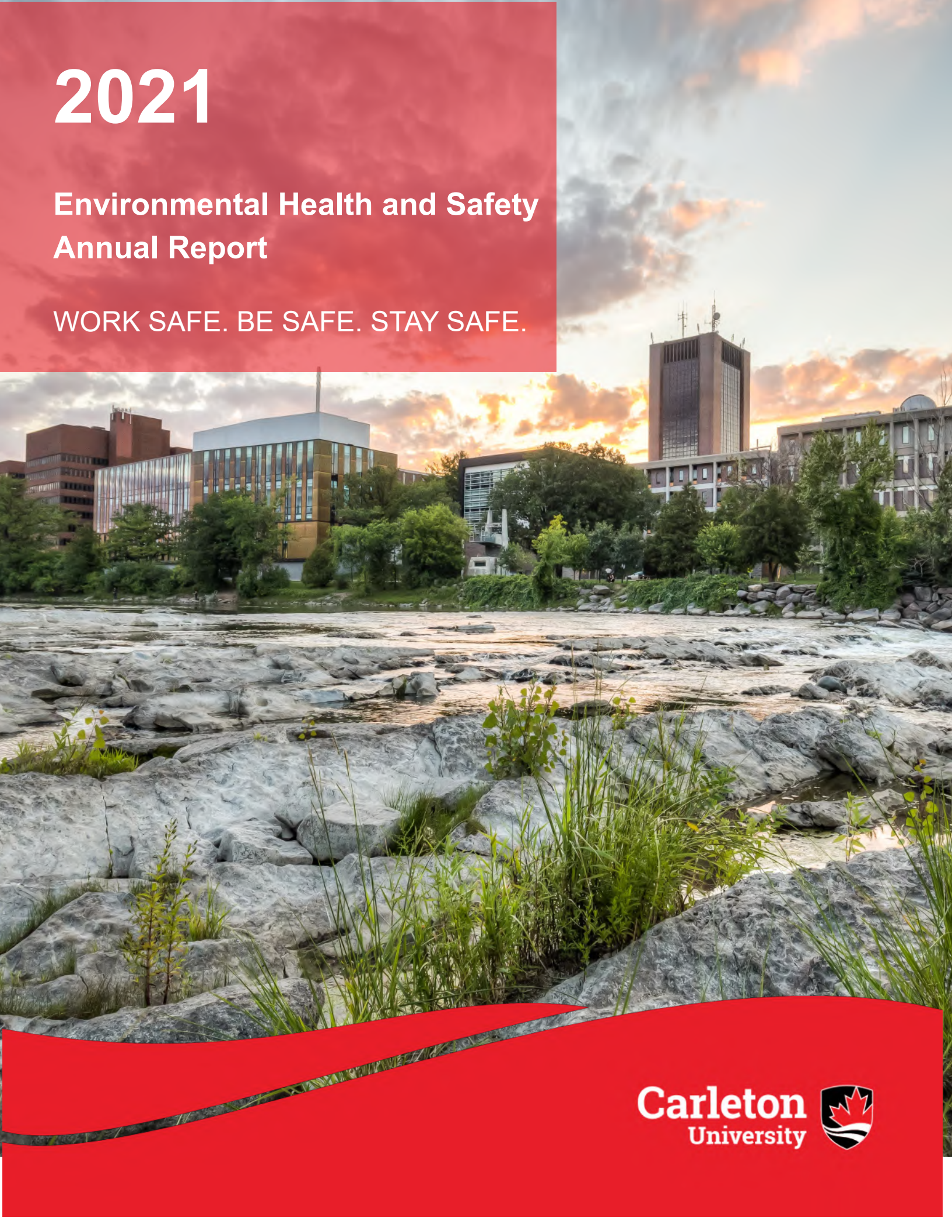


2021

Environmental Health and Safety Annual Report

WORK SAFE. BE SAFE. STAY SAFE.



Carleton
University





TABLE OF CONTENTS

The Environmental Health and Safety Office reduces risk to the university community through our focus on stakeholder engagement, hazard management and regulatory compliance.

