



Yale Environmental Health & Safety

Annual Report-FY24

July 2024

Message from the Executive Director

The **Yale Environmental Health and Safety (EHS) FY24 Annual Report** reflects our commitment to ensuring a safe and sustainable campus amid Yale University's unprecedented growth. As the institution expands, EHS continues to support the university's mission of excellence while adapting to new challenges in safety, compliance, and staffing.



Key Achievements in FY24

- **Strategic Planning:** EHS conducted comprehensive planning sessions to evaluate progress and identify growth strategies. This process culminated in the development of a high-level regulatory programs and activities assessment, which will be completed as part of EHS's FY25 Strategic Plan.
- **Staff Development and Retention:** Recruitment and retention of qualified staff remain primary challenges. EHS is focused on building internal capacity and adapting to the increased demand for services as new technologies and equipment are introduced on campus. In the summer of 2024, EHS launched a comprehensive internship program aimed at addressing the critical shortage of qualified candidates in the environmental health and safety field. This program was shared with EHS leaders across the US to encourage other institutions to begin their own internship programs.
- **Program Evaluation and Staff Well-Being:** EHS section-specific retreats provided opportunities to assess programs, enhance staff well-being, and develop growth strategies with a focus on resilience and operational sustainability.
- **Regulatory Compliance:** EHS maintained rigorous compliance with regulatory standards while addressing emerging environmental and safety concerns related to new technologies and practices across campus.

Collaborative Success

EHS's success is driven by strong partnerships with departments, laboratories, students, and staff. These collaborations are essential to maintaining a safe campus environment and delivering high-quality services. The rapid growth of Yale presents both opportunities and challenges for EHS. As new technologies and regulatory demands emerge, EHS must adapt to meet these needs. Our strategic plans focus on scaling operations, ensuring high-quality service, addressing staffing challenges, and supporting Yale's growth.

Commitment to Excellence

EHS remains committed to supporting Yale's pursuit of excellence by fostering a culture of safety, sustainability, and innovation. We will continue strengthening our team, adapting to new challenges, and developing key partnerships across the university.

This report highlights the dedication of the EHS team and our ongoing efforts to meet the evolving needs of the Yale community.

Kevin Charbonneau
Executive Director, Yale Environmental Health & Safety

Highlight: EHS Internship Program

EHS hosted 10 summer interns across eight different EHS disciplines in four internship categories in 2024. The department hosted two additional interns from the New Haven Academy at the end of their spring semester for a three-week immersion into the health and safety profession. These internships have been created to empower and inspire the next generation of talent by offering hands-on experience and exposure to a diverse range of viable professions. These interns were able to work with staff mentors in the following disciplines:

- Biosafety
- Industrial Hygiene
- Health Physics/Radiation Safety
- Infection Prevention
- Safety Advisor Program
- Environmental Affairs
- Research Safety
- Instructional Technology



Ahmed Abdulghany
University of Connecticut
EHS Integrator Software



Nile Bennett
Miles College (HBCU)
Environmental Affairs

EHS/HBCU Partnership

At the request of and under the direction of the Kevin Charbonneau, EHS executive director, EHS launched its inaugural internship program for science, technology, engineering, and math (STEM) students from Historically Black Colleges and Universities (HBCUs). This included funding for marketing provided by the New Haven Hiring Initiative for a New Haven Promise intern to help with design and marketing materials, the creation of a web section for summer internships, a contractual partnership with HBCU Connect, which provides contact information to the largest network of students and alumni for HBCUs, and a connection with two HBCU graduate student mentors to help share information about the program.



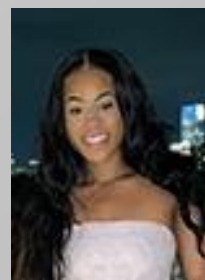
Josh Collins
University of Alabama-Birmingham
Health Physics



Josiah Ford
Quinnipiac University
Instructional Design



Gabriella John
University of Connecticut
Research Safety



Brooke Jones
Clark Atlanta University (HBCU)
Lab Biosecurity



Sofia LaFalce
University of Rochester
Infection Control



Charlotte Mulungula
Quinnipiac University
Safety Advisor Technician



Lillie Scanlon
Connecticut State
Community College
Instructional Design



Mark Taylor
University of New Haven
Industrial Hygiene

Biological Safety

Meeting Federal Requirements: EHS finalized CDC requirements for lab and animal research with Select Agents and was approved to initiate research with the authorization lasting for three years.

