



# Department of Occupational and Environmental Safety NEWSLETTER

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CASE WESTERN RESERVE UNIVERSITY

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## Who Wants to Pass an OSHA Inspection?



In the spirit of the popular game show, D.O.E.S. presents its own version of high-stakes multiple-choice trivia. All of the questions here have to do with possible violations which would be spotted during a routine inspection of lab safety procedures. The answers are inside, but see how far you can get without them -- answer each question by visually inspecting your own lab! Use your co-workers as life-lines (you only get three) and try to do something almost as rewarding as winning a million dollars: become compliant, become safe. So...who wants to pass an OSHA Inspection? (Cue dramatic music) Let's play!

- In front of your laboratory exits, there is:
  - a sign.
  - a bicycle.
  - nothing.
  - a sleeping professor.
- You may eat in the laboratory area:
  - during breaks.
  - when hungry.
  - when alone.
  - never.
- Hazardous waste containers must be labeled:
  - hazardous waste.
  - refuse.
  - don't touch.
  - lunch.
- Your Chemical Hygiene Plan is:
  - safe.
  - visible.
  - lost.
  - in your car.
- Your chemical fume hood has been inspected:
  - in 1974.
  - two years ago.
  - this past year.
  - huh?
- Your chemical refrigerator should be:
  - cold.
  - used for snacks.
  - locked.
  - turned off at night.
- You should have on-hand knowledge of:
  - worthless trivia.
  - MSDS.
  - atomic numbers.
  - Dave Burba's ERA.

## Heat Stress: Know the Signs



With the summer finally here, a number of season-specific safety issues are worth discussing. Labs and buildings are mostly air-conditioned, but if the system goes down or you have work to do in a non-conditioned area, be aware of the risk of heat illness, which can be complicated by heavy PPE and heat-producing experiments.

High temperatures and humidity stress the body's ability to cool itself, and heat illness becomes a special concern during hot weather. There are three major forms of heat illnesses: heat cramps, heat exhaustion and heat stroke, with heat stroke being a life-threatening condition.

### Heat Cramps

Heat cramps are muscle spasms which usually affect the arms, legs, or stomach. Although heat cramps can be quite painful, to prevent them, drink electrolyte solutions such as Gatorade during the day and try eating more fruits like bananas.

### Heat Exhaustion

Heat exhaustion occurs when the body's internal air-conditioning system is overworked, but hasn't completely shut down. This happens when you don't drink enough fluids to replace what you're

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## **What a WASTE!**

### **Dangers of the Unknown**

Old chemicals left on lab storage shelves for "next semester" or simply "the next guy" represent an **enormous** potential safety hazard. In the past, unknown chemicals left in this manner have covertly begun reactions which have led to explosions, fires, and large personnel evacuations.

The simple solution is this: when you put your name on working samples, **add the chemical constituents as well** -- even if they are harmless. And please make sure such labels are securely attached. Also confirm that your chemical inventory (required by Safety Services) is up-to-date and complete. The summer is a good time to go through your **entire** stock to mark and identify such potential hazards. If you're switching rooms or moving labs, you **must** make sure to label **everything** left behind.

### **Is Your pH Correct?**

Liquid radioactive waste must be neutralized to a pH between 6 and 8 prior to waste pick-up by the Radiation Safety technicians. Do NOT assume that the pH is between 6 and 8. The pH can be tested simply by using pH paper.

Often buffers are added during an experiment to neutralize a solution, bringing it pH to a desirable level. However, it **cannot be assumed that the pH will stay at that level** by the time the solution is prepared for disposal. If the liquid has been standing for a period of time, changes in pH can occur due to bacterial contamination of the media and the release of carbon dioxide.

Any liquid waste picked up by the Radiation Safety Office not found to be within this pH range will be returned to the lab to be neutralized. Another waste pickup can then be scheduled by calling Radiation Safety at x2906.

