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Environmental Health & Safety

SafetyMatters

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ENVIRONMENTAL HEALTH & SAFETY

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EH&S Presents Dr. Matthias Quick with Recognition Award

by Phylicia Obame, Senior Systems Analyst

EH&S is pleased to recognize Matthias Quick, PhD for his implementation of a cutting edge Chemical Inventory Management program for New York State Psychiatric Institute (NYSPI) laboratories. His leadership, adaptability, and commitment to health and safety has been invaluable to the success of this program.

Dr. Quick is an Associate Professor of Neurobiology in the Department of Psychiatry and the Center for Molecular Recognition at the Columbia University Vagelos College of Physicians and Surgeons; he is also a Research Scientist V in the NYSPI Division of Molecular Therapeutics. Additionally, he serves as the Director of Laboratory Safety at NYSPI/Research Foundation for Mental Hygiene (RFMH), where he is the Right-to-Know Officer and Chemical Hygiene Officer.

In August 2018, Dr. Quick hired a team of research staff to manage chemical inventory using Radio-Frequency Identification (RFID) technology. RFID uses electromagnetic fields to automatically identify and track tags attached to objects (e.g., chemical containers, or vehicles passing through toll lanes). EH&S trained the research staff, who in turn, first labeled each chemical container with a unique identifier tag and then logged the chemicals into Columbia's ChemTracker database. This web-based software program tracks chemical containers and links them to important safety and regulatory information.

Additionally, EH&S trained the research staff to use mobile RFID equipment for scanning RFID tags. The mobile equipment, similar to the handheld scanners used by FedEx and other couriers, facilitates reconciliation audits to verify laboratory inventory. The equipment has an adjustable power range of 8-12 feet for swift identification of many containers. Another useful feature is the "Geiger mode" which uses the RFID reader to locate any specific tag (e.g., missing inventory).

RFID technology significantly simplifies researcher actions: real-time information about every chemical container on-site prevents ordering redundant chemicals and reduces chemical handling after initial inventory. If your laboratory is interested in learning more about the benefits of RFID and if it will work for you, please reach out to labsafety@columbia.edu.

When working in the laboratory: eating, drinking or applying cosmetics is prohibited.

Proper work attire (e.g., long pants, closed toe shoes) and PPE (e.g., laboratory coat, gloves and eye protection) must be worn when working in the laboratory.

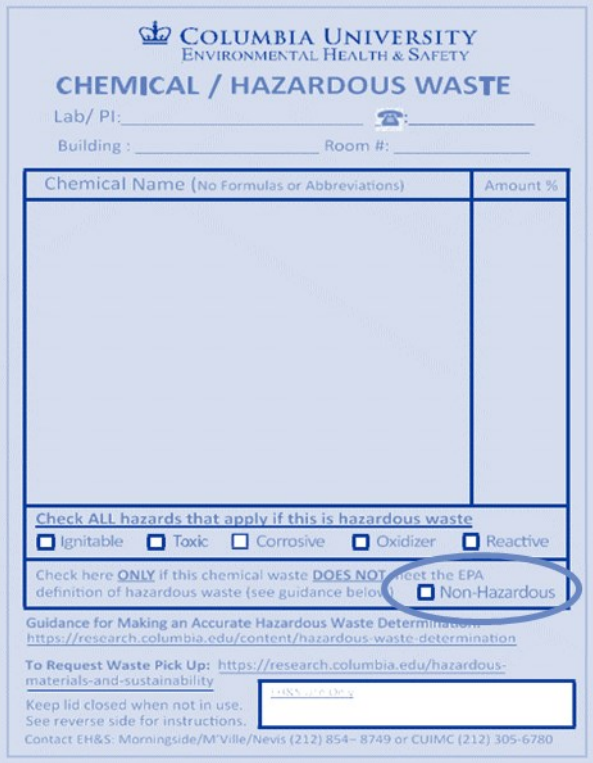
Remember to periodically flush your laboratory cup sinks and floor drains with water to prevent odors from migrating into your laboratory.