Increasing BSL-3 Demands: EHS revalidated three BSL-3 laboratories to show that they were operating as designed when tested under a variety of failure scenarios. Yale Facilities and the Yale Animal Resources Center were key partners in this initiative and over a dozen EHS professionals assisted with this important requirement. Additionally, EHS kept up with increasing demands for BSL-3 research space, helping with the review and authorization for research with new high-risk pathogens and new personnel. One of the biggest challenges in FY24 was merging select agent research into the existing BSL-3 research program. EHS maintained pace with increasing human gene transfer protocols and assisted the Yale Biological Safety Committee with its reviews of these human subjects research protocols through management of the Human Gene Transfer Subcommittee.

A Team Approach: The team worked with Yale Police for the first safe and secure transfer of select agents to Yale, which allowed this highly regulated and high-risk research to commence. As part of this initiative, EHS organized and conducted emergency response drills as part of the requirements. Representatives from Yale's Police Department, Fire Marshall's Office, Yale Animal Resources Center, and Emergency Operations Team participated and were joined by their partners from the City of New Haven (Fire, Police, Bomb Squad). A representative from the New Haven Office of the Federal Bureau of Investigation's Weapons of Mass Destruction program also joined the group. Both drills were successful and the lessons learned from the drills were incorporated back into Yale's written emergency, biosecurity, and biosafety plans.

Clinic Guidelines: The EHS Infection Prevention Program worked with colleagues to develop a manual on how to build clinics. This new document was created as a corollary to the EHS Lab Design Guidelines and will help both groups better identify needs for building new clinics or when purchasing existing ones.

Monitoring and Emergency Response

Equipment: A group of EHS technical representatives transitioned new equipment into the BSL-3 containment facility. The new Evergreen Telemetry HVAC monitoring system greatly eased the BSL-3 facility validation of the biggest high-risk research facility and will be used for all other BSL-3 lab validations moving forward. It has reduced the number of personnel required for the validations by 75%. EHS has also validated a new space decontamination device, which has expanded the EHS arsenal for high-risk biohazard emergency responses.

Professional Study: A group of nine EHS professionals participated in an International Society for the Advancement of Cytometry (ISAC) study evaluating various bioaerosol cassettes for sampling biocontainment of high- speed cell sorters. The project was conducted at the request of ISAC and two EHS professionals are slated to be co-authors on the manuscript once submitted for publication.

Ivy League Partnership: EHS co-organized the 2024 Harvard Yale Biosafety Symposium, the fifth joint offering by the two universities. The two-day hybrid in-person or remote event was held on the campus of Harvard Medical School and featured two pre-conference courses and a full-day biosafety program agenda that focused on the review of high-risk biohazard research experiments. Over 150 attended the conference.

269

biological general registration reviews

241

rDNA registration reviews

100

infectious agent registration reviews

12

IBC meetings

11

DPH registered buildings inspected

229

DPH registered and inspected lab spaces in these buildings

203.5

total BSL-3 training hours

3,635

lab spaces with biological activity

Occupational Health & Safety

Hazardous Energy Control Procedures: One challenge over the past year was the need to standardize hazardous energy control procedures across the various Facilities trades and campus areas. Through collaboration with Facilities leadership, a procedure was agreed upon and applicable trades personnel were trained on the new procedure. This included 15 training sessions for over 80 applicable trades workers.

New Partnerships: An example of an exciting partnership during FY24 was the involvement in the Science Hill READY project. This project, spearheaded by Yale Facilities Engineering and Energy Management, seeks to complete zero-carbon readiness projects within select laboratory buildings to enable the use of low temperature hot water utility for heating, remove steam process loads, and to significantly reduce energy use intensity with comprehensive energy conservation measures. EHS's involvement during the 3Flow laboratory ventilation risk assessments and risk control banding process, which took place in early 2024 in the six selected laboratory buildings, will help guide the expansion of risk control banding campus-wide in the future. Additionally, EHS's continued role into FY25 as a technical resource, and as members of the steering committee, will be necessary to ensure that a thoughtful and safe approach is undertaken in implementing energy reductions as they relate to laboratory risk control banding and ventilation.

