Lab safety and integrity University codes

June 2023

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PART ONE:

GUIDELINES FOR Lab Safety

Safety standard committee

June 2023

SECTION 1: Laboratory Safety at MSA University

A. Introduction

The purpose of the MSA University Laboratory Safety Manual is to provide users with information designed to ensure health and safety in laboratories. This manual also meets Occupational Safety and Health Administration (OSHA) requirements for a Chemical Hygiene Plan. The Laboratory Safety Manual is not intended to be all-inclusive but should serve instead to supplement more specific procedures developed for particular laboratory situations. All laboratory personnel must have access to this document as a basis for working safely at MSA University.

MSA University is committed to providing a safe laboratory environment for its faculty, staff, students, and visitors. The University Laboratory Safety Program aims to minimize the risk of injury or illness to laboratory workers by ensuring that they have the training, information, support, and equipment needed to work safely in the laboratory.

The three essential elements of the Laboratory Safety Program are:

- The departmental safety program led by the biosafety officers
- Laboratory safety support and training by Environmental Health and Safety
- Instruction and oversight by an individual's supervisor or Principal Investigator

All laboratory workers, including faculty, staff, and most students, are required to attend Laboratory Safety Training given by **Safety Standards Committee (SSC)**. This training gives an overview of general laboratory safety principles, references and resources for more specific safety information, and details about several support programs, such as the hazardous waste disposal program. The training supplements instruction given by supervisors and Principal Investigators regarding safe work practices for specific chemicals and equipment.

SSC provides training, resources, and consultation for a variety of laboratory safety issues, including chemical safety, laser safety, biological safety, radiation safety, electrical safety, and other topics. The **SSC** will create an internal web page that will offer a wide range of resources for many aspects of laboratory safety.

B. Definition of Laboratory

At MSA University, a laboratory is defined as, but is not limited to, any location where research or teaching is conducted using hazardous chemicals, biohazardous or biological materials, radioactive materials, and/or radiation producing devices.

A storage room containing the above materials is considered a laboratory if the materials are stored in support of teaching or research.

A location used for teaching or research that contains physical hazards may also be considered a laboratory, even if none of the materials listed above is routinely used in the area. Examples include:

• Electronics labs

• Art studios

• Laser labs

• Magnetic labs

The following areas are NOT typically considered laboratories under the Laboratory Safety Manual, though persons working in these areas are required to follow all applicable health and safety regulations:

• Shops, mechanical and custodial areas under the control of Facilities Planning and Management (FP&M)

• Departmental storage rooms, offices, meeting rooms, and other non-teaching and research spaces

• Computer use areas containing multiple workstations and used primarily by students, even if teaching and research are occurring unless located inside a space that meets the definition of a laboratory

1. Laboratory design and facilities

In designing a laboratory and assigning certain types of work to it, special attention should be paid to conditions that are known to pose safety problems. These include

1. Formation of aerosols
2. Work with large volumes and/or high concentrations of microorganisms
3. Overcrowding and too much equipment
4. Infestation with rodents and arthropods
5. Unauthorized entrance
6. Workflow: use of specific samples and reagents.

2. Design features

1. Ample space must be provided for the safe conduct of laboratory work and for cleaning and maintenance.
2. Walls, ceilings, and floors should be smooth, easy to clean, impermeable to liquids, and resistant to the chemicals and disinfectants normally used in the laboratory.

Floors should be slip-resistant.

3. Bench tops should be impervious to water and resistant to disinfectants, acids, alkalis, organic solvents, and moderate heat.
4. Illumination should be adequate for all activities. Undesirable reflections and glare should be avoided.
5. Laboratory furniture should be sturdy. Open spaces between and under benches, cabinets, and equipment should be accessible for cleaning.
6. Storage space must be adequate to hold supplies for immediate use and thus prevent clutter on bench tops and in aisles. Additional long-term storage space, conveniently located outside the laboratory working areas, should also be provided.

7. Space and facilities should be provided for the safe handling and storage of solvents, radioactive materials, and compressed and liquefied gases.
8. Facilities for storing outer garments and personal items should be provided outside the laboratory working areas.
9. Facilities for eating and drinking and for rest should be provided outside the laboratory working areas.
10. Hand-washing basins, with running water if possible, should be provided in each laboratory room, preferably near the exit door.
11. Doors should have vision panels, appropriate fire ratings, and preferably be self-closing.
12. At Biosafety Level 2, an autoclave or other means of decontamination should be available in appropriate proximity to the laboratory.
13. Safety systems should cover fire, electrical emergencies, emergency showers, and eyewash facilities.
14. First-aid areas or rooms suitably equipped and readily accessible should be available
15. In the planning of new facilities, consideration should be given to the provision of mechanical ventilation systems that provide an inward flow of air without recirculation. If there is no mechanical ventilation, windows should be able to be opened and should be fitted with arthropod-proof screens.
16. A dependable supply of good quality water is essential. There should be no cross-connections between sources of laboratory and drinking water supplies. An anti-black flow device should be fitted to protect the public water system.
17. There should be a reliable and adequate electricity supply and emergency lighting to permit a safe exit. A standby generator is desirable for the support of essential equipment, such as incubators, biological safety cabinets, freezers, etc., and for the ventilation of animal cages.
18. There should be a reliable and adequate supply of gas. Good maintenance of the installation is mandatory.

19. Laboratories and animal houses are occasionally the targets of vandals. Physical and fire security must be considered. Strong doors, screened windows and restricted issue of keys are compulsory. Other measures should be considered and applied, as appropriate, to university security.

C. Roles and Responsibilities

Employees are expected to observe all applicable practices and procedures contained in the Laboratory Safety Manual, attend designated training sessions, and report hazardous or unsafe conditions to the lab supervisor, Principal Investigator (PI), and biosafety officer (BSO).

Principal Investigators, laboratory supervisors and instructors are responsible for ensuring that the policies and guidelines established in this manual are strictly followed by all employees, collaborating researchers, other visitors, and students under their jurisdiction.

Faculty deans are responsible for the following:

- Ensure laboratory workers attend general training given by **SSC**
- Ensure laboratory workers understand how to work with chemicals safely. Provide chemical and procedure-specific training, as needed.
- Provide laboratory workers with appropriate engineering controls and personal protective equipment needed to work safely with hazardous materials. Ensure such equipment is used correctly.
- Ensure laboratory workers complete and submit Particularly Hazardous Substance Use Approval forms and submit them for approval before using any particularly hazardous substance.
- Review and approve work with particularly hazardous substances.

Departments are responsible for adopting and implementing the policies within the Laboratory Safety Manual in laboratories under their administrative control. Departments must designate a biosafety officer that will act as a point of contact for this effort. The department chair shall be the biosafety officer unless otherwise designated.

Safety standards committee (SSC) The duties of this committee will be as follows:

- Conduct exposure monitoring, as needed.
- Provide general training.
- Audit the departmental program periodically.
- Provide safe working guidelines for laboratory workers through the SSC web page.
- Review the model Chemical Hygiene Plan at least annually
- Inspect fume hoods annually
- Provide consultation for safe work practices for hazardous chemicals
- Conduct limited laboratory safety inspections annually
- Develop and maintain the Laboratory Safety Manual

The biosafety officer (BSO), formerly known as the departmental Chemical Hygiene Officer assists laboratory supervisors in adapting requirements of the Laboratory Safety Manual to individual laboratories. Assigned duties may include:

- Establish and implement a Chemical Hygiene, safety Plan.
- Review and update the Chemical Hygiene Plan at least annually.
- Investigate accidents and chemical exposures within the department.
- Act as a liaison between the department and SSC for laboratory safety issues.

- Maintain records of training, exposure monitoring, and medical examinations.
- Ensure laboratory workers receive chemical and procedure-specific training.
- Review and approve the use of particularly hazardous substances.
- Approve laboratory workers' return to work following a chemical exposure requiring medical consultation.
- Providing information and consultation on laboratory safety requirements,
- Disseminating information published by the SSC committee facilitating laboratory audits and conveying departmental information (concerns) to SSC.
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The Research monitoring office ensures compliance with local rules and a regulation related to research and oversees the following compliance committees.

Laboratory Worker

- Attend laboratory safety training.
- Review the working safety plans.
- Follow procedures and laboratory practices outlined in the Chemical Hygiene Plan and Laboratory Safety Manual and as provided by supervisors and principal investigators.
- Use engineering controls and personal protective equipment, as appropriate.
- Report all incidents, accidents, potential chemical exposures, and near-miss situations to the faculty dean and the biological safety officer (BSO)

- Document specific operating procedures for work with particularly hazardous substances, including carcinogens, reproductive toxins and chemicals with high acute toxicity.

Students are expected to observe all applicable safety practices and procedures contained in this Laboratory Safety Manual, attend designated training sessions, and report any unsafe or hazardous conditions to the lab supervisor, PI, biosafety officer (BSO).

Visitors are considered to be all persons entering a laboratory other than the PIs, laboratory staff, enrolled students, and authorized MSA University employees. Visitors to MSA University laboratories will be under the supervision of the host laboratory. The host is responsible for laboratory security during the visitation, visitor training and notification of potential hazards, and oversight of visitor compliance with applicable safety practices and procedures contained in the Laboratory Safety Manual.

D. Process Planning

Working safely in the laboratory does not happen by accident. Planning laboratory processes will help you identify hazards, establish hazard control measures, and ultimately keep you and other lab personnel safe.

I. Standard Operating Procedures

Process planning must begin with development of standard operating procedures (SOPs). This first step requires each investigator or laboratory work group to assess (i.e., identify and evaluate) all chemical, biological, radiological and physical hazards associated with laboratory operations and describe safety precautions necessary to avoid employee exposures and injuries. ***SOPs must be specific to each laboratory operation.***

SOPs must be reviewed and approved by the PI or the lab supervisor. After approval, SOPs are then incorporated into or attached to written materials and methods. Laboratory personnel must be trained on the elements of the SOP before performing an experiment or operation. See the Standard Operating Procedure template. At minimum, SOPs must include the following:

- ***Health and safety information for materials used*** – list and briefly describe the chemical, biological, radiological and physical hazards associated with the operation. Identify available resources like material safety data sheets (MSDS) and specify where they can be accessed.
- ***Hazard control measures*** – include containment devices, ventilation, specific personal protective equipment, and hygiene practices as recommended by

the MSDS or other authoritative guides. Evaluate whether special procedures discussed below will be required.

- ***Waste disposal practices*** – establish procedures for the safe and timely removal of laboratory waste.
- ***Decontamination procedures*** – develop procedures and use in contaminated areas with required frequency and duration.
- ***Spill/release containment and clean up procedures*** .Developed SOPs must be readily available in the laboratory where the experiment or operation will be performed. SOPs should be reviewed and updated annually

II. Special Procedures

Special procedures must be developed for work involving materials or equipment that present a significant risk of exposure or damage to the human body. Examples include: carcinogens, reproductive toxins, and dermatogen, highly toxic substances, explosives, controlled substances, select biological agents, radioactive materials, radiation-producing devices, and lasers. The following special procedures must be developed and specified on the SOP:

• ***Identify authorized personnel*** that may work with these materials or equipment. Authorized persons must receive training on the unique hazards of these materials or equipment before use.

• ***Establish a designated use area*** (e.g., fume hood, glove box, lab bench, etc.) and identify the area by signs or postings. Restrict access to this area to authorized personnel. If an entire lab is designated, then access must be restricted to authorized personnel.

• ***Specify special safety precautions*** for experiments or laboratory operations where these materials or equipment are used. Be sure to identify specialized equipment, shielding or security requirements to be used.

III. Ordering Chemical, Biological, and Radiological Materials

Many materials and equipment require special authorization to purchase, use, and store. Include these ordering procedures as part of your process planning to increase laboratory safety, decrease procurement delays, and reduce potential regulatory deficiencies.

- Obtain any necessary permits, licenses or registrations prior to ordering.
- Before ordering chemical, biological or radiological materials, carefully plan and outline specific safety precautions in an SOP approved by the laboratory supervisor.
- Order only those materials for which adequate safety equipment is available.
- Order the minimum quantity of chemical, biological and radiological materials required.
- Prepare the laboratory prior to receipt of the substance (i.e., establish storage location, post appropriate signs, obtain necessary personal protective equipment, etc.).

Special authorization is required to purchase, possess and use the following materials:

1. ***Biological materials:*** These may include human, animal or plant pathogens, animals, animal parts, Plants, plant parts and soils.
2. ***Controlled substances:*** This category includes any drug or material regulated by the Egyptian different legal authorities.
3. ***Explosives***: These items are regulated by the Egyptian Ministry of Interior.

4. ***Radioactive materials and radiation production devices:*** Only individuals identified as approved users on a Radioactive Material Use Authorization may request and receive radiological materials.

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1. Receipt and Distribution of Chemical, Biological, and Radiological Materials

In addition to ordering procedures, overall lab process planning must include the receipt and distribution of hazardous materials. Follow these guidelines when materials are received in the lab or transported on campus.

- Do not accept any chemical, biological or radiological material in a damaged or improperly labeled container.
- Update hazardous materials inventories to reflect newly received materials. Inventories must be copied to the **safety standard committee (SSC)**
- Obtain and review an **MSDS** or equivalent (e.g., Merck Index, Biosafety in Microbiological and Biomedical Laboratories) for all chemical, biological, and radiological materials.
- Use shock-resistant carriers when transporting materials by hand.
- When transporting materials by cart, ensure the cart is stable enough to prevent tipping and provides containment of any spilled materials.
- When transporting materials on elevators use freight-only elevators (where possible) to avoid potential exposure to passengers.
- Use an appropriate hand truck or cart to transport gas cylinders and Dewar flasks (do not drag or roll), ensure the valve protection caps are in place, and handle only one container at a time.

- Do not transport chemical, biological or radiological materials in personal vehicles.
- Adhere to permit conditions when transporting permitted, licensed or registered materials.

2. Shipping Laboratory Materials Off-Campus

All off-campus transport of laboratory materials must comply with university, local and international shipping requirements. Laboratory materials may include chemicals, biological or radiological materials, compressed gases, diagnostic specimens, refrigerants, and equipment or instruments that contain hazardous materials. Shipments of these materials must be properly classified, packaged, marked, labeled and documented. For information on how to ship hazardous materials, review the **safety standards committee (SSC)**

3. Use of Engineering Controls

Engineering controls must be implemented where possible to reduce hazards associated with the use and storage of chemical, biological and radiological materials. Engineering controls should be considered in the following order:

- Substitution of less hazardous equipment, chemicals or processes
- Physical isolation of the operator or process
- Local and general exhaust ventilation and/or filtration (e.g., use of fume hoods, charcoal filters, etc.

4. OSHA Laboratory Standard

The Occupational Safety and Health Administration (OSHA) promulgated a regulation entitled Occupational Exposure to Hazardous Chemicals in Laboratories, otherwise known as the Laboratory Standard.

The goal of the Lab Standard is to ensure that laboratory workers are informed about the hazards of chemicals in their workplace and are protected from chemical exposures exceeding allowable levels (e.g., OSHA Permissible Exposure Limits).