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sweating away. The symptoms of heat exhaustion include headache, heavy sweating, intense thirst, dizziness, fatigue, loss of coordination, nausea, impaired judgment, loss of appetite, hyperventilation, tingling in hands or feet, anxiety, cool moist skin, weak and rapid pulse (120-200), and low-to-normal blood pressure. Somebody suffering these symptoms should be moved to a cool location such as a shaded area or air-conditioned building. Elevate feet, loosen their clothing, apply cool compresses or fan them to cool them down. Have them checked by medical personnel.

### **Heatstroke**

Heat stroke is a life-threatening illness with a high death rate. It occurs when the body has depleted its supply of water and salt, and the victim's body temperature rises to deadly levels. Heat stroke is sometimes mistaken for heart attack, which makes symptom-recognition important. Symptoms include:

- a high body temperature (103 F)
- a distinct absence of sweating
- hot red or flushed dry skin
- rapid pulse and difficulty breathing
- constricted pupils
- any/all the signs or symptoms of heat

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## **Upcoming Training Sessions**

### **Radiation (x2906)**

- New Training:** August 15, 30 (call for times)
- Retraining:** August 8, 23 (call for times)
- X-ray Training:** call office to set up training

### **Chemical (x2907)**

- OSHA Lab Standard:** Mondays 1-3 (Service Building Conference Room)

### **Bloodborne Pathogen (x2907)**

- New Training:** Mondays 3-4 (Service Building Conference Room)
- Retraining:** August 2, 17, 29 (call for times; Service Building Conference Room)

Don't forget: rad re-training is now also **ONLINE** on our website: <http://does.cwru.edu>.

As always, call us for upcoming dates and times.

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exhaustion such as dizziness, headache, nausea, vomiting, or confusion.

- high blood pressure.

It is vital to lower a heatstroke victim's body temperature. Seconds count. Pour water on them, fan them, or apply cold packs. Call x3333 and get an ambulance on the way as soon as possible.

#### **Precautions to avoid heat illness**

- Do not stay in or leave anyone in closed, parked cars during hot weather (**this includes pets!**).
- Do not exercise vigorously during the hottest times of the day.
- Wear light-colored, loose-fitting clothing.
- Drink lots of liquids. Water and electrolyte drinks are recommended. Thirst is **not** a reliable sign that your body needs fluids.
- Do not drink alcohol or beverages with caffeine. These items increase fluid loss.
- Stay out of the sun if you are taking water pills, mood-altering, or antispasmodic medications.

#### **Centrifuge Check-Up**

Does your lab have a centrifuge? Are you aware that 90% of centrifuge failures are the result of user errors? To lower user risk and prevent lost samples and damaged equipment, check and follow these guidelines:

##### **1. BEFORE starting the centrifuge:**

- Insure centrifuge bowl and tubes are dry.
- Is the centrifuge spindle clean?
- Avoid overfilling of tubes and bottles.
- Ensure rotor is properly seated on drive hub.
- Make sure tubes are properly balanced.
- Are O-rings properly attached to the rotor? Is the vacuum grease fresh?
- Is the rotor properly secured to the drive?

##### **2. AFTER (Maintenance and cleaning):**

- Keep rotors clean and dry. If a spill occurs, make sure rotor has been cleaned/decontaminated.
- Avoid mechanical scratches. The smallest, scarcely visible scratch allows etching to enlarge the fracture, which is subject to enormous rupturing forces at high g's. This could result in a dangerous rotor explosion.
- Avoid bottle brushes with sharp metal ends and harsh detergents when cleaning aluminum rotor heads.
- After proper clean-up, rinse the rotor with deionized water.



## **HOT TIPS**



### **Handling Millicuries of 32P**

Handling millicurie quantities of 32P can be dangerous, so review this information, courtesy of NEN:

