



WORKING SAFELY AT TUFTS!

A guide for new and current employees

Tufts University has a history of excellence in scholarship, of teaching and service. There is much more excellent work to be done, now and in the future. An important consideration in the planning and conduct of all work at Tufts is the protection of the health of ourselves and others.

Many employees work with hazardous equipment, with hazardous materials, and in a hazardous environment. At each step, these hazards are identified and controlled. The work is completed, and no one is harmed.

Tufts Environmental Health and Safety (TEHS) is part of the Department of Public and Environmental Safety. In partnership with them and our colleagues in Human Resources, Risk Management, and Facilities Services, there are always resources available to each employee to assist and guide in achieving an injury and accident-free workplace. Please visit our website at <http://publicsafety.tufts.edu/ehs/>, and you can subscribe to the TEHS newsletter at <http://publicsafety.tufts.edu/ehs/newsletter/>

We look forward to working with you.



Environmental Health and Safety

Top 10 Safety Things Tufts Staff Need to Know

Please discuss each item with your Supervisor and then check off each of the following items. Once completed, sign and send to Tufts Environmental Health and Safety (TEHS).

	Review the Tufts Public and Environmental Safety Emergency Response Guide available in paper and online at Public and Environmental Safety.
	Know the location of the nearest first aid kit . This first aid kit is limited to band-aids, sterile bandages, and gloves, and is for self-treatment. For more serious injuries, contact x66911 and request medical assistance. Tufts Police are first aid providers. In addition, during the academic year, the student staffed Tufts Emergency Medical Service (TEMS) is on call on the Medford campus only.
	In the event of a fire , notify others in the area, close the door to the room, call x66911, and follow EXIT signs out of the building. Go to your designated Area of Assembly and notify your supervisor that you are out of the building. Persons receiving special fire extinguisher training are authorized to extinguish small fires if there is no risk of injury while extinguishing the fire.
	In the event of a work-related injury or illness , immediately notify your Supervisor. You and your Supervisor will complete the Accident Incident Report Form and submit to Tufts Risk Management and Tufts EHS.
	The air in your workplace must be safe and comfortable . However, do not bring fans, humidifiers, dehumidifiers or heaters from home. Contact Facilities Services or Tufts EHS if you have concerns about the air quality in your work area.
	If you have a mold or questionable odor concern , contact Campus EHS Manager for indoor air quality investigation. There is an EHS Specialist on each Campus!
	If you have concerns while lifting, standing, or sitting at your workstation, contact the Campus EHS Manager and request a workstation ergonomics assessment .
	Back pain is preventable through correct design of the workstation (incorrect posture) or use of assistive devices to minimize lifting, carrying, pushing, pulling (overexertion). Contact the Campus EHS Manager and request a job and task ergonomics assessment .
	Extension cords should not be used for permanent wiring, do not string power strips together and immediately repair/replace all wires with damaged insulation and plugs if the grounding pin is missing. These actions prevent electrical shocks and fires .
	Read Safety Data Sheet (SDS) and container label before handling any chemical to determine if it is hazardous and what precautions to follow for storage, use, and disposal. Dispose of all chemicals by calling the Campus EHS Manager. Do not place in trash or down the sink .

Tufts Safety Orientation sessions are held every other week for all new employees by TEHS. Attendance is mandatory. The classes are designed to inform and educate so that in case of accident or emergency you will be able to protect yourself and others, and minimize damage through prompt appropriate actions. If you have any questions, please do not hesitate to ask.

employee (PRINT & SIGN)

supervisor

date

assignment: department, lab number, etc.

**To: Environmental Health and Safety
200 Harrison Avenue
Posner Hall 105
Boston Campus**

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Emergencies at Tufts

Emergency Response

It is imperative that all emergencies, including but not limited to fires, first aid and medical issues, hazardous spills, or suspected criminal activity be immediately reported. For specific information on emergency response, refer to the Tufts Emergency Response Guide at <http://emergency.tufts.edu/guide/>.

First Aid and Medical Issues

For minor injuries such as paper cuts and minor lacerations or burns, a simple first aid kit can provide band-aids, sterile pads, nitrile gloves to assist others without coming into contact with blood. Any injury should be reported to Tufts Police via the Communications Center. Refer to the Tufts Emergency Response Guide for additional contact information and first aid guidance.

Accident and Incident Report Form

The Accident/Incident Report Form should be used by all faculty members, staff members, students, contractors and visitors to report **any accident** that resulted in bodily injury/illness, an incident that could have resulted in bodily injury (a near miss) or **an incident** that resulted in property damage that occurred on Tufts property or on a Tufts sponsored/approved activity off campus. To access the form and get information on Workers Compensation, refer to <http://publicsafety.tufts.edu/ehs/accident-and-incident-reporting-at-tufts-university/>.

Tufts Threat Assessment and Management (TTAM)

The Tufts Threat Assessment and Management (TTAM) program was approved in October 2013 by President Monaco as a university-wide Public Safety initiative aimed at preventing targeted campus violence. The mission of TTAM is to determine if any individual poses, or may reasonably pose, a threat of violence to others in the Tufts community and to provide assistance to the individual in order to avert the threat and maintain the safety of the community. TTAM responds to behaviors exhibited by students, employees, and visitors of the university to ensure that Tufts remains a safe place in which to learn, work, and live. If you become aware of a situation that you believe may pose a threat to our community or to one of its members, we encourage you to report the situation to TTAM via one of the following mechanisms: consult with a TTAM team member, email the TTAM team at threatassessment@elist.tufts.edu, file a report online using Ethics Point (anonymously if you so choose), or call Tufts University Police. In the case of an imminent situation, always contact University Police immediately. For more information about TTAM and to view a list of your campus's team members, visit ttam.tufts.edu.

Organizing Your Work Area

Electrical Devices

There is a wide range of electrical devices located throughout the University including many computers and small household appliances. In addition, laboratories and machine shops may contain more elaborate equipment such as lasers, centrifuges, or table saws. While most devices meet electrical safety codes, all electrical devices can present some level of risk for electrical shock and/or fire when used, stored, maintained, or positioned incorrectly. Though some equipment may require additional guidance, it is critical that the following general guidelines are adhered to:

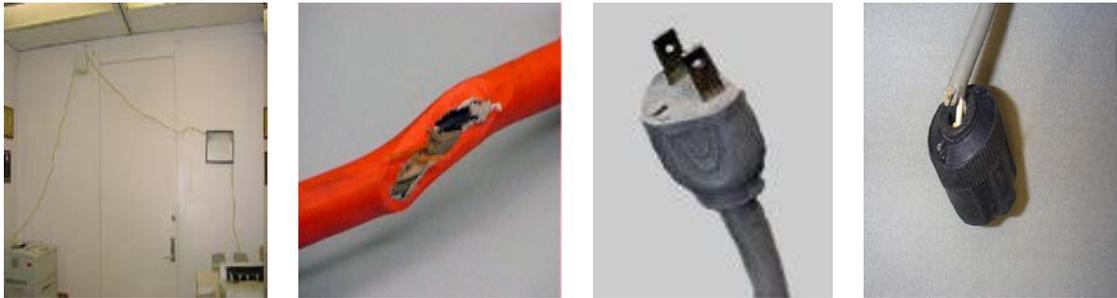
Equipment

- Modification or repair to outlet receptacles, breaker panels, or equipment shall be done by a qualified electrician, technicians, or contracted vendors.
- Placement of equipment and supplies shall not obstruct egress pathways, stairwells, fire alarms, fire extinguishers, sprinkler heads, or other safety equipment.
- Placement of equipment shall not obstruct electrical panels. It is critical that at a minimum, a three-foot clearance is provided.
- Placement of equipment shall prevent contact with chemical or water spills.
- Placement of equipment shall prevent overheating and allow for proper ventilation.
- Placement of boxes, papers, and other combustible materials shall not be placed on equipment cooling fans, or on areas of equipment used to disperse heat.
- Inspect equipment before use. Damaged equipment shall be marked DO NOT USE and removed from use.

