Neurobiology Safety Committee Meeting

June 10th, 2019
Critters in the Lab

If you notice critters in your lab, biowaste, regular trash please contact 2-1901 or the facilities email to have them send EHS Pest to investigate.
Proper packaging of Lab Glass Trash/Broken Glass

- Place non-contaminated glassware in sturdy cardboard box lined with a plastic bag...
- When the box is full tie the inner plastic bag.
- Close box lid and securely seal the box with tape.
- Label the box “CLEAN Lab Glass - Trash”.
- Place in the trash or directly into a dumpster.
Proper Packaging of Biohazardous Waste Boxes

**Step 1:** Line container with red bag.

**Step 2:** Tie bag when container is full.

**Step 3:** Secure lid on container. Ensure all closure and/or locking mechanisms are engaged.
During an alignment with a rotating graduate student, a senior postdoc was struck in the eye by a purple (405 nm) laser with about 18 mW (which is 18x higher than what’s eye safe).

- Fortunately, no detectable damage to the retina resulted from this incident.

The PI notified RSS about the incident and recorded an entire lab refresher training with RSS in attendance – which will be their annual refresher.

The main causes of this incident were:
- Researchers not wearing laser safety eyewear
- Since they chose not to wear eyewear, the beam power should have been reduced to less than 5 mW (laser pointer), and preferably less than 1 mW (supermarket scanner).
Laser Safety Eyewear

Not Required

Required
## EH&S Updates

### New LabPoint Up and Running

<table>
<thead>
<tr>
<th>Building</th>
<th>Room</th>
<th>Department</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPH1</td>
<td>906A</td>
<td>Immunology and Infectious Diseases</td>
<td>Up-to-Date</td>
</tr>
<tr>
<td>SPH1</td>
<td>303A</td>
<td>Molecular &amp; Integrative Physiological Sciences</td>
<td>Up-to-Date</td>
</tr>
<tr>
<td>SPH1</td>
<td>206</td>
<td>Genetics and Complex Diseases</td>
<td>Up-to-Date</td>
</tr>
</tbody>
</table>
NO GLOVES

Water Fountains  Door Handles  Elevators

Gloves should never touch door handles, elevator buttons, telephones, or other common surfaces.

Environmental Health & Safety – Longwood Office
107 Avenue Louis Pasteur, Newton, MA 02125
T: 617-495-1720

Lab Glove Policy Revision Date: 4/19/2019
Minors in Lab Policy

• Read and review

• Harvard has backup childcare options

• The lab is not one of them!

EH&S Reminders
EH&S Reminders

- Summer attire
  - Closed toed shoes!
  - Common sense clothing in the lab, please!
COMS Policy Updates & Links


Longwood Chemical Amnesty REVIEW
April 29th – May 3rd 2019
<table>
<thead>
<tr>
<th>Year</th>
<th>Chemicals Collected</th>
<th>Chemicals Swapped</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>7000</td>
<td>10</td>
</tr>
<tr>
<td>2016</td>
<td>5100</td>
<td>37</td>
</tr>
<tr>
<td>2017</td>
<td>3200</td>
<td>58</td>
</tr>
<tr>
<td>2019</td>
<td>10719</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>10719</td>
<td>10719</td>
</tr>
</tbody>
</table>

**Total # Chemical Containers Collected by Year**

- **2015**: 7000
- **2016**: 5100
- **2017**: 3200
- **2019**: 10719
Total waste drums shipped: 271
Total weights of hazardous waste shipped: 17,174 lbs
Unknowns tested: 114
Total man hours over 7 days: 471
Largest volume pick-up: C130 (955 containers registered*) and SGM 6th floor (980 containers registered*)
Chemical Amnesty

Incident Review

• 50mL brittle, old, plastic conical tube of concentrated nitric acid shattered and splashed onto a TEI employee while handling in SPH 1. Nitric acid originated from SPH.

• TEI employee was wearing safety glasses, nitrile gloves, and all of the appropriate PPE. Only their shirt and floor were affected.

• TEI employee rinsed affected area off for 15 minutes and was escorted to BWH ED. Luckily, was not injured or harmed.

• Plastic integrity of conical tube may have degraded overtime in presence of nitric acid. Based on spray patterns on shirt, it appears the acid may have had some force as it was released from the vial.

• Although there was a near miss incident, the fact that the container is no longer on campus makes the campus safer and the incident can be used to better educate the researchers in proper waste collection and timely disposal.
Laboratory/Workstation Ergonomics
Outline

• Ergonomic basics
• Topics of concern
  • Laboratory Hoods
  • Microscopes
  • Repetitive motions
  • Workstations
• Computer Workstations
Ergonomic Basics: What, How, & Why?

