



# Health & Safety Manual

**Version 3.0**

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## Health & Safety Manual

### Introduction

The Lagos State DNA Forensics Centre (LSD&FC) Health & Safety Manual is designed to provide staff with general health and safety information. Following the guidance outlined in this manual will help prevent illness and injury while protecting the environment. This Laboratory Health & Safety plan meets the United States of America (USA) Occupational Safety and Health Administration (OSHA) requirements for a Chemical Hygiene Plan as specified in 29 CFR 1910.1450, and outlines appropriate practices, policies, and other regulations that must be followed in the laboratories. The Health & Safety plan is not intended to be comprehensive but should supplement specific procedures developed by the person(s) responsible for managing laboratory hazards. Laboratory personnel must review and have access to this manual and other health and safety documents, at all times. Contact the Director or Quality Assurance Manager with questions regarding this manual.

### LSD&FC Laboratory Overview

LSDFC is a state-of-the-art Forensic Laboratory that was established in 2017. The laboratory is located at 48 Broad Street, Lagos Island, Lagos, Nigeria. The DNA and Forensic Biology Section was established to provide forensic DNA Identification and serology services in Nigeria.

1. At LSD&FC, a laboratory is defined as, but is not limited to, any location where research or forensic examination and analysis is conducted using hazardous chemicals, biohazardous, or biological materials.
2. A location that is used for training and research that contains physical hazards may also be considered a laboratory, even if none of the materials listed above are routinely used in the area.
3. The following areas are typically NOT considered laboratories under the Laboratory Health & Safety plan; however, persons working in these areas are required to follow all applicable health and safety regulations:
  - Custodial areas
  - Storage rooms
  - Offices
  - Meeting rooms
  - Computer use areas containing workstations
  - Private offices, unless contiguous with or in a space that meets the definition of a laboratory

### Purpose

The purpose of this Health & Safety manual is to provide the training, information, support, and equipment needed to work safely at LSD&FC. This manual provides the policies, procedures and practices for the prevention and elimination of injuries and health hazards. It also identifies potential physical and health hazards associated with working in a forensic laboratory environment.

### Responsibilities

#### LSD&FC Staff

1. All LSD&FC staff have the responsibility to participate actively in their own safety.
2. LSD&FC staff shall follow safe laboratory practices at all times.
3. LSD&FC staff have the responsibility to learn and abide by the policies and procedures applicable to their work tasks, to report all injuries, illnesses and exposures to their supervisors promptly and to use all necessary safety equipment.
4. All employees have the right to report unsafe working conditions to Management.

#### Health & Safety Officer

1. The Health & Safety Officer, under the supervision of the Director will provide support to the Laboratory with regards to safety programs, training, monitoring of work conditions and responding to emergency conditions.
2. The Health & Safety Officer is responsible for the oversight of the Health & Safety program and related activities relevant to operations.
3. The Health & Safety Officer will be qualified by training or experience and will be an appointed position.
4. Responsibilities include but are not limited to the following:
  - Develop and implement appropriate chemical hygiene, bloodborne pathogen, hazardous waste management, hazardous communication, fire and emergency evacuation and electrical safety policies and practices.
  - Provide oversight in the selection and performance of protective equipment.
  - Monitor procurement, use, storage and disposal of chemicals used in the lab.
  - Know the current legal requirements concerning regulated substances and

- the regulations concerning chemicals in the workplace.
- Seek ways to improve the Health & Safety program.
- Determine when an exposure assessment is appropriate.
- Investigate a reported injury

### Management

1. The Safety Officer, Quality Manager, Section Director and Center Director are responsible for maintaining and implementing the Health & Safety plan and will review and update the plan at least annually.
2. Ensure that the technical staff know and follow the chemical hygiene, bloodborne pathogen, hazardous waste management, hazardous communication, fire and emergency evacuation and electrical safety guidelines, ensure that protective equipment is available and in working order and that appropriate training has been provided.
3. Provide regular, formal training and housekeeping inspections including routine inspections of emergency equipment.
4. Know the current legal requirements concerning regulated substances.
5. Determine the required levels of personal protective equipment based on Safety Data Sheets (SDS) information.
6. Ensure that facilities and training for use of any material being ordered are adequate.

### Scope

This Health & Safety manual applies to all laboratories of LSD&FC. The Laboratory is located at:

Lab Address	LSD&FC
	48 Broad Street Lagos Island Lagos, Nigeria

### Incident Reporting

1. An accident is an incident which involves safety issues and may or may not include physical injury of some type (i.e., chemical spill etc.).

2. Report medical emergencies and life-threatening injuries (including after hours, weekends or holidays) by calling 112.
3. If you are injured at work, always inform your supervisor and seek medical attention at the appropriate facility whenever you're advised to do so.
4. A Workplace Incident Form will also need to be completed within 24 hours of the incident. Work with your supervisor to complete this form.

### Safety Committee

LSD&FC has established a Safety Committee to coordinate, monitor and manage the occupational health and safety program at the center. Any incident, accident and concerns associated with occupational health and safety shall be brought to the attention of this committee and/or the Safety Officer.

The purpose of the Safety Committee shall be to:

1. Ensure jobs are designed for the safety of employees.
2. Ensure employees obtain safety and health training.
3. Ensure the workplace is inspected and hazards are controlled.

### Regulations

LSD&FC shall adopt the USA General Industry Occupational Safety and Health Regulations, 29 CFR 19010.1200, Hazard Communication or an appropriate equivalent regulation in Nigeria, if available.

### Glossary

Term	Abbreviation	Definition
<b>Occupational Health &amp; Safety Officer</b>	<b>OHSO</b>	Individual who is responsible for all aspects of workplace health and safety (i.e., chemical, bloodborne, hazardous waste, fire, emergency, electrical and injuries)
<b>Chemical Hygiene Officer</b>	<b>CHO</b>	Individual who is responsible for the Chemical Hygiene Plan (CHP) and the safe use of chemicals. This individual provides technical guidance in the development and implementation of the provisions of the Chemical Hygiene Plan.
<b>Chemical Hygiene Plan</b>	<b>CHP</b>	A written plan developed and implemented by Management, designating procedures, equipment, personal protective



	equipment, and work place practices that are capable of protecting employees from the health hazards presented by hazardous chemicals used at LSD&FC.
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### Regulatory Agencies and Accrediting Bodies

The laboratory safety program is influenced by requirements of the regulatory agencies and accrediting bodies. The main agencies and their requirements are described in the following pages.

1. The **International Labour Organization (ILO)** is a tripartite United Nations agency established in 1919 to bring together governments, employers and employees. The ILO consists of representatives from 187-member States. The ILO develops labor standards, policies and programs for improving peace among classes, pursuing decent work and justice for workers, and providing technical assistance to lesser developed nations. The ILO registers complaints against entities that are violating international rules however, the organization does not impose sanctions on governments.
2. The **Ministry of Labour and Productivity** was established in 1939 to facilitate and promote peaceful, productive and harmonious industrial relations, a safe and decent working environment, and enhance social security coverage for all. The organization was renamed the Federal Ministry of Employment Labour and Productivity in 1979 and the Ministry of Labour in January 2007.
3. **OSH** management in Nigeria is largely based on the Factories Act (1958, 1987 & CAP.126 L.F.N.1990, CAP. F1 L.F.N.2004). OSH is an interdisciplinary area that involves protecting the health, safety and welfare of people in the workplace and others that may be affected directly or indirectly by the activities at the workplace.
4. The **Occupational Safety and Health Administration (OSHA)** was established by the Occupational Safety and Health Act of 1970. Under the auspices of the United States Department of Labor, OSHA is responsible for the development and enforcement of workplace safety and health regulations. OSHA regulations are concerned with all workplaces and employees in the United States, from agriculture to robotics, from laboratories to construction. The Occupational Safety and Health Administration:

