



Albert Einstein College of Medicine

Chemical Hygiene Plan

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I. Purpose

It is the intent of Albert Einstein College of Medicine (“Einstein” or “College”) to provide a safe and healthful work environment for its employees, students, and visitors. To achieve this aim, the management the goals of the Chemical Hygiene Plan. This plan is designed to protect employees from health hazards associated with hazardous chemicals in the laboratory and to keep any chemical exposure below the action level or permissible exposure limit (PEL).

On November 25, 1983, the Occupational Safety and Health Administration (OSHA) published the Hazard Communication Standard which applied to certain manufacturers and laboratories. OSHA received many comments regarding whether the Hazard Communication Standard should apply to laboratories where the staff is highly educated. Other unique differences for laboratories were noted including: the small amounts of chemicals used; the vast numbers of different chemicals involved; and nearly half of the laboratories in one survey could not accurately predict their chemical needs even one month in advance.

OSHA decided that “...Despite the existence of the unique characteristics of laboratory work places, in actual practice incidents of acute adverse health effects resulting from exposures to toxic substances in laboratories do occur. Furthermore, some studies... have shown increased risks of certain types of diseases for laboratory workers. In addition, although laboratory workers are, in general, a well-educated work force, there is evidence that many laboratories do not have health and safety programs...” and “...there is some question as to whether laboratory workers actually make themselves as knowledgeable as they should be and some laboratory employees are not professionally trained.”

As a result, OSHA promulgated the “Occupational Exposures to Hazardous Chemicals in Laboratories” rule commonly known as the Laboratory Standard. The effective date of the standard, 29 CFR 1910.1450, was May 1, 1990. As part of that standard, laboratories are required to develop and implement a Chemical Hygiene Plan.

This Chemical Hygiene Plan describes Einstein’s program, including, but not limited to, personal protective equipment, control equipment (such as vented hoods), employee training programs, medical programs, and safety inspections relating to the use of hazardous chemicals in our laboratories. The Chemical Hygiene Plan is supplemented by safety procedural notes included in test methods used (examples: ASTM, EPA Test Methods, or Standard Methods...). The Chemical Hygiene Plan is designed as a tool to coordinate safety procedures. The Principal Investigators/ Supervisors establish laboratory procedures. The Department of Environmental Health and Safety and the Chemical Hazards and Storage Committee review and evaluate those procedures. Every employee in the laboratory must be trained in the applicable details of this plan. The Principal Investigators/Supervisors must ensure that each employee is trained to their specific laboratory procedure and that proper safety procedures are followed.

II. Scope

This Plan applies to all faculty, staff, and employees of Einstein.

III. Plan

III.A. Responsibilities

It is the responsibility of the principal investigator/supervisor to ensure that the goals and conditions of the Chemical Hygiene Plan are strictly followed by all employees under their supervision. It is the employee's responsibility to incorporate the practices and requirements outlined in the Chemical Hygiene Plan into their daily activities. It is the responsibility of the Department of Environmental Health and Safety (EH&S) to administer the college-wide Chemical Hygiene Plan.

III.A.1. Industrial Hygienist/Chemical Hygiene Officer/Safety Specialist/Laboratory Safety Officer/Fire Safety Officer

1. Develops and updates the Chemical Hygiene Plan and appropriate policies and practices.
2. Provides technical assistance in complying with the Chemical Hygiene Plan and answers safety questions for employees.
3. Assists Investigators/Supervisors in developing appropriate safety precautions for new projects and procedures in conjunction with the Institutional Chemical Hazards and Storage Committee.
4. Ensures that employees comply with the Chemical Hygiene Plan.
5. Ensures that appropriate personal protective equipment is available as needed.
6. Monitors proper functioning of engineering controls such as fume hoods and arranges for prompt repairs as needed.
7. Performs workplace inspections.
8. Gathers and maintains manufacturers' Safety Data Sheets (formerly Material Safety Data Sheets or electronic MSDSs.)
9. Develops and implements a labeling program consistent with the global harmonization system of classification and labeling of chemicals (GHS).
10. Responds to exposure complaints.
11. Monitors chemical exposure of employees.

III.A.2. Laboratory Safety Officer

1. Monitors procurement of new chemicals.
2. Monitors collection and disposal of chemical wastes.
3. Reviews chemical inventory to determine which chemicals are carcinogens.
4. Conducts laboratory inspections.
5. Reviews Research Grant Applications.

III.A.3. Fire Safety Officer

1. Assures fire safety in all buildings.
2. Conducts building and laboratory inspections.

III.A.4. Senior Director of Environmental Health and Safety

1. Remains current on developing regulations concerning chemicals used at Einstein.
2. Oversees the Industrial Hygiene, Safety Specialist, Laboratory Safety, and Fire Safety positions.

III.A.5. Occupational Health Services

1. Responds to medical conditions relating to occupational exposure.
2. Conducts Medical Monitoring of employees.

III.A.6. Responsibilities of Each Employee Working with Hazardous Chemicals

Each employee and student is responsible for knowing how to handle a hazardous chemical safely according to its type of hazards. If there is any uncertainty concerning a chemical's hazard or its safe handling, it is the employee's responsibility to ask a supervisor or a health and safety professional. Each employee is also responsible for ensuring that all chemicals are correctly labeled.

III.A.7. Chemical Hygiene Plan Contacts

Industrial Hygienist/Chemical Hygiene Officer		
Safety Specialist		
Laboratory Safety Officer		
Senior Director of Environmental Health and Safety		
Fire Safety Officer		
Occupational Health Services		

III.B. Chemical Hygiene and Safety Plan Procedures and Practices

III.B.1. Standard Operating Procedures

The Standard Operating Procedures are fundamental safety precautions which must be familiar to all employees. These practices must be followed at all times.

