

Environmental Health & Safety

SafetyMatters

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ENVIRONMENTAL HEALTH & SAFETY

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Laboratory Safety Culture by Christopher Pettinato

“How do you get people to buy into safety?” This is the “\$64,000” question being asked by the National Academies Board on Chemical Sciences and Technology (NABCST) following a preliminary review of the results of an international survey of researchers’ workplace attitudes and practices regarding safety. *Nature*, which published the survey’s preliminary findings in its January 2, 2013 edition (<http://www.nature.com/news/safety-survey-reveals-lab-risks-1.12121>), helped launch the survey on behalf of UCLA’s Center for Laboratory Safety. The Center was established in 2011 following the death of a research assistant. This incident has been widely covered, mostly recently for the criminal charges filed against the Principal Investigator, and has forced scientists to reexamine their laboratory’s safety practices. The survey, to-date the most comprehensive of its kind, was responded to by ~2,400 scientists, mostly from the United States and United Kingdom.

The baseline study revealed that while 86% of respondents stated that their laboratories were safe, roughly 50% noted that their laboratory had suffered work-related injuries and 30% reported having witnessed at least one significant injury requiring medical attention. Additionally, more than 25% reported sustaining an injury, which they had not reported to their supervisor. The results from some of the more specific questions in the survey indicate that safety standards are often not followed, with 50% of respondents agreeing that laboratory safety could be improved. Differences between junior (i.e., postdocs and PhD students) and senior scientists (i.e., professors, PIs and department heads) were also noted, with 40% of junior scientists stating that laboratory personnel worked alone in the laboratory on a daily basis, while only 26% of senior scientists reported this occurrence. The authors posit that senior scientists may not have a firm understanding of the safety culture in their own laboratory.

Truthfully, the scientific research and safety communities did not need the NABCST to ask the “\$64,000” safety buy-in question. In fact the safety professional community has been asking this question, albeit somewhat informally, for decades. The answer inevitably informs us that safety must be a part of the fabric of an organization for buy-in to occur at all levels, and that in fact, safety must be a priority at all levels of an organization for it to be relevant. For safety to be a priority at all levels, EVERYONE in the organization must play an active role in establishing, fulfilling and reinforcing responsibilities for themselves and for their colleagues. This means continuous dialogue with all stakeholders and self-policing of institutional policies and standards, coupled with periodic benchmarking by safety professionals or safety-savvy senior scientists. While we pause to take a look at our own safety fabric, NABCST will be partnering with behavioral scientists later this year to develop practical guidance for researchers on how to establish a better safety culture and attempt to more formally answer the “\$64,000” question.



Are You Ready for the DEA? by Kevin McGhee – Biological Safety Program

Controlled substances, which are heavily regulated by the government due to their potential for abuse, are a valuable tool for many researchers, in particular for those conducting research in animal models. While the use of controlled substances is fairly commonplace, careful attention must be given to regulatory compliance when acquiring, possessing, using, or disposing of these materials.

Regulatory oversight of controlled substance use rests jointly with the Drug Enforcement Administration (DEA) on the federal level and locally with the NY State Department of Health (DOH). Recently, several Columbia investigators have been subject to random, unannounced compliance inspections by the DEA, a practice that EH&S expects to continue.

To prepare your laboratory for an unannounced compliance inspection, please review the University's Policy for the Acquisition, Use and Disposal of Controlled Substances in Research. This policy, along with many other useful resources and reference documents, can be found on the controlled substances webpage: <http://ehs.columbia.edu/ControlledSubstances.html>. A primary focus of these DEA inspections has been on proper recordkeeping. Templates developed by EH&S have been extensively vetted and when properly completed, have been favorably accepted by regulators. Laboratories using controlled substances in research are required to complete a Receipt Log, Use Log and Biennial Inventory, which is available on the EH&S website.

EH&S is available to provide consultation to any laboratories using controlled substances in research (contact boisafety@columbia.edu).

Radioactive Waste Mis-management

by Lauren Kelly – Hazardous Materials Program

Recently, while completing regular waste pick-up rounds, an EH&S team member was splashed with an unknown liquid that was inappropriately discarded in a 1 gallon "sharps" container. It was later determined the liquid contained 0.04 microcuries of ³⁵S, a radioactive isotope. Thankfully, the safety professional was wearing appropriate personal protective equipment (including a coat, gloves and safety glasses) so that exposed skin covered preventing bodily contamination.

