

ANNUAL REPORT

Highlights from 2022

The University of Pennsylvania's Office of Environmental Health and Radiation Safety (EHRS) promotes health, safety and environmental protection in teaching, research, health care and administrative activities by providing services, advice and compliance.

Welcome Letter

We are pleased to present to you the University of Pennsylvania Environmental Health & Safety (EHS) Annual Report for CY 2022. This year marks an increase in pace as activities on campus and in research have surged back to pre-pandemic numbers. With the emergence of several large, new research spaces, principally dedicated to biological, animal, and clinical research, our EHS team has been comprehensively involved with permitting, design, and compliance, of these laboratory spaces with a focused eye toward safety.

EHS is proud to support the over 18,000 faculty and staff and approximately 25,000 students at Penn. This support includes research and clinical endeavors in the School of Arts & Sciences, School of Engineering & Applied Sciences, Penn School of Medicine, Dental School, the Stuart Weitzman School of Design, and Veterinary School, and health and safety for our trades, librarians, dining services, animal care, and housekeeping departments. Our team manages the environmental, health and safety programs not only for our main campus in Philadelphia, but our New Bolton Center in Kennett Square, our Morris Arboretum in Chestnut Hill, and our newest location, Discovery Labs in King of Prussia. Our services range from consultation on complex laboratory and research operations, to securing appropriate permits to ensure compliance with federal, state, local, and university policies, to creating a safe workplace for everyone from the office workforce, large equipment operators, to researchers and staff that work in laboratories and animal facilities.

Our commitment to environmental health and safety goes beyond faculty and staff to our students and community. We partner with students, faculty, staff, and postdocs to create solutions that deliver results while minimizing hazards and risks to all in our community. When incidents occur, EHS has a 24/7 emergency team. We respond, investigate, and collaborate with our campus partners to learn from each event and to help create a safer campus.

This report provides a glimpse into the efforts of the EHS teams; Occupational Safety, Biosafety, Industrial Hygiene and Laboratory Safety, and Environmental Programs (the EHRS Radiation Safety team has a separate report). Our metrics and project profiles highlight the scope and impact of the incredible work EHS is privileged to be part of. This report highlights the contributions from each team within EHS, along with a celebration of shared accomplishments from the past year.

We thank you for your continued support of our work. We look forward to another year of growth and excellence at the University of Pennsylvania.

Sincerely,
Maureen O'Leary PhD, MBA, CBSP
 Associate Vice Provost for Research
 Environmental Health and Radiation Safety



The Pereleman School of Medicine Gene Therapy Program, Discovery Labs, encompass 150,000 square feet of lab space over a 1 million square foot campus. The research facility involves two floors of rodent and non-human primate housing in the vivarium, as well as a large-scale vector production facility with support laboratories.

EHS has been a partner in all stages of design, construction, and planning to ensure compliance, risk, and operational permits meet standards and use best practices.