III.B.1(a) General Rules

1. Awareness is the most fundamental rule of chemical safety. Everyone should remain constantly aware of:
 - a. The chemical's hazard, as determined from the bottle label, SDS (formerly MSDS), principal investigator/supervisor, and other appropriate references.
 - b. Safeguards for using that chemical, including personal protective equipment and engineering controls.
 - c. Location and proper use of emergency equipment.
 - d. How and where to properly store the chemical when not in use. (Remember: The chemical is used for only minutes in the average workday. The remainder of the time, it is being stored on the laboratory shelf, bench top or in the appropriate storage cabinet)
 - e. Proper personal hygiene practices.
 - f. The proper methods of transporting chemicals within the facility.
 - g. Appropriate procedures for emergencies including evacuation routes, spill cleanup procedures, and proper waste disposal.

- h. For a laboratory to operate, at minimum, one person must possess a Certificate of Fitness, Supervising non-production chemical laboratories (C-14) at all times.
2. Prudent practice dictates that one should not work alone in the laboratory. If solitary work is necessary, inform someone else of your location.

III.B.1(b) General Practices for Using Hazardous Chemicals

1. Order the correct amount of a chemical. Excessive amounts of hazardous chemicals create storage, use, and disposal problems.
2. Wear the appropriate personal protective equipment (e.g., laboratory coat, gloves, goggles, disposable sleeves, and shoes).
3. Weigh or measure hazardous chemicals in the chemical fume hood.
4. Clearly label all secondary containers and store in a ventilated storage cabinet.
5. Procedures which may generate aerosols or vapor must be conducted in the chemical fume hood.
6. Collect hazardous waste in a labeled container and transfer to the designated storage area.
7. Wash hands thoroughly after chemical use and when you leave the laboratory.
8. In the event of personal contamination or a spill, contact your supervisor and/or instructor and notify EH&S.
9. Review procedures with the research supervisor whenever there are any changes in operation or results.
10. Wash work surface after each use.
11. Be aware of the safety hazards of the chemicals in your workplace. Know the proper emergency procedures.

III.B.1(c) General Chemical Transportation Procedures

1. Chemicals are transported in original packaging from the manufacturers directly to the laboratories in the approved transport packaging.
2. Chemicals cannot be transported in personal vehicles.

III.B.1(d) Personal Hygiene

Personal hygiene is an important factor in safety. Proper protection can eliminate a chemical's ability to do harm. Use the following personal hygiene practices:

1. Wash promptly with soap and water for at least 15 minutes if skin contact is made with any chemical.
2. Wear appropriate eye protection at all times.
3. Avoid inhalation of chemicals; do not "sniff" known or unknown chemicals.
4. Do not mouth pipette; use suction bulbs or other mechanical pipettes.
5. Wash well with soap and water before leaving the laboratory.
6. Change clothing as soon as possible after leaving the laboratory. Launder work clothes separately.
7. Do not eat, smoke, or apply cosmetics in laboratories or storage areas.
8. Do not wear gloves outside the laboratory.

III.B.1(e) Food and Smoking

1. Food, drink, and especially tobacco, absorb chemical vapors and gases from the air. Do not bring food, beverages, or tobacco products into areas where chemicals are used or into chemical storage areas.
2. No smoking is permitted in any laboratory area.

III.B.1(f) Protective Clothing and Equipment

1. Most personal protective equipment is provided by Einstein to employees when necessary. It is the responsibility of each employee and Principal Investigator/Supervisor to be certain that the appropriate equipment is worn.
2. Clothing should be worn to minimize exposed skin surfaces to prevent direct contact through splashing. All employees should wear long sleeved/long legged clothing and avoid skirts and sandals.
3. Additional equipment is available through your supervisor and/or EH&S including:
 - a. Eye wear
 - b. Lab coats
 - c. Gloves
 - d. Aprons
 - e. Face Shields
 - f. Respirators
4. The proper uses and maintenance of the equipment is discussed in Section III.B.4, General Control Measures and Equipment.

III.B.1(g) Housekeeping

1. Common housekeeping practices contribute greatly towards chemical hygiene and safety. Some appropriate housekeeping measures:
 - a. Keep all aisles, hallways, and stairs clear of all chemicals and debris.
 - b. Keep all work areas clear of clutter and obstructions.
 - c. Keep all working surfaces and floors cleaned.
 - d. Never block access to emergency equipment, showers, eyewashes and exits.
 - e. Keep waste in the proper closed containers and labeled correctly.
2. The typical housekeeping staff is not trained on the hazards of individual laboratory chemicals. For the safety of the housekeeping staff, laboratory workers should ensure that:
 - a. Chemicals are placed in the proper storage areas.
 - b. Chemical containers are labeled with both the identity of the chemical and its hazards.
 - c. Secondary chemical containers are properly labeled with the identity of the chemical and its hazards.
 - d. Spills are promptly cleaned up by lab personnel or EH&S (if the spill is large), and the waste is properly disposed. Notify EH&S about any spills.