Have you seen our new and improved website? https://research.columbia.edu/content/environmental-health-safety

For Lab Fire Safety Prevention tips, check out FDN(wh)Y Me https://research.columbia.edu/content/fdnwhy-me

Chemical/Hazardous Waste Label Update

by Vincent Vagnone, Senior Safety Advisor


COLUMBIA UNIVERSITY
ENVIRONMENTAL HEALTH & SAFETY

CHEMICAL / HAZARDOUS WASTE

Lab/ PI: ☎:

Building : Room #:

Chemical Name (No Formulas or Abbreviations) | Amount %

Check ALL hazards that apply if this is hazardous waste

☐ Ignitable ☐ Toxic ☐ Corrosive ☐ Oxidizer ☐ Reactive

Check here ONLY if this chemical waste DOES NOT meet the EPA definition of hazardous waste (see guidance below) ☐ Non-Hazardous

Guidance for Making an Accurate Hazardous Waste Determination:
https://research.columbia.edu/content/hazardous-waste-determination

To Request Waste Pick Up: https://research.columbia.edu/hazardous-materials-and-sustainability

Keep lid closed when not in use.
See reverse side for instructions.

Contact EH&S: Morningside/M'Ville/Nevis (212) 854-8749 or CUIMC (212) 305-6780

EH&S received valuable feedback from many researchers following the Summer 2018 announcement of EPA's Hazardous Waste Generator Improvement Rule. The feedback prompted revision of the large, orange Columbia University "CHEMICAL/ HAZARDOUS WASTE" label. Since the EPA rule now explicitly requires an accurate hazardous waste determination to be made at the point of generation (i.e., in the laboratory), the updated label now includes a new hazard classification check box for "NON-HAZARDOUS WASTE" to account for those wastes that do not meet one or more of EPA's definitions of hazardous waste, but which are still managed as chemical waste. EH&S has begun delivering the new labels to laboratories across all campuses. Laboratories can still use the older version of the label until depleted. The updated orange label is pictured here.

To assist researchers in making an accurate hazardous waste determination at the point of generation, EH&S prepared a new webpage. The page provides lists and additional guidance on common chemicals and how to properly classify them prior to disposal: https://research.columbia.edu/hazardous-waste-determination.

For routine hazardous waste removal or additional waste collection supplies, researchers should submit an online request to https://bit.ly/2z26OoQ. If there are any questions, concerns or if assistance is needed in making an accurate hazardous waste determination, please contact hazmat@columbia.edu.

Fire Prevention Week: October 6-12, 2019

How to Safely Work with Isoflurane

by Ritu Pandit, Health and Safety Specialist

Isoflurane is commonly utilized as an inhalation anesthetic in animal research. It is a clear, colorless, and volatile liquid. Researchers could have exposures if the gas is inhaled or is absorbed through skin contact. Detrimental health effects may occur with repeated and prolonged exposure. EH&S sought to assess what activities contributed to vapors escaping into the work environment that may affect researcher health.

Based on numerous evaluations performed in Columbia laboratories, EH&S identified the following activities during rodent surgeries that contribute to increases of isoflurane vapors escaping into the work environment during anesthesia administration:

- A loose seal around the animal's nose cone;
- Multiple animal surgeries, which led to an extended length of time of anesthesia delivery;
- Frequent re-filling of the induction chamber with isoflurane liquid several times during the surgery;
- Failure to flush the induction chamber with oxygen prior to opening the chamber when transferring animals.

Figure 1 Snorkel exhaust

These assessments demonstrated the importance of controlling and minimizing any leaks of isoflurane vapor. In accordance with these findings, EH&S presents the following recommendations on how to minimize the escape of isoflurane when researchers are administering anesthesia.