- Creates and enforces regulations
  - Provides compliance assistance
  - Produces safety and health related publications
  - Collects data and publishes statistics
  - Approves and monitors state plans
5. Forensic laboratories are audited and accredited by the **ANSI-ASQ National Accreditation Board or A2LA**. These organizations play an important role in ensuring the safety and quality of goods and services and in protecting the environment. They provide accreditation under ISO/IEC 17025 for testing, calibration, and forensic laboratories. The program incorporates the safety requirements of the Quality Assurance Standards (QAS) and are therefore an essential part of any forensic laboratory accreditation.
  6. The **Quality Assurance Standards (QAS)** are issued by the Federal Bureau of Investigation (FBI) and is a set of standards specific to Forensic DNA Testing Laboratories and DNA Databasing laboratories. Standard 16.1 states that the laboratory shall have and follow a documented environmental health and safety program. This program shall include the following:
    - A blood borne pathogen and chemical hygiene plan
    - Documented training on the blood borne pathogen and chemical hygiene plan.
 Standard 16.2 states the laboratory's environmental health and safety program shall be reviewed once each calendar year and such review shall be documented.
  7. The **Scientific Working Group on DNA Analysis Methods (SWGDM)** is an organization that meets under the guidance of the Federal Bureau of Investigation (FBI). The group has established guidelines for QA programs, Proficiency Testing, Proficiency Test Manufacturing and Reporting, QA Audits for DNA testing labs and serves as a medium for forensic scientists all around the world to exchange ideas. It is the body that proposes and recommends revisions to the Quality Assurance Standards (QAS) and has a more liaison role with the forensic DNA community.
  8. SWGDAM issued a **Guidance Document for Implementing Health and Safety Programs** in DNA Laboratories in July of 2002 based on the OSHA standard 29 CFR 1910.1450 Occupational Exposure to Hazardous Chemicals in the Laboratory [Chemical Hygiene]. The document was created to assist laboratories in the establishment of a comprehensive health and safety program.

## Health & Safety Manual Review

1. Management shall review and update the Health & Safety Manual annually.

## Chemical Hygiene Plan

### Purpose

The LSD&FC Chemical Hygiene Plan will be based on the United States of America Occupational Safety and Health Administration (OSHA) plan. The USA OSHA promulgated a final rule on January 31, 1990, regarding occupational exposure to hazardous chemicals in laboratories. The standards which became effective on May 1, 1990, include a requirement for all employers covered by the standard to develop and carry out the provisions of a **Chemical Hygiene Plan (CHP)**.

A **CHP** is a written program which sets forth the procedures, equipment, personal protective equipment and work practices that are put in place to protect employees from the health hazards presented by hazardous chemicals used in within the laboratory. Components of the CHP shall include standard operating procedures for safety and health; criteria for the implementation of control measures; measures to ensure proper operation of engineering controls; provisions for training and information dissemination; permitting requirements; provisions for medical consultation; designation of responsible personnel; and identification of particularly hazardous substances.

The CHP is maintained by the Safety Officer and/or Quality Assurance Manager and readily available to laboratory employees. All Laboratory personnel shall know and follow the procedures outlined in the chemical hygiene plan. All activities performed in the laboratory shall be planned and executed in accordance with the procedures as established in the Health & Safety manual. In addition, each employee is expected to develop safe personal chemical hygiene habits aimed at the reduction of exposure to chemicals and hazards.

## Scope

The Chemical Hygiene Plan (CHP) applies to laboratory staff who are engaged in the laboratory use of hazardous materials, including those covered under the Occupational Health and Safety Administration (OSHA) Standard 29 CFR 1910.1450, Occupational Exposure to Hazardous Chemicals in Laboratories, also referred to as the Laboratory Standard.

## Glossary

Term	Definition
<b>Action level</b>	A concentration designated in 29 CFR part 1910 for a specific substance, calculated as an eight (8)-hour time-weighted average, which initiates certain required activities such as exposure monitoring and medical surveillance.
<b>Acute</b>	An adverse effect with symptoms of high severity coming quickly to a crisis.
<b>Carcinogen</b>	A substance capable of causing cancer in living tissue.
<b>Chemical Agents</b>	A wide variety of substances that have a high potential for body entry by various means. Some are more toxic than others and require special measures of control for safety and environmental reasons.
<b>Chronic</b>	Adverse effects with symptoms that develop slowly over a long period of time or that frequently recur.
<b>Combustible</b>	Able to catch on fire and burn.
<b>Emergency</b>	Any occurrence such as, but not limited to, equipment failure, rupture of containers or failure of control equipment which results in an uncontrolled release of a hazardous chemical into the workplace.
<b>Employee</b>	An individual employed in a workplace who may be exposed to hazardous chemicals in the course of his or her assignments.
<b>Flammable</b>	Capable of being easily ignited and of burning with extreme rapidity.
<b>Hazardous chemical</b>	Any chemical which is classified as health hazard or simple asphyxiant in accordance with the Hazard Communication Standard (§1910.1200).
<b>Health hazard</b>	A chemical that is classified as posing one of the following hazardous effects: Acute toxicity (any route of exposure); skin corrosion or irritation; serious eye damage or eye irritation; respiratory or skin sensitization; germ cell mutagenicity; carcinogenicity; reproductive toxicity; specific target organ toxicity (single or repeated exposure); aspiration hazard. The criteria for determining whether a

	chemical is classified as a health hazard are detailed in appendix A of the Hazard Communication Standard (§1910.1200) and §1910.1200(c) (definition of "simple asphyxiant").
<b>Infectious Agents</b>	Sources that cause infections either by inhalation, ingestion, or direct contact with the host material.
<b>Laboratory</b>	A facility where the "laboratory use of hazardous chemicals" occurs. It is a workplace where relatively small quantities of hazardous chemicals are used on a non-production basis.
<b>Laboratory scale</b>	Work with substances in which the containers used for reactions, transfers, and other handling of substances are designed to be easily and safely manipulated by one person. Laboratory scale excludes those workplaces whose function is to produce commercial quantities of materials.
<b>Laboratory type hood</b>	A device located in a laboratory, enclosure on five sides with a moveable sash or fixed partial enclosed on the remaining side; constructed and maintained to draw air from the laboratory and to prevent or minimize the escape of air contaminants into the laboratory; and allows chemical manipulations to be conducted in the enclosure without insertion of any portion of the employee's body other than hands and arms.
<b>LC50</b>	The concentration of a substance in the surrounding medium (air, water, etc.) that causes death in 50% of the animals exposed to it. A measure of acute toxicity.
<b>LD50</b>	The dose that causes death in 50% of the animals exposed to a substance. A measure of acute toxicity.
<b>Walk-in hoods</b>	Hoods with adjustable sashes meet the above definition provided that the sashes are adjusted during use so that the airflow and the exhaust of air contaminants are not compromised and employees do not work inside the enclosure during the release of airborne hazardous chemicals.
<b>Laboratory use of hazardous chemicals</b>	<p>Handling or use of such chemicals in which all of the following conditions are met:</p> <ol style="list-style-type: none"> <li>1. Chemical manipulations are carried out on a "laboratory scale;"</li> <li>2. Multiple chemical procedures or chemicals are used</li> <li>3. The procedures involved are not part of a production process, nor in any way simulate a production process; and</li> <li>4. Protective laboratory practices and equipment are available and in common use to minimize the potential for employee exposure to hazardous chemicals.</li> </ol>
<b>Medical consultation</b>	A consultation which takes place between an employee and a licensed physician for the purpose of determining what medical examinations or procedures, if any, are appropriate in cases where a significant exposure to a hazardous chemical may have taken place.

<b>Mutagen</b>	Chemicals that cause permanent changes in the amount or structure of the genetic material in a cell. Chemicals classified as mutagens in accordance with the Hazard Communication Standard (§1910.1200) shall be considered mutagens for purposes of this section.
<b>PEL</b>	Permissible Exposure Limit. This is the OSHA-defined (legally-enforceable) concentration in the workplace that is considered a safe level of exposure for an 8-hour shift, 40 hours per week.
<b>Personal Protective Equipment (PPE)</b>	Refers to protective clothing, lab coats, goggles, gloves or other garments or equipment designed to protect the wearer's body from exposure, injury or infection. The purpose of personal protective equipment is to reduce employee exposure to hazards when engineering controls and administrative controls are not feasible or effective to reduce these risks to acceptable levels. PPE is needed when there are hazards present. The hazards addressed by protective equipment include physical, light, electrical, heat, sound, chemicals, biohazards, and airborne particulate matter. Protective equipment shall be worn for job-related occupational safety and health purposes.
<b>Physical Agents</b>	Workplace sources recognized for their potential effects on the body. Heat exposure or excessive noise levels are examples of this type of risk group.
<b>Physical hazard</b>	A chemical that is classified as posing one of the following hazardous effects: Explosive; flammable (gases, aerosols, liquids, or solids); oxidizer (liquid, solid, or gas); self-reactive; pyrophoric (gas, liquid or solid); self-heating; organic peroxide; corrosive to metal; gas under pressure; in contact with water emits flammable gas; or combustible dust. The criteria for determining whether a chemical is classified as a physical hazard are in appendix B of the Hazard Communication Standard (§1910.1200) and §1910.1200(c) (Glossary of combustible dust and pyrophoric gas).
<b>Protective laboratory practices and equipment</b>	Those laboratory procedures, practices and equipment accepted by laboratory health and safety experts as effective, or that the employer can show to be effective, in minimizing the potential for employee exposure to hazardous chemicals.
<b>Reproductive toxins</b>	Chemicals that affect reproductive capabilities including adverse effects on sexual function and fertility in adult males and females, as well as adverse effects on the development of the offspring. Chemicals classified as reproductive toxins in accordance with the Hazard Communication Standard (§1910.1200) shall be considered reproductive toxins for purposes of this section.
<b>Safety Data Sheets (SDS)</b>	SDSs are a widely used system for cataloging information on chemicals, chemical compounds, and chemical mixtures. SDS information may include instructions for the safe use and potential hazards associated with a particular material or product. The SDS should be available for reference in the area where the chemicals are being stored or in use.
<b>Sensitizers</b>	Agents to repeated exposure over time creating an allergic reaction at some point in time.