MESSAGE FROM THE DIRECTOR	3
SAFE RETURN TO CAMPUS	4
VENTILATION ASSESSMENT	6
ERGONOMICS	7
ASBESTOS MANAGEMENT	8
TRAINING HIGHLIGHTS	9
WSIB AND COMPLIANCE METRICS	11
LABORATORY SAFETY	12
2022 UPDATE	14
COMMUNITY ENGAGEMENT	15
EHS TEAM	15



MESSAGE FROM THE DIRECTOR



The Environmental Health and Safety Team is pleased to present the 2021 Carleton University EHS annual report, one of three annual reports from the newly created Office of Risk Management.

The EHS Team offers solution-based programs and expertise in areas of Industrial Hygiene, Laboratory Safety, Ergonomics, Accident and Incident Prevention, Risk Assessment, Regulatory Compliance, Training, Workplace Violence and Harassment Prevention and overall Health and Safety. We identify, evaluate and mitigate operational risk across the spectrum of our research, teaching and business activities, implementing innovative solutions and providing guidance in support of Carleton's academic mission.

Through collaboration and partnership with stakeholders across the Carleton community, we have adopted best-in-class strategies and frameworks to continue to build an ever safer and increasingly productive environment to welcome back our community into a cherished space to work, study, learn and grow.

In last year's report, we stated 2020 was an unprecedented year as the university responded with compassion, resilience and innovation to the pandemic. One year later and we are finally seeing light as we emerge from the COVID pandemic. This year, health and safety continued to be a critical factor in decision-making at all levels of the organization, allowing a safe and measured approach to the ongoing and ever-changing pandemic, to ensure a safe and confident return to campus for our faculty, staff, and students.

The EHS Team continued to occupy a critical space in the university COVID response.

Some milestone moments from 2021 include:

- Over 50,000 vaccination attestations and documents verified in support of the Carleton Mandatory Vaccination Policy.

- EHS supported the verification of HVAC effectiveness through air sampling of selected spaces using a novel technology. Findings confirmed and supported both internal Facilities Management and Planning (FMP) findings and third party consultants. Our study will be presented at the International Conference of the Society of Indoor Air Quality and Climate later this summer.
- Successful completion of the WSIB Health and Safety Excellence program, resulting in a rebate on our WSIB premiums, and recognition of Carleton University as a WSIB Excellence Member.
- All EHS online training updated and successfully transferred to the new Brightspace learning management system continuing on-demand learning opportunities for the community.
- Successfully obtained a university wide Cannabis Licence, one of the very few Canadian universities to be granted an institutional research licence.

Even as COVID continued to largely focus our activities, the EHS team enhanced the health and safety culture across the organization. I am pleased to highlight some of the performance based metrics we achieved, as a community, in 2021.

CU 2021 SAFETY METRICS:

- 165 ergonomic assessments completed, the highest number of requests since EHS assumed responsibility for the ergonomics program in 2014.
- 139 Good Catches, a 53% increase over 2020.
- Over 7300 COVID-19 infection prevention training completions.

The newly consolidated Office of Risk Management benefits from unique expertise, synergies and enhanced collaboration. This ensures an integrated approach to navigating all levels of risk at Carleton University.

WORK SAFE. BE SAFE. STAY SAFE.

Nancy Delcellier, MBA, BSc, CRM, CRSP
Director
Environmental Health and Safety



SAFE RETURN TO CAMPUS

The health and safety of Carleton faculty, staff and students remained at the forefront of decision making in the face of the global pandemic. Despite the ever changing public health directives, Carleton established a framework of integrated systems through creativity, collaboration, and nimbleness. The drivers for the preventive initiatives that were undertaken were based on a steadfast focus on adhering to scientific and public health principles. EHS maintained a pivotal role, supporting many of the strategic initiatives.