To prevent future occurrences and avoid unnecessary injuries to you, your colleagues and EH&S personnel who handle your waste, always wear appropriate personal protective equipment when working with or around hazardous materials ... <http://www.ehs.columbia.edu/ppe.html> and always manage laboratory waste in accordance with University policies for radioactive, chemical and regulated medical wastes ... <http://www.ehs.columbia.edu/WasteMgt.html>. Proper waste management includes using only an appropriate collection container for your laboratory's wastes, and labeling all waste collection containers appropriately with the contents (including the chemical name).

EH&S LAUNCHED ITS REDESIGNED WEBSITE OFFERING NEW FEATURES AND ENHANCED NAVIGATION.

[HTTP:// EHS.COLUMBIA.EDU](http://ehs.columbia.edu)

NO EATING DRINKING OR APPLYING COSMETICS WHEN WORKING IN THE LABORATORY

For Lab Fire Safety Prevention tips, check out:

FDN(wh)Y Me @

[http://](http://www.ehs.columbia.edu/FDNYMe.html)

www.ehs.columbia.edu/FDNYMe.html

[On-line Chemical Waste Pick-up Request](#)

Form.

Biosafety Cabinet Maintenance - Thinking Inside the Box

by Christopher Aston - Biological Safety Program

When properly maintained and used, biosafety cabinets (BSCs) protect users from exposure to infectious materials and prevent contamination of research material. They must be certified annually, or following relocation, to ensure the integrity of the HEPA filter and blower motor. Individual laboratories are responsible for arranging this service through an outside vendor. The list of University-approved vendors for this service can be found @ <http://www.ehs.columbia.edu/bccert.html>. Some self-performed maintenance can also help ensure that your BSC is functioning correctly and remains free of contamination. After a certification, take note of the manometric gauge reading, and consider placing a mark there. Check the gauge before each use; any significant change in pressure may indicate that the BSC is not operating effectively and that a maintenance call to an approved vendor is warranted.

Most BSCs have a removable work surface tray and front grille. Researchers are often surprised to see how dirty the space underneath can get. Puddles of tissue culture media and even pipette tips inadvertently dropped through the grille (by users who do not pipette with their hands well inside the cabinet and over a collection tray) can lead to the prolific growth of microbial life. A schedule for periodic removal and cleaning of the space underneath with 10% bleach followed by 70% ethanol is recommended to avoid contamination of valuable tissue culture experiments. The drain valve under the work surface can facilitate cleaning. It's best to empty the BSC of materials after each use, but if vacuum flasks for aspiration are maintained inside the cabinet, frequent replacement of disinfectant and cleaning of these vessels will also reduce the likelihood of contamination. Compression of the Tygon tubing may indicate that the in-line HEPA filter needs replacement. Many tissue culture contamination problems stem from incorrect use or maintenance of BSCs.



EH&S is available for consultation (contact biosafety@columbia.edu).

Summer Students and Interns

As spring and summer breaks approach, EH&S would like to remind the research community about the University's policy, Guidelines for Short-term Visitors in Research-Related Activities (policy found at <http://evpr.columbia.edu/content/selected-policies>), regarding the presence of both minors and interns in laboratories. The policy includes special provisions for minors, defined as individuals less than 18 years of age, performing research-related activities in University laboratories. Please also review the following:

- ◆ A Registration Form and Parental Consent Form must be signed by a parent or guardian of the minor volunteer or observer, prior to them performing any research related activities.
- ◆ No one under the age of 14 is allowed in any University laboratory (except if present on an organized tour or field trip for strictly observational purposes, provided hazards are minimized).
- ◆ Provided there is direct supervision by the principle investigator, minors between ages 14 and 17 may perform certain research-related activities in lab, provided the applicable safety training is complete.