<b>Sterility</b>	Changes made in male or female reproductive systems resulting in inability to reproduce.
<b>Teratogens</b>	A substance that causes a deformity in newborns if a significant exposure exists during pregnancy.
<b>TLV</b>	Threshold Limit Value. The maximum concentration in air of a chemical allowable for an employee with repetitive daily exposure.

### Chemical Procurement

1. The decision to procure a chemical constitutes a commitment to handle and utilize the chemical properly from receipt to disposal.
2. Chemicals are received in a central location. Personnel who receive chemicals at LSD&FC shall understand how to receive chemicals.
3. Chemical containers shall not be accepted without accompanying labels and packaging and in accordance with the proper regulations.
4. All Chemical shipments shall be labeled with the initials of the person receiving the chemical and the date the chemical was received.
5. **SDSs** are a widely used system for cataloging information on chemicals, chemical compounds, and chemical mixtures. SDS information may include instructions for the safe use and potential hazards associated with a particular material or product. The SDS shall be available for reference in the area where the chemicals are being stored or in use as well as electronically on the server.

### Incident Reporting

1. Any spill on benches or floors shall be contained and cleaned immediately, and the waste shall be disposed of properly.
2. If the employee who causes or notices the spill does not feel capable of cleaning the spill, then the employee shall notify his/her Supervisor and/or the Safety Officer who shall determine the best course of action for addressing the spill.
3. If the spill is too large or the material is too hazardous to be cleaned safely, the Supervisor and/or the Safety Officer shall order the evacuation of the area and the laboratory dependent upon the severity.
4. The Director, Supervisor and/or the Health & Safety officer shall be notified immediately.

### Chemical Hygiene Training

1. Chemical hygiene training shall be conducted at least *annually* to familiarize new employees with LSD&FC and chemical hygiene safety plan.
2. Training documentation shall be retained within the employees Training and Education manual.

### Annual Chemical Hygiene Plan Review

1. Management shall review and update the Chemical Hygiene Plan annually.

### Bloodborne Pathogen Plan

#### Purpose

Blood and/or other human body fluids may contain pathogenic agents, that is, microorganisms that cause disease. Among those pathogens that may be present are Hepatitis B and C viruses (HBV or HCV) or human immunodeficiency virus (HIV), which causes AIDS. If an individual has blood exposure to broken or injured skin, mucous membranes of the eyes, nose, mouth, or by needle stick or other injection, there is the potential of infection with any possible pathogen that might be present. To minimize the risk of infection, information and training must be provided to all employees, particularly to those who will likely be exposed; Hepatitis A and B vaccination is offered; protective measures in the work environment are instituted; and exposures are reported to ensure that proper medical evaluation and treatment can be provided. It is especially important that employees with potential exposure understand and follow the principle of "Universal Precautions" as required in the Occupational Safety and Health Administration standard. "Universal Precautions" is the infection control approach in which all blood and body fluids are treated as if they are infected and the necessary precautions are taken.

#### Scope

LSD&FC adopts the OSHA standards which require a Bloodborne Pathogen program for employees with job responsibilities which reasonably expose them to blood and certain other body fluids, unfixed human tissue or cell cultures. This program is intended to prevent infection with bloodborne pathogens. The Bloodborne Pathogen program applies to all technical staff who have occupational exposure to bloodborne pathogens.



## Glossary

Term	Definition
<b>Blood</b>	Human blood, human blood components and products made from blood, including (but not limited to) serum, plasma, red blood cells, tissues, organs and fluids that come in contact with them.
<b>Bloodborne Pathogens</b>	Pathogenic microorganisms that are present in human blood and can cause disease in humans. These pathogens include, but are not limited to, hepatitis A, B and C virus (HBV and HCV) and human immunodeficiency virus (HIV).
<b>Contaminated</b>	The presence or the reasonably anticipated presence of blood or other potentially infectious materials on an item or surface.
<b>Contaminated Sharps</b>	Any contaminated object that can penetrate the skin, including but not limited to, needles, scalpels and broken or sharp glass.
<b>Decontamination</b>	The use of physical or chemical means to remove, inactivate, or destroy bloodborne pathogens on a surface or item to the point where they are no longer capable of transmitting infectious particles and the surface or item rendered safe for handling, use or disposal.
<b>Exposure Control Plan</b>	A plan containing documentation which is used as a source of information for answering bloodborne pathogen-related questions and to help ensure exposure control activities are in place.
<b>Exposure Incident</b>	A specific eye, mouth, other mucous membrane, non-intact skin, or parenteral contact with blood or other potentially infectious materials that results from the performance of an employee's duties.
<b>Hepatitis B virus</b>	A form of viral hepatitis caused by a DNA virus that often persists in the blood serum and can cause chronic liver damage. Hepatitis B is usually transmitted by infected blood products (as through transfusion), by contaminated needles, or by exposure to infected bodily fluids through sexual intercourse.
<b>Hepatitis C virus</b>	Hepatitis C is a viral infection that causes inflammation of the liver. Hepatitis C is asymptomatic, and the disease may go unnoticed for decades. The virus is commonly contracted through shared needles and contaminated blood. Symptoms usually do not show in the early stages, but fatigue, muscle aches and nausea are common signs of the illness in the later stages. Another primary symptom is jaundice, which is a condition that yellows the skin and causes discoloration of the eyes.
<b>Human immunodeficiency virus</b>	The human immunodeficiency virus (HIV) is a lentivirus (a subgroup of retrovirus) that causes HIV infection and acquired immunodeficiency syndrome (AIDS). AIDS is a condition in humans in which progressive failure of the immune system allows life-threatening opportunistic infections and cancers to thrive.

<b>Occupational Exposure</b>	Actual or potential parenteral, skin, eye or mucous membrane contact with blood or other potentially infectious materials that may result from the performance of an employee's duties.
<b>Parenteral</b>	Piercing mucous membranes on the skin, barrier through such events as needle stick, cuts and abrasions.
<b>Potentially Infectious Materials</b>	Body fluids (including but not limited to blood, semen, vaginal secretions, cerebrospinal fluid, synovial fluid, pleural fluid, pericardial fluid, peritoneal fluid, amniotic fluid, and saliva) and any body tissue.

### Universal Precautions

1. Universal precautions will be observed at the laboratory in order to prevent contact with blood or other potentially infectious materials.
2. All blood or other potentially infectious materials will be considered infectious regardless of the real or perceived status of the source individual.
3. Blood is the single most important source of HIV, HBV, and other bloodborne pathogens in the occupational setting. Infection control efforts for HIV, HBV, and other blood-borne pathogens must focus on preventing exposures to blood as well as on delivery of HBV immunizations.
4. Universal precautions also apply to tissues and to the following fluids: cerebrospinal fluid, synovial fluid, pleural fluid, peritoneal fluid, pericardial fluid, semen, vaginal secretions and amniotic fluid.
5. Universal precautions do not apply to saliva (except in instances where a mixture of saliva and blood is present).

### Work Practice Controls

#### Personal Protective Equipment (PPE)

Personal protective equipment (PPE) is used to create a protective barrier between the staff and hazards in the laboratory. PPE includes such equipment as chemical resistant gloves, safety glasses, respirators, ear plugs and clothing such as laboratory coats and sleeves.