III.B.1(h) Guidelines for New Procedures

1. It is the responsibility of the principal investigator/supervisor to inform his/her employees and EH&S when there are changes in laboratory procedures or practices which may create an environmental or occupational health hazard.
2. EH&S must be notified whenever:
 - a. There is a failure of any safety equipment such as fume hoods.
 - b. There is a change in the type of hazardous chemical used.
 - c. Where members of the laboratory staff suspect exposure to a chemical.
3. Any new procedure should be subjected to peer review, not only from a scientific standpoint, but also to ensure that all safety considerations are in place prior to implementation. The Institutional Chemical Hazards and Storage Committee and EH&S are available for assistance. The appropriate time for this review is when a grant application for a specific research project is being submitted. See EH&S for the appropriate research project evaluation form.

III.B.1(i) Hazardous Waste

1. Hazardous wastes are regulated by the U.S. Environmental Protection Agency under the Resource Conservation and Recovery Act and its amendments. In N.Y.S., this responsibility is turned over to the N.Y.S. Department of Environmental Conservation.
2. All employees should be advised by their supervisor on how to handle hazardous wastes. EH&S will assist you in chemical disposal.
3. Hazardous wastes shall NOT be disposed down the sink drain.
4. Waste containers must be properly labeled.

III.B.2. Specific Safety Procedures

Written laboratory procedures can be obtained from the principal investigator/supervisor in each area. EH&S and the Institutional Chemical Hazards and Storage Committee can assist you in reviewing laboratory procedures.

III.B.2(a) Working with Allergens and Reproductive Toxins

Review each use of these materials with the principal investigator/supervisor. Review continuing use annually or whenever a procedural change is made. Store these properly-labeled substances, in an unbreakable secondary container in an adequately-ventilated area. Notify supervisors of all incidents of exposure or spills; consult a qualified physician when appropriate.

1. Allergens - (examples: diazomethane, isocyanates, bichromates) Wear suitable gloves to prevent hand contact with allergens or substances of unknown allergenic activity.
2. Reproductive toxins - (examples: DES, organomercurials, lead compounds, formamide). If you are a woman of childbearing age, handle these substances only in a hood whose satisfactory performance has been confirmed, using appropriate protective apparel (especially gloves and lab coat) to prevent skin contact.

III.B.2(b) Requirements for Work with Select Agent Toxins

Select Agent Toxins are biologically derived toxic chemicals that are specifically regulated by the federal U.S. Department of Health and Human services under regulation 42 CFR Part 73 when handled at levels above the specific quantities listed in the chart below. The following table provides the toxins and the limitations for working with each toxin. For any research requiring purchase, storage, or use of more than the quantities listed in this table, the researcher must apply for a license to the Center for Disease Control (CDC) and must be approved by the Institutional Biosafety Committee (IBC).

TOXIN	Max Allowed
Abrin	100 mg
Botulinum neurotoxin	0.5 mg
Clostridium perfringens epsilon toxin	100 mg
Conotoxins	100 mg
Diacetoxyscirpenol (DAS)	1000 mg
Ricin	100 mg
Saxitoxin	100 mg
Shigatoxin and Shiga-like ribosome inactivating proteins	100 mg
Staphylococcus enterotoxins	5 mg
Tetrodotoxin	100 mg
T-2 Toxin	1000 mg

These materials are highly toxic and special precautions must be taken whenever handling concentrated forms, even in small amounts. Regulatory exempt quantities of these stock toxins should be stored under lock and key. A log must be maintained that tracks the use of these materials. Researchers wanting to work with these materials should contact the Department of Environmental Health and Safety for more information.

The laboratory facilities, equipment, and procedures appropriate for work with toxins of biological origin must reflect the intrinsic level of hazard posed by a particular toxin as well as the potential risks inherent in the operation performed. This is called a risk assessment. If both toxins and infectious agents are used, both must be considered when containment equipment is selected, and policies and procedures are written. If animals are used, animal safety practices must also be considered.

Access to areas containing toxins must be restricted to those individuals whose work require access. Preparation of primary containers of toxin stock solutions and manipulations of primary containers of dry forms of toxins should be conducted in a chemical fume hood or a biological safety cabinet. HEPA and/or charcoal filtration of the exhaust air may be required or some other form of tapping mechanism, depending on the toxin.

Any special entry requirements must be posted on the entrance(s) to the room. Only personnel whose presence is required must be permitted in the room while toxins are in use. All high-risk operations must be conducted with two knowledgeable individuals present. Each must be familiar with the applicable procedures, maintain visual contact with the other, and be ready to assist in the event of an accident.

Before containers are removed from the hood, the exterior of the closed primary container must be decontaminated and placed in a clean, secondary container. Toxins must be transported only in leak/spill-proof secondary containers. Contaminated and potentially contaminated protective clothing and equipment must be decontaminated using methods known to be effective against the toxin before removal from the laboratory for disposal, cleaning, or repair. Contaminated materials must be autoclaved or otherwise rendered non-infectious before leaving the laboratory. The interior of the hood must be decontaminated periodically.

PPE must be worn when handling toxins. PPE must include gloves and a disposable long-sleeved body covering (gown, laboratory coat, smock, coverall, or similar garment) must be worn so that hands and arms are completely covered. Eye protection should be worn if there is a risk of ocular exposure.

III.B.2(c) Working with Chemicals of Moderate Chronic or High Acute Toxicity

Examples: diisopropylfluorophosphate, hydrofluoric acid, cyanide, azidotrimethylsilane.

1. General Procedures

- a. Always work with chemicals in an operational fume hood.
- b. At least two people must be present at all times if the compound in use is highly toxic or of unknown toxicity.
- c. Store breakable containers of these substances in chemically resistant trays.
- d. Always wash hands and arms, with soap and water, immediately after working with these materials.
- e. Be prepared for accidents and spills. If a major spill occurs outside the hood, call EH&S.