Looking Forward: For FY25, the Occupational Health and Safety section is tasked with utilizing and developing EHS staff professionally. Moreover, additional resources will be dedicated towards reducing worker injuries.

50

inspections of fabrication shops

40

site and trade specific trainings for Facilities staff

325

active fall protection equipment inspection items (including roof anchorages, lanyards, and harnesses)

45

powered industrial truck operator evaluations

70

drone flight requests

1,574

individuals provided with respiratory protection training and fit tested

175

hazardous chemical registration reviews completed

75

samples taken to evaluate student/staff exposures to chemicals



Radiation Safety

Laser Inventory: Radiation safety staff determined the EHS laser registration inventory was in need of improvement as it was found there were multiple record sets of laser locations. Health Physics Intern Josh Collins worked with radiation safety leadership to develop an approach to canvas the university and re-establish the laser safety program. The initial inventory listed 296 spaces housing lasers, which increased to 329. Staff completed walkthroughs of 229 rooms in 21 buildings and 60 percent of these rooms were confirmed to be actively using lasers while 95 rooms were found to be inactive. Staff completed a cleanup of the inventory database to allow for a better understanding of lasers on campus. This also served as a way to re-connect with PIs and pave a new path forward that will ultimately reduce the burden on PIs in the laser safety program.

Regulatory License Improvements: In order to be better prepared upcoming Nuclear Regulatory Commission's (NRC) inspections, radiation safety leadership conducted a comprehensive audit to assess compliance with the NRC broad scope licensing requirements. They evaluated NRC regulations, records associated with those requirements, information on the EHS website, EHS Integrator, and the Radiation Safety Manual to assess the consistency of information across multiple platforms. Staff will begin the process of updating information as necessary and are committed to this continuity moving forward.

Continued Focus: In collaboration with the Yale University Radiation Safety Committee, the program is looking to rebrand the radiation safety laboratory surveys and evaluate ratifying registrations based on risk. Staff plans to continue to focus on stabilizing the laser safety program and work with PIs to complete their laser safety surveys in the spaces identified during FY24's walkthroughs.



84

PIs approved for laser use

33

buildings containing lasers

308

labs containing lasers

114

PIs authorized for radioactive material use

44

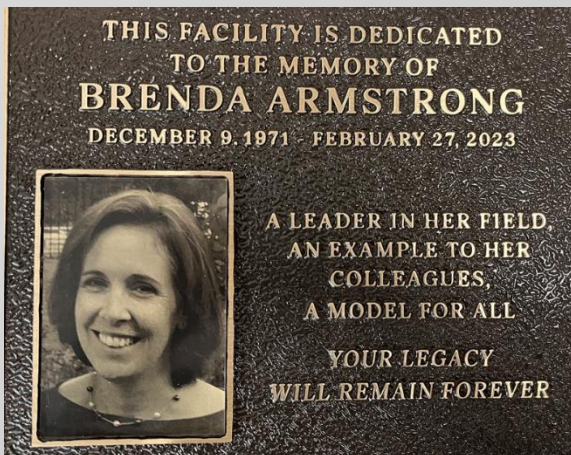
buildings containing radioactive material

