



Life Sciences Directorate ES&H News Letter

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Office Safety

By Bob Colichio

Maintaining a healthy office environment requires attention to chemical hazards, equipment and work station design, physical environment (temperature, humidity, light, noise, ventilation, and space), task design, psychological factors (personal interactions, work pace, job control) and sometimes, chemical or other environmental exposures.



A well-designed office allows each employee to work comfortably without needing to over-reach, sit or stand too long, or use awkward postures (correct ergonomic design). Sometimes, equipment or furniture changes are the best solution to allow employees to work comfortably.

On other occasions, the equipment may be satisfactory but the task could be redesigned. For example, studies have shown that those working at computers have less discomfort with short, hourly breaks.

Situations in offices that can lead to injury or illness range from physical hazards (such as cords across walkways, leaving low drawers open, objects falling from overhead) to task-related (speed or repetition, duration, job control, etc.), environmental (chemical or biological sources) or design-related hazards (such as nonadjustable furniture or equipment). Job stress that results when the requirements of the job do not match the capabilities or resources of the worker may also result in illness.

As with any type of accident prevention program, office safety first requires that we all recognize the hazards that exist. In fact, it is a BNL requirement to assess the workplace annually, identifying hazards that may exist. However, this does not exclude the employee from his/her responsibilities. In addition to compliance, we must accept our obligation to family, co-workers, and employer. In doing so, we will recognize the necessity to help maintain a healthy and safe work environment.

Electrical hazards are often easy to spot, provided you are alert. Perhaps, the most common and probably the major electrical hazard in the office is the use of extension cords. When used without guidelines, they can quickly create all sorts of problems such as circuit overload and trip hazards. If you must use an extension cord, be sure that it is rated to handle the equipment you're plugging in. Check with Facilities Services Electric shop if in doubt. Also, be sure that it is in good shape and that you don't create another kind of hazard by running the cord under a rug or through a high-traffic area.



A generalized list of safety reminders regarding electrical safety in the office area include:

- Avoid overloading outlets. A 120V/20amp general-purpose outlet is generally connected to other receptacles each sharing the same circuit. The circuit is then de-rated, allowing for a maximum load of 18 amps. Don't forget! Amperage varies depending on the particular appliance used. Some appliances, because of voltage or amperage, require a dedicated circuit. Plugging additional equipment into a dedicated circuit may result in overload. Remember! When in doubt – Consult with your Building Manager or ES&H Coordinator.
- Check for worn or frayed cords and have them replaced immediately. Never attempt to tape or splice a defective cord!
- Never place cords near heat or water.
- Never use electrical equipment when your hands are wet.
 - Report any potential electrical problems.



A classic tripping hazard in an office is the open file drawer. It sounds so simple, but it happens, please keep drawers closed. Another common tripping hazard is loose or torn carpet. When you see these conditions, report them to your supervisor or building maintenance person. Chairs can be dangerous as well. Be especially careful if you use a chair on wheels. Sitting too far forward can be just as dangerous as leaning too

far back.

Back injuries are very common and costly for both management and victim. Slip trip and falls are responsible for a large number of workplace back related injuries, but they also come from improper lifting. Remember to lift with your legs, not the back and don't try to lift more than you can safely handle. Always bend at the knees, not the back.

Keep in mind that good housekeeping can do a lot to keep the office safe. This means, if you drop it - pick it up! If you use it – put it back! Good housekeeping prevents aisles, stairwells, and hallways from getting cluttered. The result? Good housekeeping can lessen the chance of a fire and falls that may result in personal injury.

Lawnmower Safety

By Bob Colichio



Each year, approximately 75,000 people are injured seriously enough by lawnmowers to require emergency room medical treatment. Only a small percentage of the injuries are caused by mechanical failure; most are the result of human error.

Here onsite there was an incident with a large ride-on lawn mower where it slowly rolled onto its side while being used to mow a berm (small hillside) north of the Building 911 employee parking lot. The operator avoided injury by stepping off the machine as it continued to slowly roll over onto its side.