2. Personal Protection

- a. Always use the appropriate glove type, wear long sleeve shirts and a lab coat. Check the glove compatibility guide for each chemical. Be aware that no one glove type provides protection against all chemicals.
- b. Use appropriate eye protection such as safety glasses, goggles, and face shields.

3. Waste

- a. For complete information on waste disposal, please refer to the Waste Disposal Guidelines.
- b. Store contaminated waste in closed, suitably labeled, impervious containers.
- c. Label all waste with a hazardous waste label. Include the chemical name, amount, and date of accumulation.
- d. Record - Maintain inventory records.

III.B.2(d) Working with Chemicals of High Chronic Toxicity

Examples: dimethylmercury, nickel carbonyl, benzo-a-pyrene, nitrosodiethylamine, or substances with high carcinogenic potency in animals.

For work with substances of known high chronic toxicity in quantities above a few milligrams to a few grams, depending on the substance:

1. Work with these substances must be under the supervision of the area principal investigator/supervisor. Approvals for projects may be obtained from the Institutional Chemical Hazards and Storage Committee or EH&S.
2. Conduct all transfers and work in a posted operational fume hood or glove box. People in the area must be aware of the substances being used and the necessary precautions to be taken. Laboratories where the above chemicals are used are considered controlled areas.
3. Non-Contamination/Decontamination: To protect vacuum pumps from contamination use scrubbers or HEPA filters and vent them into the hood. Decontaminate vacuum pumps or other contaminated equipment in the hood before removing them from the controlled area. Decontaminate any contaminated equipment in the controlled area before normal work is resumed.
4. Exiting: On leaving a controlled area, remove any protective apparel; wash hands, forearms, face, and neck.
5. Mechanical surveillance: If using toxicologically significant quantities of a substance on a regular basis, consult with the Institutional Chemical Hazards and Storage Committee, EH&S, your Principal Investigator/Supervisor or Occupational Health Service concerning the desirability of regular medical surveillance.
6. Work area should be appropriately posted and all containers properly labeled.
7. Spills: Immediately notify EH&S.
8. Storage: Store containers of these chemicals in a ventilated, limited access area. Use appropriately labeled, unbreakable, chemically resistant, containers.
9. Glove boxes: For a negative pressure glove box, the ventilation rate must be, at least, 2 volume changes/hour and pressure at least 0.5 inches of water. For a positive pressure glove box, thoroughly check for leaks before each use. In either case, trap the exit gases or filter them through a HEPA filter and then release them into the hood.
10. Waste: Arrange for EH&S to remove this waste.
11. Check compatibility before mixing chemicals.

III.B.2(e) Animal Work with Chemicals of High Chronic Toxicity

1. Access: For large scale studies, special facilities with restricted access are preferable.
2. Administration: When possible, administer the substance by injection or lavage instead of in the diet. If administration is in the diet, use a caging system under negative pressure or under laminar air flow directed toward HEPA filters.
3. Aerosol suppression: Devise procedures which minimize formation and dispersal of contaminated aerosols, including those from food, urine, and feces. Use HEPA filtered vacuum equipment for cleaning, moisten contaminated bedding before removal from the cage, mix diets in closed containers in a hood.
4. Personal protection: When working in the animal room, wear plastic or rubber gloves, fully buttoned laboratory coat or jumpsuit, and other necessary equipment.
5. Waste disposal: Dispose of contaminated animal tissues and excreta as pathological waste for incineration. Consult with the Waste Disposal Guidelines if you have any questions.

III.B.3. Special Procedures for Carcinogens

III.B.3(a) Background

OSHA has noted that many laboratory workers use known or suspected carcinogens. Exposures to multiple carcinogens can have synergistic effects on health. To limit possible exposures, there are special procedures and precautions for work with carcinogens.

III.B.3(b) Regulated and Controlled Work Areas

1. Special work areas are designated for work with carcinogens.
2. These rooms, including storage areas for chemical carcinogens, will have restricted access.
3. Signs warning “Authorized Personnel Only” will be posted at entrances to these work areas, and if necessary, these areas will be locked.
4. Only personnel with special instruction on the hazards and safe handling of carcinogens will be permitted access to the areas.
5. The rooms where carcinogens are used and stored should be kept at a slight negative pressure when compared to the rest of the rooms.

III.B.3(c) Closed System Protection

All work involving carcinogens must be done in specially equipped closed systems to reduce the risk of employee exposure to the vapors. Closed systems include fume hoods, glove boxes or similar devices.

III.B.3(d) Handling of Contaminated Waste

Rinse-water and other waste waters contaminated with carcinogens are to be collected and labeled for disposal.

III.B.3(e) Personal Hygiene

Laboratory workers using carcinogens shall take extra precautions in maintaining good personal hygiene. Refer to good hygiene practices in Section III.B.

III.B.3(f) Protection of Vacuum Systems

1. To protect vacuum lines and pumps, HEPA filters or High Efficiency Scrubber systems should be used if carcinogens are present.
2. The central vacuum system is not intended and must not be used to eliminate chemical waste. Improper use of the system may result in reduced service life of the system and increases maintenance costs.

III.B.3(g) Personal Protective Equipment

1. Any person working in restricted areas should not wear any personal items which might be lost if decontamination is not possible.
2. Disposable clothing should be used whenever possible.
3. Gloves and long sleeves should be used at all times to prevent skin contact.

4. Use appropriate eye protection such as safety glasses, goggles, and face shields.
5. Hair should be secured to prevent contamination.