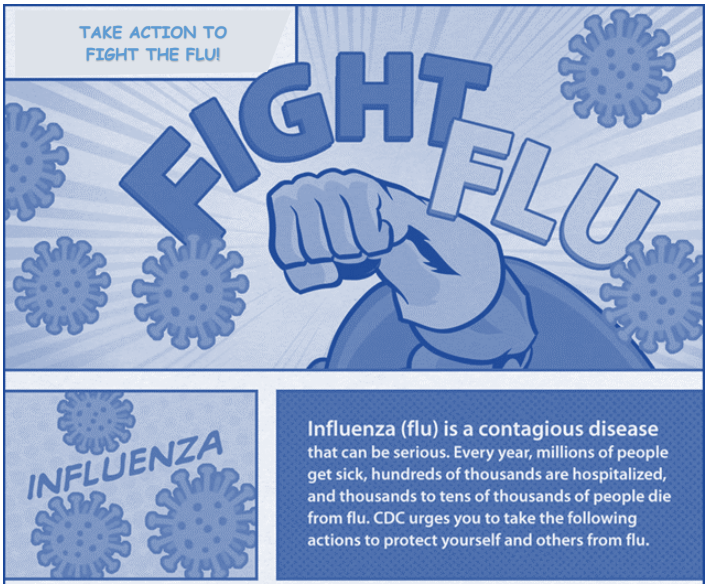
If researchers are using active extraction systems, hard-ducted Biosafety Cabinets —note, traditional, recirculating BSCs must never be used with volatile chemicals, including isoflurane — and chemical fume-hoods are the favored engineering controls to enclose the entire gas mixing and delivery system. These systems protect workers via ventilation; they efficiently capture fumes for exhaustion out of the work area. Downdraft tables and snorkel exhausts (Figure 1) also serve the same function and can be used if placing the delivery system in an enclosed hood is not practical.

Researchers may prefer passive and active scavenging systems. Scavenging systems use activated charcoal to remove waste isoflurane gas. An efficient scavenging system is capable of removing 90% of waste gases from ambient air. In addition to the scavenging system, researchers should perform anesthesia delivery in a well-ventilated room. EH&S exposure assessments show that there is less airborne concentration of waste isoflurane in a well-ventilated room as compared to a poorly ventilated room when passive scavenging system was used on a bench top.

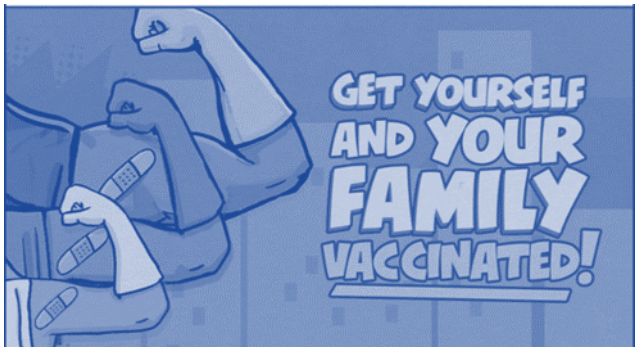
Figure 2 Stock bottle adaptor

Prudent work practices are necessary to minimize exposure to waste anesthetic gases. EH&S exposure assessments have shown that during induction, there is a decrease in airborne concentration of waste isoflurane gas when researchers reduce the duration of opening and closing the chamber. The exposure assessments have also shown that use of an isoflurane stock bottle adaptor (Figure 2) reduces the airborne concentration by several folds during pouring activities. Moreover, factors like the saturation of the charcoal in the scavenging system and integrity of the tubing can impact exposure mitigation. Simple changes including the practices outlined above make for a safer work environment. If your laboratory would like EH&S to assess your work environment, please email occusafety@columbia.edu.

Columbia University Seasonal Flu Vaccination



From September 24th
To December 5th



Too Hot to Handle: Keep Bunsen Burners Out of BSCs

by Cody Cameron, Biological Safety Officer

The Bunsen burner, a microbiology laboratory staple, is widely used in research. Historically, microbiologists had to rely on using open flames to maintain a sterile environment for sensitive procedures. However, many modern administrative practices and engineering controls have made the need for an open flame nearly obsolete. There are disposable single-use plastic tools such as spreaders and loops. Autoclaving reusable tools and utensils is also an appropriate option. Furthermore, there are alternative equipment available such as dry-bead sterilizers or micro-incinerators for instrument sterilization. The main engineering control that helps maintain sterility is the Biological Safety Cabinet (BSC). The use of open flames inside a BSC is a bad idea for multiple reasons.