Electrical Cords

- Inspect electrical cords before use. Damaged, crushed cords, or cords that get warm when used shall be removed from use and labeled “Repair/Dispose of.” Note: electrical tape on power cords does not constitute an acceptable repair.
- Electrical cords shall not be located across pathways, under rugs, or draped over doorways and light fixtures. Permanent outlets must be added to meet electrical needs.
- Electrical cords shall not be disconnected from the outlet by pulling the cord.
- Only power strips with multi-outlet over-current protection are permitted.
- Multi-outlet power strips shall not be “daisy chained,” plugged into additional power strips.
- Extension cords should be rated to handle required wattage needed to power equipment.
- Extension cords shall not be extended through wall openings, structural ceilings, suspended ceilings, dropped ceilings, or floors.
- Extension cords shall not have furniture, papers, or other items placed on top of them.
- Extension cords shall not exceed 8 feet in length. Cords shall be three wired including a grounded wire and plug.

- Extension cords shall not act as permanent wiring. Note: UL approved power strips are the exception.



Storage

With space at a premium, employees must be careful not to create hazards when organizing their work environment. Though some areas such as laboratories and machine shops may require additional guidance, it is critical that the following general guidelines are adhered to in all areas:

- Avoid excessive storage of paper, boxes, and other combustible items.
- Avoid storage in areas that are prone to water damage.
- Decorative items shall not be draped from light fixtures or sprinkler heads.
- Equipment, supplies, or furniture shall not obstruct egress pathways or emergency devices. Storage in hallways or stairwells is prohibited.
- Heavy items or liquids shall be stored on low shelves.
- Chemicals and compressed gas cylinders shall be stored in well-ventilated locations with applicable signs and away from electrical outlets and exits. Flammable chemicals must be stored in flammable storage cabinets. Contact TEHS at 617-636-3615 for assistance.
- Equipment, supplies, and furniture shall not be placed within 18 inches of sprinkler heads. Note; unless located against a wall, items shall not be within 18 inches of the ceiling.
- Each shelf can support a specific weight. Know the weight limits on any shelf or contact TEHS to calculate.



Portable Space Heaters

Portable space heaters can be used to supplement building heating systems when temporary warmth is needed. However, when improperly used, portable space heaters present a heat source that is conducive to creating a fire. The requirements listed below are a combination of regulatory requirements and best management practices. These requirements, along with manufacturer's recommendations, shall be followed always.

If an area is not adequately heated via the installed building heating system, before purchasing a portable space heater, contact the Facilities Services Department to report the condition. Often the issue can be corrected by adjusting or repairing the building's HVAC system. Portable space heaters shall not be used in laboratories or anywhere flammable or combustible gases or liquids are stored or used.

If the issue cannot be corrected promptly, the Facilities Services Department may recommend the use of temporary portable space heaters that meet the following requirements:

1. Heaters must be Underwriters Listed (UL) or Factory Mutual approved.
2. Heaters must have a thermostat to automatically shut down the unit when the desired temperature is achieved.
3. Heaters must have a tip over automatic shutdown switch.
4. Heaters must be kept at least 3 feet (36 inches) from all combustible materials, e.g. file cabinets, desks, trash cans, paper boxes, etc.
5. Heaters shall not contain open, glowing electrical coils as illustrated below.



In addition, if you will be using a portable space heater, ensure you follow these safety tips:

- Heaters should not be placed under desks or other enclosed areas.
- Heaters must always be monitored when in operation.
- Heaters should be plugged directly into a wall receptacle. Never plug it into an extension cord or multi-outlet power strip.
- Heaters need to be inspected before use. Heaters missing guards, control knobs, feet, etc. must be taken out of service immediately and repaired by a competent person.
- Heaters should not be in rooms that will not be continually occupied.
- Heaters shall not be stored or positioned near exit ways, walkways, or paths of travel.
- Heaters should not be used in wet areas like bathrooms or kitchens.
- Heaters in areas where small children are expected are prohibited.
- Heaters of any type are prohibited in laboratories and other areas with combustible or flammable chemicals.

If any of these conditions cannot be met, contact Fire Safety at 617-627-2745. Additional information on campus fire safety can be found at www.campusfiresafety.org

Avoid Contact with Sharp Objects

About 30% of all workplace injuries are cuts, lacerations, abrasions, and punctures. 70% of these injuries occur to the hands. The workplace contains numerous objects with sharp and pointy edges: scissors, paper cutters, utility knives, razor blades, scalpels, needles, knives, paper, broken glass, staples, tools, unfinished metal edges - the list goes on. The severity of these injuries varies from minor - self-treatable with handwashing and a Band-Aid, to severe - requiring immediate medical attention. In addition to tending the initial injury, be sure blood is properly cleaned and the wound is cared for during the entire healing process, thus reducing the risk of infection or scarring.

With patience (don't hurry), planning (think before you cut), and having the right tool for the task, most of these injuries can be prevented. To discuss guards, protective gloves, sharps disposal containers, and other controls to prevent injuries from sharps, contact TEHS.

Workplace Ergonomics

Workplace Ergonomics looks at an individual relative to their workstation and work tasks. In doing so, the individual can work in a “neutral” or “natural” position, thus reducing the likelihood of injury. TEHS can assist by providing guidance documents, self-evaluation tools, and by performing a workstation evaluation. For additional information on workplace ergonomics, refer to <http://publicsafety.tufts.edu/ehs/ergonomics/>

Indoor Air Quality

Faculty, staff, students and visitor concerns with Indoor Air Quality (IAQ) have increased since energy conservation measures were instituted in office and commercial buildings during the 1970s, minimizing the leakage of outside air into buildings and contributing to the buildup of contaminants in the indoor air. Complaints about IAQ range from simple complaints of comfort issues (too hot/cold/drafty, etc.) and odd smells, to more serious perceived and actual health hazards, where the air quality may be suspected of causing illness and lost work time.

It may not be easy to identify a single reason for IAQ complaints because of the number and variety of possible sources, causes, and varying individual sensitivities. Nevertheless, Tufts University is committed to providing its students, employees, and visitors with indoor air free of unhealthful contaminants including airborne disease agents. For additional information, refer to <http://publicsafety.tufts.edu/ehs/indoor-air-quality/>

Drinking Water Safety

Faculty, staff, students, and visitors concerns with water quality have resulted from an increased public awareness of lead, copper, Legionella, and other potential drinking water contaminants.