No one under the age of eighteen is allowed to be alone in a laboratory, handle human blood, human cell lines or any other material defined as "other potentially infectious materials" by OSHA (Bloodborne Pathogens Standard 29 CFR 1910.1030), handle radioactive materials, or work directly with vertebrate animals or enter Institute for Comparative Medicine facilities where such animals are housed. Visit @ <http://evpr.columbia.edu/content/selected-policies>.

FAQs Concerning FDNY Certificate of Fitness(C-14) for Laboratories

by John LaPerche - Fire/Life Safety Program

What is a Certificate of Fitness (C-14) for Supervising Non-production Chemical Laboratories and who requires one?

NYC Fire Code requires “at least one certificate of fitness holder be present on each floor of the laboratory unit ... while the laboratory is in operation.” Since most laboratory units on Columbia’s campuses are divided by room, and not entire floors, to maintain compliance at least one person with a Certificate of Fitness must be present *in the lab unit*, when the lab is in operation. While the University recommends the “buddy” system when working in a laboratory, should only one person be in the laboratory working, that person must have a Certificate of Fitness. Please note, this includes nights, weekends and holidays, noting also that last Fall, FDNY commenced unannounced weekend inspections. EH&S encourages all members of the laboratory to obtain a Certificate of Fitness, offers weekly training for the C-14 and pays the \$25.00 application fee. Go to <http://www.ehs.columbia.edu/COFFlyer.html> for more information on C-14.

What are the educational and experience requirements to get a C-14?

The FDNY requires that applicants taking the test at the FDNY Headquarters must have one of the following diploma or transcript, in order to obtain a Certificate of Fitness:

- ♦ A B.S., M.S. or Doctorate degree in Chemistry, Biology, Biochemistry, Environmental or Health Sciences, Medical Technology, Chemical, Environmental, Mechanical or Biomedical Engineering, or related field; or
- ♦ A Doctor of Medicine or Dental Surgery (DDS); or
- ♦ An A.A.S. or A.S. degree in Chemistry, Biology, Biochemistry, Environmental or Health Sciences, Medical Technology or Chemical, Environmental, Mechanical or Biomedical Engineering, or related field and completion of a course on laboratory safety provided by the employer; or 60 credits with minimum of 21 credits in applicable science or engineering courses, and completion of a course on laboratory safety provided by the employer.

FDNY has an “Alternate Issuance Program” (AIP) which allows EH&S to administer the C-14 Fitness testing onsite at Columbia for laboratory personnel who qualify. However, FDNY does impose stricter qualifications for EH&S to operate under this AIP, including the requirement that applicants have a minimum of a B.S. plus 2 years of experience in the operation of chemical laboratories. All claimed experience must be post baccalaureate. If an applicant does not meet the minimum AIP requirement, then the test must be taken at FDNY Headquarters (Metrotech Center) in Brooklyn.

Why must I provide my Social Security number?

This is a government regulation [General Obligation Law Section 3-503(2)] that requires all applicants for any city or state license to be checked to ensure that they are in compliance with their fulfillment of child support obligations.

I have been to the C-14 class, taken the test but not have received a Certificate of Fitness, is there something else I need to do?

In order for EH&S to process a C-14 application and submit it to FDNY, all required forms must be filled out completely and accompanied by a diploma (in English or translated to English) or relevant transcripts and a passport sized photo (taken by EH&S). If EH&S does not receive all of the above items, the FDNY does not accept submission of the application (taken by EH&S). If EH&S does not receive all of the above items, the FDNY does not accept submission of the application.

I received a letter for my C-14 renewal from FDNY, does EH&S pay for renewals ?

EH&S pays for your C-14 renewals. Approximately 1 to 2 months prior to its expiration, FDNY will mail a renewal letter to the home address listed on the Certificate of Fitness. When this letter is received, please promptly email fire-life@columbia.edu to confirm that EH&S will process your renewal. EH&S will also email C-14 holders prior to the expiration date to verify that they still work at Columbia and to update information including work and home address changes.