What  The science of fitting the job to the worker, rather than the worker to the job
     • Adapting tasks, processes, work stations, equipment and tools to the individual

How  • Ergonomic risk factors include repetitive motions, excessive use of bodily force, awkward postures, or environmental stressors (lighting, vibration, temperature)
     • Acute (single event) vs. Chronic (repeated over time) stressors

Why  Improves health and safety, productivity, human error, and employee satisfaction
How to identify tasks with ergonomic opportunities

• Ask: 'what tasks do I purposely avoid because of physical or mental discomfort'?
  • Examples:
    • Not enough time between repetitions to rest,
    • Equipment is too high,
    • Tool handles are too small,
    • An activity forces you to reach really far,
    • The gas cylinder connection at the manifold won't budge even when you put your entire weight on the wrench, ..... 

• Ask: 'when I started in the lab, was there any soreness from new lab activities'?
How to identify tasks with ergonomic opportunities

Work with EHS to identify the risk factors of the body parts involved in the tasks you've identified.

<table>
<thead>
<tr>
<th>Body Part</th>
<th>Risk Factor for Discomfort</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eyes</td>
<td>Glare or reflections on display</td>
</tr>
<tr>
<td></td>
<td>Low contrast on the screen</td>
</tr>
<tr>
<td>Head, neck, upper back</td>
<td>Craning neck – head forward</td>
</tr>
<tr>
<td></td>
<td>Head turned or tilted</td>
</tr>
<tr>
<td></td>
<td>Upper trunk and shoulders rolled forward</td>
</tr>
<tr>
<td>Forearm, wrist, hand, fingers</td>
<td>Pressure on wrist</td>
</tr>
<tr>
<td></td>
<td>Strong wrist angles</td>
</tr>
<tr>
<td></td>
<td>Pinch grips</td>
</tr>
</tbody>
</table>
• Ask 'why is the task currently designed like this':
  • Working in a BSC requires reaching for pipettes, causing back, shoulder and wrist pain.

<table>
<thead>
<tr>
<th>RISK FACTOR</th>
<th>WHY?</th>
<th>WHY?</th>
<th>WHY?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Over extending</td>
<td>Pipettes/tips located to side/rear of BSC</td>
<td>Safety and Sterile practices</td>
<td>Handling biohazardous agents</td>
</tr>
</tbody>
</table>

Can we change this?

How to identify tasks with ergonomic opportunities
## Risk Factors & Job Tasks

<table>
<thead>
<tr>
<th>Job Task</th>
<th>Repetition</th>
<th>Posture</th>
<th>Contact Stress</th>
<th>Force</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pipetting</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fume Hood</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Microscopy</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Bench Work</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Microtome/Cryostat</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Glove Box</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Cytometer</td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Fine Motor</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>
Laboratory Hoods
Biosafety Cabinets

• Be aware of posture
  1. 90° should be used
  2. Neutral positions

• Adjust lab chair (lumbar, seat height, seat pan) and use foot rest

• Comfortable knee space placement – work close to surface while fully sitting in seat pan

• Take breaks when possible or rotate tasks

• Limit contact pressure on wrist, forearm and thighs – use approved padding

• Avoid over reaching - perform work in front of you and keep supplies within easy reach

• Keep your sash clean to limit glare and eye strain
Fume Hoods

• Be aware of posture
  1. Use 90° angles
  2. Neutral Positions

• Use anti-fatigue mat when standing for long periods

• Take breaks when possible or rotate tasks

• Avoid over reaching - perform work in front of you and keep supplies within easy reach

• Keep your sash clean to limit glare and eye strain
Microscopes
Risk Factors

• Excessive neck flexion and shoulder rounding from microscope's low position.
• Lack of adequate leg and knee clearance under work table.
• Working with elbows winged and elevated.
• Pinch grip when adjusting binocular eyepiece.
• Wrist and palm contact pressure against hard surfaces in the carpal tunnel area.
• High repetition and prolonged sedentary position.
• Eye strain and fatigue.
• Awkward posture from microscope base distance from person.
Preventative Measures

• Install horizontal eye piece adapter or place an insert underneath microscope base to elevate and adjust eyepiece angle.

• Position microscope as close to user as possible, maintaining proper posture and upright head position.

• Clear clutter underneath microscope bench to allow adequate leg and knee clearance under work bench. Use adjustable footstool where appropriate.

• Avoid elevated winged elbows, keep close to sides, bent between 45-90°.

• Wrists in neutral (straight) position. Avoid forearm and wrist contact pressure. Pad sharp edges with foam to reduce pressure.

• Use an adjustable chair, lumbar should always be supported. While seated, the thighs should be well supported and the backs of the knees free from any pressure created by the seat angle.

• Prevent repetition and alter prolonged awkward posture. Take adequate small breaks. Every 15 minutes close your eyes and focus on something in the distance.

• Make sure scopes remain clean all the time, and lighting is of proper intensity for clarity.