- ◆ cuScreen linked mandatory COVID-19 training , daily screening tied to access control, and vaccination attestations for all individuals accessing the Carleton campus. Since its launch in August of 2021, well over 65,000 individuals have used cuScreen in some capacity. Ambassadors supported the daily screening at campus building entrances.
- ◆ The Mandatory Vaccination policy introduced in September 2021, resulted in the submission of over 55000 vaccination documents from around the globe. A team of 12 student validators operated under EHS oversight to verify these documents and ensure all campus attendees were indeed vaccinated.
- ◆ EHS led contact tracing for faculty, staff, affiliates and visitors to campus. Health and Counselling managed all student reports, with Athletics overseeing contact tracing for our varsity athletes. Approx. 500 faculty and staff and 1000 students were individually contacted to follow up on symptoms.
- ◆ EHS completed the highest number of ergonomic assessments ever this year, ensuring that faculty and staff working remotely did not develop ergonomic injury

HEALTH AND SAFETY EXCELLENCE



Health and Safety
Excellence program

In 2021 Carleton joined the WSIB Health and Safety Excellence program. Key benefits include:

- ◆ Demonstrates our commitment to health and safety across the organization.
- ◆ Grants rebates on WSIB premiums contingent upon verified workplace safety performance.
- ◆ Opportunities to network and share best practices with other like-minded organizations.
- ◆ Clear roadmap to improve existing systems and processes.

Our evidence based submission in support of health and safety improvements resulted in successful completion of the 2021 program. As a recognized Safe Ontario Employer, Carleton has received a rebate of 16K on our WSIB premiums with a second disbursement to follow. We have already submitted our application for 2022 to continue our path to Safety Excellence.



0 WORKPLACE TRANSMISSIONS FOR THE 2ND YEAR IN A ROW

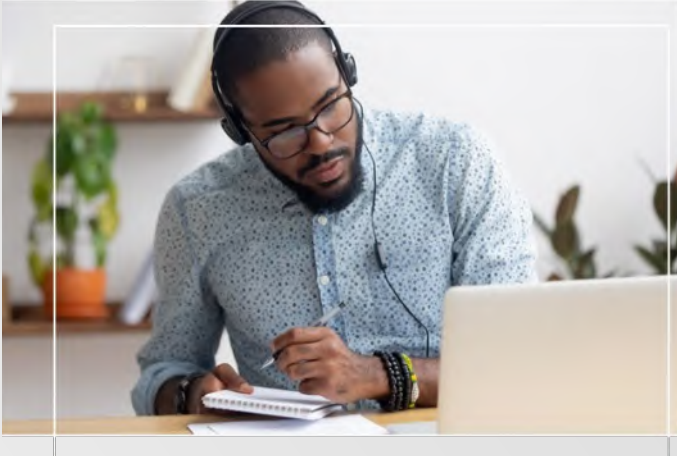


500 SYMPTOM REPORTING FORMS REVIEWED



150+ LIFE SAFETY ALARM TESTS AND CALIBRATIONS COMPLETED

320 INCIDENTS, INJURIES AND GOOD CATCHES REPORTED IN CUWORKSAFE



7 EHS COURSES TRANSFERRED TO BRIGHTSPACE



75K+ SPENT ON ERGONOMIC HOME OFFICE SUPPLIES



36 RESPIRATORY FIT TESTS PERFORMED



600 +
AEROSOL
SAMPLES WERE
COLLECTED
FROM 24
DIFFERENT
SPACES



VENTILATION ASSESSMENT: HVAC ENGINEERING CONTROLS

The EHS Team performed air sampling campaigns from 24 different indoor areas to assist in the assessment of our HVAC systems performance across campus. Over 600 aerosol samples were collected using **veriDART's patented DNA-tagged tracer particles** that simulate airborne pathogen mobility and exposure within and between rooms. The primary goal of the survey was to assess aerosol migration at the floor level as well as the potential dilution rate of COVID-19 like aerosols.

Our ventilation assessment included two scenarios. A survey test to identify the flow pattern and potential “hot spots” of stagnant air and a dilution test to verify ventilation and filtration performance of HVAC system.