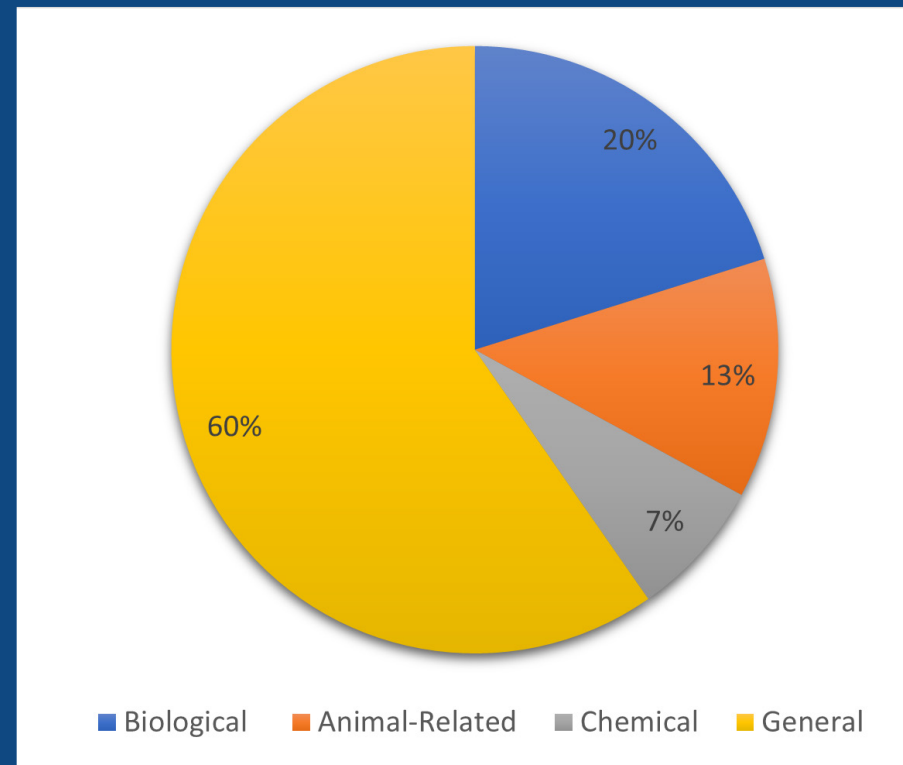
Project Highlight

EHS is committed to ongoing support of Discovery Labs as the facility brings operations fully to scale by the end of 2023.

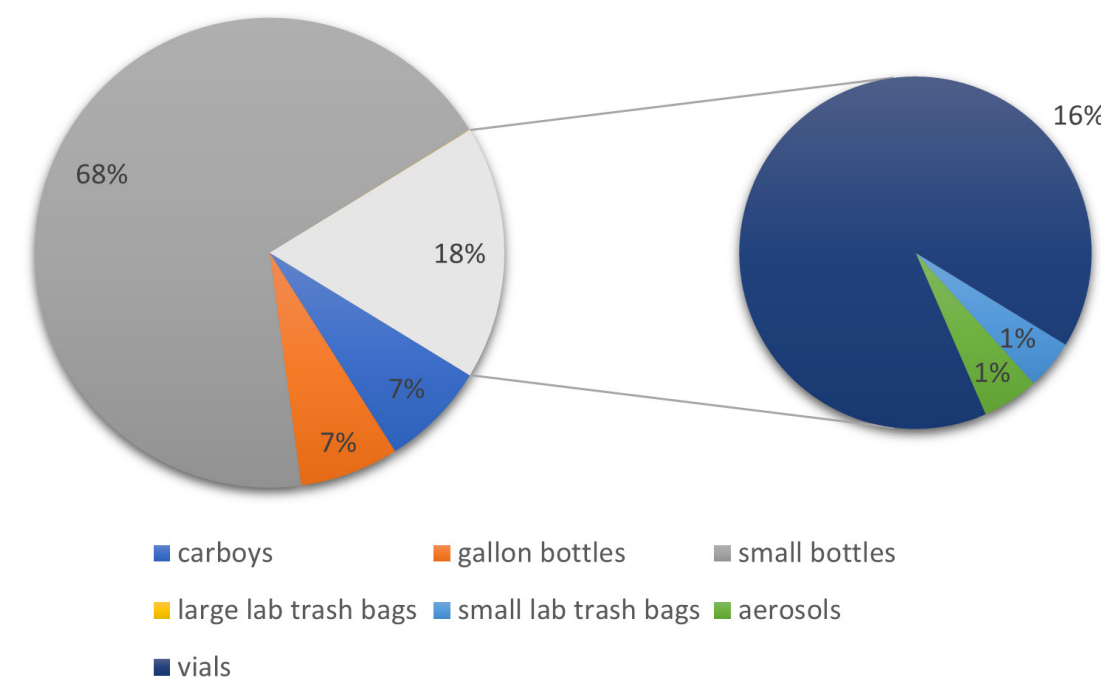
EHS By the Numbers

Providing support in all areas of safety on Penn's campus and health system

EHS supports ~18,000 faculty and staff members at Penn. This includes researchers, clinicians, housekeepers, technicians, farmhands, museum curators, and many more. Our goal is to protect faculty, staff, postdoctoral fellows, students, and visitors from risks inherent to working with hazardous materials, animals, chemicals, equipment, and biohazards.