Chemical Segregation Word Scramble by Maytal Rand – Research Safety Program

Proper storage of hazardous chemicals is one of the most important and challenging laboratory safety initiatives. Chemical segregation is a perennial target during EH&S laboratory safety surveys, as well as weekly laboratory inspections performed by FDNY (see *By the Numbers*, in this issue). Unscramble the following words as a reminder of some chemical categories requiring segregation in the laboratory:

SOEVIRRC
 IEORIZXD
 NONIGACRI CDIA
 NLOMPBAETICI
 BSECTIBLUM
 YRPCHOOPRI
 FAEABLLMM
 OSOPONUIS

Answers: Corrosive, Oxidizer, Inorganic acid, Incompatible, Compatible, Pyrophoric, Flammable, Poisonous

Please note, this Spring, EH&S will be releasing a RASCAL module on the basics of chemical segregation violations. Labs that have received recent violations for chemical storage issues will find this module particularly instructive in avoiding future findings. As always, the Research Safety Program is available to guide your lab towards the best corrective actions and safe work practices.

Welcome, Barnard College!

Columbia University is pleased to welcome Barnard College to the growing community served by EH&S. The partnership is an opportunity for EH&S to continue its tradition of providing expert guidance and timely service to the University community by enabling Barnard College to advance their laboratory health and safety goals.

Coming soon....

Lamont-Doherty Earth Observatory will be joining Morningside campus to use the ChemTracker system this spring.

By the Numbers by Tasha Hightower – Research Safety Program

All laboratories in NYC require a FDNY permit and an annual inspection to operate. The FDNY Laboratory Unit performs regular, weekly inspections in all chemical laboratories across Columbia University's New York City campuses and has the authority to issue Violation Orders or Notices of Violation for non-compliance with fire code requirements. Each year the department tracks the number of violations and uses this data as an identifier for EH&S program initiatives.

Improper Storage of Chemicals, as a general category, is the single greatest challenge the University faces with respect to FDNY laboratory inspections. Storage of materials in non-rated refrigerators is the #1 finding at the Medical Center and the #2 finding at Morningside. Flammable chemicals (liquids with a flash point of less than 60 °C and capable of sustaining combustion) may only be stored in an approved refrigerators or freezer specifically designed to safely store such materials, and never in cold rooms. No matter the concentration, quantity, and/or duration of storage, flammable liquids must never be stored in refrigerators or freezers that are not properly rated. As an alternative, a wet or dry ice-bath may be an option for temporarily cooling samples of flammable liquids.

EH&S is pleased to report that over the past three years the number of FDNY violations written to labs for not having a **Certificate of Fitness (C-14)** holder present during the time of the inspection has declined 45%. This is a huge accomplishment and we want to thank the research community for continuing to enroll your laboratory personnel in the C-14 program. This is becoming even more important now that FDNY is performing unannounced laboratory inspections on weekends and “off hours”. See *FAQs Concerning FDNY Certificate of Fitness (C-14) for Laboratories* (in this edition of *SafetyMatters*) for more information on how to obtain a Certificate of Fitness or visit <http://www.ehs.columbia.edu/COFFlyer.html>.

The Radiation Safety Office @ CUMC is Moving! by Bithi Roy – Radiation Safety Program

We are moving! As you may have heard, EH&S and the Radiation Safety Program offices will be relocating this Spring to 601 West 168st from the Allan Rosenfield Building. We are actively developing strategies to minimize any potential disruption to ordering and receipt of radioactive materials, training, quarterly RAM audit scheduling, and to continue to provide the research community with the service you have come to expect.

Quarterly laboratory audits and safety training will continue as scheduled. A new process for the receipt and delivery of radioactive packages, as well as survey meter calibration, including pick-up and drop-off is being developed. Additional information from the Radiation Safety Officer will be forthcoming prior to the move.

If your laboratory needs to borrow a survey meter please contact Bithi Roy (br2280) or Jeff Leavey (jl4025) to set up an appointment. Thyroid uptake monitoring and urine analysis will also continue to be on a by-appointment basis. If you have any comments, suggestions or concerns, please send them to us by email via rsoresearch@columbia.edu.

Vision Statement

Environmental Health & Safety (EH&S) provides expert guidance and timely service to the University Community through our commitment to health and safety. Employing best practices and collaboration, and by building long term relationships, we promote a productive and safety conscious work environment.



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Do you have a suggestion for a future *SafetyMatters* article? Do you have a comment on something you just read?

Please share it with us at newsfeedback@columbia.edu