All individuals who work with hazardous chemicals in science and engineering laboratories are obligated to comply with the Lab Standard. Work with chemicals outside of laboratories is covered by the OSHA Hazard Communication Standard.

For more information about how a particular department complies with the Laboratory Standard, please contact the **Safety Standards Committee (SSC)**

5. MSA University Policies

MSA University is committed to providing a safe and healthful environment for its employees, students and visitors and managing the University in an environmentally sensitive and responsible manner. We further recognize an obligation to demonstrate safety and environmental leadership by maintaining the highest standards and serving as an example to our students as well as the community at large.

The University will strive to continuously improve our safety and environmental performance by adhering to the following policy objectives:

- Developing and improving programs and procedures to assure compliance with all applicable laws and regulations
- Ensuring that personnel is properly trained and provided with appropriate safety and emergency equipment
- Taking appropriate action to correct hazards or conditions that endanger health, safety, or the environment
- Considering safety and environmental factors in all operating decisions including planning and acquisition

- Engaging in sound reuse and recycling practices and exploring feasible opportunities to minimize the amount and toxicity of waste generated
- Using energy efficiently throughout our operations
- Encouraging personal accountability and emphasizing compliance with standards and conformance with University policies and best practices during employee training and in performance reviews.
- Communicating our desire to continuously improve our performance and fostering the expectation that every employee, student, and contractor on University premises will follow this policy and report any environmental, health, or safety concern to Princeton University management.
- Monitoring our progress through periodic evaluations

6. Laboratory Security Policy

` Safeguarding University resources from unauthorized access, misuse or removal is a duty of all faculty and staff. In laboratories, this obligation rests primarily with the faculty Dean; however, all laboratory personnel has a responsibility to take reasonable precautions against theft or misuse of materials, particularly those that could threaten the public. Any extraordinary laboratory security measures should be commensurate with the potential risks and imposed in a manner that does not unreasonably hamper research.

At a minimum, the institution expects all laboratory personnel to comply with the following security procedures:

- Question the presence of unfamiliar individuals in laboratories and report all suspicious activity immediately to MSA security
- After normal business hours, all laboratories must be locked when not in use

Laboratory building exterior doors are secured after normal business hours. To minimize the likelihood of unauthorized access, all after-hours building users should:

- Avoid providing building access to unfamiliar individuals
- Secure doors behind them
- Immediately report any building security problem to MSA security.

Research or other activities involving the use of lab space, materials or equipment without the knowledge and approval of the responsible faculty dean is strictly prohibited. Violation of this prohibition may result in disciplinary action up to and including termination.

SECTION 2: Departmental Chemical Hygiene Plans

Each science and engineering department has its own Chemical Hygiene Plan. This plan includes information about:

- Roles and responsibilities for laboratory safety in the department
- Chemical Hazard Identification
- Controlling Chemical Exposures
- Fume Hood Evaluations
- Information and Training
- Emergency Action Plans
- Prior Approval for Laboratory Procedures
- Medical Examinations and Consultations
- Particularly Hazardous Substances
- Laboratory Inspections and Audits
- Department Facility Systems

SECTION 3: Emergency Procedures

In case of any emergency, including fires, chemical spills, injuries, accidents, explosions, and medical emergencies, dial **MSA security (ADD SECURITY NUMBER)** from any University phone, located throughout campus. MSA Safety personnel will respond, determine whether additional assistance is needed and alert others who can help.

Each department has an individual emergency action plan and is designated an emergency coordinator and assembly point. The emergency coordinator is the first point of contact for questions about the emergency procedures and the emergency action plan. The designated assembly point is where building occupants should gather in the case of a building evacuation. Make sure you are accounted for before leaving the assembly point. Rescue personnel are required to enter a building and search for individuals who are thought to still be in the building.

Be sure to familiarize yourself with the emergency action plan for your department.

a. Fire

In the event of a fire, activate the fire alarm and notify **MSA security** immediately

1. University policy states that individuals are not required to fight fires, but that those who choose to do so may fight small, incipient-stage fires (no bigger than a wastepaper basket) as long as they have been trained in the proper use of fire extinguishers.

- If you have been trained in the use of a fire extinguisher, fight the fire from a position where you can escape, only if you are confident that you will be successful.
- A fire contained in a small vessel can usually be suffocated by covering the vessel with a lid of some sort.

2. If your clothing catches fire**,** drop to the floor and roll to smother the fire. If a co-worker's clothing catches fire, get the person to the floor and roll him or her to smother the flames. Use a safety shower immediately thereafter.

3. If the fire is large or spreading, activate the fire alarm to alert building occupants. If the fire alarm does not work, or if the building is not equipped with one, notify the building occupants verbally of the need to evacuate. If possible, shut down any equipment which may add fuel to the fire. **Do not turn off any hoods** in the immediate area, as they will tend to keep the area free from smoke and fumes. **Close the door behind you** to prevent the fire's spread.

4. Evacuate the building upon hearing a fire alarm calmly and await the arrival of Public Safety. Be prepared to inform them of the exact location, details of the fire, and chemicals that are stored and used in the area.

5. Do not re-enter the building until you are told to do so by Public Safety or the municipal fire official.

b. Notification

MSA Telephone and E-mail Notification System is an emergency notification system that allows authorized MSA officials to send news and instructions simultaneously to individuals through landline phones, cellular phones, text messaging and e-mail. Should your building be evacuated during an emergency, this system may be used to communicate important information via cell phone or e-mail. Faculty and staff should enter emergency contact information through the Office of Human Resources self-service website.

C. Medical Emergencies

- **First Aid Kits**

Never attempt to administer first aid unless you have been properly trained to do so.

According to the MSA` University Policy on First Aid, first aid kits maintained by University departments and offices must:

- Be kept in a sanitary condition;
- Be limited to simple household supplies such as band-aids and sterile gauze pads; and
- Include the following personal protective equipment:
- At least one pair of large size examination or laboratory gloves
- An airway resuscitator, such as the "pocket mask", for use in mouth-to-mouth resuscitation
- A spill kit containing an appropriate disinfectant and other cleanup and disposal materials for handling spills of blood, vomits, or other body fluids.

The supplies listed above are required by OSHA regulations. No other first aid supplies are authorized unless arranged through the university doctor.

All work-related injuries or illnesses must be reported to supervisors and the Biological safety officer

- **Chemical Exposures**

The following procedures should be followed in the event of chemical exposure. In all cases, the incident should be reported to your laboratory manager, supervisor or principal investigator, regardless of its severity. Consult your department manager to determine whether or not a *First Report of Accidental Injury or Occupational Illness* form should be completed.

Chemicals on Skin or Clothing

1. Immediately flush with water for no less than 15 minutes (except for Hydrofluoric Acid, Flammable Solids or >10% Phenol). For large spills, the safety shower should be used.

2. While rinsing, quickly remove all contaminated clothing or jewelry. **Seconds count.** Do not waste time because of modesty.
3. Use caution when removing pullover shirts or sweaters to prevent contamination of the face. If possible use scissors to remove contaminated clothing
4. Check the Material Safety Data Sheet (MSDS) to determine if any delayed effects should be expected.
5. Discard contaminated clothing or launder them separately from other clothing. Leather garments or accessories cannot be decontaminated and should be discarded.

Do not use solvents to wash skin. They remove the natural protective oils from the skin and can cause irritation and inflammation. In some cases, washing with a solvent may facilitate the absorption of a toxic chemical.

For solids on the skin, first brush off as much of the solid as possible, then proceeds as described above.

For hydrofluoric acid, rinse with water for 5 minutes. Apply 2.5% calcium gluconate gel, a tube for your lab can be obtained prior through EHS(environmental health and safety department). If not readily available, continue rinsing for 15 minutes. In all cases, seek medical attention at the university health services immediately.

For phenol concentrations of more than 10%, flush with water for 15 minutes or until the affected area turns from white to pink. Apply a solution of 400 molecular-weight polyethylene glycol, if available. Do not use ethanol. Proceed as described above.

Chemicals in Eyes

1. Immediately flush eye(s) with water for at least fifteen minutes. The eyes must be forcibly held open to wash, and the eyeballs must be rotated so all

surface area is rinsed. The use of an eye wash fountain is desirable so hands are free to hold the eyes open. If eyewash is not available, pour water on the eye, rinsing from the nose outward to avoid contamination of the unaffected eye.

2. Contacts should not be worn in the lab.
3. Seek medical attention regardless of the severity or apparent lack of severity. If an ambulance or transportation to university health services is needed, contact MSA security. Explain carefully what chemicals were involved. If easily accessible, bring an MSDS.

Chemical Inhalation

1. Close containers, open windows or otherwise increase ventilation and leave the room immediately, and instruct others present in the room to leave as well.
2. If symptoms, such as headaches, nose or throat irritation, dizziness, or drowsiness persist, seek medical attention by calling MSA security or going to University Health Services. Explain carefully what chemicals were involved.
3. Review the MSDS to determine what health effects are expected, including delayed effects.

Accidental Ingestion of Chemicals

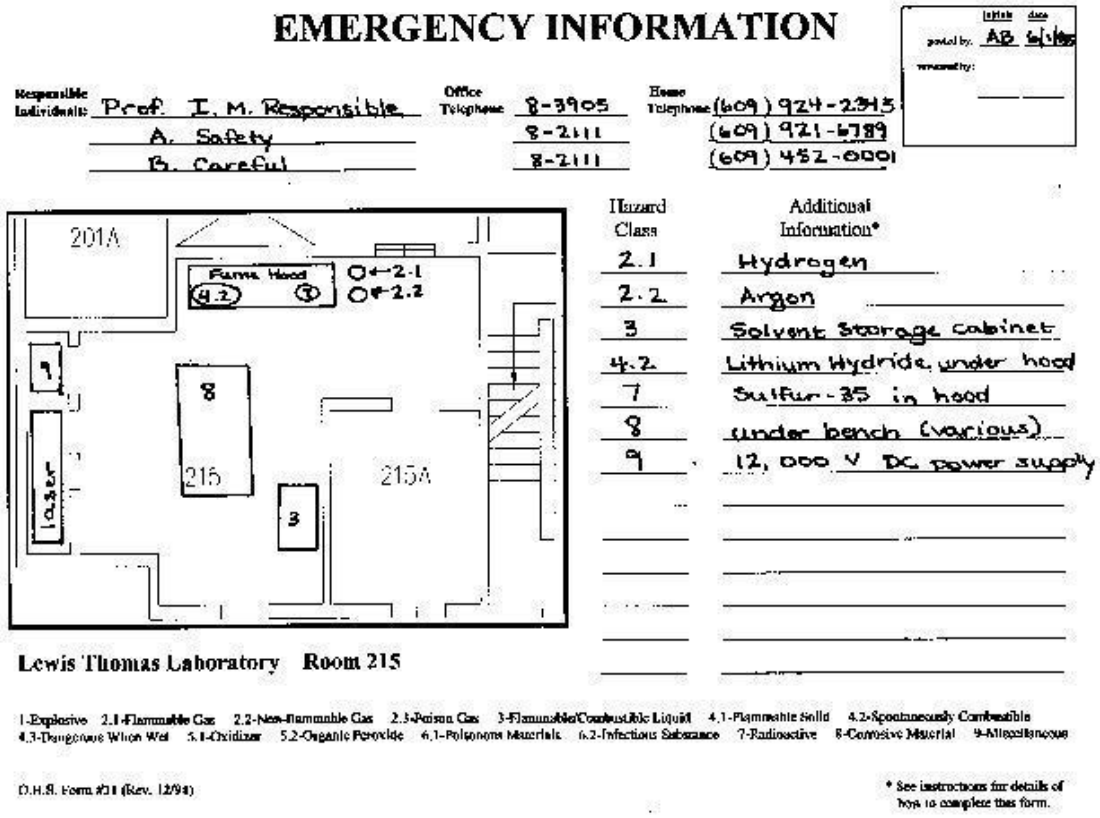
1. Immediately go to University Health Services.
2. **Do not induce vomiting** unless directed to do so by a health care provider.

Accidental Injection of Chemicals

Wash the area with soap and water and immediately seek medical attention..

D. **Emergency Information Posters**

Most laboratories or chemical storage areas must have a complete Emergency Information Poster affixed on or near each entrance to the room. A copy of the completed form must be sent to MSA security. Laboratory workers must review the poster for accuracy every six months and replace it as necessary and at least every two years.



EMERGENCY INFORMATION

initials: AB date: 6/1/95
posted by: AB 6/1/95
reviewed by: ___ ___

Responsible Individuals: Prof. I. M. Responsible — Office Telephone: 8-3905 — Home Telephone: (609) 924-2345
A. Safety — 8-2111 — (609) 921-6789
B. Careful — 8-2111 — (609) 452-0001

Lewis Thomas Laboratory Room 215

Hazard Class	Additional Information*
2.1	Hydrogen
2.2	Argon
3	Solvent Storage Cabinet
4.2	Lithium Hydride, under hood
7	Sulfur-35 in hood
8	under bench (various)
9	12,000 V DC power supply

1-Explosive 2.1-Flammable Gas 2.2-Non-flammable Gas 2.3-Poison Gas 3-Flammable/Combustible Liquid 4.1-Flammable Solid 4.2-Spontaneously Combustible
4.3-Dangerous When Wet 5.1-Oxidizer 5.2-Organic Peroxide 6.1-Poisonous Materials 6.2-Infectious Substance 7-Radioactive 8-Corrosive Material 9-Miscellaneous

O.H.S. Form #21 (Rev. 12/94)

* See instructions for details of how to complete this form.

The following information should be supplied on every poster:

- **Responsible individuals** - List those who are most familiar with the activities in the room.
- **Room diagram** - A drawing of the room, showing important items such as fume hoods, storage cabinets, lab benches, etc.
- **Hazard class** - Hazardous materials found in the room should be identified and listed on the poster when quantities exceed the threshold levels.

- **Posting/Review Dates** - Posters should be reviewed to ensure all information is current and initialed at six-month intervals, and replaced every two years.
- **Emergency contact numbers**- of MSA security, health services, and authorized first aider.
- **Additional information** - This allows narrative comments by the user on the material, storage conditions, unusual hazards, etc.

The purpose of the Emergency Information Poster is to provide an easily recognizable and consistent means of displaying essential information about the status and contents of laboratories and facilities, primarily for the benefit of persons attempting to cope with an explosion, fire, natural disaster, or other emergencies. Such information is important for the safety of emergency personnel and is often of considerable value in evaluating and dealing with the emergency.

In the absence of current and accurate information, responders may take an extremely conservative approach to handling the emergency and the response may become disproportionate to the actual hazard. This may lead to a delayed response that could result in an emergency of greater magnitude or, at the very least, lengthen the disruption of normal activities.

During an emergency, the poster may be used as the primary source of information about a room or space. Therefore, the information on the poster should be complete and accurate.