Tufts University is committed to providing water that meets or exceeds national water safety standards in all of its buildings and on all of the grounds. Water that is NOT safe to drink will be labeled NON- POTABLE DO NOT DRINK OR USE FOR FOOD.

In Boston and Medford, water is supplied by the Massachusetts Water Resources Authority using large surface reservoirs which provide high-quality water year-round. The Town of Grafton operates a municipal water supply system for the Grafton campus. Information about both of these systems is available at their websites.

Please notify TEHS or Tufts Facilities Services on your campus if you have any concerns about your water.

Food Safety

Faculty, staff, students, and visitors have several dining options through Tufts Dining, as well as through contractors that source and provide food in compliance with all applicable state and federal food service safety and sanitation regulations. Please notify TEHS or Tufts Dining if there is any concern with the safety of the food on the Tufts campuses.

Biological Safety

OSHA Bloodborne Pathogen Regulation (29 CFR 1910.1030)

This OSHA regulation was written to protect employees from exposure to potentially contaminated human material and consequently diseases produced by bloodborne pathogens in the workplace. Bloodborne pathogens include human immunodeficiency virus (HIV), Hepatitis B (HBV) and C (HCV) viruses and other microbial agents that could be present in human blood, blood products, organs, tissues, other bodily fluids and human cell lines.

For more information on the Bloodborne Pathogen Standard refer to the Tufts University Exposure Control Plan for Bloodborne Pathogens. This document is published on the TEHS Biosafety Support Webpage.

The following is a summary of the regulation:

1. Identify job classifications, tasks, and procedures where there is occupational exposure to bloodborne pathogens:

If your job falls **outside of Research Areas**, your supervisor is responsible for identifying potential exposure risks. Supervisors are encouraged to work with TEHS to provide appropriate training to their staff. Risky activities may involve work with knives, blades, or clean-up of blood. If your job falls **within Research Areas**, the Principal Investigators must ask all employees to attend Bloodborne Pathogens training before allowing the handling of human blood and other human source material. The following are examples of tasks and procedures, in which occupational exposure may occur for personnel in research areas: Working in HIV and HBV research laboratories, where the culture, production, concentration, experimentation, or manipulation of HIV or HBV occurs. Use of needles or other sharp devices. Handling human material, blood, other potentially infectious materials or human cell lines. Working with animals that have been infected with or exposed to bloodborne pathogens, other potentially infectious materials or human cell lines.

2. Information and Training:

- **Training requirements:** Employees identified as potentially exposed individuals must attend Bloodborne Pathogen training before handling human source material and annually thereafter. In addition to the annual training requirement, employees must implement the practices and procedures required by the regulation and by the Tufts University Bloodborne Pathogen Exposure Control Plan.
- **Training elements:** An accessible copy of the Bloodborne Pathogen standard (29 CFR 1910.1030). Information on the epidemiology and symptoms of bloodborne diseases and their modes of transmission. Description of employer's Exposure Control Plan and how to get a copy. How to recognize tasks that may involve exposure to blood or other potentially infectious materials. Use and limitations of methods to reduce exposure,

including engineering controls, work practices, and personal protective equipment. Information on the hepatitis B vaccine. What to do and whom to contact after an exposure. Information on post-exposure evaluation and follow-up. An opportunity for interactive questions.

- 3. Methods to reduce or eliminate potential exposure (engineering controls, personal protective equipment-PPE):** Employees must be trained in the use of the appropriate PPE such as gloves, gowns, lab coats, face shields or masks and eye protection for their job classifications and for the activities they perform with bloodborne pathogens. Also, in the proper use of biosafety cabinets and safety cups or sealed rotors for centrifuges. Implementation of Universal Precautions when handling blood and other potentially infectious materials. Ensure that contaminated sharps are disposed of in proper sharps disposal containers. Handling waste according to the regulations and institutional policies and procedures. Tufts University is responsible for providing PPE to all employees at their work sites and specific to the risk associated with the material and processes in use.
- 4. Training and work practice requirements in HIV, Hepatitis B Virus, and Hepatitis C Virus research laboratories:** For employees working in HIV and HBV research laboratories, where the culture, production, concentration, experimentation, or manipulation of HIV or HBV occurs, additional training on lab-specific procedures must be done by the Principal Investigator or designated qualified Lab Manager.
- 5. Employer's responsibility to provide Hepatitis B vaccination and Post-exposure Evaluation and Follow-up:**
 - Tufts University will make available the Hepatitis B vaccination, at no cost, to all employees who have occupational exposures to bloodborne pathogens. Those who decline to take part in the vaccination program must sign the "Vaccination Declination Form". However, they will have the opportunity to be vaccinated at a later date. If you are interested in receiving this vaccination or would like more information on this vaccination, please contact TEHS at 617-636-3615.
 - Exposure Incident, Post-exposure Evaluation and Follow-up: An exposure incident is defined as a specific event in which blood or other potentially infectious materials come into contact with the eye, mouth, other mucous membrane, non-intact skin, or penetrate through the intact skin via needle, broken glass, or laceration. Following a report of an exposure incident, the employer shall make immediately available to the exposed employee a confidential medical evaluation and follow-up. Exposure incident should be reported on the Tufts Accident and Incident report form with immediate notification of TEHS to expedite immediate medical diagnosis and treatment following the exposure.
- 6. Documentation:** Medical records shall be maintained in the occupational medical clinics in accordance with OSHA 29 CFR 1910.20. These records shall be kept confidential.

Research with Biological Agents

Tufts University scientists frequently work with biological agents including recombinant and synthetic nucleic acid molecules, infectious agents, biological toxins and human source material as well as human cell lines. When planning your research, please take into account the following biosafety areas:

Regulations

Several regulatory agencies oversee the use of biological agents in research laboratories. Tufts University requires compliance with all regulations and has instituted policies and procedures to support compliance with these regulations. The primary goal of the institution is to provide a safe work environment for all staff, employees, students, volunteers, and the public. Because Tufts University receives NIH funding for research, the University is required to comply with the **NIH Guidelines for Recombinant and Synthetic Nucleic Acid**. All laboratories working with nucleic acid molecules must comply with these guidelines, even if they do not receive NIH funding. A primary requirement under the NIH Guidelines is the establishment of an Institutional Biosafety Committee (IBC).

The IBC is mandated to review and approve nucleic acid work as defined in the NIH Guidelines and to carry out activities in support of this research at Tufts. The scope of the IBC has been expanded beyond nucleic acids to include infectious agents, and biological toxins, and human source material including blood, tissue and human cell lines if injected into animals. Tufts University has two IBCs; one oversees research on the Boston and Medford campuses, and one oversees research on the Grafton campus. For more information on the IBC, go to <http://www.tufts.edu/central/research/IBC/>

To assist Principal Investigators working with biological agents other than human source material, there are Biosafety Officers assigned to support each campus. These individuals are available to assist PIs in complying with regulations, registering their work with the IBC, providing a safe work environment, training of staff, and guidance on biosafety practices and procedures. The Tufts Biosafety Program is part of the Office of the Vice President for Research.