386

labs containing radioactive material

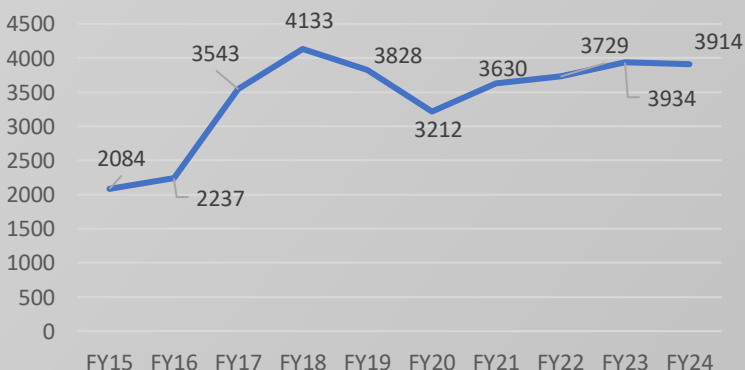
Environmental Affairs

Plans Becoming Reality: After 10 years of planning and execution, this year saw the completion of a new multimedia Yale School of Medicine (YSM) waste facility. The new space relocates and replaces the aging 23-year-old medical waste processing equipment previously run at YSM. It more than doubles its capacity for both operational reliability and expanding future capacity from Yale research. The new space also replaces the old radioactive materials storage facility, which is being displaced by research expansion projects at Science Hill. Construction of a new, less than 90-day hazardous waste storage area within the new YSM facility, coupled with renovations and expansion to an existing less than 90-day hazardous waste storage facility at YSM were also completed. The expanded hazardous waste storage capacity will reduce the number of hazardous waste shipments from YSM, which will, in turn, reduce Yale's liability and compliance burden and result in cost savings. The strategic planning and timing of these projects has allowed the research community to remain unimpacted in their valuable work.



The Digital Age: EAS prepared a Digital Opacity Monitoring Plan that was reviewed and approved by the CT Department of Energy & Environmental Protection for performing periodic monitoring of visible emissions, as required by U.S. Environmental Protection Agency (EPA) regulations and many of Yale's New Source Review air permits. The approved plan outlines Yale's process for capturing digital video of exhaust stacks and analyzing the footage with computer software that detects and quantifies the opacity of visible emissions that may be present. Previously, this monitoring was performed using EPA Method 9 (a 50-year-old test method that involved hiring a third-party contractor who had been trained to estimate the degree of exhaust opacity based upon their personal visual observations). In FY24, EHS has deployed the digital video method for opacity monitoring of sources located at Central Campus, School of Medicine, and West Campus. Using this method provides Yale with objective and defensible monitoring results that can be relied upon for certifying compliance with visible emissions requirements. By performing the monitoring in-house, Yale now has greater operational flexibility and can conduct monitoring on short notice when sources are otherwise operating to support campus demand. This has already yielded emissions reductions compared to prior years when affected sources would need operate for the sole purpose of completing visible emissions monitoring based on the availability of outside contractors. Yale's five trained and certified staff are the first to use this technology in the State of CT outside of regulatory enforcement officers.

Waste Pickup Requests



Continued Challenges: FY25 will bring more waste facility construction and renovation, an EAS office move, final demolition and decommissioning of Wright Lab West and the Chemistry Safety Building. These disruptions and displacements of staff and assets that have already forced EAS to constantly adjust day-to-day operations will continue.

Safety Advisor Program

Data Driven Analysis: Leadership performed an in-depth audit of Safety Advisor program for FY23 and FY24 to evaluate hours spent on specific Safety Advisor tasks and programmatic responsibilities. The audit utilized data from EHS's internal software management system. As a result, the Safety Advisor areas were reassigned to make the workload more evenly distributed among Safety Advisor staff.

Managerial Support: A new position was created in order to support managers of the Safety Advisor program and its increased workload. A total of four Safety Advisor Team Leads were interviewed and promoted from within the program into the Lead Safety Advisor position in March 2024. As part of the Safety Advisor Team Lead/s responsibilities, a mentorship program for current Safety Advisors and Safety Advisor Technicians was developed and initiated. The purpose of this is to provide guidance and assistance to each Safety Advisor and Safety Advisor Technician for work and personal growth.

New/Reorganized Staff: Due to staff turnover, a new co-manager of Safety Advisor program, new Safety Advisor, new Safety Advisor Technician, and summer interns were interviewed and hired during FY24. This resulted in onboarding training for new Safety Advisors in 2024 ensure consistent customer services and support among Safety Advisors to the Yale community.

Yale's Growth: Safety Advisors had an increased workload in assisting laboratories as well as entire departments with their relocation to new buildings or newly renovated spaces to ensure compliance with Yale, state, and federal policies. This resulted in an increased workload for the Safety Advisors with decommissioning the old lab spaces and commissioning the new spaces. In addition, Safety Advisors also assisted in commissioning back-filled lab spaces for new principal investigators.