Determining If Posting Is Necessary

An Emergency Information Poster is required if any of the quantities listed here are exceeded:

- Class 1 - *Explosives* - any quantity
- Class 2 - *Compressed Gas* (flammable, non-flammable, poison) - any compressed gas cylinder

- Class 3 - *Flammable or Combustible Liquids* - 40 liters Class 4 - *Flammable Solids, Spontaneously Combustible, Dangerous When Wet Materials - 2 pounds*
- *Class 5.1 - Oxidizers - 40 pounds or* 5 gallons
- Class 5.2 - *Organic Peroxide* - 2 pounds
- Class 6 - *Poisonous or Infectious Materials* - any quantity
- Class 7 - *Radioactive* - any quantity
- Class 8 - *Corrosive* - 40 pounds or 5 gallons
- Class 9 - *Miscellaneous Hazardous Materials* - User's judgment. Include lasers and any uninterruptible power supply (UPS) systems.

Obtaining Posters

A poster pre-printed with the building name, room number and room diagram may be obtained from MSA security.

E. Reporting Accidents and Injuries

All accidents, injuries, or near-misses should be reported to your supervisor or Principal Investigator.

If a laboratory worker believes that he or she has been over-exposed to a chemical, the worker or supervisor should contact the BSO (biosafety officer) regardless of whether or not signs or symptoms are noted. SSC will contact the individual and lab manager to conduct an incident investigation.

MSA UNIVERSITY SSC encourages a culture of reporting all incidents and near misses. Incident investigations are conducted to work towards safer working environments and practices. These investigations are not to assign blame or responsibility for an accident.

Section 4: Chemical and Hazard Identification

- Chemical manufacturers are required to perform an assessment of the physical and health hazards of the chemicals they produce. This information must be made available in two places: the chemical label and the material safety data sheet (MSDS). Thus, the information found on the original container label and the MSDS may provide a great deal of information about the identity of the chemical constituents and their health and physical hazards.

- Labels

The manufacturer's label should be kept intact. Do not intentionally deface or obscure the label or the hazard warnings until the container has been completely emptied. When a chemical is transferred from the original container into a secondary container for storage, the new container should be labeled with the name of the product, the chemical constituents and the primary hazard warnings.

- Material Safety Data Sheets

All chemical manufacturers or distributors are required to conduct a hazard evaluation of their products and include the information on a material safety data sheet (MSDS). The manufacturer or distributor is required to provide an MSDS with the initial shipment of their products. Any MSDSs received by the laboratory must be maintained in a central location in the laboratory or the department. The SSC must outline what to do with MSDSs received by a particular laboratory.

SECTION 5: Safety Equipment

Safety equipment protects personnel, ensures proper storage of hazardous materials and enables a laboratory to respond to emergencies. Each laboratory should be evaluated for adequate safety equipment during the development of an Emergency Action Plan or standard operating procedure and during a laboratory's annual safety survey. For more information about the following safety equipment, refer to the links provided or contact the safety standard committee (SSC)

- **Biosafety Cabinets**

  Biosafety cabinets are designed to protect personnel, the products being handled and the environment from particulate hazards, such as infectious microorganisms.

- **Eyewash Fountains**

  An eyewash fountain must be easily accessible and unobstructed in all areas where corrosives, hot liquids, or other eye-irritating materials (e.g., formaldehyde) are used or stored. During the development of an Emergency Action Plan, personnel must identify eyewash fountain locations, verify proper function and determine if additional eyewash fountains are required in the laboratory. Ensure that eyewash fountain locations are marked with a sign (typically green/white) posted at eye level above the fountain. Eyewash fountains should be flushed weekly by laboratory personnel. Record these tests on the "Safety Equipment Test Record" tag attached to the eyewash.

- **Fire Extinguishers**

  Each laboratory must have unobstructed access to at least one multi-purpose fire extinguisher (ABC) located at or near the exit. During the development of an Emergency Action Plan, personnel must identify fire extinguisher locations and determine if available extinguishers are appropriate for planned laboratory

activities. Ensure that fire extinguisher locations are marked with a red/white "fire extinguisher" sign posted at eye level above the device. Annual extinguisher testing performed by SSC will be documented on a "Recharge & Inspection" tag attached to the extinguisher. For signs, tags or assistance with installation of an appropriate fire extinguisher, contact MSA security. Fire Safety and Extinguisher Training is required for all laboratory personnel. **Flammable Safety Cabinets**

Flammable safety cabinets are storage cabinets (typically metal) manufactured to isolate 12 flammable materials from a fire that occurs in the laboratory. Safety cabinets are required for storage of flammable liquids in laboratories with aggregate quantities greater than 40 liters (~10 gal.)

- **Flammable Safety Cans**
- Flammable safety cans are containers (typically metal) with self-closing spouts and integral flame arresters used to store flammable liquids in single container quantities greater than four liters (~1 gal.). Safety cans must be properly labeled
- **Laboratory Hoods**

Fume hoods are designed to protect personnel by preventing chemical and radiological contaminants from escaping into the laboratory environment. Fume hoods also provide a physical barrier to chemicals and their reactions. Fume hoods in the laboratories must be tested and evaluated periodically to ensure their effectiveness.

- **Laboratory Refrigerators/Freezers**

Refrigerators and freezers used for flammable liquid storage must be manufactured for that purpose. Modification of general-purpose (domestic) refrigerators/freezers for flammable liquid storage is NOT permitted.

General-purpose refrigerators/freezers must be labeled to prohibit storage of flammable materials (e.g., Caution: Do Not Store Volatile Materials in This Box)

Laboratory refrigerators and freezers must not be used to store food or beverages intended for human consumption.

- **Safety Showers**

An easily accessible and unobstructed, drench-type safety shower should be available within 10 seconds of travel time of each area where corrosive or toxic liquids are used or stored. In some buildings, laboratories may need to rely on safety showers outside the laboratory. During the development of an Emergency Action Plan, personnel must identify safety shower locations and verify proper function by contacting the building area mechanic. Ensure that safety shower locations are marked with a sign (typically green/white) posted at eye level below the shower. Annual safety shower testing performed by Facilities Planning & Management will be documented on a "Safety Equipment Test Record" tag attached to the shower.

Personal Protective Equipment (PPE)

Personal Protective Equipment (PPE) appropriate for the work conditions must be worn when working with laboratory hazards. At the least, they should include:

- Laboratory coats (or other protective clothing such as aprons, scrubs, coveralls, etc.)
- Safety glasses or goggles
- Gloves resistant to the material used and
- Appropriate footwear (closed at the heel and toe) Sandals must not be worn in the laboratory

. Other protective equipment, such as splash goggles, face shields, aprons, thermal or cut-resistant gloves, hearing protection, or respirators, must be worn when conditions dictate.

The PI (principal investigator) or laboratory supervisor is responsible for conducting hazard assessments, training and coordinating the use of PPE. Completion of a hazard assessment or standard operating procedure may allow individual laboratory PPE requirements to be determined and justified by PIs or laboratory supervisors. Document PPE selection on a standard operating procedure developed for the experiment or laboratory operation.

MSA University's PPE Policy requires departments to provide employees with the necessary PPE. In a class situation, students shall purchase or obtain the necessary and approved PPE designated by the department or instructor responsible for the course. Students must be trained in the proper use and care of the PPE.

All PPE shall be thoroughly inspected for damaged or worn parts before use, cleaned and sanitized after use if reusable and properly stored away from sources of heat, sunlight, chemicals or contamination. Single-use equipment (e.g., exam-type gloves, disposable coveralls, etc.) must be disposed of after each use or if significant contact with contaminants occurs.

- **Body Protection**

  Body protection must be worn to protect skin from harmful contaminants (i.e., dust, fogs, fumes, mists, gases, smokes, sprays, vapors, or splashes), limit contamination of "street clothing," and aid the decontamination process. Lab coats shall constitute minimum body protection when working in laboratories. Elastomeric equipment (such as acid-resistant aprons) used for chemical resistance must be constructed of elastomers resistant to the material used.

The wearing of shorts or short skirts in laboratories is strongly discouraged. When allowed, the required lab coat or non-permeable apron must cover the knees. These minimum requirements apply to labs with minimal hazards.

- **Hand Protection**

Hand protection must be worn to prevent skin absorption of harmful substances, cuts or lacerations, abrasions, punctures, chemical burns, thermal burns or harmful temperature extremes. Elastomeric gloves used for chemical resistance must be constructed of elastomers resistant to the material used. Selection is based on elastomer thickness, permeation breakthrough time (in minutes), permeation rate and resistance to degradation.

- **Hearing Protection**

Hearing protection is recommended when laboratory operations produce noise levels of 85 decibels or greater and required when noise levels of 90 decibels or greater are encountered.

- **Respiratory Protection**

Respiratory protection may be required to prevent exposure to airborne contaminants when engineering controls (i.e., fume hoods, biological safety cabinets, etc.) prove inadequate. A medical exam, fit test and specialized training are required before using a respirator. Contact SSC for more information.

- **Safety Glasses**

Safety glasses with side shields protect the eyes from flying projectiles and constitute minimum eye protection when working in laboratories.

- **Safety Goggles**

Safety goggles (unvented or indirectly vented) are required in laboratory operations where there is potential for chemical vapors, splashes, mists, sprays or airborne dust exposure to the eyes.

SECTION 6: inspections

- **HEALTH AND SAFETY INSPECTION CHECKLIST**

(For office-based areas)

General Environment

- Sufficient space (a minimum of 11m^3 per person)
- Room thermometer reasonably available – comfortable temperature
- Adequate ventilation or air-conditioning
- Humidity (does the air feel dry or do you need some more plants?)

Floor Surfaces

- Worn or missing stair-treads
- Worn floor covering causing a tripping hazard
- Slippery floor surface
- Trailing cables
- Boxes, coats, cases, etc on floor
- Wetness (eg from drinks, weather or cleaners (unless signed))

Furniture

- Sharp edges or corners
- Filing cabinets without interlocks (not essential but otherwise should be wedged back or screwed to adjacent ones)
- Unstable cupboards or shelves

- Heavy storage above head-height
- Availability of steps/kickstools in good condition(if necessary)

Hazardous Substances

- Correct storage
- Properly labeled
- Correct use
- Emergency procedures laid down

Electrical Equipment

- All inspected within the prescribed date
- Any damaged plugs, cables or worn insulation?
- Any internal colored wires visible at the plug head?
- No cube adapters – use fused distribution boards
- "Overloaded" sockets

First Aid

- First aid boxes properly stocked (details in Appointed Person/First aider handouts and on Safety Services' web pages)
- List of qualified personnel inside the lid up-to-date
- At least 2 Appointed Persons certificated within the last 3 years (2 fully qualified first aiders for Type 1 departments and those doing practical work)

Toilets and Washrooms

- Designated male/female
- Disposal bins available in female toilet
- Not used for general storage

Kitchens and Tea Rooms

- Furniture in reasonable condition
- Fridge (if provided) for food only
- Reasonable state of hygiene
- Dishcloths and tea-towels (if any) kept clean

Outdoor Areas

- Reasonable lighting
- Access steps and paths non-slip and free from moss
- Not used for general “dumping” of rubbish
- No potholes/uneven paths likely to cause trip

Display Screen Equipment

- Work station assessment available
- “Users received training”
- “Users been offered eye check

MSA LAB SAFETY INSPECTION CHECKLIST

Building:
Lab/ Clinic Number:
Manager/supervisor:
Lab technician:
Audited by:
Date:

Laboratory housekeeping and general safety awareness	Yes	No	N/A
Are passageways unobstructed?			
Are floors, walls, and ceilings clean and well-maintained?			
Are bench tops, drawers, and sinks clean and well-maintained?			
Are storage areas well organized and free of clutter?			
Are storage areas well organized and free of clutter?			
Are storage areas well organized and free of clutter?			
Is shelving stable and not overloaded?			
Is there documented completion of the “New Employee On-Site Safety Training Checklist” for all new employees?			
Have all employees completed/reviewed the “Laboratory Safety Evaluation Form” within the last year? This form is included in the “Annual Work Agreement” reading list in SoftTech.			

Are all occupational incidents, injuries, or illnesses reported through the appropriate reporting system?			
Are there procedures for follow-up and evaluation of lab accidents and occupational injury/illness to prevent recurrences?			
Does the laboratory have a documented program to protect personnel from allergic reactions to job-related exposures to natural rubber latex in gloves and other products?			
Are all employees aware of Blood and Body Fluid Exposure guidelines?			
Have all employees who work with human blood/products been offered the Hepatitis B vaccine?			
Has the lab performed an ergonomics assessment? Date?			
Is the Emergency Response Guide posted in the lab?			

Personal protective equipment	**Yes**	**No**	**N/A**
Is appropriate personal protective equipment provided to all employees at no cost to them?			
Is there documentation that all employees have been instructed on the proper use of PPE that is used for protection against hazardous materials (i.e. chemicals, radioactive, potentially infectious human specimens)?			
Do personnel remove gloves and clean hands (i.e. perform handwashing) using an effective antimicrobial method after manipulating biological samples or after each patient contact?			
At a minimum, are lab coats and disposable gloves worn when handling any hazardous materials (e.g., blood and body fluids, hazardous chemicals, etc.)?			
Do laboratory personnel use only non-latex or powder-free latex gloves? (Latex gloves may be used in selected settings, but should be free of cornstarch or talc)			

Is face protection available or in place for performing tasks that are likely to cause splash or splatter?			
Is hearing protection needed for any procedure?			
Are handwashing sinks available in all areas where work involving potentially infectious materials is performed?			
Are all sharps disposed of in an approved puncture-resistant container?			
Is recapping, breaking, and bending of needles prohibited?			
During transport, are all potentially infectious materials placed in a secondary leak-proof container?			
Does the lab ship biological materials or ship materials on dry ice? *Note: Answer "No" if your lab only uses Duke couriers for transport. Answer "Yes" if your lab uses any commercial carrier (e.g., USPS, FedEx, UPS, etc.)* If **Yes:** Have the necessary personnel completed Shipping Biological Materials Training?			
Are mechanical devices (i.e. forceps, hemostats, dust pans, etc.) available and are they used by employees to pick up broken glassware?			
Are surfaces on which work involving blood and blood products is performed, routinely wiped down with an approved disinfectant at the end of the procedure or immediately following a spill?			
Are all general-use items (i.e. phones, keyboards, etc.) that have been labeled as "dirty" handled only with gloved hands?			
Is regulated medical waste collected in containers that are clearly labeled or color-coded as "biohazardous"?			
Are all sterilizing devices (e.g. autoclaves) monitored periodically with biological indicators (or chemical equivalent) for the effectiveness of sterility?			
Have doorways that lead to areas where potentially infectious materials are manipulated been labeled with the universal biohazard symbol?			
Are all refrigerators and freezers used to store potentially infectious materials labeled with the universal biohazard symbol?			