Training

All laboratory staff members, including students, postdoctoral trainees, research scientists, interns, and summer students, must be adequately trained prior to beginning any work with nucleic acids, infectious biological materials, and human or non-human primate blood, tissues, or cells. The IBCs require that all persons handling regulated materials attend the course "Biosafety in the Research Laboratory" (<http://viceprovost.tufts.edu/ibc/ibc-training/>). Persons handling animals treated with such agents or that may be contaminated with such agents must also attend "Animal Biocontainment Practices and Procedures."

Exposure Response Plans

An Exposure Response Plan (ERP) is a biological agent or material-specific document that summarizes the initial measures to be taken following an unintentional exposure by any route of entry, description of the signs and symptoms associated with each biological agent or material,

description of vaccinations or pre-diagnostic testing for each biological agent or material and how to respond and whom to contact in case of exposure. These plans can be found at <http://viceprovost.tufts.edu/ibc/exposure-response-plans/>

Occupational Medical Program

During their work, some employees are at risk of exposure to biological agents that can cause injury and disease. The Occupational Medical Program (OMP) provides several services to individuals exposed to select agents and toxins, infectious agents, and laboratory animals. Tufts University provides occupational medical services through different external providers on each campus. Contact TEHS or the Biosafety Program for specific contact information for providers.

General Laboratory and Biosafety Inspections

Biosafety staff conduct biosafety inspections prior to the initiation of regulated research that requires approval by the Biosafety Officer or the IBC, and annually thereafter in order to ensure compliance with state, federal, and local regulations.

For more information on these and other biosafety areas, please refer to:

Tufts Exposure Control Plan for Bloodborne Pathogens

<http://publicsafety.tufts.edu/ehs/biosafety-support/bbp-exposure-control-plan/>

Biosafety in Microbiological and Biomedical Laboratories

<https://www.cdc.gov/biosafety/publications/bmb15/>

NIH Guidelines

<https://osp.od.nih.gov/biotechnology/nih-guidelines/>

Chemical Hazard Communication

Hazard Communication Program

“Top 10” chemical safety practices to follow in chemical storage or use areas:

1. No eating, drinking, or use of cosmetics.
2. Do not store chemicals and food in the same refrigerator or freezer.
3. Do not reuse food containers to store chemicals.
4. Read the SDS before handling any chemical.
5. Wear eye protection to prevent contact with splashed material when pouring, stirring, or pipetting chemicals (or any other manipulation which creates splash exposure).
6. Read the label and plan accordingly.
7. Label any secondary container of chemicals unless it will be completely used by you during the workday.
8. Wear the correct gloves to prevent skin contact with chemicals - refer to the manufacturers' webpages or TEHS for advice.
9. Immediately flush any skin or eye for 15-20 minutes under flowing water after contact with a hazardous chemical.
10. Immediately remove any clothing contaminated with dust or liquid to minimize skin contact.

Purpose

The purpose of the Hazard Communication Program is to promote employee safety through training and communication on the safe use, handling and storage of hazardous materials. The program establishes guidelines for informing employees about the hazards of chemicals in the workplace and the procedures needed to protect themselves from these hazards.

This program complies with the requirements of the OSHA Hazard Communication Standard, 1910.1200. The standard was adopted on November 25, 1983, to ensure that the hazards of chemicals are evaluated and that information concerning these hazards are communicated to employees.

Definitions

Hazardous Chemical/Material Any element, chemical compound, or mixture of elements which may be physical hazard or a health hazard. Physical properties include flammability, combustibility, instability, explosiveness, and water reactivity. Health hazards can be either short-term or long-term and include agents which can damage the eyes, skin, lungs, internal organs, etc.

Safety Data Sheet (SDS) Written information from the manufacturer of a hazardous material describing the hazardous ingredients, physical and chemical data, fire and explosion hazards, reactivity, health hazards, precautions for safe handling, and special protection information.

OSHA Occupational Safety and Health Administration, the federal agency responsible for regulating and enforcing safety and health policies.

Responsibilities

Tufts Environmental Health and Safety

TEHS is responsible for the development and maintenance of the Hazard Communication Program. TEHS will also provide technical information and recommendations concerning hazardous chemicals, carcinogens, and infectious agents.

Supervisors

Supervisors at all levels, including Principal Investigators, have the primary responsibility for informing and training employees about safe work practices for hazardous materials. This training should be specific to the hazards in their work area. This will be done before the work is started. This training will include the location of a list of chemicals in the work area and the location of Safety Data Sheets for each chemical on the list. Additional training includes information on using the information contained on the Safety Data Sheet to plan every work activity involving chemicals.

Employees

It is the responsibility of every employee to adhere to established safety policies and procedures and to conduct operations in a safe manner. Generally, this means following the Safety Data Sheet information and the Standard Operating Procedure for the task involving chemicals. Employees should report any unsafe condition to their supervisor and TEHS.

Program Information

TEHS maintains a written Hazard Communication Program which details requirements for informing employees about the hazards of chemicals in the workplace and the procedures needed to protect themselves from these hazards. The written program is available on request to employees.

Hazard Communication Standard Labels

OSHA has updated the requirements for labeling of hazardous chemicals under its Hazard Communication Standard (HCS). As of June 1, 2015, all labels will be required to have pictograms, a signal word, hazard and precautionary statements, the product identifier, and supplier identification. A sample revised HCS label, identifying the required label elements, is shown on the right. Supplemental information can also be provided on the label as needed.

SAMPLE LABEL	
<p style="text-align: center; color: #0070C0; font-weight: bold;">PRODUCT IDENTIFIER</p> <p>CODE _____</p> <p>Product Name _____</p> <p style="text-align: center; color: #0070C0; font-weight: bold;">SUPPLIER IDENTIFICATION</p> <p>Company Name _____</p> <p>Street Address _____</p> <p>City _____ State _____</p> <p>Postal Code _____ Country _____</p> <p>Emergency Phone Number _____</p> <p style="text-align: center; color: #0070C0; font-weight: bold;">PRECAUTIONARY STATEMENTS</p> <p>Keep container tightly closed. Store in cool, well ventilated place that is locked.</p> <p>Keep away from heat/sparks/open flame. No smoking.</p> <p>Only use non-sparking tools.</p> <p>Use explosion-proof electrical equipment.</p> <p>Take precautionary measure against static discharge.</p> <p>Ground and bond container and receiving equipment.</p> <p>Do not breathe vapors.</p> <p>Wear Protective gloves.</p> <p>Do not eat, drink or smoke when using this product.</p> <p>Wash hands thoroughly after handling.</p> <p>Dispose of in accordance with local, regional, national, international regulations as specified.</p> <p>In Case of Fire: use dry chemical (BC) or Carbon dioxide (CO₂) fire extinguisher to extinguish.</p> <p>First Aid</p> <p>If exposed call Poison Center.</p> <p>If on skin (on hair): Take off immediately any contaminated clothing. Rinse skin with water.</p>	<p style="text-align: center; color: #0070C0; font-weight: bold;">HAZARD PICTOGRAMS</p> <div style="text-align: center;">  </div> <p style="text-align: center; color: #0070C0; font-weight: bold;">SIGNAL WORD</p> <p style="text-align: center; font-weight: bold;">Danger</p> <p style="text-align: center; color: #0070C0; font-weight: bold;">HAZARD STATEMENT</p> <p style="text-align: center; font-weight: bold;">Highly flammable liquid and vapor. May cause liver and kidney damage.</p> <p style="text-align: center; color: #0070C0; font-weight: bold;">SUPPLEMENTAL INFORMATION</p> <p>Directions for use</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>Fill weight: _____ Lot Number _____</p> <p>Gross weight: _____ Fill Date: _____</p> <p>Expiration Date: _____</p>

For more information: www.osha.gov



Hazard Communication Standard Pictogram

As of June 1, 2015, the Hazard Communication Standard (HCS) will require pictograms on labels to alert users of the chemical hazards to which they may be exposed. Each pictogram consists of a symbol on a white background framed within a red border and represents a distinct hazard(s). The pictogram on the label is determined by the chemical hazard classification. It is not uncommon for a chemical to have multiple pictograms and/or for a single pictogram to represent multiple hazards.

