical incompatibility.

Chlorine compounds such as bleach must NOT be used to disinfect anything containing Iodine-125 (125I) because the chlorine will cause the volatilization of radioactive iodine.

Management must keep information for the below listed departments/agencies in case of an accidental large-scale release of biologically/chemically/radiologically hazardous materials.

* *HAZMAT response agency*
* *Environmental protection department*
* *Department/Ministry incident response office*
* *Department/Ministry office of public affairs*

### CHEMICAL SPILLS

*Write-up specific sections according to the chemicals that are present in the lab.*

REFERENCES

1. Centers for Disease Control and Prevention (CDC)/National Institutes of Health (NIH), Biosafety in Microbiological and Biomedical Laboratories (BMBL), 6th Edition, <https://www.cdc.gov/labs/BMBL.html>
2. World Health Organization (WHO), Laboratory Biosafety Manual, 4th Edition, <https://www.who.int/publications/i/item/9789240011311>
3. ISO 35001 : 2019, Biorisk management for laboratories and other related organisations, <https://www.iso.org/standard/71293.html>
4. WHO Guidance for After Action Review (AAR), <https://www.euro.who.int/__data/assets/pdf_file/0009/393651/who-guid-aar-eng.pdf>
5. World Health Organisation (WHO), Biorisk Management: Laboratory Biosecurity Guidance, September 2006, <http://www.who.int/csr/resources/publications/biosafety/WHO_CDS_EPR_2006_6.pdf>