Here are some other tips to follow before and while mowing your lawn:

- **Become familiar with your mower.** Read the owner's manual before using the mower for the first time. Note all safety and operating instructions. Learn the controls well enough to act instantly in an emergency and to stop the machine quickly.
- **Proper clothing is essential to protect your body from harm.** Always wear non-slip shoes instead of tennis shoes or sandals. Steel-toe safety footwear offers the most protection against the blade. Long pants help protect your legs from objects that may be thrown from under the mower. Use ear plugs to prevent hearing loss caused by exposure to the high noise levels.
- **Police the area.** Before you start mowing, be sure the lawn is free of tree limbs, rocks, wires and other debris, which can get caught up in the blades or become a projectile.
- **The main source of danger is the blade.** To perform its task efficiently, the mower blade must be sharp and travel at a high speed. If a hand or foot gets under the mower while the engine is running, it can cause serious injury. Never attempt to unclog or work on a lawnmower while the engine is on.
- **Disconnect the sparkplug wire.** Any time it is necessary to reach under the mower, disconnect the spark plug wire to insure that the engine cannot start. It takes a little extra time, but not as long as it does to recover from a serious injury.

Human Performance Analysis of Liquid Nitrogen Spill

Editor: Lori Stiegler

A review of a recent incident at NSLS, as well as historical events, shows that communication and self checking are crucial to avoiding Human Performance Error Traps.

During commissioning of the X-ray lines last week, a seemingly small change was made in equipment in a hutch, and not communicated to all other workers that may work on that beamline. In a protein crystallography hutch, the inside dewar was disconnected from the fill line for maintenance. In this particular hutch, the inside dewar is not visible from the door. The next day a worker hooked up a full dewar to the fill line outside the hutch and opened the valve. After hearing the familiar sound of the line venting, he left the area. Consequently, about 75 liters of liquid nitrogen spilled inside the hutch before being noticed by others in the area who closed the valve. Fortunately, there was no injury or equipment damage, however some floor cleanup was necessary. This could have been avoided by communicating the changed equipment status either by a tag on the outside line, or verbal or written communication to the other workers.

Another way to avoid this error trap is by using the Human Performance tool '**STAR**'. You should always **STOP** before performing the task step, and focus on attention to detail. **THINK** before taking any action, and verify the action is correct. It may help to touch or verbalize the intended action. **ACT** – perform the intended action. And then you should **REVIEW** to verify that the actual response was the expected response.

NSLS has undertaken Human Performance Improvement training for staff so that we can all be more aware of error traps and error –likely situations. It's up to us to implement changes in order to help eliminate the errors that can affect our facility.

Laboratory Animal Allergens

By Bob Colichio



Laboratory workers who have regular contact with animals may develop laboratory animal allergies (LAA). LAA may affect people who have not previously experienced allergies. Epidemiological studies have shown that the greater the exposure to animal allergens, the more likely one will become sensitized and develop symptoms.

People with pre-existing allergies also have a greater chance of developing asthma over non-allergic workers.

Airborne allergens are the most common causes of LAA. Research animals such as rats, mice, and rabbits produce allergens in their urine, saliva, hair, pelt and dander. Laboratory researchers have frequent exposure to these animal by-products via inhalation and through direct skin and eye contact. Other possible routes of entry, such as percutaneous exposures, may occur as a result of animal bites or needle sticks.

The highest exposure rates typically occur in handlers responsible for cage cleaning and animal feeding. Staff members who have intermittent contact with animals such as technicians, students, and investigators were found to have a lower rate of LAA.

Symptoms of LAA are similar to other allergies and include itchy, watery eyes, sneezing, rhinorrhea (runny nose), skin rashes, and hives. Lower respiratory symptoms may also occur giving rise to shortness of breath and asthma. Many LAA cases can be prevented by exploring methods to minimize allergen exposure, including combining engineering and administrative controls, and by using the appropriate personal protective equipment (PPE).

Engineering controls include:

- Adequate ventilation to reduce airborne hazards
- The use of ventilated hoods or safety cabinets whenever possible.