Phenol Safety: Safety Advisors worked with the labs to complete Phenol registrations and conducted surveys of labs who indicated they utilize Phenol in their research. Safety Advisors provided a PEG spill kit for exposures to labs which have Phenol or Phenol-containing kits. During the Phenol survey, Safety Advisors ensured the Phenol poster indicated the location of the PEG spill kit. This will improve the proper treatment time in the event of a personal Phenol exposure.

949

biological/chemical lab inspections

243

controlled substance inspections

397

radiation inspections

273

minor/visitor application reviews

126

autoclaves tested

1,473

fume hoods tested

3,370

emergency eyewash and showers tested

163

legionella testing samples for cooling towers, water fountains, etc.

79

radiation meter calibrations

20

samples for asbestos/lead



Research Safety Program

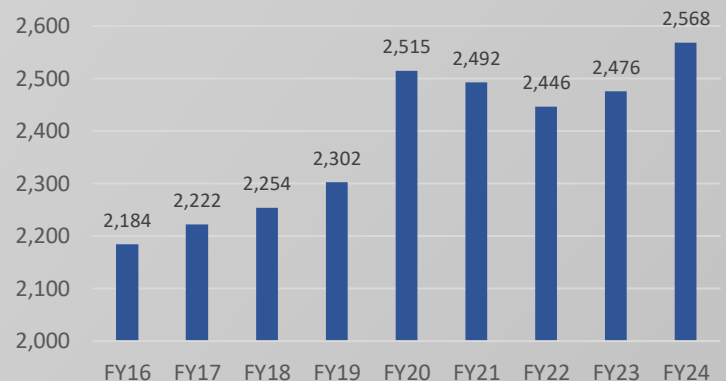
Shipping Compliance: EHS continued to streamline the use of the eShipGlobal system and the shipment review process by auditing existing procedures and updated them to align with the latest regulatory requirements. This helped to ensure the continued compliance with shipping regulations for research materials, particularly for sensitive biological and chemical substances. The university sent or received roughly 14,500 research material shipments in FY24.

Training Transition: Staff assisted in the university launch of a new Learning Management System in Workday Learning, which facilitated easier access to training modules and provided automated reminders for required courses. As a result of this transition, participation rates in safety trainings are increasing, ensuring that faculty, staff, and students are well-prepared to conduct research safely, thus reinforcing the university's dedication to a safe learning environment.

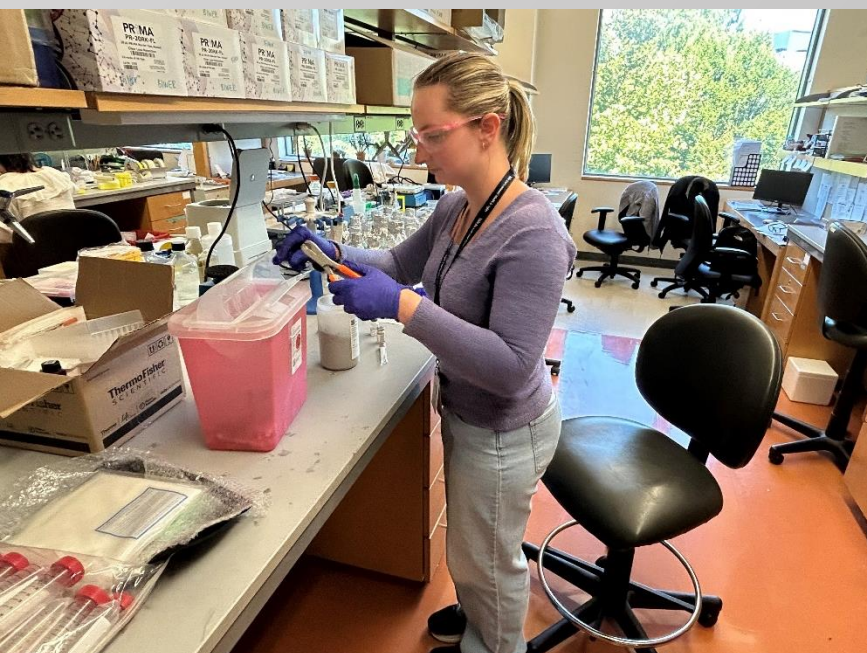
Record-Keeping Improvements: In an effort to improve record-keeping and compliance with DEA and State of Connecticut regulations, controlled substance records were digitized, which eliminated manual processes and ensured all principal investigators were properly licensed and trained. Staff continues to convert users to the EHS Integrator online inventory system. This transition not only improved accuracy and efficiency, but also enhanced the ability to track and audit-controlled substances, thereby safeguarding the integrity of the university's research efforts. In doing so, staff were able to perform 125 drug waste disposals and ensure there are a limited amount of expired materials being stored on campus.