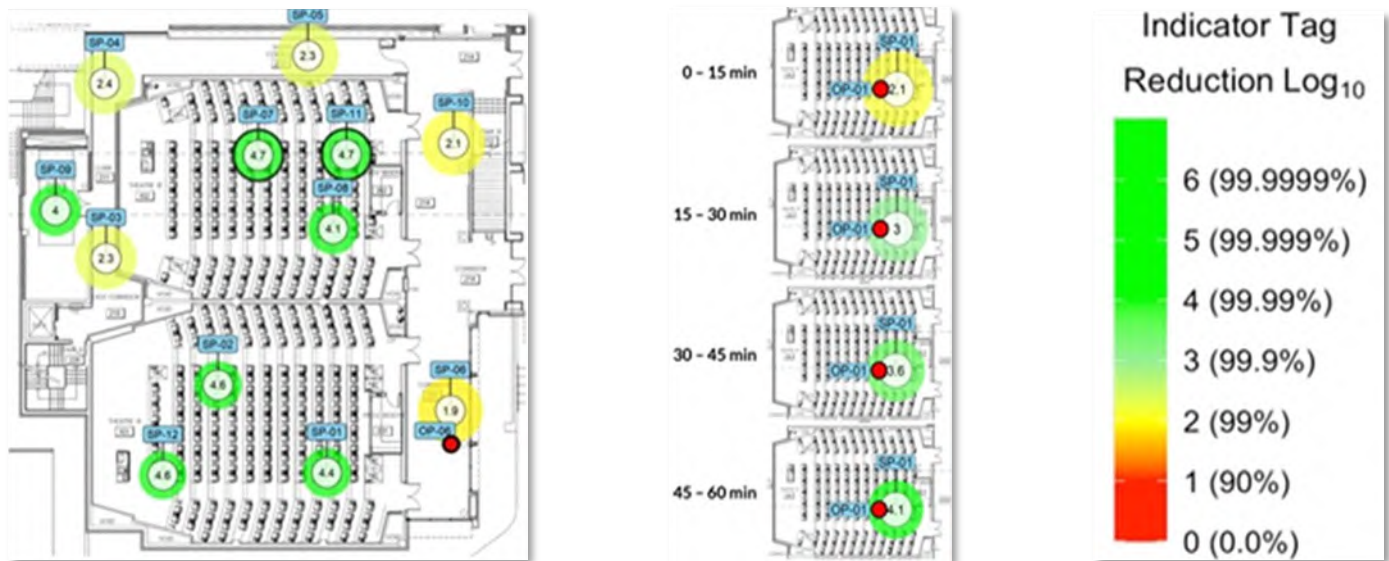


Figure 1. From left to right: an example of a “heat map” showing the flow pattern of tracer DNA (colours indicating the log reduction of DNA concentration). Next, a visual example of a dilution test and the gradual removal of tracer DNA from the space. The DNA tag reduction scale colour gradient proposed by Safetraces and corresponding indication of ventilation effectiveness.

Using the veriDART system we were able to confirm that the majority of our buildings already had adequate ventilation and filtration controls in place. Test results also identified minor issues related to airflow between adjacent rooms, which were subsequently corrected. With veriDART, we were able to demonstrate that in spaces with MERV13 rated filters and a minimum of 15% fresh air, the DNA tracer was cleared from the space within the first 30 minutes.

In 2021, aerosol transmission of the COVID-19 virus was confirmed by the CDC and WHO. EHS proactively undertook ventilation efficacy testing to confirm safe spaces for the eventual safe return of our staff and students. The veriDART results together with other COVID-19 controls aided the university to strategically plan the allocation of resources and to determine safe occupancy limits.



ERGONOMICS IN 2021



2021 was the second year where the majority of Carleton employees were working from home. Our Office Ergonomics Program continues to be in high demand. Our team completed **165** assessments which was an increase of **52%** over last year and is the highest number of requests since the ergonomics program was transferred to EHS in 2014.

Workplace musculoskeletal injury remains a significant hazard province-wide, with WSIB claims on the rise. EHS recognizes the importance of continuing to offer proactive and sustainable solutions that every employee can implement to improve their office conditions, whether at home or on campus.

"I wanted to thank you for your assistance in getting me set up ergonomically at work and at my home office. My set up is now 100 times better and more comfortable than what I was working with before."

-Anna Riethman
(Graduate Administrator and Community Coordinator)



ASBESTOS MANAGEMENT

Remediation of asbestos containing material (ACM) is ongoing in academic buildings and mechanical systems on campus.

- ◆ In 2021, over 1500 specialized type 2 operations were used to remove more than 300 pipe elbows and fittings and approximately 740 linear meters of asbestos containing pipe insulation.
- ◆ Following asbestos removal, all exposed piping was re-insulated with mineral based insulation and finished with a non fabric vinyl or metal covering to prevent the growth of mold, extend the lifespan of the pipe covering and render it safer for workers.