INCIDENT RESPONSES



WASTE PROCESSED

28

HAZARD ASSESSMENTS PERFORMED

537

INCIDENT RESPONSES

61

NEW FACULTY VISITS

1410

INSTITUTIONAL BIOSAFETY COMMITTEE
REGISTRATION REVIEWS

993

LABORATORY INSPECTIONS

1433

MATERIAL TRANSFER AGREEMENT
REVIEWS

1234

INSTITUTIONAL ANIMAL CARE AND
USE COMMITTEE (IACUC) PROTOCOL
REVIEWS

20966

TRAININGS COMPLETED

159179

POUNDS OF HAZARDOUS
CHEMICAL WASTE PROCESSED
IN-HOUSE

Biological Safety

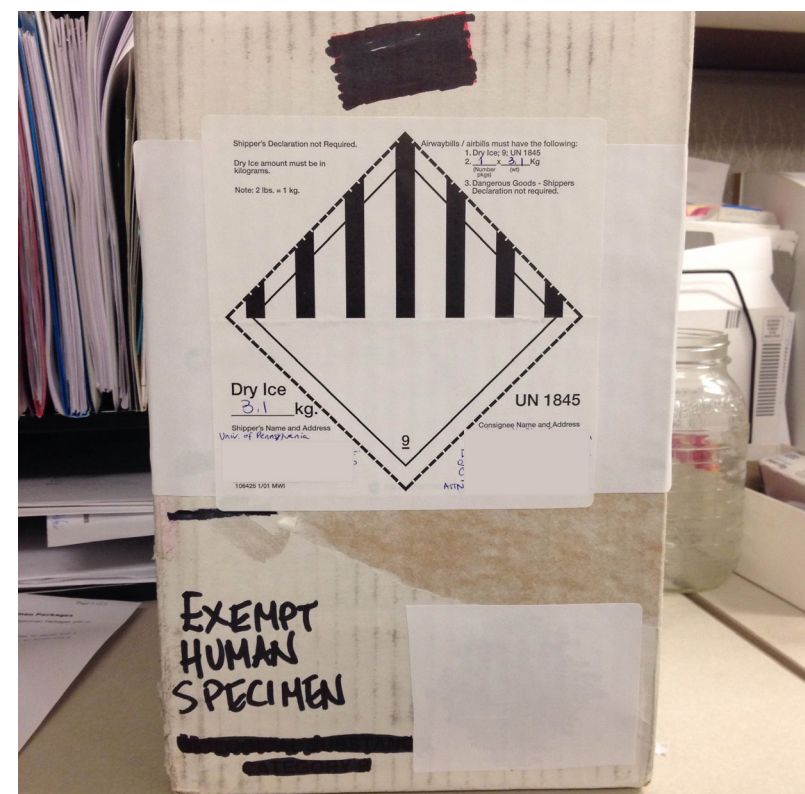
Securing the highest standards of biosafety for new and established labs



BSL-3 PPE

Containment Labs

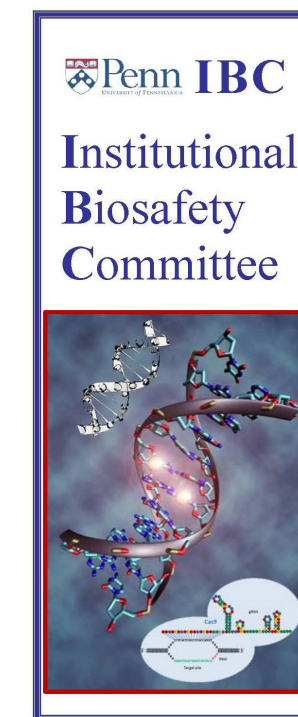
The Containment Lab Oversight Program for BSL-3 and ABSL-3 spaces provides safety, compliance, security, and oversight for research involving infectious agents or toxins. Efforts of this program include ensuring appropriate training and credentials, meeting compliance guidelines set by CDC, NIH, and others, and providing support to researchers.



Dangerous Goods Shipment Box

Dangerous Goods Shipping

The Dangerous Goods Shipping Program at Penn is a collaborative effort to support biological, chemical, and radiation shipping needs across campus, providing **training to 1,069 shippers** in 2022 for research and clinical groups to ensure compliance with IATA and FAA regulations.



AAALAC Accreditation

Association for Assessment and Accreditation of Laboratory Animal Care (AAALAC) International is a private, non-profit organization that promotes the humane treatment of animals in science through voluntary accreditation and assessment programs that are renewed every 3 years. Obtaining this accreditation sends the message to the community that Penn is committed to animal welfare. EHS provided critical support in this process, answering questions regarding occupational health program, compliance, safety, and animal welfare. Operational assistance was provided to University Laboratory Animal Resources (ULAR) and the Gene Therapy Program (GTP) to ensure all animal and facility programs were ready for accreditation.

Institutional Biosafety Committee (IBC)

The IBC ensures institutional compliance with the National Institute of Health Guidelines for Research Involving Recombinant or Synthetic Nucleic Acid Molecules. In 2022, there were **1,410 registration review activities conducted involving Human Gene Transfer and other research** including administrative reviews and follow-ups. A new Biosafety Policy on Aerosol Producing Procedures Involving Biological Hazards or Recombinant Materials is pending final approval.