- 1) An intense collimated beam of beta radiation comes out of the mouth of an open vial. At 1 mCi in 1 ml, the dose rate at 15 cm above the open vial is about 2 rem/hour. This dose rate will increase with increasing activity. If you have 40 mCi in 1 ml, you may be dealing with 50 to 100 rem/hr at pipetting distances.
- 2) An uncollimated liquid-filled pipette tip or petri dish can also contribute to dose to the hands. A significant depth of liquid in the petri dish will self-shield part of the beta dose.
- 3) The bremsstrahlung dose levels are minor compared to the unshielded beta dose rates. At 15 cm from a 40-mCi vial, the dose rate from bremsstrahlung may be only 3-4 mrem/hour.
- 4) Pipetting should take place behind a 3/8-inch plastic shield to protect the torso and head. Efforts should be made to optimize the positioning of the stock vial and final container to minimize travel distance and time.
- 5) Try to get the pipetting hand out of the beam of stock vial as soon as possible after removing the pipette tips. Remove and replace the stock vial cap using tongs. Put the cap back on immediately after pipetting. Have the petri dishes in a secondary tray (such as a cafeteria tray) during transfers. A top shield during transfer would also be prudent.
- 6) The pipette should have a 3/8-inch plastic shadow shield attached to the grip. The shield should be large enough to keep the hand and forearm out of the beam from the stock vial. Once pipetting is done, the used tip should go directly into a shielded waste container.
- 7) Gloves should then be monitored. If contamination is found, adjust your technique to eliminate the cause. The dose rate of 32P directly on the skin is about 8800 mrem/hour per microcurie/cm<sup>2</sup>. A layer or two of gloves will not decrease the exposure rate by much.

This information is relevant to all users of 32P. Call Radiation Safety at x2906 if questions.

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8. In the event of a fire, immediately call:  
 A. Safety Services. B. x3333.  
 C. x9911. D. 911.
9. All injuries or spills of any magnitude should be:  
 A. discussed. B. analyzed.  
 C. ignored. D. reported to your P.I.
10. All lab personnel should be trained by:  
 A. the P.I. B. your Department.  
 C. Health Services. D. D.O.E.S.
11. Posted in your lab should be:  
 A. a class list. B. an 8x10 of you.  
 C. a swimsuit calendar. D. Contact numbers for lab personnel.
12. P.I. stands for:  
 A. Personnel Info. B. Priv. Investigator.  
 C. Primary Investigator. D. Pete Isherwood.
13. P.P.E. should be worn:  
 A. at all times. B. when needed.  
 C. only on hands. D. as a fashion statement.
14. The phone number to Safety Services is (don't cheat!):  
 A. x1234. B. x2960.  
 C. x2609. D. x2907.

And finally:

15. The most important component of a laboratory is:  
 A. Good data. B. Good coffee.  
 C. Personnel. D. Safety.

There you have it. How did you do? Did you have to use any life-lines? Check the answers on the right and see how compliant your lab is. Because even though this is all in good fun, but where real safety is concerned, the stakes are much higher. Be compliant; be safe.

#### ANSWERS:

1. **A. Nothing.** All of your exits should be unobstructed so that in the event of an emergency, everyone may evacuate as rapidly as possible.
2. **D. Never.** In the laboratory area designated for experiments, there is absolutely no food allowed! Keep all food in the designated eating area --

which should have appropriate signs posted. D.O.E.S. will confiscate any food we find.

3. **A. Hazardous Waste.** This should be plainly visible.

4. **B. Visible.** In an easily-accessible location.

5. **C. This past year.** Safety Services arranges inspections/certification every year. If you have a question or concern about a hood, call us ASAP.

6. **C. Locked.** This is a **must**, especially if the refrigerator is outside of the general lab area. Also: do not keep food in the same refrigerator as you do chemicals. Not-so-tasty, potentially fatal mistakes might result.

7. **B. MSDS.** Should be posted for all relevant chemicals in your lab and known to personnel.

8. **B. x3333.** Do not call 911. x3333 is Protective Services who will route your call accordingly. Be sure and give them a description of the fire and your complete location.

9. **D. Reported to your P.I.** This goes for the slightest spill or injury -- symptoms or results can often occur much later and reporting can help identify the problem.

10. **D. D.O.E.S.** If you have untrained personnel, refer to the times on pg. 2 or call us.

11. **D. Contact numbers.** This is very important and **should include current numbers of people who may be reached twenty-four hours a day** in the event of an overnight emergency.

12. **C. Primary Investigator.** Know yours.