The management team (Director, Technical Leader, safety officer and Quality Manager) is responsible for ensuring that staff are using Universal Precautions when exposed to blood or other potentially infectious materials.

1. The following items are considered personal protective equipment:
  - Disposable gloves
  - Utility gloves used in housekeeping tasks
  - Masks, goggles, and face shields
  - Disposable gowns or Lab coats
2. Management is responsible for assuring the easy accessibility of personal protective equipment in the proper sizes for use by occupationally exposed employees.
3. Personal protective equipment is provided, maintained, cleaned and repaired at no cost to the employee.
4. Each instance in which an employee is performing an activity that results in occupational exposure must be documented.
5. The employee's supervisor is responsible for assuring this documentation in the form of a memorandum, in addition to following procedures described in the section of this document on post exposure evaluation and follow-up.
6. The supervisor will retain one copy of the memorandum to the record on file and forward one copy to the Safety Officer.
7. Documentation on exposures in which personal protective equipment was not used will be reviewed and evaluated every six months by supervisors and the Safety Officer to determine methods for improving compliance with Universal Precautions as recommended by the Centers for Disease Control and to determine if safer measures can be developed to eliminate preventable occupational exposure.
8. Instances in which an employee is found to be negligent in following universal precautions will be reflected in the employee's performance evaluations.
9. Defective protective equipment will be reported to the immediate supervisor who will procure replacement items.

### PPE Training

1. Each employee that is required to use PPE must be trained on the following:
  - When PPE is necessary
  - What PPE is required
  - How to properly put on, take off, adjust, and wear PPE
  - The limitations of the PPE
  - The proper care, maintenance, useful life and disposal of the PPE.

2. Each employee must demonstrate an understanding of the training and the ability to handle the PPE properly.
4. A hazard assessment and training must be performed and added to the existing program for:
  - A new or different hazard
  - A new or different type of PPE
  - A new process or procedure
5. Training only must be accomplished or repeated for:
  - A new employee
  - A previously trained employee who lacks understanding of PPE use.
6. The laboratory shall certify the training by documenting that the employee received and understood the material presented.
7. Completion of training shall be documented on the PPE Awareness Form.

### Soiled Personal Protective Equipment

1. Laboratory coats that becomes visibly soiled with blood or other potentially infectious materials must be changed immediately.
2. Soiled coats must be placed immediately into a red or labeled biohazard bag that is leak proof.
3. Universal precautions must be used for processing the laundry unless it is decontaminated before being laundered.
4. Personal protective equipment such as gloves soiled with blood or other potentially infectious materials must be disposed of in a labeled biohazard bag or color coded red plastic bag.

### Laboratory Work Spaces

1. Eating, drinking, smoking, applying cosmetics or lip balm, and handling contact lenses are prohibited in work areas where there is a reasonable likelihood of occupational exposure. This includes any area where

blood or other potentially infectious materials are collected, processed or tested.

2. Food and drink shall not be kept in refrigerators, coolers, freezers or cabinets, or on shelves, counter tops or bench tops where blood or other potentially infectious materials are present or may be placed. Equipment such as refrigerators and coolers used for storage or transport of biological samples shall not be used for any other purpose.

### Specimen Collection, Blood Drawing and Handling

1. Blood drawing and handling of blood or other potentially infectious materials shall occur in designated areas in the laboratory.
2. If blood must be processed in large quantities (as in the case of database samples or a mass disaster), an area may be temporarily designated as a handling area for the collection or packaging of samples.
3. Mouth pipetting blood or other potentially infectious materials is never permitted and expressly prohibited.
4. Specimens of blood or other potentially infectious materials shall be placed in labeled containers that prevent leakage during collection, handling, processing, and storage.
5. Laboratory samples of potentially infectious materials shall be placed in labeled coolers or mailing packages immediately or as soon as feasible in order to prevent leakage or breakage.
6. Specimens for transport shall be placed in a double container if a container is leaking or is contaminated on the outside.
7. Specimens for transport must conform to shipping regulation requirements for etiologic agents.
8. Unfixed slides from cancer detection activities shall be treated as potentially infectious materials.
9. Equipment which becomes contaminated with blood or other potentially infectious materials shall be decontaminated prior to shipping or repair. Portions that remain potentially contaminated must be identified by a readily observable label or tag.
10. If equipment cannot be decontaminated, biomedical technicians and equipment repair personnel will be advised when equipment requiring repair may be contaminated.
11. Broken glass, whether or not potentially contaminated with blood or other potentially infectious materials must not be picked up by hand,

even when wearing gloves. A broom, dustpan, tongs, or other mechanical means must be used.

12. Equipment used must be disinfected afterwards with a detergent washing followed by a soak in a sodium hypochlorite (household bleach) solution for at least five minutes, or in another EPA approved intermediate level disinfectant.

### Needles and Sharps

1. Contaminated needles and other contaminated sharps shall not be bent or recapped under any circumstances.
2. Only disposable needles and sharps will be used. There will be no reprocessing of disposable equipment.
3. Immediately after or as soon as possible after use, contaminated needles or sharps shall be placed into a sharps container which is puncture resistant, labeled or color coded as a biohazard, leak proof on the sides and bottom, and cleansable. Lids must be kept closed on sharps containers during transportation.
4. Sharps containers will be replaced when they are three-quarters full to prevent overfilling of the container.

### Immunizations and Vaccines

1. Immunizations reduce the risk of contracting a communicable disease, protecting the health of the employees and their families. LSD&FC complies with the OSHA mandate by providing the Hepatitis B vaccination and/or routine booster series free of charge to all employees within ten days of their assignment to a job or task that has the likelihood of occupational exposure.
2. Although the vaccination is not mandatory, LSD&FC strongly recommends that all employees elect to receive available vaccination(s) unless:
  - Documentation exists that the employee has previously received the series.
  - Antibody testing reveals that the employee is immune.
  - Medical evaluation shows that vaccination is contraindicated.

3. Participation in a pre-screening program is not a prerequisite for receiving Hepatitis B or any other vaccination.
4. All LSD&FC personnel must sign a Vaccination Acceptance/Refusal Form. If the employee elects to decline the vaccine. This form serves as a waiver. Individuals may change their mind and elect to take the vaccine at any time merely by completing another acceptance/refusal form and submitting it to the Health and Safety Officer.
5. Vaccinations and post-exposure evaluations are provided by or under the supervision of a licensed physician or healthcare professional.
6. All laboratory tests will be conducted by a clinical laboratory at no cost to the employee.

### Bloodborne Pathogen Training

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1. All new technical staff will receive exposure control training at the time of initial assignment to a job or task, every 5 years thereafter and when changes, modifications or institution of new tasks or procedures are initiated with a possibility of Occupational Exposure to bloodborne pathogens.
2. All technical staff shall receive education on precautionary measures, epidemiology, symptoms, modes of transmission and prevention of bloodborne pathogen diseases at no cost to the employees during working hours.
3. After an initial training, bloodborne pathogen training shall be conducted at least once in 5 years to familiarize technical staff with bloodborne pathogen training and safety.
4. Training documentation shall be retained within the employees Training and Education manual.

### Annual Bloodborne Pathogen Plan Review

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1. Management shall review and if necessary update all phases of the Bloodborne pathogen plan annually.



## Hazardous Waste Management Plan

### Purpose

Employees who generate hazardous waste are obligated to manage the waste properly. This Hazardous Waste Management Program (HWMP) serves as a guide for handling hazardous waste generated by the Laboratory. The goals of the HWMP include handling of hazardous waste in a safe, efficient, and environmentally sound manner and complying with local and federal regulations. These goals shall be achieved through employee training and through the implementation of pollution prevention, waste minimization, recycling and re-use practices. The HWMP provides the framework for hazardous waste determination, labeling and container management, hazardous waste storage area requirements, contingency planning, employee training, and a clear definition of roles and responsibilities. It provides directions for containing, labeling, storage, transportation, inspection, training, and record keeping for hazardous waste activities. Hazardous waste shall not be transported or shipped from one facility to another. The HWMP is available to all employees through the Health & Safety. The HWMP shall be maintained by the Health & Safety Officer.

### Scope

The Hazardous Waste Management plan applies to LSDS&FC laboratory staff who are engaged in the use of hazardous materials and generate hazardous waste.

