

# LAB SAFETY



Mount  
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Selikoff Centers for  
Occupational Health

Laboratory safety is important. This fact sheet is designed to help lab managers and workers be aware of safety regulations, determine what to do in case of an injury, be informed of general lab preventive tips, and use ergonomics to prevent aches and injuries.

A recent study has shown that scientists may have a false sense of security in the lab; while most of the study participants believed their labs to be safe, over half sustained an injury at some point while working.<sup>1</sup>

Different types of hazards exist in laboratories:

Examples include:	
Chemical	Carcinogens, toxins, irritants, corrosives, sensitizers, hepatotoxins, nephrotoxins, neurotoxins
Biological	Viruses, bacteria, fungi, and prions found in biological samples and animals
Physical	Physical accidents, radiation, noise, poor ergonomics
Psychological	Stress, social isolation

There are more than 500,000 people employed in U.S. labs.<sup>2</sup>

Preventive measures that reduce risk of these hazards are key to making your lab experience safe.

## OSHA Regulations:

There are regulations in place to ensure lab safety, including standards determined by OSHA.<sup>3</sup> Lab standards include regulations on:

- Hazardous Chemicals
- Hazard Communication
- Bloodborne Pathogens
- Protective Equipment
- Eye and Face, Hand, and Respiratory Protection
- Radiation
- Record keeping and reporting

All laboratories must have a chemical hygiene plan. Ask your employer if you are unfamiliar with your lab's plan. This plan must include the following information for all lab workers:<sup>4</sup>

- How to use personal protective equipment
- Requirements to ensure machinery and protective equipment are functioning properly
- Provisions for employee training
- Which operations require employer approval
- Provisions for medical consultation
- Measures to protect employees from hazardous substances

The Occupational Safety and Health Administration (OSHA) is a federal agency dedicated to the safety and health of workers across all industries.

There are other measures lab supervisors may take. Speak to your employer about:

- Industrial hygiene assessments to determine all hazards in the workplace and correct protective equipment.
- Pre-placement examinations, which take into account a researcher's job function and personal health history, to prepare a researcher for his/her role in the lab.
- Ergonomics education and evaluations for lab workers and managers focusing on work techniques, tools, and lab design that can prevent musculoskeletal injuries and discomfort.

## WHAT TO DO IF YOU GET HURT

If you get injured or have been exposed to a hazardous substance, move away from the exposure and remove any contaminated clothing. Wash the exposed area and apply appropriate first aid. Any spills or broken materials should be cleaned up as soon as possible to avoid additional exposure.<sup>5</sup>

In the case of a medical emergency, seek treatment at the nearest emergency room or urgent care facility.

After appropriate first aid is applied and if further treatment is needed, you should visit an occupational medicine physician, who can provide treatment and tools to prevent further injury.

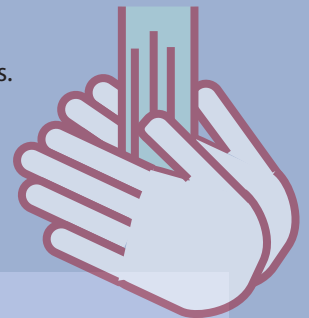
Occupational Health Physicians are doctors who specialize in the prevention, diagnosis, and treatment of work-related injuries and illnesses.

An occupational health specialist may refer you to an industrial hygienist or ergonomist who can assess your situation or worksite and provide tips on ways to decrease risk of future injury and/or illness.

Your employer must provide you opportunity to receive medical treatment and any follow-up treatment at no cost to you. Your employer must be able to provide information on which chemicals you were exposed to and details surrounding your exposure.

## PERSONAL HYGIENE & SAFETY

- Wash your hands when you leave the lab or if you come in contact with any chemicals or specimens.
- Avoid eating, drinking, smoking, handling contact lenses, applying cosmetics, taking/applying medicines.
- Learn location and how to use safety equipment, like eye washes, fire alarms, clean up tools.
- Avoid touching mouth, nose, and eyes.
- Pull back long hair, and remove long jewelry.
- Be aware of any allergies to animals, chemicals, latex.
- Know who to call in case of an emergency.
- Remember to have someone with you for two-person tasks and risky operations, e.g. collecting liquid nitrogen.
- When working alone or at nights:
  - Be aware of your surroundings.
  - Know who to call in case you need help.



Employers must train all lab workers on emergency response procedures, using personal protective equipment, identifying hazards and best practices to reduce exposure to hazards, and how to safely use all equipment.

## PERSONAL PROTECTIVE EQUIPMENT

- Wear eye protection and face protection when necessary.
- Wear gloves. Gloves designed for specific lab tasks should be available, for example, animal bite-resistant, cryogenic, or heat-resistant.
- Wear fitted silencing ear plugs when appropriate. You can be fit-tested by an industrial hygienist.
- Wear close-toed shoes, or steel-toed shoes if required.
- Check the dress code policy. Wear full-length clothing when appropriate.

Personal protective equipment (PPE) should fit you securely and properly. PPE are designed for specific job tasks; wearing PPE designed for the wrong task or that doesn't fit well can increase your risk of getting hurt.