13. **B. When needed.** PPE is determined on a materials- and lab-specific basis and should be adhered to zealously when handling the materials in question. However, be sure to remove PPE (especially gloves) when leaving the lab or using communal objects such as doorknobs. Don't inadvertently transport hazardous materials this way.

14. **D. x2907.** Radiation Safety is x2906.

15. **D. Safety.** Data is important, but laboratory safety should be the highest-order concern of your lab, especially if you are dealing with hazardous materials. If you are vigilant and careful, safety can become an ongoing process that will pay off for years to come.

Thanks for playing!

## Pipetting Ergonomics



Did you know that pipetting can be a cause of serious injury? A recent study found that technicians who pipetted for over 300 hours a year were at very high risk of developing cumulative trauma disorders (CTDs) such as tendinitis, tenosynovitis, carpal tunnel syndrome, and generative arthritis. These injuries are not only very painful and incapacitating, but are expensive as well -- claims can easily exceed \$25,000 for a single injury alone.

These types of injuries are also detrimental because they can cause small errors in pipetting which often result in major discrepancies in the final results of an experiment.

Pipetting injuries are caused by two factors: 1) force and 2) repetition. In a normal pipetting cycle, the "high hand" is called on to exert as much as 12 kilograms of cumulative force per cycle. If you are exerting this force repetitively over time, you increase your chance for injury. For a repetitive task such as this, ergonomists recommend a force exertion of only 3 kg for a male and 2.1 kg for a female -- levels well below so-called normal exertions.

To prevent against injury, a traditional mechanical pipettor should not be used for more than 1-2 hours per day. If this is not feasible, the best way to address this problem is through technology. Since the major cause of injury in pipetting is the constant inward rotation of the thumb, one way to alleviate force is to choose a pipettor with a plunger that travels as short a distance as possible. These distances can sometimes vary up to .5 cm, so try to choose one with a short plunger distance.

Another way to alleviate pipetting stressors is to utilize even newer technology. The range of handheld electronic pipettors on the market such as the Biohit Proline range and the LTS LiteTouch line both use cylindrical tips to reduce tip ejection and require a minimum of force.

Now that ergonomics has proven to be a major, OSHA-addressed safety issue instead of just a vague set of theories, make sure that ergo-friendly pipetting is a part of your everyday laboratory routine.

Information in part from Mannonen and Ylatups, *Intl. Biotechnology Laboratory* Aug. 1998.

## Bicycle Safety: Know the Facts



With summer here and gas prices soaring out of control, riding your bike to work can be a pleasant alternative to your gas-guzzling, four-door sedan. But there are some responsibilities to consider when taking your bike to the street.

### Locking up

Lock your bike up to avoid theft, but **DO NOT** block any entrances to buildings and/or fire zones. If your bike is blocking any means of egress including a door or even a stairwell, Protective Services will come and take it. **FYI:** Kryptonite-style locks are **not** immune to their cutting tools.

### Helmets

How large is the problem of bicycle-related head injury in the United States? Here are some facts:

- According to reports, 96% of bicyclists killed in 1997 were not wearing helmets. Each year, about 153,000 get treatment in hospital emergency departments for bicycle-related injuries.
- Bicycle helmets have been shown to reduce the risk for head injury by as much as 85% and the risk of brain injury by 88%.
- Universal use of bicycle helmets by children aged 4 through 15 years old would prevent between 135 and 155 deaths per year and between 18,000 and 55,000 scalp and face injuries annually.
- If all bicyclist wore helmets one life would be saved everyday, one head injury would be prevented every four minutes.

The facts speak for themselves. Bike safely!

## Assault with a Deadly Isotope



Recently at the University of California at Irvine, a technician was found to have intentionally contaminated a fellow worker's chair with 15-30 mCi of <sup>32</sup>P. The victim received about 400 mrem shallow dose from the exposure. The NRC limit is 50 rem/year. Once the poisoning was diagnosed, inspectors deduced the path of the contaminant and identified the culprit. Charges were then filed although the motive behind this act remains unknown. The perpetrator was charged with assault with a deadly weapon.



### *Reminder:*

Fall semester begins August 28!!!

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**Safety News For the Campus Community**