III.B.3(h) Additional Precautions

Work with carcinogens should be performed with the smallest quantities possible. This will decrease disposal costs, storage problems, and minimize risks.

III.B.4. General Control Measures and Equipment

Chemical safety is accomplished through awareness of the chemical hazards and by keeping the chemical under control through a variety of engineered safeguards.

1. Laboratory personnel should be familiar with the proper use of all safeguards.
2. Laboratory supervisors and employees should be able to detect the malfunction of all safeguards.
3. All engineering controls must be properly maintained, inspected on a regular basis, and used within their design limits.

III.B.4(a) Fume Hoods

Work done with chemicals with low PELs or high vapor pressures should be done in a fume hood. The fume hood should provide 80 to 120 linear feet per minute of air flow at the face of the hood at a 12-inch sash height. When using a fume hood, the worker should be aware of the following:

1. Sashes should be at most 12 inches from the base at all times except when adjusting the apparatus inside.
2. Equipment inside the hood should be kept towards the rear of the hood to prevent vapors from escaping.
3. Hoods are not storage areas.
4. The vent ducts and fans must be kept clean and clear of obstructions.
5. The hood must remain “on” at all times when a chemical is inside the hood.
6. Personnel should be aware of emergency response procedures in the event of a hood failure.
7. Inspections are performed periodically to assure proper hood function.

III.B.4(b) Bunsen Burners or Open Flames

Open flames in a laboratory must always be avoided. This is especially important when flammables are present. The College prohibits the use of open flames when flammables are being used. Bunsen burners should not be used in biosafety cabinets since this combination may increase the potential for explosion when flammables are present.

If there is a spill of a flammable chemical in the laboratory, all open flames must be extinguished.

III.B.4(c) Safety Cans

Flammable liquids should be kept in safety cans. These cans should be handled according to manufacturer’s instructions and common safety practices.

1. The can must be kept closed except when adding or removing liquid.
2. The flame arrester screen must be kept in place at all times and replaced if punctured or damaged.
3. Chemicals in safety cans must be kept in storage areas and not in laboratory work areas, hallways, or on the floor.
4. All flammables must be protected against sources of ignition.

III.B.4(d) Flammable Storage Cabinets

Cabinets designed for the safe storage of flammable chemicals can only do so if used and maintained properly. Always read the manufacturer's information and follow prudent safety practices.

1. Store only compatible materials inside the cabinet.
2. Store chemicals of similar vapor density together when using mechanical ventilation (e.g., heavier than air vapors are vented through the bottom vent and lighter than air vapors through the top vent).
3. Do not store paper or cardboard inside cabinets.
4. Do not overload the cabinet.

III.B.4(e) Corrosive Storage Cabinets

All corrosive chemicals should be kept in specially designed cabinets. Care must be taken to separate acids from bases by distance or barriers.

III.B.4(f) Eyewashes and Safety Showers

Whenever chemicals have the possibility of damaging the skin or eyes, an emergency supply of water must be available. All laboratories must have access to eyewashes and safety showers or sink dowsers.

NOTE THE LOCATION OF THE SAFETY EQUIPMENT IN YOUR AREA BEFORE AN EMERGENCY OCCURS.

Be aware of the following:

1. Keep all passageways to the eyewash and shower clear of any obstacles.
2. Eyewashes and Showers should be checked routinely to assure proper flow.

III.B.4(g) Personal Protective Equipment (PPE)

For more information on PPE please refer to the "Personal Protective Equipment Guidelines."

1. Gloves - Must be of a material compatible with the chemicals used. Gloves should be inflated (by whipping it in air, not by mouth inflation) to check its integrity before each use.
2. Safety glasses - Should only be used when working with solid materials. Glasses should not be used with liquid chemicals.
3. Goggles and Face Shield - Must be used when working with hazardous chemicals, corrosives, and hot chemicals. The goggles protect the eyes in case of a splash from the side or beneath the shield.
4. Laboratory Coat - Long sleeved coats offer the wearer minimal skin protection against minor splashes.

5. Laboratory Coat and Apron - Rubberized aprons offer additional protection from splashes. Arm guards should be worn when using an apron.
6. Street clothing such as long-sleeved shirts, pants, and closed shoes are also important components to personal protective equipment.

III.B.4(h) Respirators

Respirators are required if the levels of a contaminant in the air exceeds the OSHA permissible exposure limit (PEL). If administrative and engineering controls are inadequate to maintain the concentration below these levels, the employer will implement Einstein's Respiratory Protection Program in accordance with 29 CFR 1910.134. The written respirator program discusses such issues as respirator selection, inspection, maintenance, and proper fit. All personnel using respirators must be trained in the proper use and care of a respirator. Medical surveillance is also required. For more detailed discussion of respirator use and selection, see Einstein's "Respiratory Protection Policy."

III.B.4(i) Odor Detection

If suspicious odors are noticed, the investigators should contact EH&S for assistance.

III.B.5. Emergency Procedures

III.B.5(a) Spills and Accidents

1. Spills of toxic substances or accidents involving any hazardous chemical should be resolved immediately, according to Einstein's written Emergency and Contingency Plan. The overall steps of handling an accident are as follows:
 - a. Notify your Principal Investigator/Supervisor and EH&S.
 - b. If spilled chemical is flammable, eliminate all nearby sources of ignition.
 - c. If a person has been splashed with a chemical, wash the affected area with water for at least 15 minutes, remove all contaminated clothing and seek medical attention immediately.
2. There are some fundamental actions that must NOT be used in handling emergencies. Some of them include:
 - a. DO NOT force any liquids into the mouth of an unconscious person.
 - b. DO NOT handle emergencies alone, especially without notifying someone that the accident has occurred.
 - c. DO NOT apply medical aid procedures without training in that area. If you are not trained in first aid, get medical direction before proceeding.
 - d. DO NOT linger at the accident scene if you are not one of the emergency responders.