The purpose of a BSC is to utilize a steady volume of air current flowing at a constant speed in a uniform direction over the cabinet's work surface. The hot air rising from an open flame opposes the downward flowing streams of air, disrupting the steady laminar flow. The resulting turbulence may allow aerosols generated beneath the flame to travel outside of the cabinet without the steady, protective laminar flow of supplied air to trap them. Aerosols escaping the cabinet may expose the worker to infectious materials.

Moreover, the use of an open flame has been shown to melt the HEPA filter, thereby impeding the supply of filtered air to the cabinet's interior. The adhesive which bonds the filter's frame can also be compromised from the flame's heat. Having to fix or replace a HEPA filter can be a costly endeavor. BSC manufacturers discourage Bunsen burner use inside the BSC and may go as far to void the BSC warranty if Bunsen burners are used within cabinets. Manufacturers also will not assume liability for any explosions or fires resulting from flammable gas recirculating within the cabinet. The practice of using a flame further invalidates Underwriters Laboratories Inc. approval, which is an OSHA approved quality assurance organization. BSC Manufacturers are not alone in their stance; the NIH, CDC, WHO, and NSF international all oppose the use of a Bunsen burner in a BSC due to the collective concerns regarding potential aerosol exposures and ignition. For more information about eliminating Bunsen burners in BSCs, reach out to biosafety@columbia.edu.

RAM Waste Management: Labels

by Samuel Dindayal, Health Physicist

CAUTION RADIOACTIVE MATERIAL

PI Name: John Smith Uni: JS1234

Building: P&S Room: 1234 ☎: 305-1234

Waste Type (cannot be combined; check only one):

☒ Dry Solid Waste ☐ Liquid Scintillation Vials

☐ Aqueous Radioactive Waste ☐ Radioactive Sharps

☐ Animal Carcasses _____ µCi/g ☐ Biological Radioactive Waste

☐ Mixed Waste (hazardous chemical & radioactive)

Container Size: ☒ 5G ☐ 30G ☐ 2L ☐ 10L ☐ 20L Other _____

Isotope Information: Isotopes with a half life <90 days must be separated by isotope. ^{3}H & ^{14}C may be combined. Circle unit of activity.

Isotope 1 H-3	Date	Activity (µCi) mCi	Isotope 2 C-14	Date	Activity (µCi) mCi
	1/28/15	150		2/10/15	200
	2/15/15	100			
	3/7/15	150			

Total Activity Per Isotope (circle unit of activity):

Isotope 1:	H-3	Isotope 2:	C-14
Activity:	400 (µCi) mCi	Activity:	200 (µCi) mCi

Chemical constituents must total 100%. Please list liquid scintillation cocktail used by brand name. No abbreviations or formulas may be used. Aqueous radioactive waste should consist of water or buffer only

Chemical Constituents	pH	Amount %
pads, gloves	—	—

Columbia University has established processes for the safe and compliant management of Radioactive Material (RAM) Waste from the point of generation to eventual disposal. Radioactive waste includes, but is not limited to, dry radioactive waste, liquid radioactive waste, sealed radioactive sources, and other RAM-contaminated items (e.g., liquid scintillation vials or 96-well plates). The University's RAM waste management procedures are in place to protect the safety and efficiency of personnel who consolidate and ship out RAM waste and to ensure compliance with regulatory requirements. During the initial waste accumulation process, researchers should legibly document the contents and characteristics of the container on the label, including the isotope name and percentage or pH of any chemical constituents. Other requirements include proper identification, classification, separation and labeling of the RAM waste. Waste should be segregated by type and isotopes (except ^{14}C and ^{3}H, which can be combined). Researchers should consult with Radiation Safety prior to generating any mixed waste (i.e., RAM mixed with a hazardous chemical). RAM-contaminated sharps and pipette tips should be placed into a puncture-resistant container with a proper RAM waste label. Secondary containment, such as trays, should be used to store liquid waste, to prevent incidental leaks from becoming wide-spread contamination. If there are any questions or concerns about how to manage RAM waste, please reach out to rsocumc@columbia.edu.