### Glossary

Term	Definition
<b>Biohazardous Waste</b>	Biohazardous waste typically includes waste containing pathogens with sufficient virulence and quantity so that exposure to the waste by a susceptible host could result in an infectious disease.
<b>Hazardous Chemical</b>	Hazardous chemical wastes are generated as a result of forensic laboratory analysis at LSD&FC. Hazardous waste is a very specific term that is defined by



## Waste

EPA. EPA groups hazardous waste into two categories 1) characteristic waste (physical properties) and 2) listed waste (specifically identified by technical name).

## Biohazardous Waste Types

1. Infectious agents and associated biological materials, including but not limited to:
  - Specimens from medical, pathology and clinical/medical laboratories
  - Waste from the extraction of biological materials
  - Human biological materials
2. All sharps (contaminated and uncontaminated) such as:
  - Needles and syringes
  - Scalpels, razors and microtome blades
  - Slides and cover slips
  - Shards of broken glass
3. Other laboratory waste may include but not be limited to:
  - Specimen containers
  - Disposable gloves, lab coats, masks and aprons
  - Disposable pipettes
  - Pipet tips

## Handling Biohazardous Waste

1. Waste must be segregated at the point of origin by the generator.
2. Containers (e.g., tubes, vials etc.) used to handle biological material must be placed directly into the red bag lined transport containers and placed in designated areas for pickup at least monthly by the Biohazard Waste Disposal company retained by LSD&FC.
6. Contaminated sharps must be placed in a red sharps container.

### Handling Non-Biohazardous Waste

1. Uncontaminated sharps must also be placed in a red sharps container.
2. Uncontaminated plastics are discarded in the regular trash, or recycled where that option is available.
3. Uncontaminated, unbroken glassware is discarded by placing it in a sturdy cardboard box and marking it as uncontaminated, unbroken glass. Broken glassware must be managed as sharps.

### Hazardous Chemical Waste Types

Waste exhibiting any of these characteristics is considered hazardous.

#### Ignitability

- Liquids that have a flash point less than 140° F (60° C.), e.g., xylene, acetonitrile, ethanol, toluene, paint thinner, methyl ethyl ketone.
- Solids capable of causing fire by friction, absorption of moisture, or spontaneous chemical change and when ignited burn vigorously and persistently to create a hazard, e.g., picric acid, sodium dithionite.
- Flammable compressed gases, e.g., hydrogen, ethylene, methane.
- Oxidizers: substances that yield oxygen readily to stimulate combustion, e.g., potassium permanganate, sodium chlorate, sodium nitrate.

#### Corrosivity

- Aqueous solutions with pH equal to or less than 2 or greater than 12.5.
- Liquids capable of corroding steel at a specified rate and temperature.

#### Reactivity

- Substances that react with water violently, or produce toxic gases or explosive mixtures with water, e.g., potassium, sodium, and sodium hydride.
- Substances that are normally unstable or explosive, e.g., phosphorous.

- Chemicals containing cyanide or sulfide that generate toxic gases when exposed to pH between 2 and 12.5, e.g., potassium cyanide, sodium sulfide.

### Toxicity

- Materials that contain certain heavy metals above regulated levels, e.g., silver, cadmium, mercury, arsenic.
- Materials that contain certain organic constituents, mainly solvents and pesticides, above regulated levels, e.g., benzene, chloroform.

### Universal Waste Types

The following group of waste materials are considered hazardous to the environment and are commonly found in industry as well as households. Because the materials are common, they are known as Universal Waste. Items that are Universal Waste include:

- Mercury containing instruments such as thermometers, barometers, thermostats.
- Fluorescent lamps that contain mercury vapor.
- Batteries that contain hazardous materials such as NiCad, lithium and lead-acid batteries.

### Other Chemical Waste Types

There are many other chemicals that present a hazard to human health and the environment. Some items that are hazardous to human health or the environment may be prohibited from disposal at the local landfill. These include such things as:

- Ethidium bromide and ethidium bromide gels.
- Carcinogens, mutagens, teratogens.
- Pharmaceuticals.
- Pesticides and herbicides.
- Aerosol cans.
- Latex paints.

Such items will be packaged separately for pickup by the hazardous waste disposal company.

## Waste Pick-up

Properly packaged and labeled waste will be removed by the company contracted to remove waste. LSD&FC staff will place waste in containers in the locally designated area for removal.

In order to comply with shipping regulations, the laboratory or staff that generates the biohazardous waste must prepare their waste for disposal as follows:

- All biohazardous waste, including biohazard boxes must be lined with a red bag.
- To avoid puncturing do not overfill.
- Tie the red bag liner closed.
- Attach a fully completed Biohazardous Waste Certification label sticker to the side of the bio-waste container.

All hazardous waste will be removed by the waste removal contractor at least monthly. Waste must be packaged and labeled properly prior to arranging for pickup.

## Hazardous Waste Training

1. Hazardous Waste training shall be conducted prior to the use of biological materials, chemicals and the generation of hazardous waste.
2. Training is necessary in order to familiarize new employees with hazardous waste safety.
3. Training documentation shall be retained within the employees Training and Education manual.

## Hazardous Waste Management Plan Review

1. Management shall review and update the plan, as needed, annually.

## Hazardous Communications

## Purpose

The purpose of the Hazard Communication Program is to comply with the LSD&FC safety plan which complies with the United States OSHA's Globally Harmonized Chemical Hazard Communication Standard, 29 CFR 1910.1200 as amended on March 26, 2012. Requirements consist of maintaining a list of hazardous chemicals, making Safety Data Sheets accessible, ensuring that containers are labeled, and providing the information, training, work practices, and equipment capable of protecting employees.

Hazard communication is the employees' Right-to-Know the hazards and identities of the chemicals they are exposed to in the workplace.

The goal of this section is to establish procedures and policies that provide information to employees about the hazards of chemicals which they may be exposed to in their workplace through an effective hazard communication program, chemical inventory, labels, Safety Data Sheets and employee training. This program is integrated with the Chemical Hygiene Plan.

## Scope

This hazardous communications program applies to technical work operations at LSD&FC where staff may be exposed to hazardous chemicals under normal working conditions or during an emergency situation. Work areas typically include laboratories.

## Glossary

Term	Definition
<b>Chemical</b>	Any substance, or mixture of substances.
<b>Container</b>	Any bag, barrel, bottle, box, can, cylinder, drum, reaction vessel, storage tank, tube or the like that contains a hazardous chemical.
<b>Employee</b>	A worker who may be exposed to hazardous chemicals under normal operating conditions or in foreseeable emergencies.
<b>Employer</b>	A person engaged in a business where chemicals are either used, distributed, or are produced for use or distribution, including a contractor or subcontractor.

<b>Exposure or exposed</b>	An employee is subjected in the course of employment to a chemical that is a physical or health hazard, and includes potential (e.g. accidental or possible) exposure. "Subjected" in terms of health hazards includes any route of entry (e.g. inhalation, ingestion, skin contact or absorption.)
<b>Foreseeable emergency</b>	Any potential occurrence such as, but not limited to, equipment failure, rupture of containers, or failure of control equipment which could result in an uncontrolled release of a hazardous chemical into the workplace or the environment.
<b>Hazard Category</b>	The division of criteria within each hazard class, e.g., oral acute toxicity and flammable liquids include four hazard categories. These categories compare hazard severity within a hazard class and should not be taken as a comparison of hazard categories more generally.
<b>Hazardous Chemical</b>	Any chemical which is classified as a physical hazard or a health hazard, a simple asphyxiant, combustible dust, pyrophoric gas, or hazard not otherwise classified.
<b>Hazard Class</b>	The nature of the physical or health hazards, e.g., flammable solid, carcinogen, oral acute toxicity.
<b>Health Hazards</b>	A chemical which is classified as posing one of the following hazardous effects: acute toxicity (any route of exposure); skin corrosion or irritation; serious eye damage or eye irritation; respiratory or skin sensitization; germ cell mutagenicity; carcinogenicity; reproductive toxicity; specific target organ toxicity (single or repeated exposure); or aspiration hazard
<b>Hazard not otherwise classified (HNOC)</b>	An adverse physical or health effect identified through evaluation of scientific evidence during the classification process that does not meet the specified criteria for the physical and health hazard classes addressed in the OSHA Standard.
<b>Hazard Statement</b>	A statement assigned to a hazard class and category that describes the nature of the hazard(s) of a chemical, including, where appropriate, the degree of hazard.
<b>Immediate Use</b>	Means that the hazardous chemical will be under the control of and used only by the person who transfers it from a labeled container and only within the work shift in which it is transferred.
<b>Label</b>	An appropriate group of written, printed or graphic information elements concerning a hazardous chemical that is affixed to, printed on, or attached to the immediate container of a hazardous chemical, or to the outside packaging.