Administrative controls include:

- Frequent cleaning of animal rooms/areas employing the wet method technique
- Following standard operating procedures
- Covering cages while transporting animals
- Maintaining hygienic work practices

Standard safe work practices include:

- Wearing appropriate PPE which may include lab coats, gloves and N-95 respirators
- Practicing frequent hand washing, and showering after work
- Wearing scrubs or coveralls rather than street clothes
- Avoid direct skin contact

Wearing Gloves Outside Laboratories

By Bob Colichio

I often receive complaints regarding individuals who wear gloves in hallways and touching elevator buttons, railings or door knobs with their gloved hands.

Many people are concerned about potential laboratory contamination transfer from gloves. You may have been working with something non-hazardous or radioactive but, the rest of us don't know that.

We strongly encourage laboratory workers to only wear gloves in the laboratories. Obtain a clean pair of gloves at your destination if required.

Preventing Repetitive Stress Hand Injury

By Denise Monteleone



Most people who experience soreness or numbness in the hand or wrist from pipetting automatically assume they have carpal tunnel syndrome (CTS). In fact, CTS is just one of many repetitive strain injuries (RSIs). These injuries, also known as cumulative trauma disorders (CTDs), are characterized by damage to muscles, nerves, tendons, ligaments, joints, cartilage or spinal discs. Usually, symptoms are gradual in onset as they result from many small injuries sustained over a long period of time. It is the cumulative nature of CTDs that make them dangerous.

Know Your Risk Factors: When looking at your work space and pipetting tasks, it is useful to keep certain risk factors in mind. Exposure to a combination of common risk factors can greatly increase your chances of developing one of the CTDs discussed previously.

Force: Force Manual pipettes require relatively high levels of hand force. Tip insertion, plunger manipulations, and tip ejection require forces that have been shown to exceed recommended risk levels. The bottom line is that 4 kg of ejection force is too much. New pipette designs significantly lower the forces required for plunger activation and tip ejection. Electronic pipettes reduce two major risk factors: force and repetition. Choose a pipette that requires less force and your thumb will thank you for it.



Be aware of your posture: Keep your ears positioned over your shoulder, shoulders in line with your hips, and arms close to your body when possible. It is important that the wrist be held in a neutral position, so that it is not bent up or down or side to side. An awkward posture may lead to injuries.

Static Position: Tightly gripping a pipette handle tightly for extended periods of time reduces the blood flow and may put pressure on nerves. Pipettes with a finger-hook make it easy to rest the hand before, during and after a pipette cycle. Your grip can be relaxed, reducing inflammation of the tendons and possible compression of the median nerve.

Summer Student Safety

By Bob Colichio

The following is a list of basic, safe laboratory practices which are expected of all students.

(Many of these are common sense rules)

- Eye protection (minimum: safety glasses with side shields) must be worn at all times in the laboratory when hazards are present.
- Students should wear durable clothing that covers the arms, legs, torso and feet. (note: sandals, shorts, tank-tops etc. have no place in the lab. (Students inappropriately dressed for lab, will be denied access)

- To protect clothing from chemical damage, wear a lab coat. Long hair should be tied back to keep it from coming into contact with lab chemicals or flames.
- An open flame may be ignited only when no flammable solvents are in the vicinity. The person lighting the flame must check with students in the vicinity to see if they are working with flammable solvents.
- In case of injury (cut, burn, fire etc.) notify the PI immediately and report to the Occupational Medicine Clinic.
- In case of a fire or imminently dangerous situation, call 911 or Extension 2222 immediately.

Know the location and operation of:

- Fire Extinguishers
- Safety showers and Eye Wash Stations
- Fire Alarm Boxes
- Exit Doors
- Telephones
- Eating, drinking and smoking are prohibited in the laboratory at all times
- Never work in the laboratory without proper supervision by an instructor.
- Never carry out unauthorized experiments. Come to the laboratory prepared. If you are unsure about what to do, please ask the PI.
- Supervisors should ensure all training is complete and review the ESR and focus on the hazards and controls for the work the students will do.
- Students should not be working in laboratories off hours unsupervised.