• Use television systems to eliminate the use of binocular eyepieces when appropriate.
Repetitive Motions
Repetitive Motions

• The combination of force, frequency, and posture contribute to wear and tear injuries.
• Repetitive motions done over long periods of time make repetitive strain injury (RSI) more likely.
• RSIs are increased when awkward postures and forceful exertions are involved.
• Like pipetting, typing, mousing, etc.
• Best to take lots of breaks to avoid RSI
Pipetting Ergonomics

• Encourage micro-breaks, 2 minutes for every 20 minutes. Mild hand exercises are beneficial during micro-breaks.

• Clean pipettors on an annual basis to reduce "Sticking" and improve quality of work.

• Use thin-walled pipette tips, reducing tip insertion and ejection force.

• Adjust workstation so arms are not in elevated or winged position, work with arms close to body.

• If it is necessary to stand for long periods of time, use a lab anti-fatigue mat.

• Use electronic pipettes for highly repetitive tasks.
Pipetting Ergonomics

> Bending the upper back strains the neck.
Try Before You Buy!

<table>
<thead>
<tr>
<th>Electronic serological pipette with multi-finger dispensing and aspirating controls</th>
<th>Multi-channel pipette</th>
<th>Electronic pipette with automated aspirating and dispensing controls</th>
<th>Pipette with ergonomic hand-fitting, light-weight design</th>
<th>Electronic multi-channel pipette with automated aspirating and dispensing controls</th>
</tr>
</thead>
</table>

[https://us.vwr.com/store/](https://us.vwr.com/store/)

To request a demo of an ergonomic pipette, contact VWR:

**Harvard University Longwood Campus**

Jodi Loring  
Account Manager  
[Jodi_Loring@VWR.com](mailto:Jodi_Loring@VWR.com)  
Phone: 781-534-0853
Breaks and Stretching – for ALL repetitive, long work
Workstation Ergonomics
Laboratory Benches

- Keep workflow items within arm's reach to avoid excessive overreaching.
  - Frequently used items should be in the normal work area and close enough to see detail.
  - You should not have to hold up your hands and arms for long periods—adjust work height or provide supports and place less frequently used items in the maximum work area.
  - Use a turntable to store equipment near the worker to reduce reaching and twisting.
- Allow yourself leg room, don’t store supplies/equipment under bench areas where frequent work is done.
- Use a foot rest for higher lab benches, if your feet don’t touch the floor
- Use anti-fatigue mats if you will be standing for long periods of time.
- Take frequent micro-breaks to perform stretching exercises.
Workstation Height

• Ideal workstation height depends upon a variety of factors
  • Task
    • Fine motor work that requires high visual acuity (e.g., micro-manipulation, pipetting) - most people prefer a work surface that is slightly above elbow height
    • Fine motor work with low visual acuity (e.g., touch typing) - most people prefer a work surface that is at or slightly below elbow height
    • High arm force tasks (e.g., hammering or similar) - most people prefer a work surface that is below elbow height
  • If you are seated or standing
Sit or Stand?

• Sit when...
  • Your work is light
  • Your work is within close reach
  • Your work is easily seen (within 3' of your eyes)

• Stand when...
  • You need to reach for your work
  • Your work involves heavy objects or high force
  • You need to move your body with your arms to do your work
  • You need to move around to get the best angle to view your work
  • You are tired of sitting

• It's best to avoid "static postures" for extended periods
  • Mix it up! Take breaks! Go for a walk!
Laptop Ergonomics

• NOT intended for extended periods of time
• Ideal positioning:
  • Laptop screen = Your line of vision is in top 1/3 of screen
  • Keyboard = Just below your elbow when at 90°
• Solution:
  • Use laptop keyboard, add secondary monitor to achieve ideal height
  • Use laptop screen (propped up), add secondary keyboard to achieve ideal height
Computer Workstation Self-Assessment Tool

https://www.ehs.harvard.edu/programs/ergonomics
Request an Ergonomic Evaluation

Laboratory Evaluation

• Christopher Tran
  • Send an e-mail directly to Christopher_Tran@harvard.edu to schedule an evaluation of your lab workstation
    • BSCs/Lab Bench
    • Microscopy
    • Pipetting
    • Microtome
    • Cryostat
    • Glove Box
    • Micromanipulation/Fine-Motor Skills

Computer Evaluation

Computer Workstation
Ensuring your computer workstation is properly set-up and aligned can prevent repetitive stress injury or discomfort.

As a start, all users should complete the EH&S Computer Workstation Self Evaluation Assessment online training program. This program is intended to educate users on the basics of ergonomics and apply this knowledge to a self-evaluation and correction of their workstation.

If additional assistance is needed, EH&S can provide an in-person evaluation of your workstation by completing this online request form.
Questions?