HCS Pictograms and Hazards

<p>Health Hazard</p>  <ul style="list-style-type: none"> ■ Carcinogen ■ Mutagenicity ■ Reproductive Toxicity ■ Respiratory Sensitizer ■ Target Organ Toxicity ■ Aspiration Toxicity 	<p>Flame</p>  <ul style="list-style-type: none"> ■ Flammables ■ Pyrophorics ■ Self-Heating ■ Emits Flammable Gas ■ Self-Reactives ■ Organic Peroxides 	<p>Exclamation Mark</p>  <ul style="list-style-type: none"> ■ Irritant (skin and eye) ■ Skin Sensitizer ■ Acute Toxicity ■ Narcotic Effects ■ Respiratory Tract Irritant ■ Hazardous to Ozone Layer (Non-Mandatory)
<p>Gas Cylinder</p>  <ul style="list-style-type: none"> ■ Gases Under Pressure 	<p>Corrosion</p>  <ul style="list-style-type: none"> ■ Skin Corrosion/ Burns ■ Eye Damage ■ Corrosive to Metals 	<p>Exploding Bomb</p>  <ul style="list-style-type: none"> ■ Explosives ■ Self-Reactives ■ Organic Peroxides
<p>Flame Over Circle</p>  <ul style="list-style-type: none"> ■ Oxidizers 	<p>Environment (Non-Mandatory)</p>  <ul style="list-style-type: none"> ■ Aquatic Toxicity 	<p>Skull and Crossbones</p>  <ul style="list-style-type: none"> ■ Acute Toxicity (fatal or toxic)

For more information: www.osha.gov



(800) 321-OSHA (6742)

Hazard Communication Safety Data Sheets

The Hazard Communication Standard (HCS) requires chemical manufacturers, distributors, or importers to provide Safety Data Sheets (SDSs) (formerly known as Material Safety Data Sheets or MSDSs) to communicate the hazards of hazardous chemical products. As of June 1, 2015, the HCS will require new SDSs to be in a uniform format, and include the section numbers, the headings, and associated information under the headings below:

Section 1, Identification includes product identifier; manufacturer or distributor name, address, phone number; emergency phone number; recommended use; restrictions on use.

Section 2, Hazard(s) identification includes all hazards regarding the chemical; required label elements.

Section 3, Composition/information on ingredients includes information on chemical ingredients; trade secret claims.

Section 4, First-aid measures includes important symptoms/ effects, acute, delayed; required treatment.

Section 5, Fire-fighting measures lists suitable extinguishing techniques, equipment; chemical hazards from fire.

Section 6, Accidental release measures lists emergency procedures; protective equipment; proper methods of containment and cleanup.

Section 7, Handling and storage lists precautions for safe handling and storage, including incompatibilities.

Section 8, Exposure controls/personal protection lists OSHA's Permissible Exposure Limits (PELs); Threshold Limit Values (TLVs); appropriate engineering controls; personal protective equipment (PPE).

Section 9, Physical and chemical properties lists the chemical's characteristics.

Section 10, Stability and reactivity lists chemical stability and possibility of hazardous reactions.

Section 11, Toxicological information includes routes of exposure; related symptoms, acute and chronic effects; numerical measures of toxicity.

Section 12, Ecological information*

Section 13, Disposal considerations*

Section 14, Transport information*

Section 15, Regulatory information*

Section 16, Other information, includes the date of preparation or last revision.

*Note: Since other Agencies regulate this information, OSHA will not be enforcing Sections 12 through 15(29 CFR 1910.1200(g)(2)).

Employers must ensure that SDSs are readily accessible to employees.

See Appendix D of 1910.1200 for a detailed description of SDS contents.

For more information: www.osha.gov

Availability

All manufacturers are required to provide SDSs. Links to obtain SDSs are also available online at <http://publicsafety.tufts.edu/ehs/informational-links/>. SDSs specific to the chemicals used in each work area should be maintained within that area. TEHS has provided SDS directories for the storage of these SDSs. If a department has problems getting an SDS for a particular chemical contact TEHS and we will assist in locating one for that product.

All employees should be aware of the location of the SDSs for chemicals they use and assist the supervisor with keeping the SDS directory up-to-date.

Requirements

- Employees should be familiar with the information contained in the SDS before a chemical is used. Questions should be directed to the supervisor or Tufts Environmental Health and Safety.
- Hazardous materials without an SDS should not be used in the work area. These materials should be returned to the vendor or held until an SDS is received.
- Employees should not accept samples of hazardous materials without first obtaining an SDS.

Chemical Inventory

Any location that uses or stores chemicals at Tufts must have a chemical inventory with NFPA ratings listed for each chemical. These inventories must be maintained within that location. It is the responsibility of the supervisor to ensure the inventories are current. Copies of inventories should be sent electronically to TEHS where they will also be available for review.

Employee Information and Training

General Training

Employees will be provided with information and training on hazardous materials in their work area before an assignment is begun, and whenever a new hazard is introduced.

Training is conducted through a joint effort between TEHS and the workplace supervisors.

TEHS provides information to employees through training, new employee orientation, safety bulletins, and a variety of other communications. Specialized training for the hazards and protective measures associated with a particular job is provided by the supervisor or designee.

Job-Related Training

Supervisors play a key role in hazard communication and training. Although methods of training vary from department to department, employees should be trained overall in the following areas:

- Location and availability of written procedures, specifications, operator manuals, and SDSs, and how they relate to hazardous materials the employees will use
- Labeling and where to obtain in-house labels if needed
- Operations in the work area where hazardous materials are present
- Methods which can be used to detect the presence or release of hazardous material and what to do if such a release occurs
- The hazards of the chemicals in the work area and why the employee must take appropriate precautions
- Measures employees can take to protect themselves from these hazards; these measures may include personal protective equipment, ventilation and containment systems, monitoring devices, and safe work practices.
- Protective equipment and clothing required, where to obtain it, and how to use it.
- Proper storage of hazardous materials
- Emergency procedures specific to the work area

This training should be repeated as necessary and whenever a new hazard is introduced into the work area.

Non-routine Tasks

Information on the hazards of non-routine tasks is the responsibility of the supervisor, with assistance from Tufts Environmental Health and Safety as required. This information should be provided prior to the start of the task. Training should include the requirements listed above as they relate to the task.