ASBESTOS BY THE NUMBERS

5

Buildings stripped of asbestos pipe insulation in mechanical rooms

300+

ACM elbows/ fittings removed from high use mechanical rooms

700+

Linear metres of ACM pipe insulation removed

1000+

Fittings and pipes re-insulated



- ◆ Buildings such as Dunton Tower, Architecture, Patterson Hall, Southam Hall, and Herzberg have been cleared of accessible ACM pipe material. Any remaining pipe ACM within those buildings is safely enclosed within wall cavities and ceiling spaces and inaccessible to the public and trade staff.
- ◆ This year we focused on academic buildings, however the planned 2022 campus ACM resurvey will facilitate future prioritization.

TRAINING HIGHLIGHTS

Health and Safety training is a key component to ensure staff and students are aware of hazards and can safely conduct their work and studies whether it be in an office setting, workshop/mechanical space or laboratory.

To ensure due diligence in the trades, EHS provides training from certified 3rd parties on the safe use of forklifts, scissor lifts and fall arrest systems (among others). Training is refreshed every three years to keep safety skills current. In 2021, a training needs assessment within the Print Shop confirmed the requirement for Pallet Stacker training due to the risks associated with such equipment.



ONLINE TRAINING COMPLETIONS



15,100

Total number of training completions

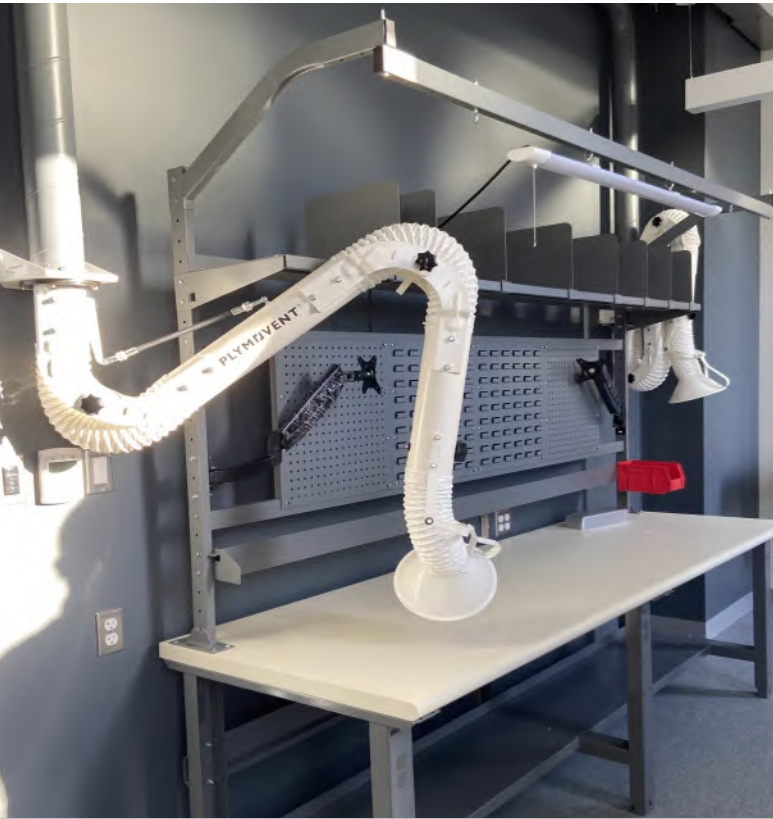
Valid Transportation of Dangerous Goods (TDG) training is crucial in order to provide compliant and safe shipping of goods from our researchers to collaborators around the world. These packages include samples, chemical substances, biological materials, and specialized equipment containing batteries. In 2021, in support of the increased demand from our laboratories, EHS selected eight Carleton staff to receive enhanced training in TDG shipping (ground and air).

EHS continued to provide timely access to varied and comprehensive health and safety training throughout the pandemic.