III.B.5(b) Fire Emergencies

1. If you smell smoke, dial Security, Operations, or EH&S.
2. If you see smoke or fire:
 - a. Activate nearest fire alarm and call Security at 4111.
 - b. Advise the operator of the specific location of the fire.
 - c. Alert coworkers and remove any incapacitated person who may be in danger.

- d. If possible, close windows and doors to fire area.
- e. If the fire is small and controllable, you can attempt to confine and extinguish it with one of the available extinguishers. If you feel the fire is beyond your capacity, do not attempt to extinguish it. Close the door to the room or area involved.
- f. Evacuate floor via stairs. DO NOT USE THE ELEVATORS.

III.C. Criteria for Control Measures

This section examines criteria and guidelines to determine whether the use of engineering controls and personal protective equipment are needed.

III.C.1. Exposure Guidelines

All hazardous chemicals must be used in an operating fume hood. The following parameters can be used to determine the proper safety precautions such as engineering controls or the need for respiratory protection:

1. Threshold Limits Values (TLV) or Permissible Exposure Limits (PEL).
2. Lethal Dosage (LD) information.
3. Vapor pressure.

III.C.2. Fire Guidelines

The following parameters will be used to determine the proper fire safety precautions:

1. Flash point - The lowest temperature at which an ignition source can cause the chemical vapor to ignite.
2. Flammable - Any chemical with a flash point below 100° F.
3. Combustible - Any chemical with a flash point between 100° F and 140° F.

A detailed discussion of fire hazards can be found in OSHA's regulations 29 Code of Federal Regulations 1910 and the New York City Fire Code. Contact Einstein's Fire Safety Officer for additional information.

III.C.3. Reactivity Guidelines

Once a chemical has been determined to be reactive, all proper safety precautions will be used including extra segregation in storage and prohibition on mixing with other chemicals without appropriate personal protection and precautions. At Einstein, a reactive chemical is any one of the following:

1. Ranked by the National Fire Protection Association (NFPA) as a three (3) or four (4) for reactivity.
2. Determined by the U.S. D.O.T. as either:
 - a. An oxidizer
 - b. An organic peroxide
 - c. An explosive (Classes A, B, or C)
3. Fits the U.S. EPA definition of reactive in 40 CFR 261.
4. Fits the OSHA definitions of unstable, or polymerizable.

5. Is found to be reactive with ordinary substances.

III.C.4. Guidelines for Work with Corrosives

Einstein will consider a chemical corrosive if it fits the definition of corrosive found in any of the following regulations:

1. OSHA (29 CFR) - Any chemical that causes visible destruction of, or irreversible alteration in, living tissue by chemical action at the site of contact.
2. DOT (49 CFR) - Any chemical which destroys or changes, irreversibly, the structure of the tissue at the site of contact following an exposure period of four hours.
3. Any aqueous solution that has a pH less than or equal to 2 or greater than or equal to 12.5.

III.D. Exposure Evaluations and Medical Consultations

III.D.1. Suspected Exposures to Toxic Substances

When an employee suspects that he/she has been exposed to a toxic substance in the laboratory, it must be immediately reported to the area supervisor and EH&S. Einstein will investigate all reasonable suspicions or complaints regarding possible chemical exposure.

III.D.1(a) Examples of Suspicions of Exposure

There are many signs that a chemical exposure may have taken place. The following list includes only a few examples of these signs.

1. Victim has had direct body, skin, or eye contact with a chemical substance.
2. Chemical odor is detected while there is nearby work with a hazardous chemical.
3. Symptoms of headache, rash, nausea, coughing, tearing, irritation or redness of eyes, irritation of nose or throat, dizziness, loss of motor dexterity or judgment which resembles drunkenness occur.
4. Some or all symptoms disappear when the person is taken away from chemical area and into fresh air. Previous symptoms reappear soon after a person starts working with the same chemicals.
5. Complaints are received from more than one person in the same work area.

III.D.2. Exposure Evaluation

When a complaint of possible hazardous chemical exposure has been received, it should be documented in a short memorandum or incident report along with the decision of appropriate action. If it was decided that no further evaluation of the event is necessary, the reason for that decision should be included in the document. If a decision is made that the complaint should be investigated further, then a formal exposure evaluation will commence.

III.D.2(a) Steps of exposure Evaluation

Exposure evaluation will be determined by EH&S. The purpose of the exposure evaluation is to determine if any exposure has taken place, not to assign blame. The steps in the Exposure Evaluation process include, but are not limited to:

1. Interviewing the affected individual.
2. Listing essential information about the circumstances of the complaint including
 - a. Chemicals in question.
 - b. Other chemicals being used or stored in the immediate area.
 - c. Relevant health symptoms.
 - d. Use of administrative, engineering, and personal protective control measures.
3. Determining appropriate action through:
 - a. Air sampling of the area for suspect chemicals.
 - b. Determining how the symptoms compare to the information on the SDS (formerly MSDS).
 - c. Deciding whether to send victim for medical evaluation.
 - d. Reviewing of the adequacies of present control measures and safety procedures.
4. As the need requires, we may call in an outside consulting firm to assist in the exposure evaluation.
5. The employee will be notified of the results of the evaluation within reasonable period of time.