<b>Label Elements</b>	The specified pictogram, hazard statement, signal word and precautionary statement for each hazard class and category.
<b>Mixture</b>	A combination or a solution composed of two or more substances in which they do not react.
<b>Personal Protective Equipment (PPE)</b>	Devices worn by staff to protect against hazards in the laboratory environment. Examples include safety glasses, gloves, lab coats and respirators.
<b>Physical hazards</b>	A chemical for which there is scientifically valid evidence that it is a combustible liquid, compressed gas, explosive, flammable, organic peroxide, oxidizer, pyrophoric, unstable or reactive, or water-reactive.
<b>Pictogram</b>	A composition that may include a symbol plus other graphic elements, such as a border, background pattern, or color, that is intended to convey specific information about the hazards of a chemical.
<b>Precautionary Statement</b>	A phrase that describes recommended measures that should be taken to minimize or prevent adverse effects resulting from exposure to a hazardous chemical, or improper storage or handling.
<b>Product Identifier</b>	The name or number used for a hazardous chemical on a label or in the SDS. It provides a unique means by which the user can identify the chemical. The product identifier used shall permit cross-references to be made among the list of hazardous chemicals required in the written hazard communication program, the label and the SDS.
<b>Produce</b>	Means to manufacture, process, formulate, blend, extract, generate, emit, or repackage.
<b>Pyrophoric Gas</b>	A chemical in a gaseous state that will ignite spontaneously in air at a temperature of 130 degrees F (54.4 degrees C) or below.
<b>Responsible Party</b>	A person who can provide additional information on the hazardous chemical and appropriate emergency procedures, if necessary.
<b>Safety Data Sheet (SDS)</b>	A written or printed material concerning a hazardous chemical that is prepared in accordance with the OSHA Standard.
<b>Signal Word</b>	A word used to indicate the relative level of severity of hazard and alert the reader to a potential hazard on the label. The signal words used in this section are danger and warning. Danger is used for the more severe hazards, while warning is used for less severe hazards.
<b>Simple Asphyxiant</b>	A substance or mixture that displaces oxygen in the ambient atmosphere, and can thus cause oxygen deprivation in those who are exposed, leading to unconsciousness and death.
<b>Specific Chemical Identity</b>	The chemical name, Chemical Abstracts Service (CAS) Registry Number, or any other information that reveals the precise chemical designation of the substance.



<b>Substance</b>	Chemical elements and their compounds in the natural state or obtained by any production process, including any additive necessary to preserve the stability of the product and any impurities deriving from the process used, but excluding any solvent which may be separated without affecting the stability of the substance or changing its composition.
<b>Use</b>	To package, handle, react, emit, extract, generate as a byproduct, or transfer.
<b>Work Area (Laboratory)</b>	A room or defined space in a workplace where hazardous chemicals are produced or used, and where employees are present.
<b>Workplace</b>	An establishment, job site, or project, at one geographical location containing one or more work areas.

## Chemical List

1. A list of hazardous chemicals known to be present using a product identifier that is referenced on the appropriate Safety Data Sheet must be compiled and updated annually, or more often when changes occur.
2. Information on the list shall include the chemical or product name, the work area where it was used, and identify the corresponding SDS.

## Safety Data Sheet (SDS)

1. A SDS specific to the chemical or product shall be available for each item on the chemical list that is present in the laboratory.
2. Staff shall be provided access to SDSs.
3. Electronic access is acceptable as long as the employee can get the information in a reasonable and timely manner.

## Signs and Postings

1. The following information shall be posted at the main entrance to each laboratory within LSD&FC:
  - The phone numbers of responsible parties to be contacted in the event of an emergency, accident, fire or spill.
  - Special hazards that may be encountered in the laboratory (e.g. biohazardous, chemical materials, laser in use, etc.).



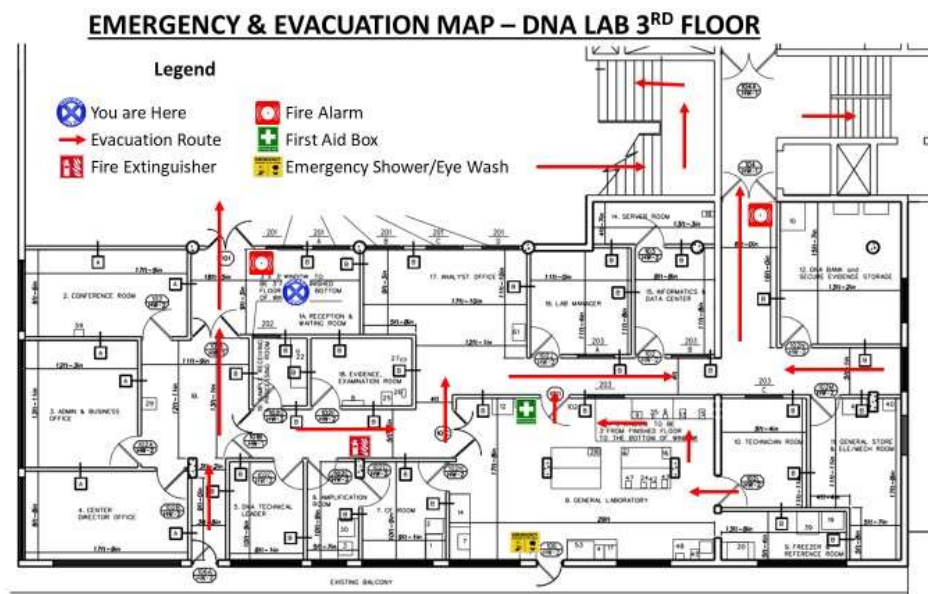
- Safety instructions for persons entering the laboratory, such as access restrictions, required protective equipment, etc.
2. The interior of the laboratory must be posted with the following:
- Emergency Action Plan near the exit.
  - Signs identifying location of safety equipment (e.g., fire extinguisher, safety shower, eyewash station, etc.).

## Emergency Action Plan

An Emergency Action Plan has been developed to help address the following potential emergency issues:

## Evacuation Procedure

1. Identify evacuation routes and meeting locations for emergencies such as fire, severe weather and chemical, biological, or radiological releases. Below is an example of the Emergency and Evacuation map posted at appropriate locations in the facility.



### Alarm System Activation

1. The locations of alarm pull stations can be found on the building emergency map (i.e., fire alarm, chemical spill, severe weather).
2. Laboratory employees must know how and when to activate alarms.

### Fire Emergencies

1. For all fires, activate alarm, dial 112, fight fire if small and safe and/or evacuate.

### Emergency Shut Off Systems

1. The locations of emergency shut-off systems can be found on the building emergency map (i.e., gas, high pressure air, electrical, water, etc.).
2. Laboratory employees must know how and when to utilize emergency shut off systems.

### Spill/Release Containment and Clean-up: Small Chemical Spills

The following general procedures should be followed by laboratory personnel to clean up small spills:

1. Notify people in the immediate area.
2. Evacuate all nonessential personnel from the spill area.
3. Attend to exposed or contaminated personnel by following the First Aid Procedures.
4. If spilled material is flammable, turn off ignition and heat sources, if possible.
5. Avoid breathing vapors of the spilled material and, if necessary, use a respirator.
6. Maintain or establish exhaust ventilation, if safe to do so, by opening the sash on the fume hood. Do not open doors or windows.
7. Wear appropriate personal protective equipment (PPE) such as gloves, lab coats, goggles to prevent exposure and minimize contamination.
8. Obtain a laboratory spill kit.

9. Using the absorbent material confine the spill, if this can be done without risk of injury or contamination.
10. Remove sharp objects using mechanical means such as tongs; never with hands.
11. Clean up spill by working from the outside of the spill toward the center to minimize spread of contamination.
12. Neutralize or clean the spill area. Be sure to allow adequate contact time to ensure complete neutralization.
13. Properly dispose of spill cleanup debris according to procedures outlined in the Waste and Recycling Guidelines.
14. Wash hands and other exposed skin after completing clean-up.
15. Notify the Director, Supervisor and/or Health & Safety Officer if you require assistance or additional information.