Working
SMOKE ALARMS
SAVE LIVES
Change Your Clock, Change Your Battery

Sunday November 3, 2019

Spotlight on Safety — Engineering Safety in the Carleton Lab

by Christopher Pitoscia, Associate Director

For this edition of Spotlight on Safety, EH&S spoke to Adrian Brügger and Will Hunnicutt of the Carleton Lab, the central laboratory for all experimental work performed in the Department of Civil Engineering and Engineering Mechanics (CEEM). The Lab has an excellent safety history, along with a track record of learning from incidents and near misses. We asked Adrian and Will to explain how they are able to manage the Lab to ensure the safety of all its users.

SafetyMatters: Please tell us a little bit about the Carleton Lab, its history and its role at Columbia University.
AB & WH: Our primary user base for research is in CEEM, but we also support teaching, student groups, and allow researchers outside of CEEM to work in the Lab. The Carleton Lab has been at its current location in the Engineering Terrace building since 1962, but has roots going back to the late 1800's, making it one of the oldest, continuously operating laboratories on campus. The Carleton Lab is also the largest laboratory, by area, at Morningside and houses a suite of incredibly sophisticated instruments capable of testing materials across all length scales.

SafetyMatters: What are some of the safety challenges that the Carleton Lab faces on a day-to-day basis?
AB & WH: Since the Carleton Lab is such a large workspace, and a host to such a wide variety of research, teaching, and external testing activities, it is challenging to keep eyes on the Lab at all times. As a result, it is absolutely critical for everyone to maintain a high level of awareness of the work taking place throughout the Lab in order for all usersto take proper precautions to remain safe.

SafetyMatters: How do you approach risk assessments? Have there been any significant events that have influenced this approach?
AB & WH: Absolutely. We strongly believe that a safety-first culture is necessary to keep all parties safe. For example, in order to gain access to the lab, users must complete a site-specific training on RASCAL that details the many unique safety concerns in the Carleton Lab. We also have internal systems to signal lab users when hazardous activities are taking place, and we utilize Columbia's LATCH tool to assess the hazards associated with activity in the Lab. Of course, we also provide appropriate personal protective equipment (PPE) to users free of charge.
Even with our precautions, accidents can still happen. A recent fire in our chemical fume hood highlighted the need for increased oversight of hazardous experimental procedures. After the incident, we held a mandatory meeting with all users to explain the new oversight protocols and reinforce that the Lab staff are here to help not only with the technical aspects of research, but also with keeping experiments safe. The new protocol requires researchers to write a detailed experimental procedure in which they identify potential hazards and the engineering controls and PPE that will be used to mitigate risk; this procedure must be submitted to and approved by Lab staff before the experiment can be conducted. If the Lab staff isn't knowledgeable on the safety aspects of a particular topic, we know that we can always turn to EH&S for guidance.

SafetyMatters: What guidance or advice would you give to other laboratory managers, or staff, in charge of safety?
AB & WH: Lab safety must be a persistent, shared effort by everyone in the lab, but ultimately the researchers conducting the experiments must understand the importance of a safety-first culture. Therefore, mutual respect needs to exist between all users of a lab: ask questions and be helpful whenever possible!

SafetyMatters: How has the Carleton Lab interacted with EH&S over the years?
AB & WH: The Carleton Lab knows that EH&S exists to support research and maintain a safe environment, our staff attend EH&S' Shop Safety Meetings, and have a friendly relationship with our EH&S liaisons so that we stay knowledgeable of current policies and new requirements. Our goals are aligned with those of EH&S; we want to provide a safe and productive research environment.

EH&S would like to thank Adrian and Will for sharing their thoughts on safety programming lab operations. Investigators can always reach out to EH&S to help support the health and safety of the laboratory at labsafety@columbia.edu.

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