## MACHINERY & EQUIPMENT

- Report all incidents of equipment malfunctions, or breakages immediately.
- Chemical fume hoods:
  - Do not let your head enter the fume hood.
  - Keep materials in the hood away from the sash.
- Centrifuges:
  - Balance centrifuges.
  - Inspect tubes for flaws before using.
  - Close lid before operation, do not open until rotor has come to complete stop.
- Autoclave/sterilizers:
  - Make sure autoclave door is closed and locked before beginning the cycle.
  - Do not remove items from autoclave until cool.



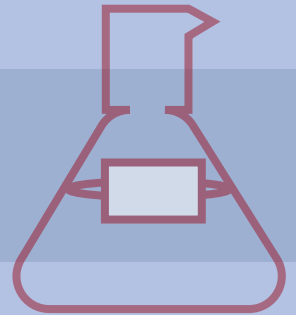
Lab equipment consist of highly specialized tools that must be used very carefully. Make sure you know how to use equipment before use, potential hazards, and how to identify if there is a malfunction.

## CHEMICAL & SPECIMEN MAINTENANCE

- Label all chemicals and specimens.
- Store all chemicals and specimens in a clear, organized way.
- Know safe transport and disposal of chemicals and specimens.
- Keep doors to rooms holding research animals closed.

### Your employer must provide:

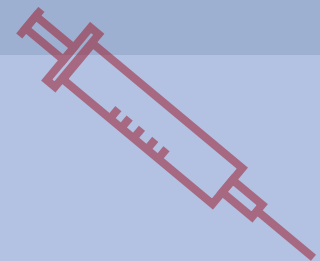
- Permissible Exposure Limits (PEL) for all chemicals you are exposed to.
- Material Safety Data Sheets (MSDSs) and all other relevant reference materials on chemicals' hazards, safe handling, storage, and disposal.
- Lab's chemical hygiene plan.
- Signs and symptoms associated with hazardous chemicals you are exposed to.



## CLEAN UP

- Keep your station clean and organized.
- Safely dispose of sharps.
- Clean up all spills immediately.
- Decontaminate surfaces after finished using them.
- Safely dispose of animal waste and bedding.
- Safely dispose of liquid nitrogen and other liquids or extreme temperature/pH.
- Change gloves/wash hands after handling animals, animal samples, and after leaving areas where animals are kept.

Keeping the floor clear can help you avoid slips, trips, and falls. Your workstation should be kept clean to prevent accidental burns, lacerations, and contamination. Keeping a clean workstation can also decrease stress.



# ERGONOMICS: PREVENTING ACHES AND INJURIES

## • General Tips

- Take short breaks to stretch and allow for muscle recovery in order to prevent fatigue.
- Avoid leaning on hard edges. When possible, place padding under forearms.
  - Alternate between sitting and standing when performing bench work for long periods.
  - Be sure to stretch your legs every 10 minutes when using a foot-ring on a lab stool.



## • Pipetting

- Use multi-channel pipettes to reduce repetition.
- Shorter pipettes help to decrease arm and shoulder elevation and fatigue.
- After every 5-10 pipette doses, release grip and splay fingers.
- When alternating between pipetting and computer use, take adequate breaks of 15-20 minutes to allow hand muscles to recover.



## • Microscopy

- Ideal microscope posture is with elbows close to your sides, with forearms parallel to your work surface. Be aware of your head and neck position and take frequent stretch breaks.
- Work with wrists in neutral/straight position.



## • Micromanipulation

- Practice using forceps between first and second digits instead of using thumb and first digit. Then alternate between the two positions to avoid overuse of thumb extensors and flexors. The thumb is used repetitively for almost every job task in the lab.

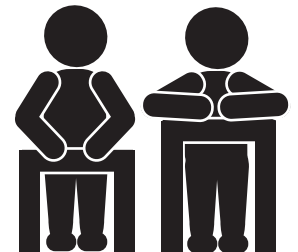
## • Chemical Fume Hoods

- When pouring repetitively, rest elbow(s) on padded surface to prevent contact stress.
- Avoid fatigue by positioning body as close as possible to the biosafety cabinet.
- When pouring from a heavy vessel, tip bottle rather than lifting up.



## • Work Bench Heights

- Be sure to adjust your stool height to match your bench height. Most laboratory benches are at fixed heights. Use guidelines suggested by NIOSH.
  - Precision work lab bench height should be above elbow height.
  - Heavy work bench height should be 4-6 inches below elbow height.



## • Eye Health

- Be sure to get annual eye exams and alert your healthcare provider of your job task requirements since lab work is visually demanding.
- Use dedicated work glasses when possible.
- Remember to blink and take your eyes off of your work every ten minutes.

## References:

<sup>1</sup>Van Noorden. Safety survey reveals lab risks. Nature. Jan 2013. 493:9-10  
<http://www.nature.com/news/safety-survey-reveals-lab-risks-1.12121>

<sup>2</sup>Laboratories. Occupational Safety and Health Administration.  
<https://www.osha.gov/SLTC/laboratories>

<sup>3</sup>Laboratory Safety Guidance. Occupational Safety and Health Administration.  
<https://www.osha.gov/Publications/laboratory/OSHA3404laboratory-safety-guidance.pdf>

<sup>4</sup>Laboratory Safety. Drexel University. <http://drexel.edu/facilities/healthSafety/labSafety/>

<sup>5</sup>Laboratory emergency response procedures. The University of Western Australia.  
<http://www.safety.uwa.edu.au/incidents-injuries-emergency/procedures/lab>



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