### Spill/Release Containment: Large Chemical Spills

In the event of a large chemical spill (i.e., a volume of chemical which exceeds the capacity of a standard spill kit, uncontrolled leakage of a toxic or highly corrosive gas or a situation in which readily available personal protective equipment (PPE) is inadequate to ensure worker safety), the following measures must be followed:

1. Evacuate the area immediately; shutting doors and windows on the way out, if possible.
2. For situations that threaten life or property, activate fire alarms (or chemical safety alarms if applicable) and immediately dial 112.
3. Notify the Management (Laboratory Director, Supervisor, and the Health & Safety Officer).
4. Attend to any persons who may have been exposed or contaminated by following the first aid procedures.
5. Assemble persons who were present in the laboratory at the time of the spill and wait for assistance at a safe location.
6. Provide Management and/or fire & police officials with details of the problem upon their arrival.

## Spill/Release Containment and Clean-up: Biological Spills

The following general procedures should be followed by laboratory personnel to clean up biological spills:

1. Any potentially contaminated clothing must be removed and placed in a biohazard waste bag for autoclaving.
2. If the spill is outside of a hood or a biological safety cabinet (BSC), the laboratory must be evacuated immediately.
3. It is the responsibility of the last person out to ensure that all doors have been closed.
4. The room must remain vacant with the door shut for least 30 minutes to allow time for the laboratory ventilation system to clear any aerosolized material from the room, and thus decrease the risk of inhaling biohazardous materials.
5. If this spill is outside of the laboratory, immediate cleanup is essential. If outdoors, personnel should remain upwind from the spill, if at all possible.
6. If the spill is inside a centrifuge, the centrifuge should be closed as soon as the spill is noticed. A do-not-use sign should be placed on the centrifuge until decontaminated.
7. If the spill is contained inside a BSC, the room need not be evacuated, however, the BSC must remain running.
8. Hands and any other contaminated skin must be washed thoroughly with soap and water.
9. Everyone not needed for spill cleanup must be cautioned to stay away from the spill area. Signs may be posted if necessary.
10. Management (Laboratory Director, Supervisor and the Health & Safety Officer) are available to assist with spills.
11. Appropriate PPE must be worn. At a minimum, disposable gloves, eye protection and a lab coat should be worn.
12. A respirator is advised for spills greater than ~10mL outside a BSC, or any spill inside a centrifuge, because of the likelihood of splashing and/or aerosolization of the biohazardous material.
13. Any sharp contaminated objects must be removed from the spill area using mechanical means, never with hands.
14. After all sharps are removed, disinfectant must be poured carefully around the edges of the spill with care taken to avoid splashing. Paper towels can be used to

absorb as much of the spilled material as possible. Working from the outside of the spill toward the center avoids spreading contamination.

15. If the spill is inside a centrifuge, the rotor and its contents should be moved to a BSC, if possible.
16. If the spill is inside a BSC, the spill tray underneath the work area and the trough below the air intake grill must be cleaned as well. These are likely to be contaminated when the spill is large.
17. Alcohol is not recommended as a disinfectant for large spills, especially inside a BSC, because large amounts of alcohol pose an explosion hazard.
18. After initial cleanup, the spill area must be flooded with disinfectant and left to soak for at least 20 minutes (adequate contact time is important to ensure complete decontamination).
19. Disinfectant can be absorbed with paper towels. A final wipe-down should be done with clean paper towels soaked with disinfectant. Laboratory personnel should be sure to disinfect any equipment, walls or other areas likely to have been splashed by the spill.
20. All contaminated waste must be disposed of properly.
21. Hands must be washed thoroughly with soap and water.
22. If the spill is inside a BSC, the cabinet should be left running for at least 10 minutes before resuming use.
23. Notify the Director, Supervisor and/or Health & Safety Officer if you require assistance or additional information.

### Unauthorized Individuals

1. An unauthorized person is an unknown and unaccompanied person, with no visitor's badge, an intruder or someone who makes inappropriate or unwanted entry into the laboratory.
2. The following steps will be taken when an unauthorized person is found:
  - Request from all unknown laboratory entrants to state their name and the purpose of their visit to the laboratory.
  - Ask the unauthorized persons to leave.
  - Report all laboratory intruders by dialing the security front desk
  - If the unauthorized person poses, then also call 112.

- Do not attempt to detain the intruder, or engage in actions that may escalate the problem or aggravate the unauthorized person thereby exposing you to harm.
- Note the physical description of the person.
- Once the person leaves or is apprehended, Conduct a quick inventory of the laboratory if it is safe to do so.
- Communicate any pertinent information to the responding security and police officer and make necessary departmental contacts.

### Theft or Vandalism

1. The following steps should be followed when responding to an incident involving vandalism or theft
  - Dial the facility security number ????? with the intercom and the general emergency, 112 to notify the police.
  - Stay out of the lab (treat as a crime scene).
  - Beware of any remaining perpetrators or malicious devices.
  - Communicate any pertinent information to the responding security and/or police officer.
  - Contact Management to notify them of the situation.

### Medical Emergencies

1. The following steps should be followed when responding to medical emergencies in the laboratory.

### Medical Treatment

Type	Action
First Aid	Administer first aid using the First Aid kit. Report to supervisor, and if necessary arrange medical care
Life Threatening Injuries	Call 112 to request an ambulance and notify supervisor as soon as possible.

Non-Life-Threatening Injuries	Administer immediate first aid using the First Aid Procedures. Report to supervisor, who will arrange medical care
After Hours Treatment/Emergency Care	Call 112 to request an ambulance and notify supervisor as soon as possible.
Follow up Treatment	Visit your local physician

### Incident Reporting

All accidents and injuries occurring at work or in the course of employment must be reported to the employee's supervisor as soon as possible and an incident report completed.

### Hazard Labels: Pictograms and related Hazard Classes

When planning for emergencies, be sure to communicate hazards through postings/signage and have procedures in place for personnel to follow.



GHS Pictograms	Used For...	Current Pictograms		
		Canada (consumer)	Canada (work place)	Europe
	<ul style="list-style-type: none"> <li>Oxidizers</li> </ul>			
	<ul style="list-style-type: none"> <li>Flammables</li> <li>Self Reactives</li> <li>Pyrophorics</li> <li>Self-heating</li> <li>Emits Flammable Gas</li> <li>Organic Peroxides</li> </ul>			
	<ul style="list-style-type: none"> <li>Explosives</li> <li>Self Reactives</li> <li>Organic Peroxides</li> </ul>			
	<ul style="list-style-type: none"> <li>Acute Toxicity (severe)</li> </ul>			
	<ul style="list-style-type: none"> <li>Corrosives</li> </ul>			
	<ul style="list-style-type: none"> <li>Gases Under Pressure</li> </ul>			
	<ul style="list-style-type: none"> <li>Carcinogen</li> <li>Respiratory Sensitizer</li> <li>Reproductive Toxicity</li> <li>Target Organ Toxicity</li> <li>Mutagenicity</li> <li>Aspiration Toxicity</li> <li>Environmental Toxicity</li> </ul>			
	<ul style="list-style-type: none"> <li>Environmental Toxicity</li> </ul>			
	<ul style="list-style-type: none"> <li>Irritant</li> <li>Dermal Sensitizer</li> <li>Acute toxicity (harmful)</li> <li>Narcotic Effects</li> <li>Respiratory Tract Irritation</li> </ul>			

## Container Labels

All containers of hazardous chemicals must have a label or other indicator of contents and hazards.



### Primary Container Labels

Each container of hazardous chemicals in the workplace must be labeled, tagged or marked with the product identifier and words, pictures, symbols, or combination providing information regarding the hazards of the chemicals, and which, in conjunction with information immediately available to employees will provide specific information regarding the physical and health hazards of the hazardous chemical.

### Secondary Container Labels

Secondary containers must have labels provided by the manufacturer, or an alternate workplace label that includes the product identifier and words, pictures, symbols, or combination providing information regarding the hazards of the chemicals. Secondary containers are typically a smaller container that an employee fills from a larger container or a drum.

### Immediate Use Container Labels

An immediate use and portable container that is filled from a labeled container, is for the employee's immediate use during that work shift and will be used by the same employee who filled the container, and will not be left unattended by that employee, is not required by the HazCom standard to have a label although using a label is recommended as best practice. If a container is left unattended or spills, e.g., during a weather emergency, label information helps emergency responders act safely, appropriately and quickly.

### Stationary Process Container Labels

Signs, placards, process sheets, batch tickets, operating procedures, or other written materials may be used in lieu of affixing labels to individual stationary process containers, as long as the alternative method identifies the containers to which it applies and conveys the same information as a label.