Working Smarter: As a way to ensure all Clean Air Devices on campus were certified, maintained, and tracked accurately, EHS reconciled device data with physical inventories, scheduled regular maintenance, and improved communication between laboratories and technicians. These actions resulted in 99% certification compliance for all 2,660 devices and improved overall lab safety, contributing to the university's mission of fostering a safe research atmosphere.

Clean Air Devices on Campus



What's Next?: Looking ahead to FY25, the Research Safety Program anticipates several challenges. With increasing research activities, maintaining compliance with evolving regulations will require continuous updates to training programs and procedures. The transition to new technologies, such as further digitizing our records and compliance systems, will demand significant resources and staff training. Additionally, as the university expands its research capabilities, the Clean Air Device Program will need to scale accordingly, presenting logistical and operational challenges. Addressing these issues will be crucial to sustaining the program's success and supporting the university's mission of excellence in research and education.



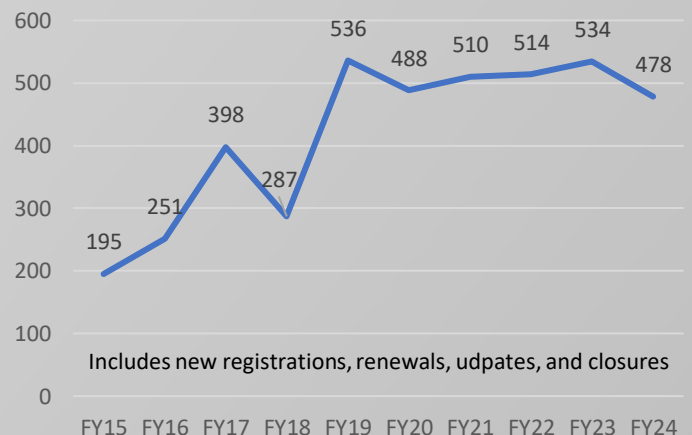
Business Operations

Planning for Staff Growth/Movement: As the EHS staff continues to grow, a continued challenge is to find the space to accommodate them. Several office renovations have been completed along with a complete renovation of the first-floor conference room at 135 College Street to create a “Zoom Room” to better handle the increase in remote meetings. The next phase of renovations includes the lower level of 135 College Street, which houses the Safety Advisors and Safety Advisor Technicians, to maximize work space and increase meeting space. Additionally, roughly 20 Environmental Affairs staff are being moved from Wright Lab to 60 Temple Street in the next two years to make room for the university’s new Physical Science and Engineering Building. This move, along with the standard logistical issues, required surveys to decommission the waste storage space at Wright Lab.

Documenting for the Future: In an effort to capture institutional knowledge and staff responsibilities, the staff has created Standard Operating Procedures to provide a better understanding of their work. This was done both on paper and via step-by-step video. This allows a better opportunity for staff to be cross-trained and for Leadership Team to have a better understanding of where help is most needed. It has been so successful, that the process has spread to other areas of the department.

Improving Efficiency: For years, Safety Advisors had been printing paper laboratory surveys and Business Operations staff were filing them into cabinets under the principal investigator’s name. The team developed a new process by which the vast majority of surveys are now stored in EHS Integrator, which saves time for the both the administrative staff and Safety Advisors as well as saves paper and makes the surveys more easily searchable when needed in the future. The existing surveys that had been filed have been shredded to create additional space in the office. Additionally, monthly biological registrations approval letters sent to principal investigators have been moved to an electronic process in EHS Integrator rather than a hand-generated letter. The manual process would take about an hour per letter while the electronic process takes roughly five minutes. This has resulted in a significant time savings as the average number of monthly approval letters has grown from around 15 to roughly 40 since the COVID-19 pandemic.