Unlabeled Pipes

It is the responsibility of the supervisor to be aware of any potential hazard, including unlabeled pipes, in the work area. The supervisor should convey this information to employees along with any precautions which must be taken. It is the policy of Tufts University that all pipes of potentially hazardous materials be labeled. It is the responsibility of Facilities Services to ensure that all utility pipes are labeled properly.

Contractor Information

It is the responsibility of the individual who brings in the contractor to provide information on potential exposures. This should be done in conjunction with the supervisor of the work area as required. SDSs should be made available for contractor review. Requests for further information by a contractor should be directed through the individual who brought in the contractor. TEHS is available to assist upon request. Contractors will also be expected to provide SDSs for materials they bring on site.

Understanding the SDS

Toxicity and Health Hazards

Toxicology is the study of the nature and action of poisons. **Toxicity** is the ability of a chemical molecule or compound to produce injury once it reaches a susceptible site in or on the body. Descriptions of toxicity (e.g. low, moderate, severe, etc.) depend on the amount needed to cause an effect or the severity of the effect. **Toxicity hazard** is the probability that injury will occur considering the manner in which the substance is used. On an SDS the lower the category number, the greater the hazard.

Dose-Response Relationships

The potential toxicity (harmful action) inherent in a substance is manifest only when that substance comes in contact with a living biological system. A chemical normally thought of as “harmless” will evoke a toxic response if added to a biological system in a sufficient amount. The toxic potency of a chemical is thus ultimately defined by the relationship between the dose (the amount) of the chemical and the response that is produced in a biological system.

Routes of Entry into the Body

There are three main routes of entry by which hazardous chemicals enter the body.

Absorption through the respiratory tract via inhalation.

Most important in terms of severity.

Absorption through the skin.

Major cause of occupational disease (dermatitis).

Absorption through the digestive tract.

Can occur through eating or smoking with contaminated hands or in contaminated work areas.

Most exposure standards, Threshold Limit Values (TLVs) and Permissible Exposure Limits (PELs), are based on the exposure by inhalation. They are normally expressed in terms of parts per million (ppm) or milligrams per cubic meter (mg/m^3) concentration in air.

If a significant route of exposure for a substance is through skin contact, the SDS will have a “skin” notation. Examples: pesticides, carbon disulfide, carbon tetrachloride, dioxane, mercury, thallium compounds, xylene, hydrogen cyanide.

Other Factors Affecting Exposure

Rate of entry and route of exposure; that is, how fast the toxic dose is delivered and by what means.

Age can affect the capacity to repair tissue damage.

Previous exposure can lead to tolerance, increased sensitivity, or make no difference.

Host factors, including genetic predisposition and the gender of the exposed individual.

State of health, physical condition and lifestyle can affect the toxic response. Preexisting disease can result in increased sensitivity.

Environmental factors such as temperature and pressure.

Types of Effects

- Acute poisoning normally is the result of a single large exposure; there is rapid absorption of the substance and the reaction is sudden and severe.
- Chronic poisoning is characterized by prolonged or repeated low-level exposures measured in days, months, or years; symptoms may not be readily apparent. Cumulative poisons are characterized by materials that tend to build up in the body as a result of numerous chronic exposures; the effects are not seen until a critical body burden is reached.
- Local refers to the site of action of an agent and means that the action takes place at the point or area of contact. The site could be skin, mucous membrane, respiratory tract, etc. Absorption does not necessarily occur.
- Systemic refers to a site of action other than the point of contact and presupposes absorption has taken place. For example, an inhaled material may act on the liver.

Types of Health Hazards

Carcinogenic – exposure, usually in low levels, for extended periods of time has been determined to cause cancer in humans. Suspect carcinogens should be handled as carefully as carcinogens.

Toxic – exposure to the chemical may result in damage to organs, tissues, or vital body fluids. For example, a substance may be nephrotoxic (causes kidney damage), hematotoxic (poisonous to blood), neurotoxic (affecting the central nervous system), or a reproductive toxic (damages fetal tissue or causes chromosomal damage).

Corrosive – damages mucous membrane or skin as a result of burning or chemical reactions.

Sensitizers – exposure may cause allergic reactions.

Irritants – produce reversible inflammation of tissues (rashes, blisters, dermatitis) as a result of chronic exposure.

Physical Hazards

Physical hazards include fire, explosion and reactivity based on the chemical and on the particular type of containment equipment and handling conditions necessary to maintain the chemical in an inert state. A chemical is a physical hazard if there is statistically significant evidence that it is a combustible liquid, a compressed gas, an explosive, a flammable, an organic peroxide, an oxidizer, pyrophoric compound, an unstable material or water-reactive substance.

Fire Safety

Congratulations on your decision and effort to join the Tufts University as a member of the faculty or staff. Your hard work and commitment has resulted in your new position and source of pride in becoming a member of the Tufts community.

Along with the many resources and attributes of the academic environment, there is also a constant threat of FIRE within our community. A fire presents an immediate threat to the life safety of all, and has repercussions in many other aspects of our lives. Even a “small fire” may have devastating effects on your work environment and livelihood. The vast majority of fires are predictable and preventable. Therefore, Tufts is committed to the prevention of fire and has invested in life safety systems to protect our community from the hazards of fires that may occur despite prevention efforts.

Maintaining a safe working and learning environment for the entire Tufts community is crucial to the mission of the university. Tufts’ commitment to excellence of that mission includes a comprehensive Fire Safety Program.

The Tufts Fire Safety staff is comprised of experienced professionals focused on creating and maintaining a “fire-safe” academic community. This goal relies on an effective and evolving fire safety program in conjunction with the vigilance of each member of the Tufts community. As members of the faculty or staff, you are relied upon to “do your part” to support the “fire-safe” Tufts environment.

The Tufts Fire Safety staff welcomes you to the community, and looks forward to working with you in creating and maintaining a fire-safe workplace and academic community.

Tufts Fire Safety

419 Boston Avenue

Medford, MA 02155

(617) 627-2745 (telephone)

(617) 627-3116 (facsimile)

Radiation Safety

Radiation Safety Program (RSP)

Radiation Safety services are provided to assist researchers, medical professionals, and staff who either work with or work in areas that store radioactive materials or radiation-producing machines. Services include training, audits and inspection of laboratories, radiation exposure monitoring, waste management, emergency response, regulatory support and other assistance involving the safe use of radioactive materials or radiation producing machines. Examples of ionizing and non-ionizing radiation sources are beta particles, gamma ray or x-ray and radio frequency, lasers, electric fields, microwaves or ultraviolet light.

Tufts University has acquired licenses and registrations to possess and use radioactive materials and radiation-producing machines. The Radiation Control Program (RCP) of the Department of Public Health is the governing agency within the Commonwealth of Massachusetts that issues radioactive materials licenses or registration for ionizing or non-ionizing radiation-producing machines respectively. The RCP's mission is to protect "people from the harmful aspects of radiation". Licensees and Registrants are required to comply with the applicable regulations and adhere to regulatory conditions as agreed upon. Other regulatory agencies also may promulgate regulations that govern the use of radiation sources. These include the US Nuclear Regulatory Commission, the US Department of Transportation, the US Environmental Protection Agency, the Department of Homeland Security, the Federal Bureau of Investigation, OSHA and others.