Biosafety Cabinet (BSC) Program

A biosafety cabinet (BSC) is the primary containment device used to protect researchers, the environment, and community from biohazardous materials that can be transmitted through the air (aerosols). Located in 42 buildings across Penn's main campus and satellite research sites, over 1,100 BSCs are certified annually by NSF accredited technicians. Certification documentation and reviews for all BSCs are maintained by EHS, and we provide guidance regarding BSC purchasing and placement within the lab.



*Left:
biosafety cabinet*

Environmental Programs

Ensuring environmental compliance, emergency response and waste management across Penn's campuses



Emergency Response

The Environmental Programs group is the primary contact for Facilities and Real Estate Services (FRES), research staff, and hospitals for various environmental events - **more than 50 chemical spills, exposures, odor complaints, fires in 2022**. EHS staff are on call 24/7 throughout the year to respond and mitigate environmental incidents on campus.

Consultation

Environmental Programs provide corporate environmental and financial risk consultation for the University and Health System.

The Environmental Programs group partners with the Office of Risk Management & the Office of General Counsel.

We are responsible for all environmental risk and property development for internal and external entities and operations, such as Pennovation, 3600 Civic Center Blvd, Discovery Labs in King of Prussia, and 1uCity Square.

Compliance

The Environmental Programs group maintains air permit compliance (Title V) for the entire University and Hospital system.

With over 21,000 gallons of fuel in campus generators, **we have conducted over 200 inspections** and were inspected by the EPA with no violations.

We also ensure compliance with underground and above ground storage regulations and wastewater permitting.

EHS reviews renovation projects to ensure new laboratories are properly designed to support safe research. **The team assisted with 75 lab renovations.**

Waste Services

Penn is the only R1 institution that manages hazardous waste without a third party consultant, allowing EHS to find ways to minimize environmental impact and assist in the continuation of important research. **Our in-house waste collection team made 2,469 waste collection visits and processed 159,179 pounds of hazardous waste.**

EHS established programs that **collected and recycled over 7,000 pounds of scrap and semi-precious metals, along with several tons of electronic equipment and light tubes** in 2022.

Additionally, **EHS assisted with the move or closure of 43 lab spaces** on campus.



Laboratory Safety & Industrial Hygiene

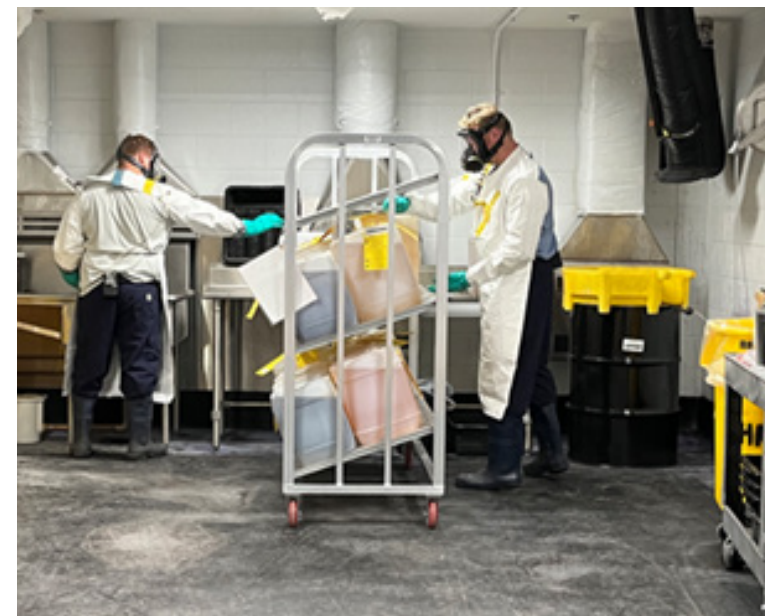
Providing support and guidance for laboratory research and office safety



Expansion Project

Ergonomics

EHS provides support identifying musculoskeletal risk factors to reduce risk of injury. In 2022, EHS partnered with Facilities, Design and Construction to obtain LEED Ergonomics Credit through the U.S. Green Building Council for the Graduate School of Education Expansion Project, **the first LEED ergonomic credit awarded to the University.**



Respiratory protection

Respiratory Protection

University respiratory protection needs evolve as hazards change. In 2022, **there were 350 respirator fit tests and trainings**, including at New Bolton Center for veterinarians for protection from Avian influenza, as required by the PA Department of Agriculture.