IN-CLASS AND VIRTUAL TRAINING

LABORATORY SAFETY	296
BIOSAFETY AWARENESS	117
WORKING AT HEIGHTS	9
FIRST AID CPR	43
LOCKOUT TAGOUT SAFETY	14
LASER SAFETY	15
TRANSPORTATION OF DANGEROUS GOODS	18
AUTOCCLAVE SAFETY	15
AERIAL WORK PLATFORM	14
GROUNDS	17
WORKPLACE INSPECTION	8
FORKLIFT/ PALLET STACKER	12
RADIATION SAFETY	29
SUPERVISORY	
DEVELOPMENT SERIES	28



“Thank you for looking into what must be done to keep our workers safe and informed of all the changing rules and policies for essential work.”

-Kristine Nadon
(Director, Space Management and Capital Planning)



ENGINEERING CONTROLS

All fume hoods, biological safety cabinets, downdraft tables and local exhaust ventilation systems across campus are inspected annually to ensure safe and optimal operation of these engineering controls.

All engineering controls are tested based on applicable ASHRAE and NSF standards. If required, corrective actions are promptly addressed to ensure workplace exposures to dangerous substances are prevented.

Seventy fume hood deficiencies were identified during this year’s annual inspection. Most of these deficiencies did not impact safety, but rather were related to optimal performance. EHS coordinated repairs via third party providers or Facilities Management and Planning. **All issues were fully addressed within 51 days.**

Local ventilation testing is provided to ensure that hazards related to dust, smoke and fume production are controlled. Local ventilation is used in many faculties and departments such as Earth Sciences, Electronics, Civil and Environmental Engineering, and Facilities Management and Planning.

SAFETY THROUGH VALIDATION

179

Fume hoods inspected across campus

70

Deficiencies identified and corrected

83

Identified local exhaust ventilation systems tested

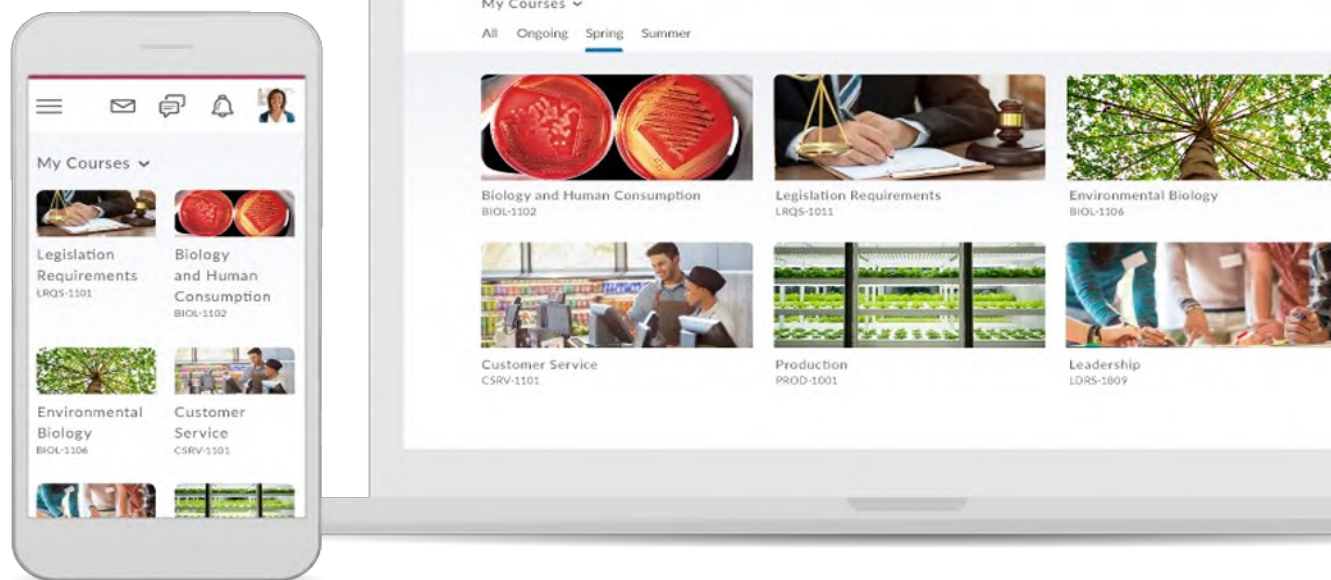
45

Biological safety cabinets across all departments tested and certified

100%

Fume hoods, local exhaust systems, downdraft tables and biological safety cabinets inspected and made safe

BRIGHTSPACE MIGRATION



Last year, Carleton University launched the new Enterprise Learning Management System, Brightspace.