The Tufts University Radiation Safety Committees (RSC) serves all three campus locations. The RSC is charged with providing independent expert advice to Administration, Directors, Investigators, and others specifically working with or in areas containing radioactive materials or radiation producing machines. The RSC receives its authority from the Vice Provost for Research of the University. Members often review a range of complex scientific, technical, and policy issues, including questions related to the development and evaluation of the RSP. The faculty committee meets on a quarterly basis to seek and promote improved methods that ensure radiological health for employees, researchers, the general public, and the environment.

ALARA at Tufts University

Once a philosophy, and now regulation, As Low as Reasonably Achievable (ALARA) is the core concept of any Radiation Safety program. ALARA applies to all radiological situations that can give rise to personal dose including both occupational and public exposures to direct and indirect radiation from either radioactive materials, or radiation producing machines. "Licensees are required to make every reasonable effort to maintain radiation exposures, and releases of radioactive materials in effluents to unrestricted area, as low as reasonably achievable." Dose limits are well defined in the Department of Public Health regulations (105 CMR 120.00) and are set to protect individuals from deterministic effects and unacceptable stochastic risk.

Committee members meet on a quarterly basis to review the Radiation Safety Program performance and identify areas within the program that could be further developed or improved.

ALARA is promoted by:

1. Providing appropriate training for workers to enhance Radiation Safety awareness.
2. Posting and labeling accordingly to alert personnel to the presence of potential radiation hazards.
3. Providing appropriate facilities and equipment to contain radiation and radioactive material including shielding, engineered containment, engineered protective equipment, specified handling tools, and personal protective equipment.
4. Investigating deficiencies, conducting audits and radiological assessment to determine areas for improvement.
5. Drafting radiological safety procedures or SOPs and reviewing existing policies or procedures for effectiveness.
6. Radiation Safety tracking the performance of the Radiation Safety Program in RSC minutes or metrics.

External ionizing radiation exposures for Tufts University researchers and personnel are well below regulatory limits. Radiation dose results provided by an outside dosimetry vendor continue to demonstrate compliance and that ALARA conditions exist at the University. In addition, the collective annual radiation dose for researchers at the University is well below the 2006 estimated effective radiation dose for individuals of the U.S. population (NCRP Publication #160, (2006)).

Radioactive Material Spill Control Procedure

This procedure applies to any unsealed liquids or powders.

Stop what you are doing, do not panic, stay in the immediate area unless there is a fire or other immediate hazard. Stay calm.

Prevent Make an effort to avoid personal contamination and minimize the spread of contamination at the workstation. Check for personal contamination on skin and clothing using portable detection equipment.
Be sure to check shoes for contamination before exiting the immediate area.

Inform & Isolate others from entering the area of concern
First notify TU Police at x66911
Provide a brief description including your location, contact number, and nature of your emergency. Please refer to the Tufts Emergency Response Guide.

Localize & Control the spilled material by surveying and establishing boundaries,
Restrict access to the contaminated area, and advise others not to leave the surrounding area until evaluated for contamination,
Estimate the activity and volume of the spill,
Place absorbent material on the spill [paper towels, bench paper, etc.],
Place damp towels over spilled powders,
Wear gloves and a lab coat

Label & Post the area as contaminated,
Remain outside the posted area to control access to the contaminated area and provide additional information to Radiation Safety support staff upon arrival.

Nonionizing Radiation Sources

Lasers

The acronym **LASER** stands for **L**ight **A**mplification by **S**timulated **E**mission of **R**adiation. A laser is a device, which when energized, can emit a highly collimated beam of extremely intense monochromatic light. The non-ionizing radiation is emitted over a wide range of the electromagnetic spectrum, starting in the ultraviolet region (100-400 nm) through the visible (400-700 nm) and near-infrared & infrared region combined (>700-10,600 nm). All personnel required to work in a Laser Work Environment should review the Tufts University Laser Safety Policies and Procedures Manual and participate in accordance with Massachusetts Department of Public Health Radiation Control Program 105 CMR 121.000, Laser System, and the American National Standard Institute (ANSI) Standard for the *Safe Use of Lasers*, ANSI Z136.12 (copy on file with the Environmental Health & Safety Office, 200 Harrison Ave, Boston, MA). Additional information specific to the safe use of lasers at Tufts is obtained by clicking on the below link listed under the Radiation Safety Manual section.

Radiofrequency (RF), Ultraviolet and Other

The “Tufts University Radiofrequency, and Other Nonionizing Radiation Sources Safety Policies and Procedures Manual” applies to all users of devices and equipment designed to generate RF and microwave fields, ultraviolet, other non-laser intense light sources, and all other sources emitting radiation within the non-ionizing spectrum. Examples include microwave, telecommunications transmitters, cell phone transmitters, RF heat sealers, light emitting diodes, welding arcs, black lights, photo therapy lamps, germicidal lamps, mercury vapor lamps, halogen lights, high-intensity discharge lamps, fluorescent and incandescent sources.

Regulatory related

Massachusetts Department of Public Health

RF and Microwave radiation limits are promulgated by the Massachusetts Department of Public Health Radiation Control Program, 105 CMR 122.000, including the frequency range of 300 kHz to 100 GHz for the general public and 10 kHz to 100 GHz for occupational workers. Additional recognition is given to the Federal Communication Commission (FCC) as it applies to licensing, other federal regulations, standards, and guidelines.

ACGIH

The American Conference of Governmental Industrial Hygienists publishes TLV values for RF and microwaves. TLV values for UVR is consistent with the International Commission on Non-Ionizing Radiation Protection (ICNIRP) guidelines.

ANSI/IEEE Standards

The American National Standards Institute (ANSI) publishes recommended limits in standard number IEEE/ANSI C95.1-2005 and covers the range of 100 kHz to 100 GHz.

FCC

Currently the FCC has adopted exposure limits from the National Council on Radiation

Protection (NCRP) and can be found in the federal regulations at 47 CFR 1.1307(b), 1.1310, 2.1091, 2.1093, and at <http://www.fcc.gov/oet/rfsafety/rf-faqs.html>.

ICNIRP

The International Commission on Non-Ionizing Radiation Protection (ICNIRP) has issued guidelines for exposures from 100 kHz to 300 GHz in Guidelines for Limiting Exposure to Time-Varying Electric, Magnetic, and Electromagnetic Fields, 1998 (ICNIRP 1998).

NCRP

The National Council on Radiation Protection and Measurements (NCRP) has issued a report on quantities and units, interaction and measurement techniques; RADIOFREQUENCY ELECTROMAGNETIC FIELDS Properties, Quantities and Units, Biophysical Interaction, and Measurements (NCRP Report #67, 1981).

OSHA Regulations

OSHA requirements can be found in 29 CFR 1910.97 and cover the range of 10 MHz to 100 GHz.

Frequently Asked Questions

Some of the common questions and answers regarding Radiation Safety at Tufts University are listed below. If you need more information or information not listed below, please contact the TEHS Radiation Safety Officer at 617-636-3450.

Q. Who is required to attend a monthly Radiation Safety Training session?

A. All individuals either working with or handling radioactive materials, handling radiation producing machines or equipment, or other personnel who work in a registered radioactive materials laboratory are required to complete Radiation Safety training. There are many different types and levels of training to serve your needs. Please contact TEHS for more information, or visit the Radiation Safety Training Description and Schedule page on the TEHS website to view a current list of course descriptions.