## Hazardous Communication Training

1. Training consists of general awareness training and site-specific training.
2. Everyone who works with or is potentially exposed to hazardous chemicals will receive initial training on the Hazard Communication standard and the safe use of those hazardous chemicals.
3. Laboratory staff shall participate annually in the LSD&FC hazard communications training as required by the overall hazard communication program or when circumstances indicate the need for additional training (the use of a new physical or health hazard category).
4. General awareness training is available online through Quality Assurance and the Health & Safety Officer.
5. Site specific information and training that is unique to the employee's workplace is provided by the staff members training mentor and/or Supervisor.
6. This training shall include the following:
  - Requirements of USA 29 CFR 1910.1200 Hazard Communication and 29 CFR 1910.1450 Chemical Hygiene Plan.
  - Operations within the laboratory which utilize hazardous substances.
  - The location of the written Hazard Communication Program and Chemical Hygiene Plan.
  - How to detect a hazard (the methods and observations used to detect the presence or release of a chemical).
  - The physical and health hazards present and protective measures that should be utilized to protect against hazards.
  - An explanation of the labels on containers and the LSD&FC labeling system.
  - Where SDSs are located and how to read and interpret the information on them.
  - Additional training will be provided by the laboratory if a new hazard is introduced or if circumstances indicate that additional training is needed.
7. Training documentation shall be retained within the employees Training and Education manual.

## Annual Hazardous Communication Plan Review

1. Management shall review and update the Hazardous Communication Plan annually.

## Fire & Emergency Evacuation Plan

### Purpose

The Fire and Emergency Evacuation Plan shall provide a plan for the safe and expedient evacuation of all employees and visitors of the laboratory.

### Scope

This Fire & Emergency Evacuation plan applies to ALL staff at the LSD&FC laboratory.

### Requirements for Evacuation

1. This plan shall be implemented in the event of a fire, explosion, or hazardous incident.
2. All employees and visitors of LSD&FC shall follow the Fire and Emergency procedures provided by the Health & Safety Officer.
3. Supervisors shall ensure the employee section count and provide pertinent information to firefighter/rescue personnel (e.g., Staff still located in building, types of chemicals present and any known dangers).
4. The Health & Safety Officer shall notify all employees of a location (the muster point) to meet upon evacuation.
5. The emergency alarm system shall be tested annually by the Health & Safety Officer or designee.

### Fire & Emergency Evacuation Drill

1. A fire & emergency evacuation drill shall be conducted at least annually to familiarize employees with the location and safe and efficient use of all exits.
2. The safety committee shall review all aspects of the practical evacuation drill to determine if any improvements to the plan are required.
3. The fire alarm system shall be used during all drills.
4. The fire department shall be given prior notice of any fire drill.
5. A Fire & Emergency Evacuation Drill Form shall be completed after each drill.
6. No employee shall be exempt from a fire drill.

7. Employees shall be instructed annually on the location and use of safety equipment (fire extinguishers, fire alarms, fire escapes etc.).

### Evacuation Procedure

1. Upon activation of the fire alarm, employees shall turn off flames and sources of ignition and power down all instruments to the extent possible.
2. Without using elevators, proceed to the closest fire exit in an orderly manner.
3. Upon exiting the building, proceed to the designated safe location.
4. A head count of the number of employees present shall be taken and compared to the number of employees who reported to work for the day. Any discrepancies shall be resolved.
5. No employee may re-enter the building until the Health & Safety Officer or designee (e.g., Fire Department Chief or designee) has determined the building is safe to re-enter.

### Fire & Emergency Safety Training

1. Training shall be conducted at least *annually* to familiarize new employees with fire and emergency safety.
2. Training documentation shall be retained within the employees Training and Education manual.

### Annual Fire & Emergency Evacuation Plan Review

1. Management shall review and update the Fire & Emergency Evacuation Plan annually.

### Electrical Safety Plan

#### Purpose

The LSD&FC laboratory contains a wide variety of electrically-powered equipment including stirrers, vortexes, pumps, hot plates, heaters, power supplies, incubators, thermal cyclers and capillary electrophoresis equipment. These and all electrical devices

used in the laboratory present a potential danger of injury due to electric shock, fires due to poorly installed or maintained systems and fires due to sparks serving as an ignition source for flammable or combustible materials.

Laboratory staff shall protect themselves from the hazards of electricity by following some basic guidelines. The guidelines include maintaining awareness of the condition of lab equipment, the proper use of lab equipment and safe work practices.

### Scope

This Electrical Safety plan applies to staff at the LSD&FC laboratory.

### Electrical Safety

#### Outlet Receptacles

1. Electrical outlets should have a grounding connection and accept three-prong plugs.
2. Surge protector strip adapters may be used if they are in good condition. (no frayed wires or damaged plug).

#### Electrical Preparedness

1. Learn the location of your electrical panels and shut-off switches so you can quickly disconnect power in the event of an emergency.
2. Be sure to always leave at least a 3-foot clearance around electrical panels for ready access.
3. Plan ahead for what steps will be taken in the event of a power loss.
4. Be aware of the potential vapor/gas release from vapor-generating processes or chemical fume hoods if the power is lost.
5. Conduct a periodic inspection of laboratory electrical equipment to be sure it is in good condition.
6. Remove equipment from service if it is in poor condition and replace or have it repaired by a qualified repair person.

### Power Cords & Power Supplies

1. Inspect power cords to be sure they are not frayed or have exposed wiring.
2. Carefully place power cords so they don't come in contact with water or chemicals.
3. Contact with water is a shock hazard.
4. Corrosives and solvents can degrade the cord insulation.
5. Do not allow cords to dangle from counters or hoods in such a manner that equipment could be unplugged, fall or cords could be tripped over.
6. Do not allow cords to contact hot surfaces to prevent melting insulation.
7. Do not lift a piece of electrical equipment by the cord or pull the cord to disconnect from the outlet in order to prevent damage.
8. Portable power supplies are commonly used in the lab. These devices are extremely high electrical energy sources and must be used carefully.
9. Never attach an exposed connector such as an alligator clip to a power supply.
10. Power cords must have grounding plugs (3 prong) and be properly insulated.
11. Extension cords are not allowed in the laboratory for permanent use. The only exception is that electrical power surge protectors (UL listed) are allowed.

### Circuit Protection

1. No more than two high current draw devices such as ovens and centrifuges should be plugged into the same outlet to prevent an overloaded circuit.
2. Overloading can lead to overheated wires and arcing. This can cause electrical shock injury and fire.
3. Fuses and circuit breakers prevent over-heating of wires and other electrical components. This overload protection is useful for equipment that may be left on for a long time such as vortexers, incubators, Genetic Analyzers, etc.
4. Ground-fault circuit interrupters, or GFCIs, disconnect current if a ground-fault is detected and protect the user from electric shock.
5. GFCI outlets or portable GFCIs are used near sinks and potentially wet locations.

- Keep electrical equipment (and yourself while you are using electrical equipment) away from water/chemical or their spills unless you are sure the equipment is rated for this type of use.

## Electricity and Flammable Materials

- Keep flammable materials away from electrical equipment. The equipment may serve as a source of ignition for flammable or explosive vapors.
- Receptacles providing power for equipment used inside a fume hood should be located outside the hood.
- Make sure that equipment used where flammable vapors may be present is specially rated to not produce sparks.
- Many household appliances such as hot plates, vacuum cleaners, and drills don't meet this requirement so they should be used only under very controlled conditions.
- If refrigeration or freezing is needed, flammable materials should only be stored in explosion safe or explosion proof equipment. These do not contain any spark sources such as lights and switches.

## General Electricity Safety

- Avoid contact with energized electrical circuits.
- Only qualified electrical workers may install, service or repair electrical equipment.

## Glossary

Term	Definition
<b>Energized</b>	Energized means connected to an energy source or containing residual or stored energy.

## Electrical Safety Training

- Electrical Safety training shall be conducted at least *annually* to familiarize new employees with electrical safety.


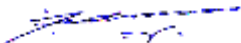


2. Training documentation shall be retained within the employees Training and Education manual.

## Annual Electrical Safety Plan Review

1. Management shall review and update the Electrical Safety Plan annually.

## Procedure Review, Sign Off & Effective Date

Procedure History			
Initial Version Created			
Author		Date	
Shelley Johnson, MFS		September 1, 2017	
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Date	Reviewed & Approved by	Title	
		Annette Alchin, MS Director, DNA Technical Leader	
		Richard I. Somiari, PhD Center Director	
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