As a result, throughout spring 2021, EHS leveraged the opportunities provided by the new platform to re-examine content, learning outcomes and participant engagement as we migrated existing online Health and Safety training. The accessibility, timeliness and content accuracy of these courses is critical due to the mandatory nature of these regulatory driven courses.

Seven training courses including Worker Health and Safety Awareness and COVID-19 Infection Prevention training were thus set up in Brightspace along with their accompanying quizzes. All course completions are seamlessly integrated into Banner to demonstrate and support legislative compliance.

WSIB AND REGULATORY COMPLIANCE METRICS

As the community returns to campus, there is a notable increase over the previous year in Good Catch reporting, and a minor increase in workplace injuries. We saw a significant increase in the number of days lost due to injury in 2021. However, 90 per cent of the total lost time days are attributed to a single critical injury. Despite this, we continue to be in good standing in terms of our experience rating compared to other Ontario Universities.

	2018	2019	2020	2021	5 Year Avg	Change
# of Critical Injuries	7.0	4.0	0.0	1.0	3.2	
# of Lost Time Injuries	5.0	9.0	3.0	4.0	5.8	
Days Lost to Injuries Claims	8.0	17.0	8.0	53.3	25.7	
Average # of Lost Days/Claim	1.6	1.8	2.6	13.3	4.9	
# Of Good Catches Reported	161.0	105.0	91.0	139.0	131.2	

As showcased in the 2021 President's Report, research at Carleton University continues to soar with an impressive \$86.5M in external funding over the last year and strong projections for next year. The innovative research is varied and EHS plays a important role in ensuring they can safely advance their research objectives.

HAZARDOUS WASTE MANAGEMENT

As research increases across Carleton faculties, so does the requirement for proper disposal of waste. This waste may include hazardous chemicals resulting from laboratory processes, biomedical, anatomical and industrial materials. The handling and disposal is strictly regulated by the Ministry of the Environment, Conservation and Parks under R.R.O. 1990, Reg. 347. In 2021, EHS coordinated the safe disposal of 21,354kg of hazardous waste.



21,354 kg

Hazardous waste safely disposed

HAZMAT SPILL AUDIT

Risk reduction activities in 2021 included an audit of the storage of large volumes of hazardous materials and the impacts of a potential spill. Areas in Steacie, Maintenance, Minto Case and Mackenzie were assessed and assigned a risk ranking based on key factors including the type and class of liquid and spill kit and drain blocker availability.

Most areas were classified as high risk for an environmental incident with challenges in regards to emergency response. In collaboration with our external partners, the path to improvement outlined the requirement for containment and spill cleanup materials.

By conducting this assessment, purchasing critical supplies and implementing procedures, we have successfully mitigated these risks.



54

Reviewed and approved projects involving biohazards



CANNABIS RESEARCH PROGRAM

The legalization of cannabis in Canada has prompted significant growth in cannabis research across the university sector. In order to regulate this new field, Health Canada introduced the Cannabis Act to provide a licensing framework for legal access to cannabis for the purpose of conducting research. After a year-long wait following the submission of our application, **Carleton University was issued an institutional licence** allowing our researchers the opportunity to work with cannabis and their products. We are one of the few universities that has been granted such a licence to date.

A Cannabis Research Program has been developed and includes an internal certification process, mandatory training and a new website where Principal Investigators can access the recordkeeping forms they need to ensure compliance with the regulations and safe operations in their laboratories.

REGISTERED BIOHAZARD LABORATORY INSPECTIONS

Laboratories storing and handling pathogens classified as Risk Group 2 and above are strictly regulated by the Human Pathogens and Toxins Act and Regulations. A condition of our institutional licence is to perform regular inspections of these labs. These are performed by the institutional Biological Safety Officer, a member of the EHS team. A successful inspection includes a comprehensive review of the physical containment of the facility and all operational practices. **Carleton has six Containment Level 2 labs on campus in four separate departments and all were visited in 2021.** Findings from these inspections revealed only minor issues with corrective actions rapidly undertaken.