III.D.3. Medical Consultation and Examination

1. Einstein will provide any employee who works with hazardous chemicals the opportunity to receive emergency medical attention including any physician directed follow-up examinations under the following conditions:
 - a. The employee develops signs or symptoms associated with a hazardous chemical to which the employee may have been exposed in the laboratory.
 - b. Exposure monitoring reveals levels of a regulated substance above the action level or PEL.
 - c. An event such as a spill, leak explosion or other occurrences resulting in the likelihood of a hazardous exposure.
2. All medical evaluations will be provided to the physician.
3. All appropriate information will be provided to the physician.
4. The physician will provide a written evaluation to the employee. This information shall not reveal any findings unrelated to occupational exposure. It shall include the following items:
 - a. Any recommendations for further medical follow-up.
 - b. The results of the examination.
 - c. Any medical condition which may pose an increased risk to the employee as a result of the hazardous chemicals found in the work place.
 - d. A statement that the employee has been informed of all the appropriate findings of the examination.

III.D.4. Documentation

All memos, notes, and reports related to a complaint of possible exposure to toxic substances must be maintained in a file for easy retrieval with cross-reference in the victim file. For more on reports and record keeping, see Section III.F.

III.E. Employee Information and Training

III.E.1. Information Requirements

1. OSHA has required that employees be informed of:

2. The existence, location and availability of the Chemical Hygiene Plan.
3. 29 CFR 1910.1450, and its appendices
4. The criteria to select and use personal protective equipment.
5. The availability of exposure limits information, including TLVs and PELs.
6. The location of reference material including SDSs (formerly MSDSs)

III.E.2. Dissemination of Information

1. Einstein uses many methods to distribute information to its employees including:
2. Formal training
3. Informal discussion groups
4. Individual discussions groups
5. Posted notices
6. Handout booklets and digital media
7. Web site
8. SDS (formerly MSDS) web site

III.E.3. Training Under 29 CFR 1910.1450

Training under 29 CFR 1910.1450 must include the following:

1. Methods and observations used to detect the presence or release of hazardous chemicals such as:
 - a. Monitoring conduct by the employer.
 - b. Continuous monitoring devices.
 - c. Visual appearance or odor of hazardous chemicals.
2. The physical and health hazards of chemicals in the work area.
3. Einstein policies implemented to protect employees from exposure to hazardous chemicals.
 - a. Appropriate work practice
 - b. Emergency procedures.
 - c. Personal protective equipment.
4. Details of Einstein's written Chemical Hygiene Plan.

7.3 Evaluating the Training's Effectiveness

The training program will be evaluated periodically to determine its effectiveness and improvements will be made if necessary.

III.F. Records and Record Keeping

III.F.1. Records

1. In the event of lost time resulting from and exposure or accident on the job, the OSHA 300 form is used to document lost workdays from incidents that occur at work.
2. Einstein maintains various records pertaining to employee safety including:
 - a. Employees exposure complaints.
 - b. Exposure evaluation results and reports.
 - c. Control system records.

- d. Accident/injury reports.
- e. Training records
- f. Hazardous waste records
- g. Medical records.

III.F.2. Recordkeeping

Since many diseases will not manifest symptoms for an extended amount of time, it is important to maintain medical records to ensure accurate accounting of employee exposures. Most medical records are kept for 30 years after the end of employment. Exceptions can be found in the general safety and health provisions of 29 CFR 1910.1020 under “Access to employee exposure and medical records.”

Every employee has the right to access their medical records. These records can be obtained by contacting Occupational Health Services.

III.G. Evaluating the Chemical Hygiene Program’s Effectiveness

To ensure the chemical hygiene program is accomplishing its stated goals, several reviews shall be undertaken on periodic intervals including:

- 1. Documentation of training.
- 2. Initial and refresher training tests.
- 3. Laboratory inspection.
- 4. Review and update the written plan.
- 5. Work place contaminant monitoring.
- 6. Communication with Einstein laboratory community.
- 7. Participating in various safety committees.

III.H. Summary of OSHA’s Laboratory Standard

III.H.1. Scope and Application

- 1. Applies to all employers whose laboratories use hazardous chemicals.
- 2. Where this section applies, it shall supersede, for laboratories, the requirements of all other OSHA health standards in 29 CFR Part 1910, Subpart Z, except as follows:
 - a. Prohibition of eye and skin contact where specified by any OSHA health standard shall be observed.
 - b. For any OSHA health standard, only the requirement to limit employee exposure to the specific permissible exposure limit shall apply for laboratories.
 - c. Where the action level or the PEL is routinely exceeded for an OSHA regulated substance, the monitoring and medical surveillance sections of the standard will apply.

III.H.2. Permissible Exposure Limits

Einstein will ensure that exposures to regulated substances do not exceed the PELs.

III.H.3. Employee Exposure Determination

Background monitoring for contaminants will be performed as needed to assure that levels remain below recommended standards. If there is reason to believe that these levels routinely exceed that action level for an OSHA designated chemical, the following monitoring schedule will apply:

1. Initial Monitoring-The employer shall measure an employee's exposure to any substance regulated by standard which requires monitoring.
2. Periodic Monitoring-If initial monitoring indicates employee exposure above the PEL or action level, the employer shall immediately comply with the monitoring provisions of the relevant standard.
3. Termination of Monitoring-The employer may terminate monitoring in accordance with the relevant standard.
4. Notification-The employee must be notified of the results of the monitoring within 15 days of the employer's receipt of the results.