Are eating, drinking, applying cosmetics and lip balm, and handling contact lenses prohibited in areas in which there is any risk of exposure to potentially infectious materials?			
Is the storage of food and drink prohibited in refrigerators, and other appliances, used to store potentially infectious materials, reagents, or hazardous chemicals? *(Note: Labels should be on refrigerators to indicate whether it is approved for food.)*			

Fire Safety	**Yes**	**No**	**N/A**
Has each employee participated in at least one fire drill in the past year?			
Are employees familiar with the location of fire extinguishers and pull alarms?			
Are all fire alarms visible, unobstructed, and accessible?			
Is the fire alarm audible from all parts of the lab? (or recognizable to all hearing-impaired personnel)			
Are aisles kept clear and unobstructed at all times?			
Are open flames or Bunsen burners used in the lab?			
Are supplies of flammables and combustible liquids reasonable for the lab's needs?			
Are there fire extinguishers available in areas where flammable and combustible materials are handled and stored?			
If the lab is larger than 1000 sq ft, are there at least two exit doors, one of which opens into a means of egress?			
Are large "bulk" containers, from which flammable or combustible solvents are decanted, and grounded appropriately?			
Have personnel been instructed in the use of portable fire extinguishers and has the training been documented?			
Are all flammable chemicals including compressed gases stored away from all sources of heat or sparks?			

Is there a written evacuation plan available that outlines the appropriate employee evacuation routes?			
Do all workers know where the outside assembly point is located?			
Is emergency power adequate for the functioning of the lab? (preservation of samples & reagents, the function of hoods, etc.)			
Does the lab avoid placing electrical devices near water sources?			
Is all wiring in the lab in good condition (e.g. no damaged cords, etc.)			

Chemical safety		**Yes**	**No**	**N/A**
55	Are precautionary labels present on the containers of all hazardous chemicals that include the chemical name, type of hazard, and what to do if accidental contact occurs?			
56	Has the annual review and evaluation of the effectiveness of the lab's Chemical Hygiene Plan been done?			
57	Are potentially reactive chemicals stored separately?			
58	Are all incompatible chemicals appropriately separated during storage to reduce the risk of potential reactivity? ● Are acids and bases stored separately near the floor level? ● Are oxidizers separated from organics? ● Are water-reactive separated from water sources?			
59	If formalin is handled in your lab, has formalin monitoring been done in the past? Date? _____			
60	Have the lab's chemical fume hood(s) been certified in the past year? Date? _____			
61	Are chemical fume hood work surfaces free of clutter?			
62	Are chemical storage cabinets well-maintained and free of rust?			
63	Are appropriate supplies (e.g., spill kits) and instructions for use available in areas where potential spill or chemical hazards exist?			

64	Do spill kits have either expiration dates or periodic assessments of the spill kits are usable? Expiration Date? _____ Or The Date of the last assessment? ____			
65	Are employees aware of how to report major chemical spills appropriately?			
66	Are all compressed gas tanks secured in an upright position away from any open flames or other sources of heat?			
67	Is there no more than one extra cylinder of compressed, flammable gas at any one workstation?			
68	Is there a plumbed eyewash in every area where hazardous chemicals which may cause skin or eye damage are used (e.g. chemicals that are irritating, corrosive, toxic by contact or absorption)?			
69	Are eyewashes tested and documented on a weekly basis?			
70	Is there appropriate signage indicating the location of the eyewash?			
71	When decanting or entering an open container of liquid nitrogen, are appropriate gloves and a face shield worn?			
72	Is the storage and use of liquid nitrogen confined to a well-ventilated area?			
73	Are secondary containers (i.e. plastic bottle carriers) available for transporting glass containers (larger than 500 ml) that contain hazardous chemicals?			
74	Is eating and drinking prohibited in areas in which hazardous chemicals are used?			
75	Are chemical waste containers properly labeled (labeled “Waste *Name of Chemical*” and the date waste is first placed in that container)?			
76	Are proper waste container management practices utilized during storage? (capped, in secondary containment, proper container, not overfilled, no visible contamination on the outer container, not stored >90 days after start date)			

Request for Disposal

Biological Waste and Sharps

Location of Pickup

Department: Building:

Room:

Person generating the waste or the representative who will aid in the disposal -

Name: _____ Phone:

(Must be MSA employee)

General Instructions: Only the materials listed will be picked up. See the back of this form for important information.

Mail, deliver or FAX this form to the address below.

1. ***Microbiological Waste:*** Must be autoclaved or chemically disinfected and disposed of in accordance with the rules described on the back of this form. If this is not possible, contact SSC for assistance.

2. ***Bedding of Animals Exposed to Pathogens****:* Must be autoclaved and disposed of in accordance with the rules described on the back of this form. If an autoclave is not available, contact EHS for assistance.

3. ***Animal Carcasses and Body Parts****:* Must be double-bagged to prevent leakage and kept frozen until pickup by disposal services.

4. ***Blood, Blood Products, and Human Tissues****:* May not be discharged into sanitary sewer system. Must be disposed of in containers provided and picked up by disposal services.

5. ***Needles, Syringes with attached needles, Razors, Scalpels, and Infectious Glass:*** Must be placed into the sharps containers provided and picked up by disposal services.

6. ***If you have any other type of biological waste not mentioned above*** and you have questions regarding the appropriate treatment and disposal method, contact SSC.

ADDITIONAL INSTRUCTIONS

Microbiological Waste

Microbiological waste includes:

1. Discarded cultures and stocks of infectious agents and associated biologicals
2. Discarded cultures of specimens from medical, pathological, pharmaceutical, research, clinical, commercial, and industrial laboratories
3. Discarded live and attenuated vaccines, but excluding the empty containers thereof

4. Discarded, used disposable culture dishes

5. Discarded, used disposable devices used to transfer, inoculate, and mix cultures

Note: In vitro tissue cultures that have not been intentionally exposed to pathogens are exempt from these regulations.

Acceptable Methods of Treatment of Microbiological Waste

• Steam Sterilization

1. Temperature of at least 121ºC

2. Pressure of at least 15 psi

3. Time of at least 30 minutes

• Chemical Disinfection

1. Use a chemical agent which is registered with the Egyptian health ministry as a disinfectant and in accordance with the manufacturer's instructions

2. Immerse the waste for not less than 3 minutes in

a. a freshly prepared solution of household bleach diluted 1:10 with water or

b. a solution of 70% by volume of 2-propanol (isopropyl alcohol)

(Waste which has been immersed in a liquid disinfectant must be thoroughly drained before disposal.)

Disposal of Treated Microbiological Waste

Microbiological waste that has been treated in accordance with the methods described above can be disposed of through regular trash as long as the following steps are taken:

1. Place a label on the bag or container stating the way the waste was treated.

2. Place the labeled bag into another sealed bag or container that is a different color and is opaque, e.g., a black trash bag.

Note: If treated waste is in a liquid form it can be disposed of through the sanitary sewer.

Bedding of Animals Exposed to Pathogens

Follow the same requirements as for the steam sterilization treatment and disposal of microbiological waste.

Record Keeping

All lab personnel who treat and dispose of microbiological waste or bedding of animals exposed to pathogens on site must keep records of the treatment.

A lab that generates 50 pounds or less per calendar month of these wastes must record the following:

1. Date of treatment
2. Amount of waste treated
3. Method/conditions of treatment
4. Name (printed) and initials of the person(s) performing treatment

A lab that generates more than 50 pounds per calendar month of these wastes must record the following:

1. All of the above with the addition of a written procedure for the operation and testing of any equipment used and a written procedure for the preparation of any chemicals used in treatment.

References

A number of books with chemical safety information are available through EHS or the University Library. The following is a partial listing – titles available through the University Library are identified with an asterisk (*):

Armour, Margaret-Ann, ***Hazardous Laboratory Chemical Disposal Guide****,* Lewis Publishers, NY, 1996

*Bretherick, I., ***Handbook of Reactive Chemical Hazards***, 4th ed., CRC Press, 1990.

British Cryogenic Council, ***Cryogenics Safety Manual***, 3rd ed., 1991.

*Clayton, George and F. Clayton, editors, ***Patty's Industrial Hygiene and Toxicology***, Wiley, Interscience, 1991.

*Compressed Gas Association, Inc., ***Handbook of Compressed Gases***, 3rd ed., VanNostrand Reinhold Company, New York, 1990.

Forsberg, Krister and Lawrence Keith, ***Chemical Protective Clothing Performance Index****,* Wiley and Sons, NY, 1999

*Furr, A. Keith, ***Handbook of Laboratory Safety***, 5th ed., The Chemical Rubber Company, 2000.

*Gosselin,et al, ***Clinical Toxicology of Commercial Products***, 5th ed., Williams & Wilkins, 1984.

* Lewis, Richard J., ***The Condensed Chemical Dictionary***, 12th ed., Van Nostrand Reinhold Company, 1993.

*Lewis, Richard J., ***Dangerous Properties of Industrial Materials***, 8th ed., Litton Educational Publishing Inc., 1992.

Meyer, Eugene, ***Chemistry of Hazardous Materials****,* Prentice Hall, Englewood Cliffs, NJ, 1977

*National Academy of Sciences, ***Prudent Practices for Handling Hazardous Chemicals in Laboratories***, 1995.

*National Institute of Occupational Safety and Health, ***Registry of Toxic Effects of Chemical Substances***, (published annually).

*National Research Council, ***Prudent Practices in the Laboratory***, National Academy Press, Washington, DC 1995

Office of Technology Assessment Task Force, ***Reproductive Health***

Hazards in the Workplace, Science Information Resource Center, Philadephia, PA 1988

Patnaik, Pradyot, ***Comprehensive Guide to Hazardous Properties of Chemical Substances***, Wiley and Sons, NY, 1999

Pohanish, Richard, ***Rapid Guide to Chemical Incompatibilities***, Wiley & Sons, NY, 1997

*U.S. Department of Health and Human Services, ***Occupational Health Guidelines for Chemical Hazards***,

NIOSH/OSHA.
Stull, Jeffrey, ***PPE Made Easy***, Government Institutes, Rockville, MD, 1998

PART TWO:

GUIDELINES FOR Lab INSPECTION

Safety Standard Committee

June 2023

Guide for the Lab Inspection Checklist

The Safety Standards Committee must inspect laboratories annually. Inspections are intended as a mechanism to increase overall safety by helping to identify risks associated with laboratory activities and provide recommendations on how to correct and prevent potentially dangerous situations. The SSC inspection team works with Biological safety officers to coordinate and schedule inspections in order to minimize interruptions to any teaching or research activities.

The following guidance document will provide details on the inspection questions found in the Laboratory Inspection Checklist. These details should help laboratories maintain a safe and healthful work environment. Should you have questions regarding this document please contact the SSC committee.

Section I, General Safety

Q1. Are there door signs list of laboratory personnel names and phone numbers, as well as special hazards?

The names and phone numbers (office and home) of the principal faculty member(s) and other knowledgeable employees/students should be listed on the front of the sign and the appropriate hazards checked on the front or back of the sign. The sign should be posted either near the door or on the door, in a way that emergency personnel can access the hazard information.

Q2. Are door signs having current information?

All door signs should be checked for accuracy on a yearly basis and should be dated when posted/updated. Additionally, the information should be updated whenever the contact or hazard information changes.

Q3. **Is the lighting in the laboratory adequate and in good condition?**

Burnt-out fluorescents should be reported to the Service Centre. The standard for laboratory lighting is 80 -100 ft/candles. General lighting can be supplemented as needed by the Principal Investigators.

Q4, **Is the temperature in the laboratory well controlled?**

Normal ambient laboratory temperature is generally 21–24 degrees Celsius. If the temperature does not seem comfortable please contact the Service Centre

Q5. Are the food and beverage rules observed? (Food and drinks should not be consumed or stored in the lab)

Food and drink can become contaminated by contact with unwashed hands, gloves or clothing, or by being left exposed in the workplace. Food and beverages are forbidden in laboratory work areas. Labs may designate a specific area for food and beverage consumption/storage, provided that the area is clearly marked and chemicals and other laboratory materials are forbidden from that area. Food and beverages must not be stored in refrigerators that also store biological, chemical or radioactive materials.

Q6. **Are protective gloves available and matched to the hazard?**

Skin contact is a potential source of chemical exposure and hands are the area most in contact with chemicals. Protection from exposure is necessary by wearing protective gloves. Different glove types have different chemical permeability. Use the gloves under the conditions for which they are recommended as protection against the penetration of the chemical for which they have been designed. Refer to the MSDS or to the manufacturer's glove charts or call SSC.

Q7. **Is eye protection available and used?**

Eye protection is required of everyone who enters a chemical work area.
Safety glasses must have side shields.
Goggles must be worn when there is a danger of splashing chemicals.
Face shields over safety glasses or goggles must be worn when working with
Severely corrosive liquids or with glassware under reduced or elevated pressure,
Glass apparatus used in combustion or other high-temperature operations,
and Cryogenic liquids.

Q8. Are lab coats only worn in the laboratory and are removed before entering offices, lunchrooms, restrooms, and other non-laboratory general-use areas?

Food and drink can be contaminated by contact with unwashed hands, gloves or clothing. Lab coats should not be worn or brought to areas where food is consumed. Lab coats should be washed separately from personal laundry.

Q9. Are aisles and exits free from obstruction?

Aisles must be free of obstructions such as chairs, boxes and waste receptacles. Floors must be clear of spilled liquids, ice, stoppers, glass beads, rods and other small items that are dangerous slipping hazards. A clear unobstructed path to exit must be maintained according to fire prevention regulations

Q10. Are the ceiling tiles in place and free of any water leaks, or stains?

Water leaks and stains can lead to mold growth. Ceiling tiles should be intact and in place to prevent contamination of laboratory experiments by dust or mold. Intact barriers are also necessary for fire safety and to control the dispersal of hazardous agents.

Q11. Is any equipment used in unattended operations have automatic shut-off?

Any equipment that is used when unattended should have an automatic shut-off to prevent situations that might result in fire or other emergencies

Q12. Are laboratory doors kept closed?

Laboratory doors must be kept closed in order to maintain the proper room pressurization and prevent the contamination of areas outside the laboratory. Keeping doors closed insures the best possible ventilation efficiency and temperature and humidity control. Any labs using biological agents must keep doors closed.

Q13. **Are fume hoods clean and free of stored chemicals?**

Laboratory hoods should not be used for storing chemicals or apparatus. Storage in hoods can interfere with the airflow in the hood. A cluttered fume hood does not provide the space required to work safely and may lead to spills or accidents and increases the amount of chemicals that could become involved in a hood fire.

Q14. Are benchtops and storage areas uncluttered and orderly?

Proper housekeeping leads to a safer environment. Materials and especially chemicals should not be stored on the floor. Workspaces and storage areas should be clear and neat. Aisles must be free of obstructions such as chairs, boxes and waste receptacles. Floors must be clear of spilled liquids, ice, stoppers, glass beads, rods and other small items that are dangerous slipping hazards.

Q15. Is the garbage free of broken glass and hazardous materials?

For the safety of lab personnel and custodial staff, all broken glass must be disposed of in University provided broken glass containers. Regulations prohibit the disposal of hazardous waste with regular refuse. Hazardous materials are collected in University provided waste containers and collected by SSC. For more information on waste collection refer to the SSC.

Q16. Are heavy objects stored on lower shelves?