Dental School CODA Accreditation

In 2022, EHS supported Penn Dental Medicine as they prepared for their Commission on Dental Accreditation (CODA) site visit. CODA standards require compliance with university health and safety policies and applicable local, state, and federal regulations. Facets of the accreditation include radiation hygiene and protection, ionizing radiation, hazardous materials, and blood-borne and infectious diseases. EHS provided support in the months leading up to the site visit, conducting walk-throughs and providing documentation, and were available as a resource to answer any questions related to the health and safety program during the visit.

Fume Hood Program

The EHRS Fume Hood Program assists with hood specifications, commissioning, and inspections of 1159 fume hoods on campus. Fume hoods are checked after repairs in conjunction with Facilities and Real Estate Services. In 2022, **231 post repair fume hood checks were completed.**

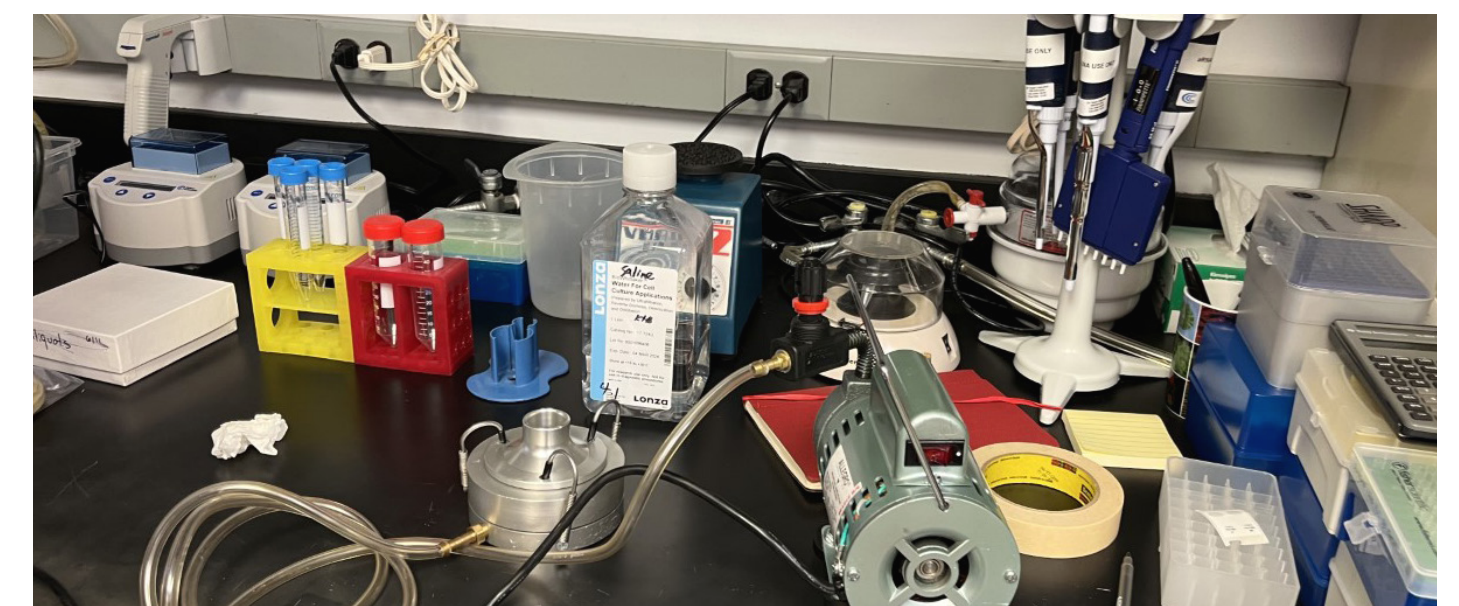
Chemical Inventory

The Chemical Inventory Program assists with tracking and sharing of chemicals among users on campus. There are approximately 138,000 chemicals in our inventory system, with **23,495 new containers entered and 219 borrow requests fielded in 2022.**

Special Projects

Fungal Air Sampling

Researchers in a School of Medicine laboratory noticed an increase in fungal contamination of their cell samples in the weeks following a wastewater flood in an adjacent mechanical space. Air sampling for viable fungi helped the lab rule out a potential cause of their cell contamination and provided them with information about the types and quantity of fungi in their lab spaces.