III.H.4. Chemical Hygiene Plan

1. Where hazardous chemicals are used in the workplace, the employer shall develop and carry out the provisions of a Chemical Hygiene Plan, the goal of which is:
 - a. To protect employees from health hazards associated with hazardous chemicals in the laboratory.
 - b. To keep the exposures below the action level or PEL.
2. The Chemical Hygiene Plan must be readily accessible to employees.
3. The Chemical Hygiene Plan shall include each of the following elements:
 - a. Specific measures the employer will take to ensure laboratory employee protection.
 - b. Standard operating procedures relevant to safety and health.
 - c. Criteria which the employer will use to reduce employee exposure to hazardous chemicals.
 - d. A provision that fume hoods and other protective equipment function properly.
 - e. Methods to ensure proper and adequate performance of the equipment.
 - f. Provisions for employee training and information.
 - g. Circumstances requiring prior approval from the employer or his designee before implementation.
 - h. Provisions for medical consultation and examination.
 - i. Designation of personnel responsible for implementation of the Chemical Hygiene Plan.
 - j. Provisions for additional protection for employees working with particularly hazardous substances including select carcinogens, reproductive toxins and substances with a high degree of acute toxicity. Specific consideration shall be given to the following, where appropriate:
 - i. Establishment of a designated area.
 - ii. Use of containment devices such as fume hoods or glove boxes.
 - iii. Procedures for safe removal of contaminated waste.
 - iv. Decontamination procedure.
4. The employer shall review and update the plan at least annually.

III.H.5. Employee Information and Training

1. The employer shall provide employees with information and training to ensure that they are informed of the hazards of chemicals in their work area.

2. Information and training shall be provided at the time of an employee's initial assignment where hazardous chemicals are present, and prior to assignments involving new exposure hazards.
3. Information will be made available concerning:
 - a. The contents of this standard and its appendices.
 - b. The location and availability of the Chemical Hygiene Plan
 - c. The PEL for OSHA-regulated substances or recommended Exposure Limits for other hazardous chemicals where PELs do not exist.
 - d. Signs and symptoms associated with exposures to the hazardous chemicals used in the laboratory.
 - e. The location and availability of know reference materials including SDSs (formerly MSDSs).
4. Employee training shall include:
 - a. Methods and observations to detect the presence or release of hazardous chemicals.
 - b. The physical and health hazards of chemicals in the work place.
 - c. Hazard avoidance measures such as:
 - i. Appropriate work practices.
 - ii. Emergency procedures.
 - iii. Personal protective equipment.

III.H.6. Medical Consultation and Medical Examinations

1. The employer shall provide all employees who work with hazardous chemicals an opportunity to receive emergency medical attention under the following circumstances:
 - a. The employee develops signs or symptoms associated with a hazardous chemical exposure.
 - b. Monitoring reveals exposure routinely above the PEL or action level.
 - c. An event takes place in the work area such as a spill, leak explosion or other occurrence resulting in the likelihood of a hazardous exposure.
2. All medical examinations and consultations shall be performed by licensed physician or under his/her direct supervision.
3. The employer shall provide the following information to the physician:
 - a. The identity of the hazardous chemicals to which the employee may have been exposed.
 - b. A description of the conditions under which the exposure occurred.
 - c. A description of any signs and symptoms of exposure employee is experiencing.
4. D. The written opinion shall not reveal specific findings of diagnoses unrelated to occupational exposure. The physician's written opinion should include:
 - a. Any recommendation for further medical follow-up.
 - b. The results of the examination and any associated tests.
 - c. Any medical condition which may be revealed in the course of the examination which may place the employee at increased risk.
 - d. A statement that the employee has been informed by the physician of the results of the examination and any medical condition that may require further examination or treatment.

III.H.7. Hazard Identification

1. Labels and Safety Data Sheets (formerly Material Safety Data Sheets)
 - a. Ensure that the labels on incoming hazardous chemical are not removed or defaced.

- b. Maintain all SDSs (formerly Material Safety Data Sheets) received and make them available to employees. Recently, OSHA has accepted electronic files of SDSs (formerly Material Safety Data Sheets) as suitable to meet its requirements.
2. The following provisions shall apply to chemical substances developed in the lab:
 - a. If the composition of a chemical substance produced in the laboratory uses is known and determined to be hazardous, the employer shall supply appropriate training.
 - b. If the chemical produced is a by-product whose composition is not known, the employer shall assume that it is hazardous and implement the Chemical Hygiene Plan.
 - c. If the chemical substance is produced for a user outside of the laboratory, the employer shall comply with the Hazardous Communication Standard, 29 CFR 1910.1200, including the requirements for the preparation of SDSs (formerly Material Safety Data Sheets) and labeling.

III.H.8. Use of Respirators

Where the use of respirators is required to maintain exposures below the PEL, the employer shall provide the proper respiratory equipment. Respirators shall be selected and used in accordance with the requirements of 29 CFR 1910.134. See Einstein's Respiratory Protection Plan.

III.H.9. Recordkeeping

1. The employer shall establish and maintain for each employee an accurate record of any measurements taken to monitor employee exposures and any medical consultation and examinations including test or written opinions required by this standard.
2. The employer shall assure that such records are kept, transferred, and made available in accordance with 29 CFR 1910.1020.

IV. Definitions

None.

V. Effective Date

Effective as of: 6 April 2018

VI. Plan Management and Responsibilities

Einstein's Department of Environmental Health and Safety is the Responsible Office under this Plan. Einstein's Associate Dean for Finance and Administration is the Responsible Executive. Einstein's Senior Director of Environmental Health and Safety is the Responsible Officer for the management of this Plan.