Storage shelves must be firm and secured against sliding and collapse. Shelves must be well supported and in no danger of tilting. Large containers should be placed on low shelves.

Q17. **Is there an 18" clearance from the ceiling?**

The distance between the sprinklers and the top of the storage shall be 46cm (18") or greater.

Q18. **Are safety showers and eyewash facilities accessible and free from obstructions?**

The safety showers and eyewash facilities must be readily accessible and access to emergency equipment must never be blocked.

Q19. **Are eyewashes and showers in good condition, clean and capped?**

Eyewash and showers should be periodically tested, testing should be recorded on a tag sheet that is posted on or near the eyewash/or safety shower the nozzles to eyewash stations need to be protected from airborne contaminants. Eyewash stations need to be kept clean and are designed with pop-off covers that must remain in position until the unit is activated. Safety standards require that eyewash units be tested (activated) and verified weekly..

Q20. Are first aid kits in designated areas? Are they properly stocked with the supply list inside?

Each laboratory was provided with a first aid kit. Kits must be properly stocked kept clean and in good order.

Q21. Are fire extinguishers located in designated areas, accessible and free from obstructions?

Each laboratory is equipped with a fire extinguisher adapted to the hazard. Fire extinguishers should be readily available, located strategically, in good working condition and properly labeled. Access to a fire extinguisher should never be blocked.

Q22. Are extinguishers functional, labeled and inspected recently?

Extinguishers shall be inspected regularly and records shall be kept on tags or labels attached to the extinguisher. At Concordia, a full inspection is done annually by an external contractor.

Q23. Are emergency switches clearly identified for power and gas supply and easily accessible?

Circuit breakers and cut-off switches should be labeled and accessible

Q24. Are fire blankets available and stored correctly?

Fire blankets are available in service corridors. As with all other emergency equipment, access should never be blocked.

Q25. Are missing or deteriorating fume hood labels being replaced?

Instruction labels and calibration labels should be visible and in good condition.

Q26. Are fume hoods in good condition, sashes open and close, and glass intact?

Fume hoods should be cleaned regularly and sash operation shall be smooth and easy throughout its travel

Q27. Are the interiors of refrigerators and freezers sound and free of chemical spills or contamination and with containers tightly closed?

Housekeeping practices should keep chemical storage areas neat and orderly. Containers of liquids should be well sealed and placed in trays that have rims high enough to furnish secondary containment in case of spills or leaks.

Q28. Are refrigerators and freezers properly labeled? "Flammable" "Explosion proof" "Chemical use only"?

When laboratory refrigerators are used for the storage of chemicals they must be labeled as such. Flammable liquids can only be stored in approved, explosion-proof or laboratory-safe units (NFPA 45). Household refrigerators have various control switches that can spark and ignite flammable materials.

Q29. Are microwaves labeled "Laboratory Use only"?

Laboratory microwaves are to be used for laboratory usage only; food should not be prepared or stored in a laboratory.

Q30. Are electrical apparatus equipped with ground plugs or properly grounded? And not connected to extensions cords.

Laboratory equipment using 220V or higher should have a standard three-conductor line cord that provides an independent ground connection to the chassis of the apparatus. An overload-protection device that will disconnect the electrical circuit if the apparatus fails or is overloaded can also be acceptable. Extension cords are only intended as temporary

solutions, to prevent overload circuits, contact Facilities Operations at x2400 to arrange for additional electrical outlets.

Q31. Is the wiring on laboratory equipment in good condition and secured along the wall or benches?

Frayed or worn wiring, plugs and cords must be replaced. Wires should not be stretched across the floor causing a tripping hazard. Electrical outlets should have cover plates.

Q32. Are electrical cords and appliances away from flammables and water (sinks), do they have grounding plugs? Are extension cords used only for computers?

Carefully place power cords so they don't come in contact with water or chemicals. Contact with water is a shock hazard. Keep flammable materials away from electrical equipment. The equipment may serve as a source of ignition for flammable or explosive vapors. Power cords must have grounding plugs or be double insulated, corrosives and solvents can degrade the cord insulation. Extension cords should not be used in the laboratory or only for personal computers and their components.

Q33. Are red outlets being used for critical equipment that requires continuous power?

Red outlets are available in most labs. These outlets provide emergency power in the event of a power failure. Please ensure that appliances and equipment needing continuous power are connected to these outlets. If they are not available in certain labs they can be requested through MSA central facility,

Q35. Are laboratory apparatus properly assembled and used in a safe manner?

Principal investigators have a responsibility to ensure that students are trained in safe laboratory practices. Students must be able to recognize the potential dangers in their laboratory work and assess the risk associated. For example, apparatus under high vacuum, heated baths, ultra-centrifuges and high-temperature ovens all present a serious risk to inexperienced students.

Q36. Is the glassware free from cracks, chips, and other defects?

Glassware should be routinely inspected to ensure that it is free from cracks, chips and other obvious defects. Damaged glassware should be repaired or discarded in the waste container labeled “broken glass”. Glass apparatus containing gas or vapor under vacuum or above ambient pressure shall be shielded or wrapped with tape, or otherwise protected from shattering during use

Q37, Are vacuum pump belt guards in place and exhaust vented?

Vacuum pump belt drives should be equipped with belt guards. The exhaust from pumps should be vented to a laboratory hood.

Q38. Is there an inventory of all radiation counting and monitoring?

Contamination checks for radiation and radioactive contamination must be performed after each procedure involving radioactive materials and recorded in the radiation logbook. At the end of each week, designated test sites shall be inspected, surveyed, wipe-tested and cleaned as needed. Records of survey and/or wipe tests must be maintained in a logbook.

Q39. Are all radiation-emitting operations restricted to a low-density traffic area and are adequately shielded?

Radioisotopes must be used only in licensed laboratories or areas, in accordance with the ALARA principles minimizing all exposures by judicious consideration of time, distance and shielding. Bench areas that are low traffic zones should be chosen and the bench area next to the fume hood should be used when a fume hood is part of the procedure.

Q40. Are safe work procedures and decontamination/emergency procedures established?

The Internal Radioisotope Permit Holder must make certain that individuals working with radioisotopes are supervised, receive training, and are made aware of potential risks, safety procedures and the operation of monitoring equipment.

Section II, Chemical Safety

Safety information:

Q1. Are primary & secondary chemical containers labeled with identity and appropriate hazard warnings?

Containers must have either the supplier label or a workplace label containing the following information: Product identifier, supplier identifier, MSDS statement, risk phrases, precautionary measures, hazard symbol(s) and first aid measures.

Q2. Are signs on storage areas and laboratories consistent with hazards within?

Storage areas shall be identified by signs to warn emergency response personnel of hazards.

Q3. Is there an updated inventory of the chemicals in the laboratory?

Laboratories must have an up-to-date inventory of their chemicals. The University is required to provide this list to the Montreal Fire Department annually.

Q4. Are the materials safety data sheets available for all chemicals present in the laboratory?

The MSDS for all chemicals stored in the laboratory must be available in the laboratory itself. The information on an MSDS must be reviewed and updated every 3 years. A binder of all MSDSs must be readily available and in plain sight.

Q5. Are all chemical containers well labeled, capped and in good condition?

All chemical containers should be labeled according to Egyptian regulations. Containers should be sealed and in good condition to prevent vapors or spills.

Q6. Are personnel and students familiar with spill cleanup requirements for their chemicals?

Personnel and students must be aware of the hazardous properties of the material they are working with and the necessary measures in case of a spill. Spills should only be cleaned up by people qualified to do so and once the risk has been evaluated. Report all incidents to SSC.

General Laboratory Chemical Storage:

Q7. Are all chemicals stored correctly, segregated by hazard and according to compatibility (e.g., organic from oxidizers, flammable from acid)?

Specific instructions on chemical storage may be obtained from the MSDS or on the container label. Incompatible chemicals must be stored separately, as opposed to alphabetically. Classify the chemicals into hazards and in storage groups. All chemicals should have a definite storage place and be returned to this place after being used.

Q8. Are corrosive & flammable chemicals stored below eye level?

Liquid chemicals, large containers of reagents and especially corrosives should be stored on low shelves below eye level to prevent injuries to the eye.

Q9. Are chemicals kept away from desks?

Chemicals belong in designated storage areas and away from non-laboratory work areas.

Q10. Are highly flammable liquids stored away from sources of heat and ignition (such as Bunsen burners in fume hoods)?

Flammables must be stored away from ignition sources in fire-resistant storage cabinets.

Q11. Are all containers of non-hazardous substances (e.g., distilled water) labeled explicitly to avoid confusion?

To protect all personnel such as cleaning and maintenance staff - All chemical containers (regardless of hazard) must be labeled during use and storage. However, Laboratories Only - containers such as test tubes, flasks, beakers, and Petri plates need not be labeled with an identity and hazard warning.

When more than one chemical is combined to create stock solutions, buffers, washing solutions and other specialized reagents refer to these mixtures by using a code and post the code sheet in the laboratory.

Q12. Are hazardous materials used/stored limited to small quantities?

Quantities of chemicals stored in a laboratory should be limited to the minimum quantity necessary to perform the work being done. Flammable and combustible liquid storage is limited based on the laboratory size and fire rating.

Q13. Do chemical containers larger than 4L have a second containment?

Large containers that must be stored on the floor (such as waste) should have a second containment to contain the contents of the container in case of breakage or spill.

Compressed Gas Cylinders:

Q14. Are gas cylinders properly chained/secured and in use?

Gas cylinders must be stored in an upright position with the valves facing upwards and be solidly held in place with chains or straps or a suitable stand. Cylinders in use shall be connected through a regulator or to a manifold to deliver gas to a lab operation. Cylinders not in use shall not be stored in the laboratory.

Q15. Are cylinder caps in place when cylinders are not in use or being moved?

All compressed gas cylinders shall be equipped with a protective cap for the valves when not connected for use.

Q16. Are cylinders transported on a cart with chains?

When moving cylinders use only properly designed carts. The cylinders must be properly fastened to the cart and have the protective cap over the valves.

Q17. Are cylinders properly labeled?

Cylinders must be labeled according to Egyptian regulations.

Q18. Are full and empty cylinders stored separately?

When cylinders are empty, regulators should be removed promptly and the protective caps replaced. The cylinders should be labeled as empty and stored separately.

Q19. Are regulators, proper connections and tubing in good condition/use?

Only regulators approved for the specific gas should be used. Valves should be closed with all pressure released from equipment connected to the cylinder at the end of a work shift.

Hazardous Waste Disposal:

Q20. Are waste being separated appropriately (e.g. solid vs. liquid, halogenated vs. non-halogenated)?

When disposing of chemicals, put each class of waste chemical in its specifically labeled disposal container. See also Question 22 for labeling information.

Q21. Are there sufficient and appropriate waste containers in the laboratory?

Waste containers can be ordered through the SSC office by calling extension

Q22. Are the waste containers clearly labeled and the chemicals identified?

Waste containers must be clearly identified using the MSA chemical waste label. Indicate the chemical name or common name of each substance in the mixture. Indicate the strength or concentration of the substance where applicable. Do not use chemical formulas, abbreviations, symbols or equations. Indicate the physical and/or health hazards of the substances.

Q23. Are syringes and other sharps disposed into biohazard waste containers?

Sharps such as needles, syringes, scalpel, razor blades, clinical glass such as Pasteur pipettes and any other items capable of puncturing, must be disposed of in a biohazardous container. Containers can be ordered through the SSC office.

Q24. Are waste containers kept closed using tight-fitting lids?

Containers should be in good condition with properly fitting caps.

Section III: Biohazard Safety

General biohazard Safety:

Q25. Are lab coats kept in the lab to prevent contact with street clothing?

Protective laboratory clothing must not be worn in non-laboratory areas; laboratory clothing must not be stored in contact with street clothing.

Q26. Are cleaning procedures established for normal cleaning and emergency spills?

Disinfectant should be available for daily work surface decontamination and spill cleanup. Work surfaces should be decontaminated on completion of work, at the end of the day, and after any spill or splash of viable material with disinfectants that are effective against the agents of concern. For some organisms, 70% ethanol may be effective. For most organisms, a 10% bleach solution is effective. Note that bleach solutions should be prepared fresh each day.

Q27. Are autoclave procedures available for disinfection?

All contaminated materials, solid or liquid, must be decontaminated before disposal or reuse; the material must be contained in such a way as to prevent the release of the contaminated contents during removal.

Q28. Is biohazard waste treated before disposal?

See question 26, if waste cannot be autoclaved then biohazard waste containers must be used.

Q29. . Are durable, leak-proof containers available to transport waste to the autoclave for decontamination?

Appropriate containers for transport include plastic or metal tubs. Do not place transport containers in the autoclave unless you are certain they are composed of “autoclavable” material. Note: If bags are heavy, the use of a cart for transport is recommended.

Q30. Are biohazard waste containers used properly where needed? (e.g. autoclave, bags, sharps containers, etc?)

All containers and bags used for waste collection are closable and prominently display the interlocking ring biohazard symbol. All bags used for waste collection must have the biohazard symbol printed on the bag. If the bag is kept in a container, the container should have a lid and also have the biohazard symbol prominently displayed. When not in use, waste containers should be kept closed

Q31. Has the Biosafety cabinet been certified in the last year?

The correct operation of a BSC should be tested annually and certified in accordance with government-issued standards.

<u>Section IV: Radiation Safety</u> General

Ionizing radiation safety:

Q32. Are registered areas properly designated?

Specific areas within a laboratory must be defined for handling unsealed sources. These areas must be enclosed by yellow warning tape displaying the standard radiation warning symbol.

Q33. Is radiation monitoring and detection equipment readily available and calibrated?

A suitably calibrated and certified radiation survey instrument must be available when working with radioisotopes. All monitoring equipment used for contamination checks must be calibrated and certified every 12 months by a licensed company or organization approved by the CNSC.

Q34. Are personnel trained appropriately?

Laboratory instructors, technicians, teaching assistants and demonstrators must be adequately trained in radiation procedures and regulations. The licensee is responsible for supervising work involving radioactive materials used by associate users or students in the lab under their jurisdiction.

Q35. Are radioactive materials securely stored according to procedures?

Unsealed radioisotopes must be stored in a refrigerator, freezer or cabinet clearly labeled with a radiation warning sign. The storage areas should be cleaned and wipe-tested on a regular basis. Refer to the manual for more detailed information and regulations.

Q36. Is radioactive waste securely stored and disposed of according to procedures?
Only solid waste may be transported for disposal. Liquid and gas wastes must be solidified (absorbed/adsorbed) before disposal. The following radioactive waste containers are available: 20-L pails for radioactive dry waste and scintillation vials; 4.5-L containers with absorber material are available for radioactive liquids.

Q37. Is the inventory of all radioactive materials up-to-date?

An up-to-date logbook must be maintained for all radioactive material outlined on the internal radioisotope permit. This will include records of acquisition, inventory, storage, and waste disposal.

Section V: Laser Safety

Q41. Do laser laboratories have appropriate warning signs?

All warning signs and labels should be displayed conspicuously in locations where they best serve to warn all personnel of potential safety hazards.