Growth in Controlled Substance Program



The Work Continues: In FY25, the group plans to continue to find ways to be more efficient and reduce paper files, continue space planning for the Environmental Affairs move and lower level renovation, and maintain its commitment to documenting workflow processes. Business Operations also looks to complete an update to the Restricted Items Policy, which includes many items under the EHS umbrella (radioactive materials, safety critical equipment, etc.). The group will work with various university safety committees and the Business Operations community to gather input before seeking approval from the Office of Procurement. In order to get a better sense of staffing needs, Business Operations also plans to compile data on staff responsibilities to look more closely at how administrative work is tied to certain processes within the office.

2,067

invoices process for payment

1,383

expense reports created, reviewed, and approved

759

requisitions created

373

biosafety approval letters sent to PIs

270

controlled substance license renewals

125

controlled substance waste disposals

69

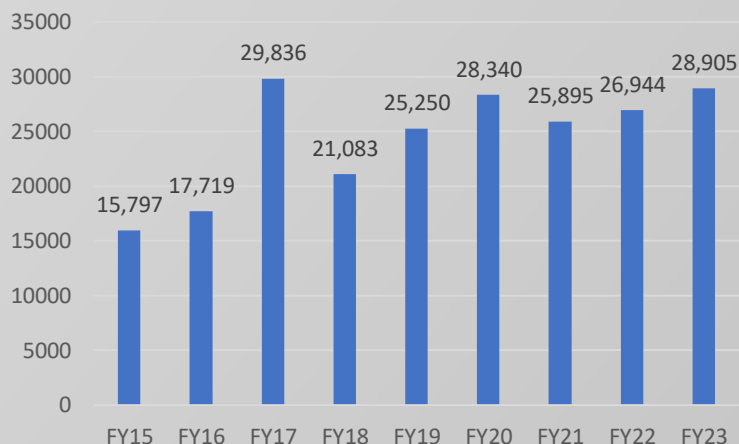
radiation registration renewals

Technology & Outreach

Conversion Complete: The Technology & Outreach section worked with leadership, the university's Learning Management Experience team, and EHS stakeholders in the conversion from Training Management System to Workday Learning (WDL). This included managing roughly 300 programs and courses as well as converting all digital content to meet WDL requirements, design standards, and SCORM packaging. Support was provided to facilitate user acceptance testing. Training, survey, and registration modules in EHS Integrator were updated and refactored to handle the data integration with WDL. In addition, university policy 1010 GD.01 Matrix of University-Wide Requirement was revised to reflect new language and weblinks for the WDL Statutory, Regulatory, and Policy Compliance training category.

Informing Our PIs: Staff worked in partnership to consolidate critical help information for new principal investigators and new lab managers into a new web section at ehs.yale.edu/new-pi. EHS safety sections assembled key documents, help guides, and relevant links to help new PIs and lab managers navigate their responsibilities and requirements. The vision was to make this important information easy to find, provide lab leaders with resources to help protect their researchers, and clearly articulate compliance requirements for state and federal laws along with applicable university policies. Although this was designed with new PIs and lab managers in mind, we hope that everyone can benefit from this focused collection of helpful information.

Web-Delivered Training Enrollments



Integrator Progress: The Technology & Outreach Manager met monthly with section leaders to review their request list for EHS Integrator. The group would discuss the section's top five priorities as well as anything new that has surfaced since the previous meeting. The Technology & Outreach Manager would then discuss with the executive director to make an overall priority list for the department. The monthly meetings also gave section leaders the opportunity to ask questions about and be trained on certain functionality. Additionally, ITS continues to develop a cloud-based Integrator platform to meet future needs.

New Systems: Intake sheets and dashboards for each section/program were developed in Smartsheets to allow for managers to view projects in progress in their section and allow for updates on project timelines. Technology & Outreach also assisted in the development of data analytics and reporting via Power BI Dashboards, which brings data for specific sections into one place using information from EHS Integrator and also produces visualizations. EHS Integrator support moved from an online webform hosted by EHS to an ITS intake form developed specifically for the department. This allows for progress tracking on support requests as well as the ability to gather better data on volume. Additionally, staff supported the deployment of the new university Health on Track system, Yale's new self-service system for tracking health requirements. *Health On Track* centralizes the management of health requirements.





ehs.yale.edu

203-785-3550

*135 College Street,
Suite 100*

New Haven, CT, 06510