Q. Who needs a radiation dosimeter at Tufts?

A. Persons who handle high energy beta-emitting radioactive materials [ex. ^{32}P > 1mCi], gamma emitters [ex. $^{99\text{m}}\text{Tc}$] or use x-ray equipment should obtain a radiation dosimeter. Persons who handle over 10 mCi of high energy beta or gamma emitters also need a ring badge. Persons using only ^3H , ^{14}C and ^{35}S do not require a radiation dosimeter since the radiation emitted is low, and incapable of penetrating to tissue depths of concern.

Q. How do I apply for a radiation dosimeter?

A. Radiation dosimeter applications are available on our website (<http://publicsafety.tufts.edu/ehs/files/RSP-061.docx>). See the section called "Forms." Complete the application and send it to the Tufts Radiation Safety Officer in Boston. You must provide relevant information such as radionuclide and quantity for those working with radioactive material, to ensure appropriate dosimetry badge assignment. Your dosimeter(s) will be issued

and sent to you as soon as possible. If you need immediate attention, and work in Boston, you may stop by the Health Physics Group office at 49 Holmes St. (3rd floor) or contact them at 617-636-6168.

If you have questions, and work in Grafton, please contact the Tufts University Health Physicist at 508-887-4556.

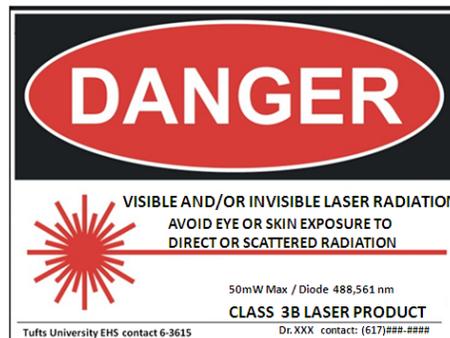
If you have questions, and work in Medford, contact TEHS at 617-636-3450.

Q. Is there a limit to the amount of radioactive material that can be in a laboratory at one time?

A. Yes, each Principal Investigator authorized by the RSC is required to manage and control radioactive materials as described within their permit application. Permits issued describe the research application, and detail radioactive materials possession limits and safety controls, amongst other related information. Amendments to current Permits are allowed and must be submitted to the Radiation Safety Officer for review using the Permit application form as found on the TEHS website.

Q. How can I know where radioactive material is used at Tufts? How do I know where lasers or UV equipment is in use at Tufts?

A. Permitted laboratories designated for radioactive materials or radiation-producing machines are required to be posted in accordance with TEHS policy. Laboratory entrances are conspicuously posted to communicate the nature of the hazard. For example, postings for those areas where radioactive materials are stored or handled, or areas that contain Class 3b or 4 lasers are provided below. Sources of UV radiation and radio frequency fields also have warning signs to alert workers.



Q. Can I take my radioactive material to another facility outside Tufts?

A. Radioactive material may be shipped from Tufts property when done in accordance with Department of Transportation regulation. There are very specific regulatory requirements that are followed when transporting radioactive materials on public roadways. Radioactive material may NOT be taken on Tufts shuttles, buses, trains, or in personal vehicles. Arrangements for the shipment of radioactive material in certified shipping containers and by approved carriers are made by contacting the Tufts Radiation Safety Officer at 617-636-3615. Special DOT training is required for all shippers of radioactive materials; trained personnel will assist you in completing the necessary shipping papers for the transport of radioactive materials outside of Tufts University or between campus locations. The individual researcher is responsible for all shipping charges.

Q. Does lab equipment require decontamination prior to disposal, repair or servicing?

A. Yes, there are strict regulations regarding the disposal of radioactive materials. Equipment labeled for disposal, recycling, repair, or servicing is subject to stringent radiological assessment by members of the Health Physics Group in Boston, or by the Tufts RSO at the Grafton and Medford Campus. Radiation Safety authorization is required before potentially contaminated equipment [centrifuges, hoods, pipette, etc.] are released for repair, recycling, servicing, or disposal. In Boston, contact the Radiation Safety Officer at 617-636-3450 or the Health Physics Group at 617-636-6168. For Medford or Grafton Campuses call the Tufts RSO at 617-636-3450.

Q. How do I get permission to use radioactive material sources at Tufts?

A. Radioactive materials management is described in our Radiation Safety Manual located at: <http://publicsafety.tufts.edu/ehs/radiation-safety/radiation-safety-manuals/>

For additional Radiation Safety information:

Radiation Safety Manuals

Ionizing Radiation Safety related

<http://publicsafety.tufts.edu/ehs/radiation-safety/radiation-safety-manuals/>

Nonionizing (**Laser**) Safety related document entitled “Tufts University Laser Safety Policies and Procedures Manual”:

<http://publicsafety.tufts.edu/ehs/files/TuftsUniversityLaserSafety.pdf>

Nonionizing (**non-Laser**) Safety related document entitled: “Tufts University Radiofrequency, and Other Nonionizing Sources Radiation Safety Policies and Procedures Manual”

Waste Disposal

Hazardous Chemical Waste and Universal Waste

Tufts University's Hazardous Chemical Waste Management Program is managed by TEHS staff who assist each generator (i.e. laboratory, clinic, maintenance area, etc.) to maintain compliance with federal and state regulations.

Chemicals are essential to support research and teaching and their use and disposal is regulated by the EPA who implements the Resource Recovery and Conservation Act.

RCRA regulates chemical waste from the "cradle-to-grave" including waste generation, transportation, treatment, storage, and disposal. MassDEP is authorized by EPA to enforce more rigorous hazardous waste regulations.

Universal Waste rules manage the handling and management requirements applicable to batteries, pesticides, thermostats, mercury-containing devices, and mercury-containing lamps (i.e., incandescent, fluorescent, high-intensity discharge, and neon light bulbs) that are recycled.

For information on Hazardous Chemical Waste and Universal Waste, refer to <http://publicsafety.tufts.edu/ehs/environmental-management/hazardous-chemical-waste-management/>

Medical and Biological Wastes

Medical and biological waste regulations mandate the treatment of all potentially infectious materials to minimize the risk of infection and injury.

Massachusetts regulations classify the following materials as medical and biological waste and require specific types of processing and documentation for processing:

- Human blood and blood products
Note: excludes feminine hygiene products
- Animals and animal wastes: if treated with or contaminated with an infectious disease agent presenting a risk to human health or infected with an agent that causes zoonotic diseases as listed in 105 CMR 300.140;
- Pathological wastes: human organs, tissues and body fluids from diagnostic procedures including specimens of such materials;
- Cultures of infectious agents: including live or attenuated human or animal vaccines
- Sharps: any object that can cause skin cuts or punctures including:
Needles, syringes, lancets, Pasteur pipettes, broken glassware, broken plastic ware, scalpels, blades, suture needles, and dental wires.
- Biotechnology effluent materials: any waste materials made from microbes or their products including microbes and their products made from genetically altered living microbes (recombinant DNA)

For information on Medical and Biological Waste, refer to <http://publicsafety.tufts.edu/ehs/biosafety-support/>