Q42. Are lasers equipped with protective housings, safety interlocks, key controls, beam stops, attenuators and scanning safety guards as appropriate?

Protective housings which enclose Class 3B or Class 4 lasers or laser systems should be provided with an interlock system that is activated when the protective housing is opened or removed during operation and maintenance.

Q43. Are the laser operators provided with wavelength-specific eye protection?

All investigators or staff, who operate or supervise the operation of a laser, are responsible for determining the need for eye protection for a particular laser. Eye protection suitable to the laser must be provided and worn within the laser control area if there is a potential for exceeding the Maximum Permissible Exposure limit if viewing the beam. Contact the Radiation Safety Officer if you require assistance.

REFRENCES

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IESNA, Lighting Handbook, 9th Edition. Illuminating Engineering Society of North America, 2000

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National Academy of Sciences, www.nasonline.org

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NFPA 70E, National Fire Protection Agency, Codes and Standards

NRC, Prudent practices for handling hazardous chemicals in laboratories, National Academy Press, 1981
Occupational Safety and Health Administration (OSHA), www.osha.gov

Regulation respecting occupational health and safety, Quebec, c. S-2.1, r.19.1

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Stricoff, R.S., Walters, D.B., Laboratory Health and Safety Handbook, A. Wiley-Interscience publication, 1990

Laboratory Safety Self Evaluation

This self-evaluation form must be completed and submitted to SSC once per semester.

Principal Investigator:

Phone:

EID:

PI Email:

Submitter (If different from

PI): Submitter Email:

Phone:

EID:

building:

Date:

Emergency contact:

Homeland Security Survey: Has your Appendix A inventory changed? Yes(j No ^j

Does your lab work with pyrophoric? Yes(_) No(__)

Does your lab work with explosives? Yes(~~) No(~)

Does your lab work with highly toxic or high-risk carcinogenic chemicals? Yes (__) No( )

Does your lab possess select agent toxins? Yes (^) No (^J)

S = Satisfactory N = Needs Improvement N/A = Not Applicable

General Safety

1. Food and drink are not in the lab areas at any time.
2. Hazardous materials or equipment are not stored in hallways.

Personal Protective Clothing

3. The appropriate personal protective clothing for work being performed is present and in good condition.
4. Lab personnel wear appropriate personal protective clothing while in the lab.
5. No shorts or open-toed shoes are worn in the lab.

Personal Protective Equipment

6. Fume hoods are working properly and only essential items are stored in them.
7. Fume hoods have been tested by SSC within the past year.
8. The fume hood sash is pulled down as far as is practical and unobstructed.
9. Biological safety cabinets are certified on an annual basis.

Emergency Equipment

10. Emergency showers have been tested by Facilities within the past year.
11. Eyewashes are available, unobstructed, and tested weekly by lab personnel.
12. Eyewash testing is documented monthly on the SSC test tag.
13. *Whenever* a fire extinguisher has been used, MSA security
14. Spill control materials are available.
15. Lab personnel are trained in spill clean-up procedures.

Fire/Life Safety

16. All exits and walkways in the lab are clear and unobstructed.
17. Hazardous materials, chemical storage cabinets, and compressed gas cylinders are not stored near the primary means of egress from the lab.
18. Lab doors are kept closed as much as possible to provide a fire and smoke barrier.
19. The storage of combustibles (e.g., cardboard boxes and paper towels) is minimized.
20. Bunsen burner tubing and vacuum pumps are properly maintained.

Electrical Safety

21. All electrical cords are in good condition. No cracked, brittle, or frayed insulation.
22. All electrical equipment is properly grounded.
23. No electrical/extension cords are run above the ceiling or behind walls.
24. The use of extension cords in the lab is minimized and temporary.
25. No electrical cords are run across the floor where they could be a tripping hazard.

Chemical Storage

26. All chemicals are stored by hazard class (e.g., flammables, oxidizers, acids, bases, reactives, and toxins).
27. No breakable chemical containers are stored on the floor.
28. All chemical containers are kept firmly closed.
29. Flammables in excess of 10 gallons are stored in flammable storage cabinets.
30. Flammables requiring cold storage are stored in lab-safe refrigerators.
31. Acids are stored inside plastic secondary containment.
32. Chemicals are dated when received and opened.
33. The integrity of chemical containers and labels is checked regularly.
34. Compressed gas cylinders are firmly secured.
35. Compressed gas cylinders not in use have safety caps in place.
36. Hazardous gases are used only in fume hoods or ventilated cabinets.
37. Shelving for chemicals is in good condition.

38. MSDS are available or readily accessible for every hazardous chemical present.
39. Lab personnel know where and how to obtain MSDS.

Physical Hazards

40. All belt-driven vacuum pumps are protected with belt guards.
41. All fans are guarded.
42. Glassware used at pressures other than ambient is taped or shielded.
43. Non-infectious, broken glassware for disposal is deposited into glass boxes.
44. No cardboard boxes for broken glassware are greater than ¾ full.

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Chemical Waste

Containment and Storage

48. All containers are closed unless actively receiving waste.
49. No containers are leaking.
50. No waste is poured down the drain without prior approval by EHS.
51. The waste is located near the point of generation and under supervision.
52. Less than a total of one quart of "acutely hazardous" waste is present.

Labeling/Tags

53. All containers are labeled with the words "waste" or "spent" and their specific chemical contents are identified.
54. Each chemical waste container has a properly completed waste tag attached to it.

Special Waste (Sharps, Biological, and Animal Waste

Does your lab autoclave biological waste? Yes ( ) No ( )

Sharps

55. All sharps (e.g., needles, contaminated glass) are deposited into red sharps containers that are provided and picked up by disposal services.
56. Needles are not bent, re-capped, or clipped.
57. No sharps containers are greater than ¾ full.

Animals and Animal Waste

58. All animal carcasses are kept frozen and double-bagged until pickup by EHS.
59. Bedding from animals intentionally exposed to pathogens is treated in the lab (e.g., autoclaved) or picked up by EHC.

Pathological Waste and Blood and Blood Products

60. All pathological and blood/blood product waste is treated in the lab (e.g., autoclaved) or picked up by disposal services.

Microbiological and rDNA Waste

61. All microbiological and rDNA waste in the lab is treated, e.g., autoclaved, or picked up by SSC.

Disposal of Biological Waste in Lab

62. A log is kept of all biological waste treated (autoclaved).
63. The bag or container of treated waste has a "treated" label and goes into a black or opaque trash bag and is thrown into the regular trash.

Radioactive Materials

Radioactive Materials Labeling

64. The area is posted with "Radioactive Materials" and "Notice to Employees and Students" signs.
65. Radioactive sharps are deposited into puncture-resistant, marked containers.
66. Radioactive materials storage units are posted with proper signs.
67. Waste containers are labeled "radioactive" and contents are identified.

Work Area

68. All materials containing radioisotopes emitting beta or gamma radiation isotopes are shielded.
69. Whole body and ring dosimeters are worn as required by PI's radioactive material authorization.
70. Dosimeters are stored away from sources of radiation or in a shielded container.
71. Isotopes are secured when not attended.

Records

72. Records of the disposition of isotopes are current.

73. Dosimeter exposure records are current, organized, and available.

74. Quarterly inventory is current and available.

75. Radioactive materials authorization and applications are available.

76. Safety and Operating Procedure is available.

77. Interlocks are working properly.

78. A laser hazard analysis report is available for each laser or laser system.

Controlled Substances

Security

79. Security is adequate to prevent unauthorized use, access, and diversion of controlled substances.

80..Controlled substances are stored in a locked cabinet.

Records

81. Records of purchases, acquisition, dispensations, and disposal of controlled substances are kept on-site.

Disposal

82. Outdated and unused controlled substances are disposed of in accordance with the Egyptian Ministry of Health.

First	Last	EID	Email

Have you provided a list of your lab personnel to SSC? If not, please list the names below

PART THREE:

GUIDELINE FOR ACADEMIC INTEGRITY

Central Committee for Academic Integrity
(CCAI)

June 2023

THE GUIDELINES

1- Introduction & Background:

On 19 October 2005, the 33rd Session of the General Conference of UNESCO adopted the *Universal Declaration on Bioethics and Human Rights* (hereafter referred to as the Declaration). The Declaration embodies a set of bioethical principles that have been agreed upon by 191 Member States of UNESCO after an intense elaboration and consultation process involving independent and governmental experts from all regions of the world. This set of bioethical principles provides a common global platform by which bioethics can be introduced and strengthened within each Member State, and UNESCO is mandated to promote, disseminate and elaborate these principles for practical purposes.

The rapid progress in scientific research has presented a number of new and unique ethical and social challenges within the context of human medical science. Research in many fields has led to increased knowledge of the disease, acceleration of the healing process, improved drug treatment for infectious diseases and hope for the struggle against incurable diseases such as HIV/AIDS, Parkinson's and Alzheimer's. biotechnology-based and biomedical researches promise major advances in human health and therefore, any limitations on the right to freedom of scientific research should be for significant reasons only, and as least restrictive as possible, so as not to impede scientific wisdom and prevent damage to the scientific undertaking., At the same time, a duty exists to ensure that research in any area is conducted in ethically acceptable ways. A balance needs to be struck between recognizing the potential benefits this research offers to individuals and the community as a whole, and the duty to ensure that research in this area is conducted ethically.

MSA University provides a unique research environment due to its sound infrastructure, well-equipped research laboratories, and skilled researchers, and the purpose of this set of guidelines is to provide a positively oriented set of practical suggestions for maintaining integrity in research. Not only does the ethical conduct of science satisfy a scientific moral code; it also

leads to better scientific results because the adherence to ethical research practices leads to more attention to the details of scientific research, including quantitative and statistical techniques, and to more thoughtful collaboration among investigators. Also, the credibility of science with the general public depends on the maintenance of the highest ethical standards in research.

2- What is ethics?

Morality is a unique feature of the life of human beings. It is deeply influenced by Several cultural factors, such as history, traditions, education, religious beliefs, etc. The intellectual analysis of this human dimension in all of its complexity is the goal of the discipline called Ethics. Ethics does not create morality or moral behavior. The goal of ethics is much more modest: to explore the nature of moral experience, its universality and its diversity. Ethics and morality are generally taken as synonyms because they originally had the same meaning: the study of the disposition, character, or attitude of a specific person, group of people or culture, and ways of promoting or perfecting it.

3- Scope of the guidelines

The objective of these Guidelines is to contribute to the development of quality and consistency in the ethical review of scientific research. The Guidelines are intended to complement existing laws, regulations, and practices, and to serve as a basis upon which ethics committees (ECs) can develop their own specific written procedures for their functions in biomedical research. In this regard, the Guidelines establish an international standard for ensuring quality in ethical review. The Guidelines should be used by national and local bodies in developing, evaluating, and progressively refining standard operating procedures for the ethical review of biomedical research.

This guideline only addresses ethical issues with regard to ‘scientific research’. The term ‘research’ covers a broad spectrum of activities and can be defined as the ‘systematic search or inquiry for knowledge’.

4- The role of the ethical committee (EC)

The purpose of an EC in reviewing biotech or pharmaceutical-based research is to contribute to safeguarding the dignity, rights, safety, and well-being of all actual or potential research participants. A cardinal principle of research involving human participants is ‘respect for the dignity of persons. The goals of research, while important, should never be permitted to override the health, well-being, and care of research participants.

ECs should also take into consideration the principle of justice.

Justice requires that the benefits and burdens of research be distributed fairly among all groups and classes in society, taking into account age, gender, economic status, culture, and ethnic considerations. ECs should provide independent, competent, and timely reviews of the ethics of proposed studies. In their composition, procedures, and decision-making, ECs need to have independence from political, institutional, professional, and market influences. They need similarly to demonstrate competence and efficiency in their work. ECs are responsible for carrying out the review of the proposed research before the commencement of the research. They also need to ensure that there is regular evaluation of the ethics of ongoing studies that received a positive decision.

Each researcher has to fill an application form and present it to EC to begin his research. Researchers will not begin their research except after receiving written approval from EC.

In terms of approval, the EC will make one of three decisions:

1. **Approval** - the researcher can go ahead with the research as proposed, perhaps with some minor changes.
2. **Conditional Approval** – researcher can go ahead, but only when the EC has proof that he has changed his protocol according to certain specified conditions.

Not Approved - The EC will not allow the researcher to proceed. Reasons will be given for this.

An ethics evaluation by the **Ethical Committee** is currently recommended for the following types of research:

- Clinical trials of medicines or other interventional forms of treatment,

- Epidemiological studies,

- Research on human behavior and the behavior of other primates,

- Research of vulnerable population groups such as children, prisoners or mentally ill patients,

- Research of groups with particular racial or cultural characteristics,

- Research on the human embryo (in vitro or in vivo),

- Research on human genetic, chemical, pharmaceutical and biological materials

- Research on vertebrate animals,

- Research in rare biological species (plants or animals),

- Research on potentially dangerous organisms for humanity and the environment, including genetically modified organisms.

5- Guiding principles

This guideline addresses the ethics of research at MSA University to ensure compliance with the basic ethical values of beneficence, non-maleficence, justice and respect for persons. Furthermore, the guideline aims to identify good, desirable and acceptable conduct in research which promotes the welfare and rights of research participants.

Any research, including scientific research must conform to the following ethical principles and values:

5.1 Integrity

Researchers must always act with honesty and respect for the truth.

5.2 Autonomy/Respect for Persons

Patients, participants and research subjects must be treated with respect for their individual autonomy, freedom of choice, dignity and human rights. Informed consent is a vital element to respecting the right to individual autonomy.

5.3 Beneficence

Researchers must always act in the best interests of the patient/research participant and make efforts to secure their well-being.

5.4 Non-maleficence

The “Do no harm” principle applies to scientific research and entails refraining from doing harm and attempting to maximize possible benefits and minimize possible harms.

5.5 Justice/Fairness

In research endeavors, researchers must attempt to address past inequities, recognizing wider community interests beyond merely the interests of the individual, organization or corporation, providing redress for the vulnerable and promoting equitable access to resources. This principle can also be described as necessitating an equal distribution of the risks and benefits of research between communities.

6. Matters of ethical concern in research

6.1 Respect for the Law and system of Government

There must be compliance with the Constitution of the Arab Republic of Egypt and all relevant Egyptian laws, legislation and standards.

6.2 Relevance & integrity

Researchers must acquaint themselves with the current relevant quantitative methods available for processing data, including graphical and tabular methods of presentation, error analysis, and tests for internal consistency.

Research integrity requires not only that reported conclusions are based on accurately recorded data or observations but that all relevant observations are reported. It is considered a breach of research integrity to fail to report data that contradict or merely fail to support the reported conclusions, including the purposeful withholding of information about confounding factors. If some data should be disregarded for a stated reason, confirmed by an approved statistical test for neglecting outliers, the reason should be stated in the published accounts. A large background of negative results must be reported. Any reckless disregard for the truth in reporting observations may be considered to be an act of research misconduct.