LIFE SAFETY ALARMS

Areas across campus are monitored and alarmed to prevent dangerous exposures by providing an early warning of a hazardous situation. Areas such as laboratories, mechanical spaces and specialized services like the ice rink and the pool are monitored for levels of gasses such as ammonia, carbon monoxide, hydrogen sulfide and oxygen, etc. Optimal performance of these monitors is paramount. Therefore, EHS manages bi-annual testing and calibration of **approximately 150 units** by a certified service provider.

2022 UPDATE

A significant focus for 2022 will be to develop synergies and identify opportunities that will arise from the new Office of Risk Management structure and the incoming Executive Director. Tony Lackey's leadership and experience was invaluable in establishing the ORM and bringing the three units (EHS, Emergency Management and Risk and Insurance) together.

The other critical focus will be to provide health and safety leadership for the Safe Return to Campus activities.

3 PRIORITIES

OFFICE OF RISK MANAGEMENT

Provide support for the incoming Executive Director and pursue development of synergies to enhance the effectiveness of the team in support of the university's mission.

WORKSHOP SAFETY PROGRAM

Develop a safety program to address the unique hazards and risks associated with workshops, engineering laboratories, studios, and related spaces. This will provide tools and resources to mitigate risks related to teaching, research and operational activities, and provide a unique opportunity for skilled learners to practice their craft safely.

SAFE RETURN TO CAMPUS

As we continue to move from a reactive approach to learning to live with COVID-19, we will develop and implement strategies that support this new reality, including our flexible work policy and processes.

STRATEGIC PRIORITIES 2022 AND BEYOND

"You have done an amazing job this past year with the coordination of events/services to continue moving Carleton forward, and maintaining the health and safety of all staff and students. Congratulations to you!"

-Joanne Bree
(Retired, Graduate Registrar & Director)

	Year 2 (2022)	Year 3 (2023)	Year 4 (2024)
Develop Workshop Safety program		Implement Workshop Safety program	Cyclical review of selected H&S programs
Chemical Inventory reconciliation		Develop laboratory and workshop inspection program	Implement laboratory and workshop inspection program
Launch CUWorksafe – new user platform		Continue to expand H&S training opportunities and develop mandatory risk management training	Full implementation of H&S training linked to job descriptions
Launch Cannabis Research program and training		Review and update the Ergonomics program	
Health and Safety Excellence (Year 2)		Health and Safety Excellence (Year 3)	Health and Safety Excellence (Year 4)



COMMUNITY ENGAGEMENT

The EHS Team continues to promote and grow safety culture within CU and beyond our borders. We proudly lead or participate in the following:

- Nancy Delcellier: Past Chair of CEHSO
- Tim Golding: Coordinated Accessibility Strategy Team member (READ)
- Tina Preseau: Chair of OUBSO
- Zaneta Polis: Obtained Certification in Ergonomic Program Management

Student Impact and Experiential Learning

Building on the success of existing experiential learning activities, we pledge to seek out opportunities for student engagement and knowledge transfer.

- Completion of respiratory fit testing for student work placements
- Faculty of Science: Review exercises for new undergraduate laboratories
- FED Capstone projects: Introduction to real world safety requirements
- Health Sciences Capstone Course
- Internship for local college Health and Safety program
- Placement for Health Sciences student annually
- Summer students as part of the EHS team

Internal

- Joint Health and Safety Committee
- Faculty Safety Committees (FED and Science)
- Return to Campus Committee
- Academic Continuity Committee
- Operations Committee
- Animal Care Committee
- Biohazards Committee
- Radiation Safety Committee
- Emergency Management Advisory Committee

External

- Council of Environmental Health and Safety Officers
- Ontario University Biological Safety Officers
- Advisory Board of the Public Services Health and Safety Association

EHS TEAM

Our team supports the prevention of incidents and injuries on campus through a number of solution based programs. Our highly skilled team works collaboratively with faculty and staff to enable and support research and student activities.



Nancy Delcellier MBA, BSC, CRM, CRSP

Director

Tina Preseau MSc

Manager, Laboratory and
Academic Safety

Zaneta Polis HBSc, MPH

Manager, EHS

Tim Golding BScEE, CRSP

EHS Officer

Stephanie Vaithilingam, BScH

EHS Officer

Norm Barton

Radiation Safety Officer



Office of Risk Management, Environmental Health and Safety

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