Sampling apparatus for special project in fungal contamination



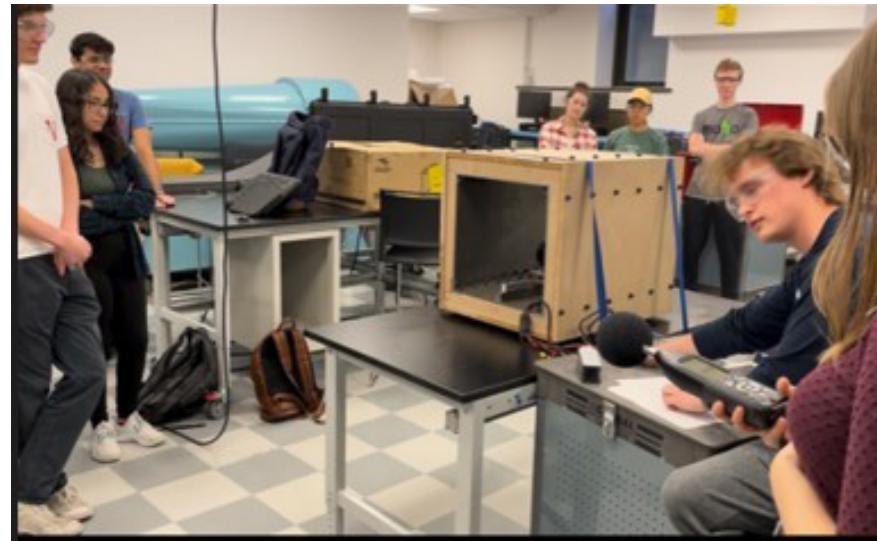
EHS completed a **comprehensive safety study of the Museum Conservation Annex Facility in New Jersey**, working closely with museum staff to minimize the potential for injuries and illnesses related to artifact conservation, optimizing ventilation, modifying procedures, and advising on appropriate personal protective equipment.

Occupational Safety

Identifying, assessing, and developing solutions for workplace hazards with an emphasis on physical hazards

Student Support

*EHS collaborated with the student **Formula SAE Electric Racing Team and the Aerospace Club** to identify hazards and mitigation measures in their projects. This focus on safety helps students enter their workplace with sought after safety training that others do not often have.*



EHS completed **safety audits of all ~50 shops and makerspaces** across campus. Additionally, a focus on cross-shop collaboration helps to foster community and create opportunities for different facilities to help one another based on expertise.



Training



The Occupational Safety Team **developed a module on Electrical Safety in the Laboratory** to address emerging needs, particularly in the case of electrical equipment that is modified or constructed in the the lab.



Penn's Heat Illness Prevention Program was developed to provide guidance to the community about preventing heat-related illness, identifying risks and ways to control exposure. For more information, consult <https://ehrs.upenn.edu/health-safety/general-health/heat-illness-prevention>.

Employee Services

*EHS hosted a **Fall Protection Demonstration for over 60 staff with 3M** to celebrate National Safety Month in June.*



The Occupational Safety Team collaborated with Facilities & Real Estate Services to create a reporting tool to help identify and correct safety hazards and concerns on campus. The **SAFE Card has led to the identification of 334 hazards of which 281 have already been closed!**

Community Efforts



Serving the larger Penn community safely and sustainably

Making a difference to the Penn community, the community at large, the scientific community, and the community of our world drives the work that EHS does every day.

Got a burning question?
EHS specialists are here to help!

Join our weekly drop-in hours to ask questions and get connected to EHS resources.

PennEHS Virtual Drop-In Hours
Environmental Health & Radiation Safety
Wednesdays • 12-2p

We pride ourselves on being available to those we serve.

Research Community

The Safety Flair reward system recognizes positive steps toward safety in research laboratory settings by recognizing those demonstrating safe lab practices.



Penn Community



EHS members provide resources to the community through outreach events held on campus.

Scientific Community

Members of the EHS team attend, present, and engage with scientific communities, allowing the work of the group to have a greater impact reaching beyond the walls of Penn.



Global Community

Participating on the Green Labs Executive Committee and collaboration on Sustainability 101 curriculum help align the needs of global sustainability with those of best practices in laboratory safety. By considering sustainability and safety in design, EHS together with partners, Facilities & Real Estate Services, Purchasing and Penn Medicine's Space, Planning and Operations Office, create a world of opportunities with environmental accountability.