Modifying an approved protocol in the midst of a clinical or epidemiological study or changing the character of an approved study (e.g., from an exploratory to a confirmatory study) might in some cases be considered improper or even be viewed as research misconduct.

Expenditure of any grant funds from either the government or others for fabricated or falsified research is not only a violation of research ethics but also a crime, and those responsible may be subject to prosecution for fraud with the possibility of a demand for restitution of funds to the government, a fine, and/or imprisonment.

Fabrication and falsification of research results are serious forms of misconduct. It is a primary responsibility of a researcher to avoid either a false statement or an omission that distorts the truth. A researcher must not report anticipated research results that had not yet been observed at the time of submission of the report.

Meticulous record-keeping is a sound scientific practice that provides an accurate contemporaneous account of observations that become a permanent reference for the researcher, who otherwise might not remember several weeks, months, or years later exactly what had been observed or what methods had been used. An accurate record also serves others who may want to replicate the observation or to apply a method to other situations. In addition, it is an aid in allowing the eventual sharing of information with others and as documentation that might disprove any subsequent allegation of fabrication or falsification of data.

6.3 **Plagiarism**

Authors who present the words, data, or ideas of others with the implication that they are their own, without attribution in a form appropriate for the medium of presentation, are committing theft of intellectual property and may be guilty of plagiarism and thus of research misconduct. This statement applies to reviews and to methodological and background/historical sections of research papers as well as to original research results or interpretations. If there is a word-for-word copying beyond a short phrase or several words of someone else's text, that section should be enclosed in quotation marks or indented and referenced to the original source.

The same rules apply to grant applications and proposals, to clinical research protocols, and to student papers submitted for academic credit.

An author should cite the work of others even if he or she had been a co-author or editor of the work to be cited or had been an adviser or student of the author of such work. Not only does plagiarism violate the standard code of conduct governing all researchers, but in many cases it could constitute an infraction of the law by infringing on a copyright held by the original author or publisher.

The work of others should be cited or credited, whether published or unpublished and whether it had been written work or an oral presentation. Each journal or publisher may specify the particular form of appropriate citation. One need not provide citations, however, in the case of well-established concepts that may be found in common textbooks or in the case of phrases that describe a commonly-used methodology. Special rules have been developed for citing electronic information.

Members of a research group who contribute to the work of the group that is later incorporated into a proposal or protocol are entitled to be consulted and informed as to what their role will be if the proposal is funded or the protocol is approved. A charge of plagiarism in the proposal or protocol, however, can usually not be sustained on the grounds that such members are not later included as part of the team that conducts the approved or funded research. Such researchers who are excluded from subsequent research are entitled, however, to be considered for co-authorship in publications if their contributions merit it.

6.4 **Investigator Competence**

Only investigators who are competent and appropriately and suitably qualified in the necessary fields of science should conduct the research. Where delegation of research is necessary, the principal investigator should only delegate to individuals who possess the necessary skills and experience. Researchers must at all times endeavor to achieve the highest level of scientific quality in their research.

When assessing the competence and suitability of the researcher to conduct the specific research the following attributes must be taken into account:

- Technical and research competence;
- Educational background and qualifications;
- Certification;
- Knowledge and experience in the required field;
- Honesty and Integrity;
- Fairness;
- The researcher's sensitivity to identify an ethical issue; and
- The ability to act responsibly and appropriately when faced with an ethically challenging situation.

A technically competent researcher must be empathetic and compassionate and these characteristics will best be maintained in a good clinical and research environment that provides appropriate research mentoring.

Researchers must never misuse their positions or knowledge for personal power or gain.

6.5 **Informed Consent**

It is necessary to obtain informed consent from the research participant prior to commencing research. This requirement is based on the fundamental moral duty that we do not act against the wishes of a person and that human dignity and integrity should be respected. Previously, Research Ethics Committees had to rely on ethical guidelines and to some extent, Constitutional and common law for ethical guidance regarding research on human subjects. The preferred manner of recording consent is in both written and verbal form. Where the participant is not literate, the consent must be obtained in the presence of a literate witness who must confirm in writing that the consent obtained was in fact informed in nature. This means that the research participant was informed of all information relevant to his/her participation, including the risks and benefits of the proposed research and understood all the risks and benefits of such research. Unforeseeable risks obviously cannot be foreseen, but participants must be told the nature and extent of all foreseeable risks or discomfort associated with the research. This includes financial risks attendant on participation. The person must also have been able to give consent voluntarily without any form of coercion or undue influence.

Research Ethics Committees must ensure that informed consent procedures are followed.
The four main requirements for informed consent are

(a) Disclosure;

(b) Understanding or appreciation;

(c) Voluntariness; and

(d) Capacity to consent.

A. Disclosure

Disclosure relates to information that must be supplied to a research participant prior to obtaining consent to participation in order for such consent to be informed. Participants must be made aware of their right to be informed of relevant new findings, and of the consequences of their withdrawal from research. They should know, too, whether the investigator may terminate participation and be informed of the availability of peer counseling to assist them in making an informed choice.

Disclosures made to prospective participants must be detailed and comprehensive, made in the appropriate language and in a manner that facilitates understanding. The researcher should adopt a non-threatening approach that invites interaction and questions from the participant. Where possible, researchers should make use of an environment where the potential participant feels comfortable and not intimidated.

In the event of significant changes in the conditions or procedures of the research, or if new information comes to light that may impact on participants continuing with the research, new informed consent must be obtained from such participants.

The following list is a concise summary of essential information that must be disclosed to research participants in order to facilitate informed consent. Participants must be informed of all relevant information that may impact on their decision to participate in the research, including the following:

(a) That they are participating in research and that participation is voluntary;

(b) What the aim of the research is and the anticipated time period of his/her involvement in the research;

(c) The research and experimental procedures to which s/he will be subjected;

(d) Any and all responsibilities which s/he will have if they consent to participate in the research;

(e) Any and all risks, dangers and/or complications that may result from, or be inherent in, the research. This includes the possibility of unforeseen risks, dangers and complications that may result from such research;

(f)The benefits to him/herself or others, both during and after the research;

(g) What will happen in the event of him/her being injured in any way during participation in the research, including whether compensation will be given in research related injuries (participants must also be told who to contact in the event of such injury);

(h) That they have a right to be informed of relevant new findings related to the research;

(i) That s/he may at any stage of the project withdraw his or her consent to participate without any disadvantage to him or herself;

(j) The consequences of their withdrawal from research;

(k) Whether the researcher is allowed to terminate participation and the circumstances which may lead to such termination;

(l) That peer counseling is available to assist him/her in making an informed choice;

(m) The extent to which confidentiality will be maintained and that the sponsors of the study and regulatory bodies will be permitted to inspect research records;

(n) Where during the course of research, information comes to light which the participant may have a legal duty to disclose to a third party, the researcher may have a duty to disclose such information to the third party, should the participant refuse/fail to do so;

(o) Whether the research has been approved by an accredited research ethics committee and that the contact details of such research ethics committee representatives must be made available to the participant;

(p) The investigator's qualifications which make him/her suitable and competent to conduct the research;

(q) The investigator's contact details should the participant require additional information or suffer an adverse event;

(r) The possible research uses, direct or secondary, of the participants medical records and of biological specimens taken during the course of the research;

(s) Whether biological specimens collected during the research will be destroyed, stored, possible future use. Participants must be made aware that they have the right to decide about the future use of such specimens and that the specimens may not be used in any other or subsequent research unless the participant's informed consent has been obtained in writing for that specific research project;

(t) That the researcher may have a legal duty to breach confidentiality if, during the course of the research, it is discovered that the participant has a notifiable disease.

B. Understanding or appreciation

Obtaining informed consent must be done in a manner that recognizes the individuality of the specific participant by considering factors such as his/her age, maturity, intelligence, education and belief system. Merely reading out the contents of the consent form in a mechanical way will not suffice as satisfactory disclosure. The researcher must be completely certain and confident that all information disclosed to the participant was understood and that s/he appreciates all risks and benefits associated with the proposed research. The researcher must allow the participant to ask questions freely and must ensure that all questions are answered honestly and appropriately. In addition, the researcher must ensure that the participant is provided with sufficient opportunity to consider all the information prior to consenting.

In the Egyptian context, researchers must pay particular attention to the vulnerability of potential research participants. Many vulnerable Egyptian populations do not have access to primary, secondary or tertiary education, nor to adequate health care services which makes them particularly vulnerable to exploitation by researchers and research establishments. For this reason, details of the proposed research must be supplied to the participant in a manner which is easily understandable and which takes cognizance of the cultural background, language, customs and beliefs of the participant.

C. Voluntariness

Informed consent is only valid when it is obtained without dishonesty or misrepresentation. Any compulsion or undue influence on the part of the researcher will negate the consent given by the participant.

D. Capacity to consent

Consent must be given by someone who is legally and factually capable of consenting. In relation to competence to consent and proxy consent, two broad categories of research participants must be recognized: Adults and Minors.

6.6 Misuse of Privileged Information

One particularly serious form of plagiarism is the misuse of privileged information taken from a grant application or manuscript received for peer review. In such a case, the plagiarism is a serious matter of theft of intellectual property because it not only deprives the original author of appropriate credit by citation but could also preempt the priority of first publication or use of the original idea to which the source author is entitled. Also, one who breaches confidentiality by showing a privileged unpublished document to an unauthorized person can be held to a shared responsibility for any subsequent plagiarism of the document committed by that unauthorized person.

6.7 Ownership of and Access to Data

Research data obtained in studies performed at the University of MSA and/or by employees of the University are not the property of the researcher who generated or observed them or even of the principal investigator of the research group. They belong to the University of MSA which can be held accountable for the integrity of the data even if the researchers have left the University. Another reason for the University's claim to ownership of research data is that the University, not the individual researcher, is the grantee of sponsored research awards. Reasonable access to data, however, should normally not be denied to any member of the research group in which the data were collected. If there is any possibility that a copyright or patent application might emerge from the group project, a written agreement within the group should specify the rights, if any, of each member of the group to the intellectual property. A researcher who has made a finding which may be patentable should file an Invention Disclosure with the Office of Technology Management. The University patent policy allows the sharing of revenues from licensing, sale, or royalties between the inventor(s) and the University.

A principal investigator who leaves the University is entitled to make a copy of data to take to another institution so as to be able to continue the research or, in some cases, to take the original data, with a written agreement to make them available to the University on request within a stated time period. A formal Agreement on the Disposition of Research Data should be negotiated in such cases through the Office of Research. Each student, postdoctoral fellow, or

other investigator in a group project should come to an understanding with the research director or principal investigator, preferably in writing, about which parts of the project he or she might continue to explore after leaving the research group. Such an understanding should specify the extent to which a copy of research data may be taken. Co-investigators at another institution are entitled to access the data which they helped to obtain.

For unique materials prepared in the course of the research, such as intermediates in a chemical synthesis, autoradiograms, cell lines, and reagents, items that can be proportioned should be divided among members of a research group at different locations under negotiated terms of material transfer agreements. For non-divisible items, the nature of the assignment should be clearly stipulated in the agreement. The Office of Research facilitates the execution of such agreements.

Since the scientific enterprise may be a cooperative endeavor encompassing many persons who now or in the future might pursue common research interests, and since it is in the interest of all to rely on the contributions and findings of others, every investigator has an obligation to the general scientific community to cooperate by sharing of data. Other virtues of sharing data include the facilitation of independent confirmation or refutation of reported outcomes. It is generally accepted that the data underlying a research publication should be made available to other responsible investigators upon request after the research results have been published. A researcher who has access to a unique set of experimental or observational data, e.g., from a satellite or from an archeological or paleontological site, has an obligation either to publish research results within a reasonable time or to make the data available to others who will be able to do so.

6.8 Confidentiality

The investigator must preserve the confidentiality of participants' research data. If the information collected and stored could cause harm or distress when disclosed to a third party, the investigator should arrange to protect the confidentiality of such information; for example, by

omitting information that might lead to the identification of individual participants, limiting access to the information, anonymizing data or by other means.

6.9 Care and protection of research staff

Adequate safety measures must be employed within the university facilities to ensure the health and safety of staff engaged in practical scientific activities and research. All staff must be properly trained in safety procedures.

Furthermore, the Egyptian Work Act No. 12 for the year 2003 [chapter 3 (Occupational Health and Safety), Articles (209 – 214)] places a duty on employers to ensure the health and safety of their employees and to take measures to protect them against the hazards to health and safety arising out of, or in connection with, the activities such employees are involved in. The appropriate Research Ethics Committee should stress the importance of protecting the safety and welfare of research staff.

The primary investigator in the research should devise guidelines and apply safety rules for the proper handling of all hazardous materials. In this regard, the Hazardous Substances must be dealt with in the safest way.

6.10 Care and protection of animals

Animal testing raise many contentious issues. Researchers must at all times ask the question: 'How valuable is the knowledge sought and how necessary is the use of animals to obtain the knowledge?'

Sentient animals must not be used in research, nor research conducted on such animals, unless the potential benefit of the technology being researched outweighs the moral and ethical concerns raised by utilizing such animals as a means to an end.

Laboratory animals should be able to live, grow, reproduce and interact under conditions and circumstances in which their species' specific needs are met, as far as possible. Special consideration should be given to the needs of social animals in this regard and to animals that have adapted to special circumstances or environments e.g. nocturnal animals and marine animals.

7 Responsibilities of Research Supervisors and Trainees

Research training is a complex process, the central aspect of which is an extended period of research carried out under the supervision of an experienced scientist. This supervised research experience is not merely the performance of tasks assigned by the supervisor but rather is a process where in the trainee takes on an increasingly independent role in the selection, conceptualization and execution of research projects. The trainee should be provided with training in the necessary skills and knowledge necessary for a successful career as a research investigator. It should be recognized that the trainee has unique, time-sensitive needs relevant to career advancement. Guidance and advocacy from the supervisor in this regard are essential components of training.

In general, a trainee will have a single primary supervisor, but may also have other individuals who function as mentors for specific aspects of training and career development. It is the responsibility of the primary supervisor to serve as a role model and provide a rich research environment in which the trainee has the opportunity to acquire both the conceptual and technical skills of the field. In this setting, the trainee should be provided with clear expectations and undertake a significant piece of research, usually chosen as the result of discussions between the mentor and the trainee, which has the potential to yield new knowledge of importance in that field. In order to provide a meaningful, high-quality training experience, the mentor should monitor and guide the trainee's progress closely, and interact personally on a regular basis to give timely feedback regarding research findings and progress. Supervisors and mentors should limit the number of trainees in their laboratory or branch to the number for whom they can provide an appropriate and productive training experience. Mentoring should be adapted to the needs and career stage of each individual trainee.

Specific aspects of the mentor-trainee relationship deserve emphasis. Training should impart to the young investigator appropriate standards of scientific conduct both by instruction and by example. Mentors should be particularly diligent to involve trainees in research and related activities that contribute to their careers, including participation in intramural or extramural collaborations, encouragement of presentations at scientific meetings, and networking. Mentors should provide

trainees with timely and realistic appraisals of their performance and with advice regarding career opportunities and advancement.

Trainees have responsibilities to their supervisors and to their institutions as well. These responsibilities include adherence to these Guidelines and other applicable rules and programmatic constraints related to the needs of the research team and university.

8. Collaborations

Collaborative research brings together investigators with distinct strengths to work together on a defined problem or address a specific research goal. Research collaborations, within MSA University as well as with extramural institutions, are strongly encouraged and supported; the complex scientific questions that face us today often require interdisciplinary or multidisciplinary approaches.

Successful collaborations are characterized by a strong sense of direction, a willingness to commit time and effort, an efficient communication strategy for discussion among the group members, a system in place for reevaluation as the project progresses, and a clear definition of roles and responsibilities. It is advisable that the ground rules for collaborations, including eventual authorship issues, be discussed openly among all participants from the beginning. Whenever collaborations involve the exchange of biological materials they are routinely formalized by written agreements. Material Transfer Agreements (MTAs) are used for the simple transfer of proprietary research material without collaboration, for example, if you request a reagent from, or give one to, a colleague outside the university. Cooperative Research and Development Agreements (CRADAs) are agreements between one or more laboratories and at least one outsider group (private sector, another university, not-for-profit, government). CRADAs provide a protected environment for long-term collaborations; they confer intellectual property rights to MSA inventions. CRADAs are handled by the Technology Transfer Office of the university.

Consulting can be viewed as a one-way collaboration, in which an MSA student/scientist is asked to contribute to an outside project by providing expert advice.

9. Research Misconduct

The scientific community and general public rightly expect adherence to exemplary standards of intellectual honesty in the formulation, conduct, reporting and reviewing of scientific research. Investigators must act with honesty and integrity when editing, analyzing, and presenting data. Deceptive manipulation of data as misrecording of data, inappropriate exclusion of outlying data points, or enhancement of images is research misconduct.

Allegations of scientific misconduct are taken seriously by the administration of MSA University The process of investigating allegations must be balanced by equal concern for protecting the integrity of research as well as the careers and reputations of researchers. The procedures followed at MSA University are intended to permit allegations of scientific misconduct to be processed promptly, confidentially, and fairly. Prompt action on an allegation helps minimize any harm to the public that could result if misconduct is found that has a potential impact on health and allows those who are incorrectly implicated to have their names cleared without going through a lengthy process. Allegations of misconduct that are shown to be untrue, even if they were made in good faith, can damage careers and have a chilling effect on research.

Confidentiality helps protect both the innocent scientists who are incorrectly or unjustly accused and those who raise the allegations. Fairness allows all who become involved in scientific misconduct cases to have the opportunity to participate appropriately in this important oversight process and address the specific issues at hand, while at the same time protecting innocent participants from adverse consequences.

- **Scientific misconduct or misconduct in research:** Research misconduct is defined as *fabrication*, *falsification*, or *plagiarism* in proposing, performing, or reviewing research, or in reporting research results.

Fabrication is making up data or results and recording or reporting them.

- **Falsification** is manipulating research materials, equipment, or processes, or changing or omitting data or results such that the research is not accurately represented in the research record.

Plagiarism is the appropriation of another person's ideas, processes, results, or words without giving appropriate credit.

Research misconduct does not include honest error or honest difference of opinion.

References

The following documents have been taken into consideration and/or referred to for the policy review.

- Policy and Procedure for Inquiring into Allegations of Scientific Misconduct Medical Research Council. Accessed November 2008.Research regulation and ethics - MRC position. Issued: 09 May 2005
- The MRC.s series of publications on ethics and best practice and on clinical trials.
- MRC Ethics Guide: Medical research involving children. Medical Research Council, 2004 Nuffield Council on Bioethics. The ethics of research related to healthcare in developing countries, 2002; and Follow-up discussion paper, 2005Economic and Social Research Council, Research Ethics Framework 2005
- MRC Position Statement on Bioterrorism and Biomedical Research, 2005Organisation for Economic Co-operation and Development Global Science Forum, Best Practices for Ensuring Scientific Integrity and Preventing Misconduct Research Councils UK Code of conduct and Policy on the Governance of Good Research Conduct. 2008.
- UK Research Integrity Office (UKRIO) Draft Code of Practice for Research, 2007Universal Ethical Code for Scientists, 2006.

- BBSRC Statement on safeguarding good scientific practice, revised, 2007 European Science Foundation: Stewards of Integrity: Institutional Approaches to promote and Safeguard Scientific Practice in Europe,2008 Mental Capacity Act, October 2007.
- National Research Council: Guide for the Care and Use of Laboratory Animals, National Academy Press, Washington D.C., 1996, 128 pp. ISBN 0-309-05377-
- Sieber, Joan E.: Planning Ethically Responsible Research: A Guide for Students and Internal Review Boards, Applied Social Research Methods Series, Vol. 31, Sage Publications, 1992, Newbury Park, CA
- UNESCO: Establishing Bioethics Committees, Guide No1, 2005, Division of Ethics of Science and Technology, SHS/B 10-2005/01
- National Bioethics Commission: Ethics Committees in Research, chapter 10, Positions on Contemporary Problems – articles 2000 – 2007, 2007, National Printing House (the full text of the book is available on the Commission's website at: http://www.bioethics.gr/media/pdf/bioethics2.pdf).
- T. Vidalis and K. Manolakou (editor): Documents on Bioethics, National Commission of Bioethics, Eds. Sakkoulas, 2002, p. 493, ISBN 960-15-0716-7.
- (International documents and Greek Legislation on bioethics, grouped in thematic sections, can be consulted on the website of the Commission at http://www.bioethics.gr/category.php?category_id=63)
- Eckstein, Sue (ed.): Manual for Research Ethics Committees (Centre of Medical Law and Ethics, King's College London), 6th edition. Cambridge: Cambridge University Press, 2003, 558 pp. ISBN 0-521-81004-3
- Patent Rights and Technology Transfer, 11-02-01, July 1, 2005. This describes the procedures for applying for patents and outlines the relative rights and responsibilities of the inventor(s) and the University.
- Research Integrity Policy, 11-01-01, January 1, 2002. This defines research misconduct and describes the procedures for conducting inquiries and investigations into allegations of misconduct and for making and appealing decisions related to misconduct.

- Rights, Roles, and Responsibilities of Sponsored Research Investigators, 11-01-02, April 3, 1992. This document outlines the rights and responsibilities of investigators and provides a mechanism for resolution of disputes.

Appendix 1: TEMPLATE CONFIDENTIALITY AGREEMENT

AGREEMENT

NOW, THEREFORE, in consideration of the premises set forth herein and the covenants and promises hereinafter set out, Discloser and Recipient, intending to be legally bound, hereby agrees as follows:

ARTICLE 1. MEANINGS

1. In this Agreement, the following words have the following meanings:

Confidential Information means all information relating to the Project including inventions; discoveries; facts; data; ideas; manner, method or process of manufacture; method or principle of construction; chemical composition or formulation; techniques; products; prototypes; processes; names; know how; routines; specifications; drawings; trade secrets; technology methods; computer programs; works in respect to which copyright subsists; circuit board layouts; and other knowledge;

Discloser means a party to this Agreement which discloses Confidential Information to another party

Project means *

Purpose means *

Recipient means a party to this Agreement to whom Confidential Information is disclosed.

ARTICLE 2. **DISCLOSURE**

2. Discloser will disclose the Confidential Information to Recipient as soon as practicable after the date of this Agreement.

ARTICLE 3. **USE OF CONFIDENTIAL INFORMATION**

3.1 Recipient must use the Confidential Information only for the Purpose, and must not use the Confidential Information for any other purpose.

3.2 Recipient must not lodge any patent application or any other application for the statutory protection of the Confidential Information, without the prior written consent of Discloser.

ARTICLE 4. **EMPLOYEES AND DIRECTORS**

Recipient may only disclose Confidential Information to a director, officer or employee who is bound by obligations of confidentiality to Recipient at least to the extent imposed upon Recipient by this Agreement.

ARTICLE 5.**CONFIDENTIALITY**

5.1 Recipient must keep the Confidential Information secret and confidential.

5.2 Recipient must not disclose to any person or make known in any manner any part of the Confidential Information.

5.3 Recipient must keep the Confidential Information in a secure place so as to ensure that unauthorized persons do not have access to the Confidential Information.

5.4 Recipient acknowledges that damages may be an inadequate remedy to Discloser in the event of any breach of this Agreement occurring and that only an injunction might be adequate to properly protect the interests of Discloser.

ARTICLE 6. **WRITTEN CONSENT**

6.1 Discloser may consent to Recipient making a disclosure or relieving Recipient from complying with the whole or any part of this Agreement. Such consent can only be in writing.

6.2 Discloser may consent pursuant to Article 6.1 subject to conditions, including a condition that the person to whom Recipient proposes to disclose executes in favor of Discloser a Confidentiality Agreement upon the same terms as this Agreement.

ARTICLE 7. **ENDING OF CONFIDENTIALITY**

Recipient shall be relieved from Recipient's obligations of confidentiality in this Agreement in respect to any part of the Confidential Information which:

(a) Recipient can show was in the possession of Recipient as at the date of the disclosure; or

(b) Recipient can show is or becomes part of the public domain otherwise than by a breach of this Agreement; or

(c) Recipient can show was received in good faith from a person entitled to provide it to Recipient; or

(d) Recipient can show was independently developed by Recipient, by employees who did not have access to the Confidential Information.

ARTICLE 8. **DURATION OF CONFIDENTIALITY**

8.1 The duration of the obligations in this Agreement is five years.

8.2 The obligations of confidentiality and nonuse upon Recipient in this Agreement end upon the expiration of that period.

ARTICLE 9. **RETURN OF CONFIDENTIAL INFORMATION**

9.1 Discloser may at any time by notice in writing to Recipient require the return to it of the Confidential Information.

9.2 Within 7 days of receipt of such a notice Recipient must deliver to Discloser all Confidential Information in its possession disclosed or provided by Discloser together with all copies of all Confidential Information in its possession:

(a) Provided by Discloser; or

(b) Which Recipient has for any reason made,

9.3 Any part of the Confidential Information which cannot conveniently be returned by Recipient to Discloser shall be completely destroyed in such manner and at such time as directed by Discloser, including by deletion from all computer records and electronic or magnetic storage devices.

ARTICLE 10. GOVERNING LAW

Each party may bring proceedings in any court of competent jurisdiction in the place where its principal executive offices are located.

SIGNATURES OF PARTIES

This Agreement shall be effective when signed by all parties, and its effective date is the latest of the dates set out below.

SIGNED on behalf of [1]

BY

_____

Print Name

_____ _____

Signature date

SIGNED on behalf of *

BY

_____

Print Name

_____ _____Signature date

Appendix 2: MATERIAL TRANSFER AGREEMENT

The undersigned,

1. MSA University was established under Egyptian law in six of October represented by it director (or any other entity in designated by the university)

And

2. …… (Name of Organization),
……(Address, no P.O. Box),
……(Postal Code + City + Country), hereinafter called 'Recipient'; lawfully represented by …….. (position + name of the legal representative):

In consideration of the receipt by Recipient of (biological) material from MSA hereby agree to the following terms and conditions:

The Material

"Material" shall mean the above-referenced (biological) material plus progeny, unmodified or modified derivatives and any accompanying know-how or data from PRI.

Use of the Material

2. The Material will exclusively be used only in the Recipients laboratory and for the purpose agreed upon only at:

Name Organization:
Address:
City:
Country:

Under the following code number:

3. Recipient shall use the Material in appropriate containment conditions only for research purposes to (fill in: specific description):

4. Recipient is not allowed to alter, modify or improve the Material without the prior written consent of PRI.

5. The Material will not be used for commercial purposes without prior written permission of PRI. In case of permission, conditions and compensation for such permission will be negotiated upon.

6. Recipient shall not use the Material in research that is subject to any consulting or licensing obligation to any third party regardless of whether or not such an obligation

Presently exists or previously existed or may be entered into in the future, without the prior written permission of MSA.

Distribution and release limitation

7. The recipient will not distribute or release or sell the Material to any person other than laboratory personnel of the Recipient and shall ensure that no one will be allowed to take or send the Material to any other location than mentioned above unless written permission is obtained from MSA.

Rights and results

8. The Material remains the property of MSA. The recipient is allowed to use the Material during its research as described in Article 3. However, MSA is entitled to request the immediate return or the immediate destruction of the Material, in case the Recipient does not comply with its obligations under this Agreement or in any other case, provided that the term of notice of two months is taken into account.

9. Recipient will inform MSA regularly about all results of her/his research with the Material.

10. MSA shall retain all rights, titles and interest in and to the Material. Except as expressly provided in this Agreement, nothing in this Agreement is to be construed as granting any right or license to Recipient to utilize the MSA Materials under any patent, trade secret or other proprietary right of MSA for purposes other than research. Any discovery, composition of matter and other inventions conceived, reduced to practice or otherwise made by Recipient using the Material shall be owned by MSA. Recipient shall promptly notify MSA of any inventions using the Material.

Publication

11. If the Recipient desires to publish the results on the Material, Recipient will need the prior written approval of MSA. The source of the Material will be acknowledged or properly referred to in all publications by Recipient.

Secrecy

12. Recipient shall keep all information related to the Material strictly confidential irrespective of whether such information was received from PRI or generated by Recipient itself under this Agreement. This obligation is not applicable for information that is already publicly available or becomes publicly available after the signature of this Agreement through no fault of the Recipient.

Warranty

13. Recipient understands that the Material is experimental in nature and is provided without warranty of merchantability or fitness for a particular purpose or any other warranty, express or implied. PRI makes no representation or warranty that the use of the Material will not infringe any patent or other proprietary right and no right or license under any patent or patent application.

14. Recipient shall hold PRI harmless from any loss, claim, damage, illness, or injury to persons or property whatever the cause may be arising out of or pertaining to Recipient's use of the Material

Liability

15. In no event shall MSA be liable for any use by the Recipient of the Material or any loss, claim, damage, or liability of whatsoever kind of nature, which may arise from or in connection with this Agreement or the use, handling or storage of the Material.

16. Subject to article 14 Recipient accepts full liability also to third parties in case of dispute over (in) the use of the Material or the research results.

Breach of Agreement

17. MSA may request that the Recipient promptly destroys the Material if the Recipient is in material breach of this Agreement and the breach is not capable of remedy within thirty (30) days of notification to PRI. Upon any violation of the terms of this Agreement, the Recipient shall be indebted a fine of (TO BE AGREED ON) for each breach, immediately payable to MSA, without prejudice to MSA's right to seek full compensation in this respect.

Regulations/law

18. Recipient shall use the Material in compliance with all laws and governmental regulations and guidelines applicable to the Material. This Agreement shall be construed and governed by the laws of The Arab Republic of Egypt .

19. Any dispute concerning this Agreement or the performance thereof shall be submitted to the adjudication of the competent court.

In witness whereof this Agreement has been executed in duplicate and signed and initialed per page by,

MSA UNIVERSITY

General Director
Date:
Signature:
and
Organization Recipient
Name:
Position:
City:
Date:
Signature: