ATSSL - 2022-2023 ANNUAL REPORT

UNIVERSITY OF CALGARY

ATSSL
Advanced Technical Skills Simulation Laboratory

CONTENTS

ABOUT THE ATSSL

The ATSSL is a modern facility that provides a safe learning environment for medical trainees and practicing professionals to acquire, practice, and enhance their skills. Since its establishment in 2014, it has offered a comprehensive range of simulation modalities, including procedural skills using human and cadaveric tissue, as well as theater-based simulations, for all learners in pre-licensure and licensed health professional education at the University of Calgary (UCalgary) and Alberta Health Services (AHS). This encompasses medical students, postgraduate medical residents, practicing physicians, nursing students, nurses, and allied health professionals. The ATSSL received accreditation as a Simulation Program from the Royal College of Physicians and Surgeons of Canada in 2018, and in 2023, it underwent its final review and renewal before the program sunsets.

The ATSSL comprises three distinct labs: the Surgical Skills Simulation Laboratory (SSL), the Clinical Skills Simulation Laboratory (CSL), and the Special Procedures Laboratory (SPL). Spanning over 30,000 square feet, the facility has the capacity to accommodate both small and large groups of learners simultaneously, running parallel training streams. The ATSSL is also responsible for managing the Southern Alberta Body Donation Program, which facilitates the acceptance and preparation of donated bodies for medical education purposes.

The ATSSL is dedicated to advancing simulation-based medical education and promoting patient safety and quality of care. To achieve this goal, the ATSSL collaborates with partners in the UCalgary Cumming School of Medicine (CSM) and AHS to design longitudinal curricula and address areas of training need. Emphasis is placed on the acquisition of skills and knowledge, interprofessional training and teamwork, and an enhanced understanding of patient safety risks. Ultimately, this results in more competent, confident, and safe medical and surgical professionals. The operations of the ATSSL are an integral part of the CSM's mission to "Create the Future of Health."

VISION

Global leader in innovative simulated education and assessment for health professionals to improve patient outcomes.

MISSION

The ATSSL is committed to providing innovative and interprofessional simulation-based medical education and research.

We continuously aim to produce effective, confident, and safe medical and surgical professionals while improving patient safety and quality of care.

GOALS

Design and facilitate individual and team-based simulation education for an inclusive community of diverse learners, offering a full complement of simulation modalities in a safe environment.

Effective design of appropriate quality simulation activities, incorporating a cost-effective, evidence-based approach.

Support research and scholarship into simulation-based education and assessment activities.

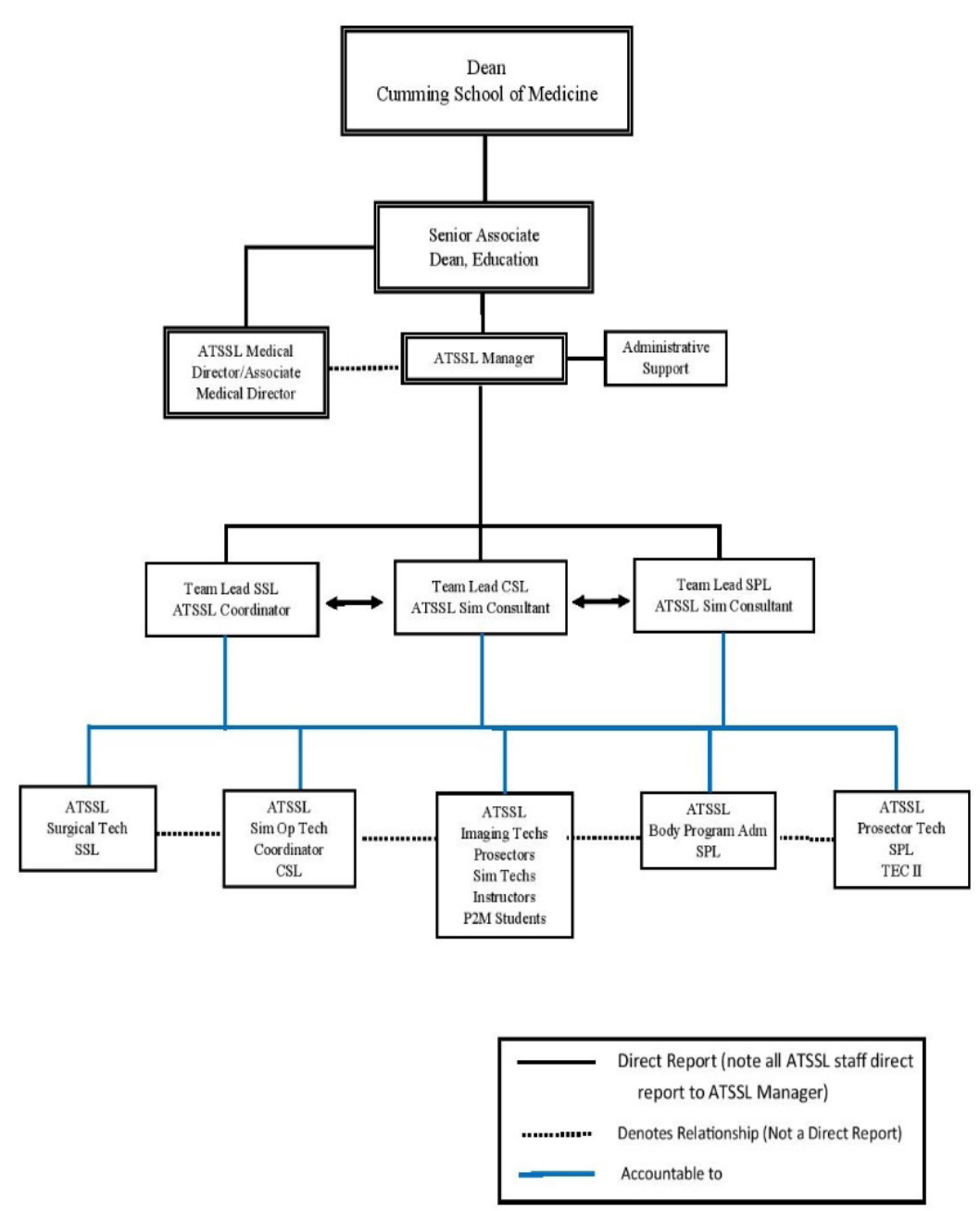
Maintain a high visibility, excellent reputation validated through retention of full accreditation.

GOVERNANCE & ORGANIZATIONAL STRUCTURE

The Executive Steering Committee oversees all operations and programming at the ATSSL and is responsible for setting the facility's strategic direction. This involves facilitating partnerships between the ATSSL, other faculties at UCalgary, and external stakeholders in simulation-based medical education. The ATSSL Medical Director and, Operations Manager report to the CSM Senior Associate Dean-Education.

EXECUTIVE STEERING COMMITTEE

Dr. Lisa Welikovitch, Senior Assoc Dean Education, CSM
Rose Yu, Senior Director, CSM
Dr. Chandrew Rajakumar, Medical Director, ATSSL
George Mulvey, Operations Manager, ATSSL



GOVERNANCE & ORGANIZATIONAL STRUCTURE

The Education Review Sub-Committee, which reports to the Executive Committee, is responsible for planning, strategizing, and implementing the educational aspects of the ATSSL. This committee convenes quarterly, and members are appointed by the organizations and departments they represent. Their specific duties include ensuring that simulation events align with the ATSSL's vision, mission, and goals, monitoring the quality of educational activities, identifying opportunities for scholarship, and contributing to accreditation standards and documentation.

EDUCATION SUB-COMMITTEE

Chair: Dr. Chandrew Rajakumar, ATSSL Medical Director

Members:
George Mulvey, ATSSL Operations Manager
Heather Hill, ATSSL Coordinator
Jan Rossiter, ATSSL Simulation Consultant
Michèle Cowan, ATSSL Simulation Consultant
Dr. Sarah McQuillan, Obstetrics & Gynecology
Dr. Ghazwan Altabbaa, Internal Medicine
Dr. Catherine Patocka, Emergency Medicine
Dr. Steve Lopushinsky, Surgery
Dr. Vincent Grant, Pediatrics & Emergency Medicine
Dr. Sarah Weeks, Cardiac Sciences

Ad Hoc Membership:
eSIM Provincial Simulation Program
OHMES
W21C
Research Faculty
Simulation Fellows
Directors from other Programs

ATSSL TEAM

MEDICAL DIRECTOR (Since 2021) Dr. Chandrew Rajakumar, MD, FRCSC Joined the ATSSL in January 2021 as the Medical Director and is currently Division Head for Minimally Invasive Gynecologic Surgery at the University of Calgary; President of the Section of OBGYN for the Alberta Medical Association; Provincial Lead for Benign Gynecology for ERAS Alberta; and a Simulation Lead for the Department of Obstetrics & Gynecology.	**OPERATIONS MANAGER (Since 2014) George Mulvey** Responsible for overseeing all aspects of ATSSL including managing the human and physical resources, operational planning, financial management and reporting, compliance with Occupational Health and Safety, Biosafety and Medicolegal Standards, RCPSC simulation accreditation standards as well as monitoring, summarizing, and communicating operations of the ATSSL with stakeholders.
SENIOR COORDINATOR (Since 2014) Heather Hill Schedules, coordinates, oversees the preparation of, and manages the execution of activities in the laboratories. She collaboratively facilitates the design of simulation experiences to provide positive outcomes in patient safety, quality improvement, and cost containment. She has created unique training models, consistently used to develop learners' procedural skill mastery.	**COORDINATOR & SIMULATION TECHNICIAN (Since 2022)Peter Hillman** Provides day-to-day support for the clinical skills simulation lab. He prepares high fidelity manikins and task trainers for simulation-based education sessions, schedules, and coordinates sessions and, provides technical support to users.
SIMULATION CONSULTANT (Since 2016) Michèle Cowan Provides technology support to facilitate communication and optimize processes for data management. She collaborates on national and international educational projects to facilitate the development of quality medical referral education and postgraduate medical simulation curriculum.	**SIMULATION CONSULTANT (Since 2023) Jan Rossiter** Recently joined the ATSSL. Jan is a Registered Respiratory Therapist with clinical experience in arrange of areas. Jan has also completed the CHSE (Certified Healthcare Simulation Educator) and CHSOS (Certified Healthcare Simulation Operations Specialist) certification through the Society for Simulation in Healthcare.
SIMULATION TECHNICIAN (Since 2014) Stephanie Jaunin Oversees the operational design, planning and support for the SSL. She upholds the day-to-day setup, maintenance, and repair of the facility. She has developed and created hybridizing cadaveric animal tissues with dry models to improve fidelity and has been instrumental in the improvements of the cadaveric standard operating procedures.	**PROSECTOR PREPATORY PROGRAM TECHNICIAN (Since 2022) Stephanie Sellan** Joined the ATSSL in 2022 as the Prosector Preparator Program Technician. She is an Athletic Therapist with a strong background in human anatomy. Stephanie provides day-to-day support for the Special Procedures Lab as well as the Surgical Skills Lab managing, coordinating, and preparing cadaveric specimens for medical educational sessions.
BODY DONATION PROGRAM ADMINISTRATOR (Since 2020) Jamie Cowie Provides professional administration of the CSM Body Donation Program. As a licensed embalmer she handles donated cadaveric specimens for the purposes of embalming and preparing for use in medical educational programs and organizes the internment ceremony every two years.	**ANIMAL TECHNICIANS (Since 2022) Cheryl Hall, Jeannine Turnbull, Barb McLellan** Duties include collaboration with physicians, lab logistics, equipment operation, knowledge management and the Institutional Research Information Service Solution (IRISS). Responsible for husbandry and, administering/monitoring anesthesia and analgesics to large animals during simulated medical procedures and surgeries. They ensure compassionate and ethical care to our animal donors.

FINANCIAL REPORT

The ATSSL is funded by the CSM and, by revenue from external users and industry-sponsored symposiums which amounted to $388,327 for the 2022-23 fiscal year. CSM provided an operating budget of $954,342, and external revenue generated in the current and previous fiscal years provided the remaining $356,501 for a 2022-23 budget sum of $And 1,310,843. Funds are utilized for staffing, equipment, materials supplies, warranties, and preventive maintenance. The ATSSL had a favorable budget variance of $82,403 due to staff attrition and support from Post Graduate Medical Education (PGME) and, Distributed Learning & Rural Initiatives. Overall, expenses have increased over the past years due to operations amalgamating all PGME porcine and ovine surgical labs, cadaveric prosections for Anatomy teaching as well as increased costs associated with procuring supplies and reagents in support of the Body Donation Program.

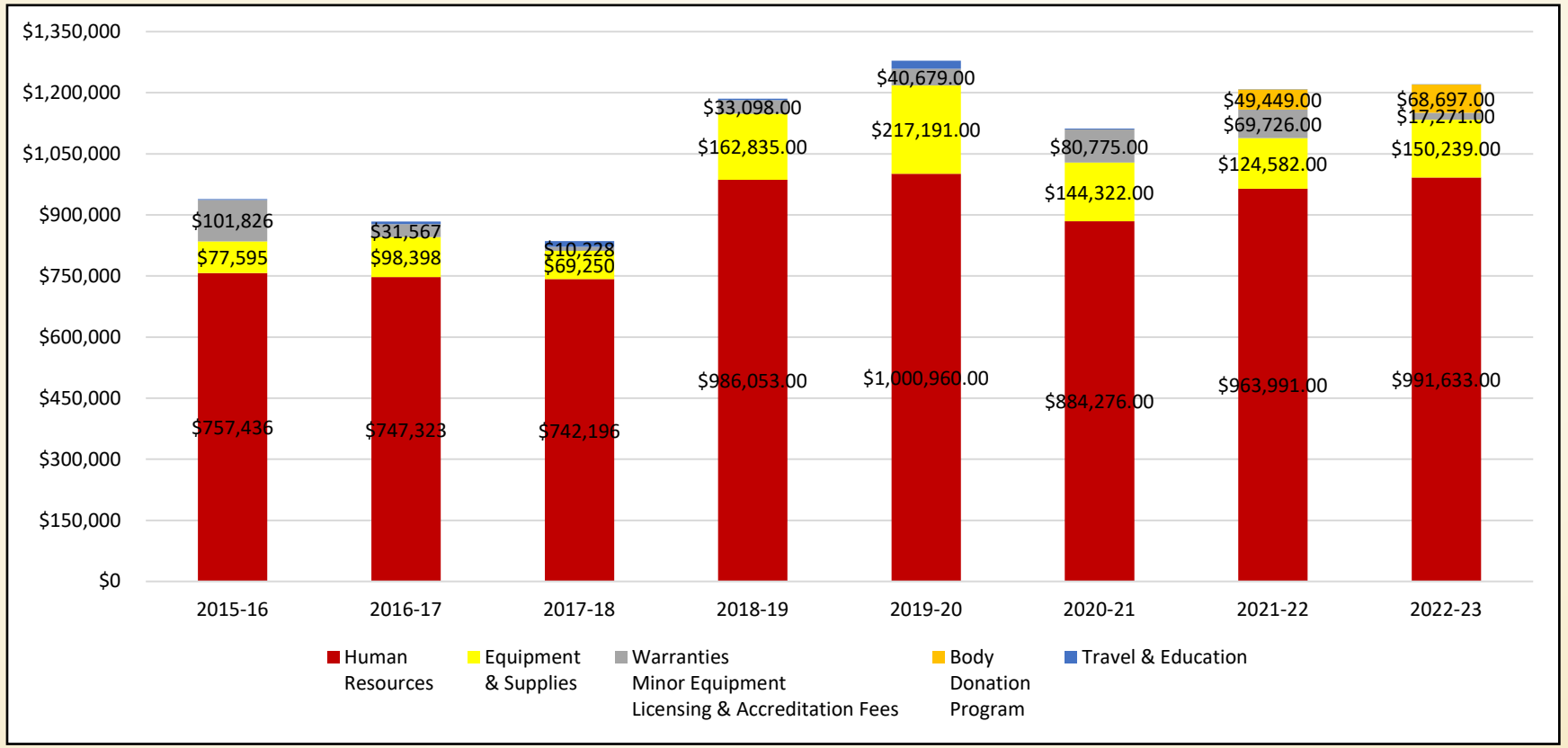
Learners from the core educational programs at UCalgary including Undergraduate Medical Education (UME), PGME, Bachelor of Health Sciences (BHSc), Graduate Science Education (GSE), as well as members of AHS clinical departments and programs are classified as 'internal users' and are not charged to access the ATSSL. Internal users however are charged for supplies, disposables and limited use items such as replacement parts for procedural simulators. Learners identified as external and industry clients are charged an hourly rate in addition to the cost of supplies, under a fee structure determined by the ATSSL Executive Steering Committee. External revenue, is retained in a separate UCalgary IRNA account and used to support additional equipment maintenance, refurbishment or replacement and educational opportunities, including conference travel for staff.

CSM Funding 2022-23
$954,342

ATSSL External/Industry Revenue 2022-23
$388,327

EXPENSES	
Human Resources	$991633
Equipment & Supplies	$150,239
Warranties/Minor Equipment/Licensing & Accreditation Fees	$17,271
Body Donation Program	$68,697
Travel & Education	$600
TOTAL 2022-23	**$1,228,440**

Expenses: 2015-2023



Year	Travel & Education	Body Donation Program	Warranties Minor Equipment Licensing & Accreditation Fees	Equipment & Supplies	Human Resources
2015-16	$2,055		$101,826	$77,595	$757,436
2016-17	$6,618		$31,567	$98,398	$747,323
2017-18	$13,750		$10,228	$69,250	$742,196
2018-19	$3,150.00		$33,098.00	$162,835.00	$986,053.00
2019-20	$19,921.00		$40,679.00	$217,191.00	$1,000,960.00
2020-21	$2,226.00		$80,775.00	$144,322.00	$884,276.00
2021-22	$600.00	$49,449.00	$69,726.00	$124,582.00	$963,991.00
2022-23	$600.00	$68,697.00	$17,271.00	$150239.00	$991,633.00

ATSSL

2022-2023 ACTIVITY

Q1-Q4 Aggregate Data

HIGHLIGHTS

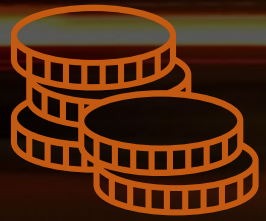
552
Sessions

9 Full-Time
Staff

2409
Sessions Hours

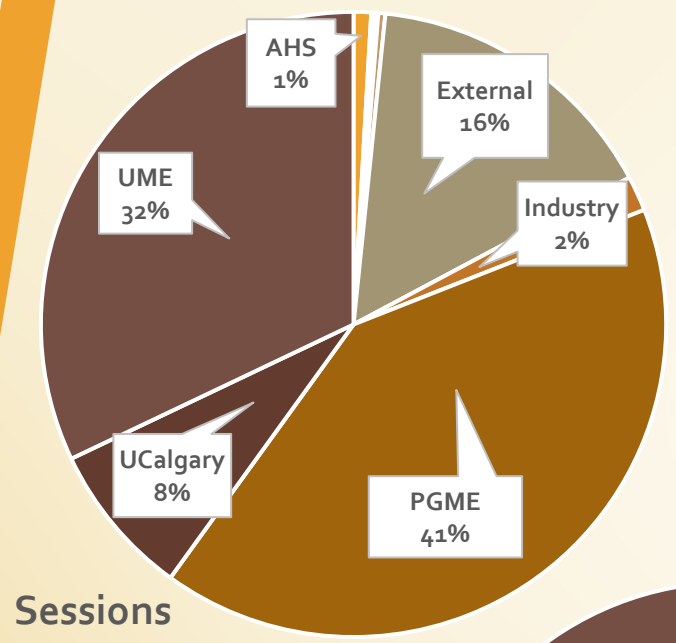
3614
Staff Hours

16599
Learner
Encounters

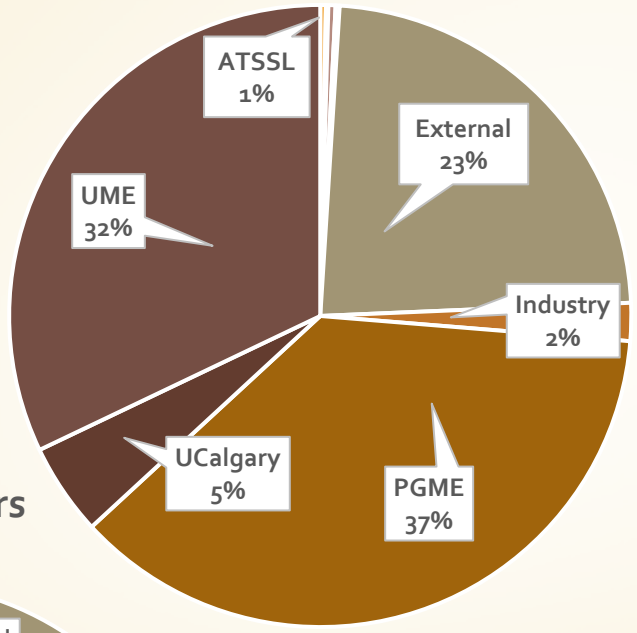


$1,302,623
Operating
Budget

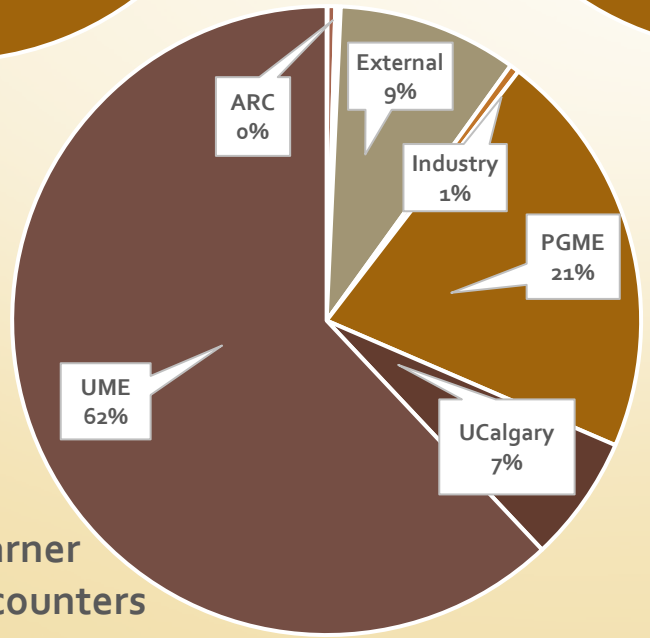
2022-2023 Overall Usage by Department



Sessions



Hours



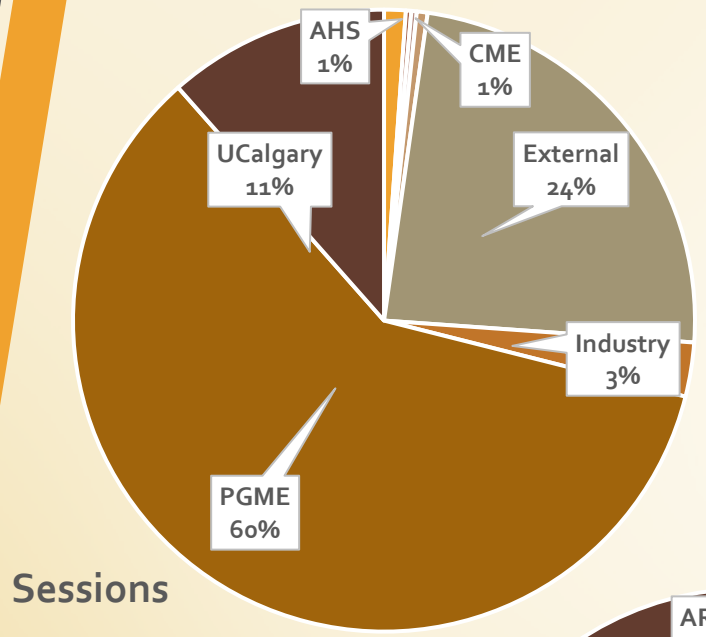
Learner Encounters

Department	Total Sessions	Total Learner Encounters	Total Hours
AHS	4	8	11
ARC	1	66	5
ATSSL	1	17	14
CME	2	29	8
External	85	1541	843
Industry	10	82	71
PGME	212	3513	1332
UCalgary	41	1086	173
UME	159	10352	1160
Grand Total	**515**	**16694**	**3614**

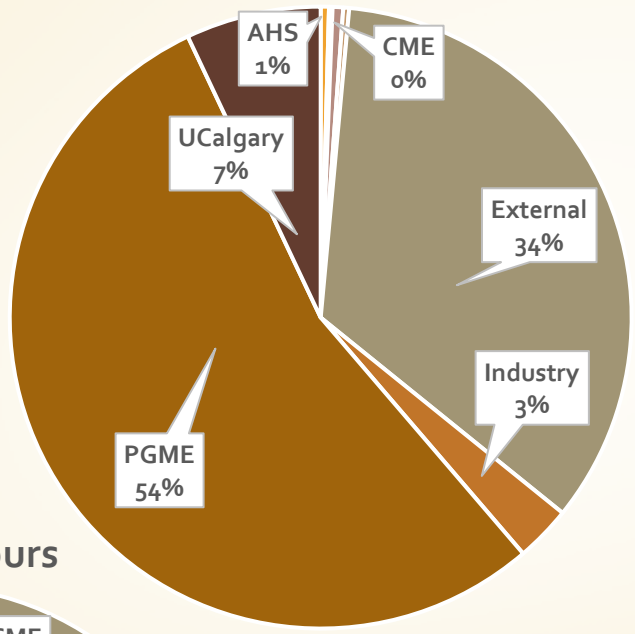
**.11 (7 minutes) hour/UME learner*

** Total Hours = 1.5x scheduled hours*

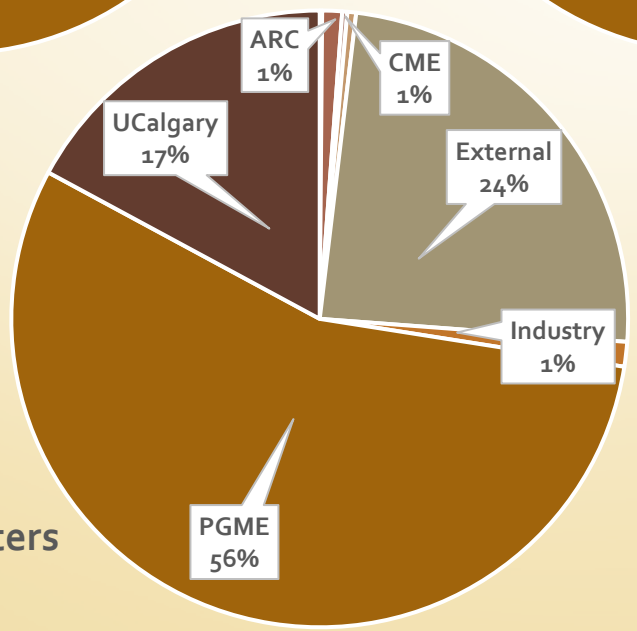
2022-2023 Overall Usage by Department; except UME



Sessions



Hours



Learner Encounters

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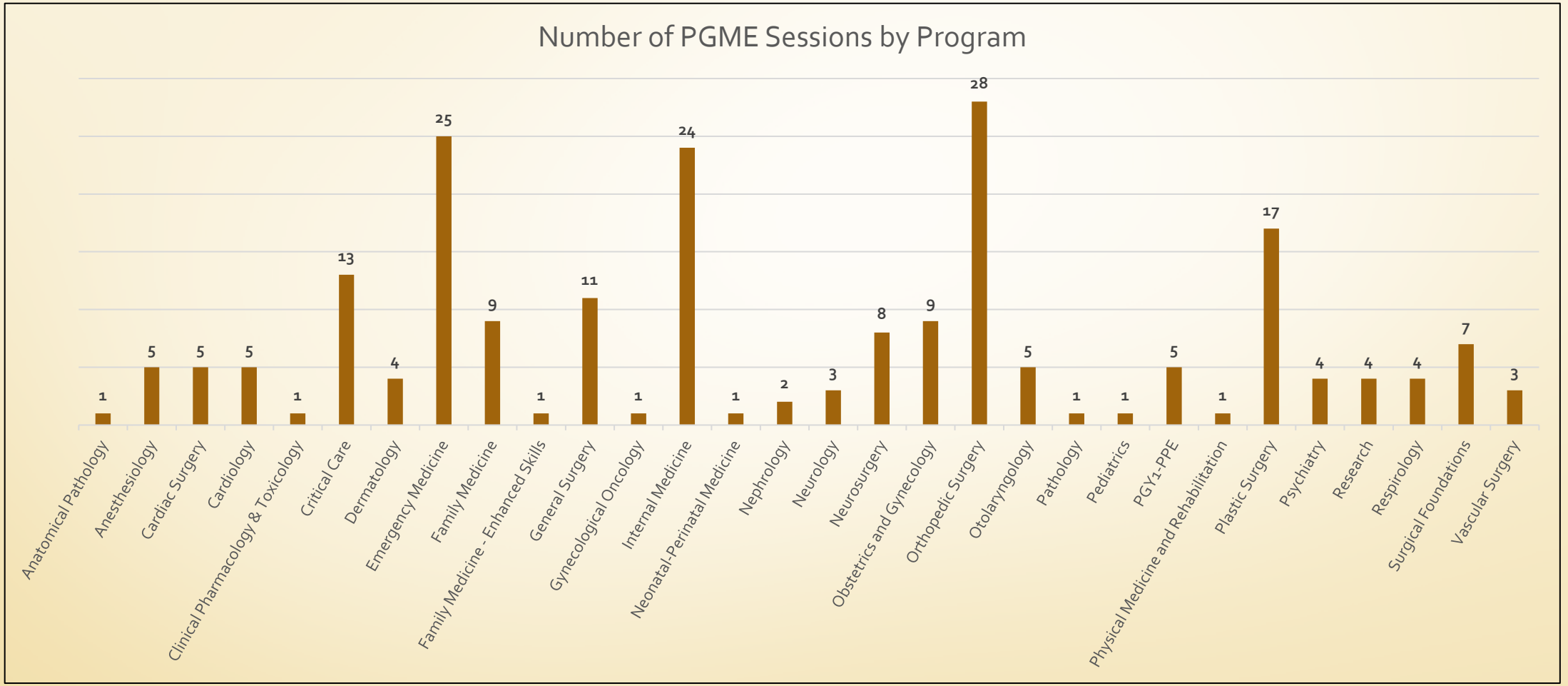
CME	2	29	8
External	85	1541	843
Industry	10	82	71
PGME	212	3513	1332
UCalgary	41	1086	173
Grand Total	**356**	**6342**	**2454**

**.38 (23 minutes) hour/ learner*
**Total Hours = 1.5x scheduled hours*

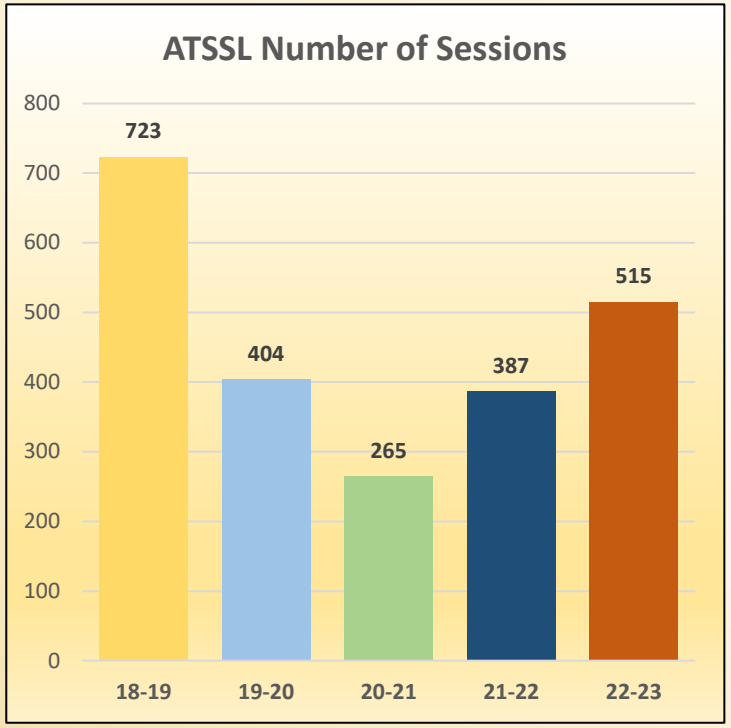
2022-2023 PGME Programs

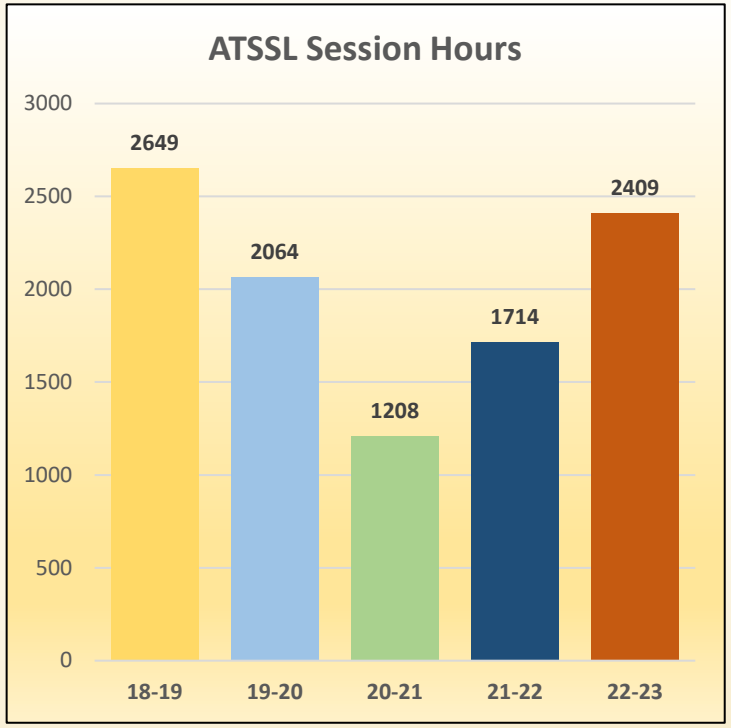


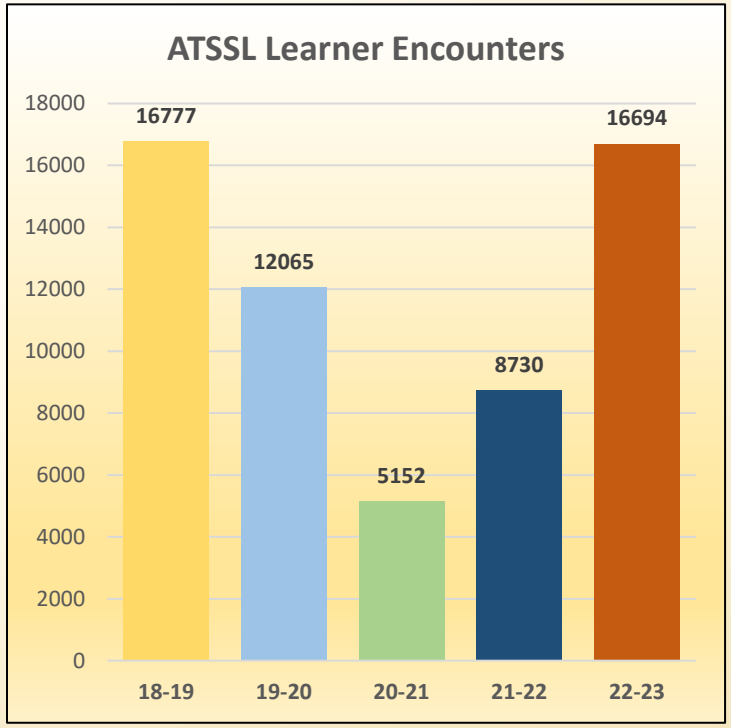
In 2022-23, the ATSSL hosted more than 200 PGME sessions. ATSSL provided simulation-based medical education to 28 PGME programs (43% of the 65 accredited residency training programs), primarily Orthopedic Surgery, Internal Medicine and Emergency Medicine. Less than 10% of all bookings were cancelled.

ATSSL
2018-2023 ACTIVITY
Year to Year Comparison

2018-2023 Overall Activity Comparison







- data reflects a remarkable recovery in numbers following the challenges posed by the COVID -19
- 2018's figures do not include SPL
- learner encounter statistics for 2018-19 may appear skewed due to the substantial number of UME open labs

FACILITIES

ATSSL

The ATSSL comprises two buildings on the UCalgary Foothills Campus, with the Surgical Skills Laboratory (SSL) located in the Health Research Innovation Centre (HRIC) and the Clinical Skills Laboratory (CSL) and Special Procedures Laboratory (SPL) located in the Health Sciences Centre. Additionally, the facility has two classrooms situated in the HRIC, each capable of hosting up to 30 learners. The classrooms are equipped with several features, such as wireless internet access, a lecture podium with laptop connections, an LCD projector, in-ceiling speakers, as well as video conference and remote viewing capabilities.

SURGICAL SKILLS LABORATORY (SSL)

The SSL serves as a training ground for diverse medical professionals to hone their surgical skills. The facility features 20 simulated operating room stations equipped with scrub sinks, surgical beds and tables, overhead OR lighting, dual LED monitors, and ceiling supply units. Among them, four stations are fitted with in-light cameras to enable real-time imaging that can be remotely displayed across the lab and classrooms. The SSL is highly versatile and can be configured to accommodate groups of any size. The area can be used as one large space or divided into two or four smaller spaces to facilitate multiple education sessions concurrently. The ATSSL prioritizes user safety and is equipped with a fully functional reprocessing area to clean and sterilize instruments onsite.

CLINICAL SIMULATION LABORATORY (CSL)

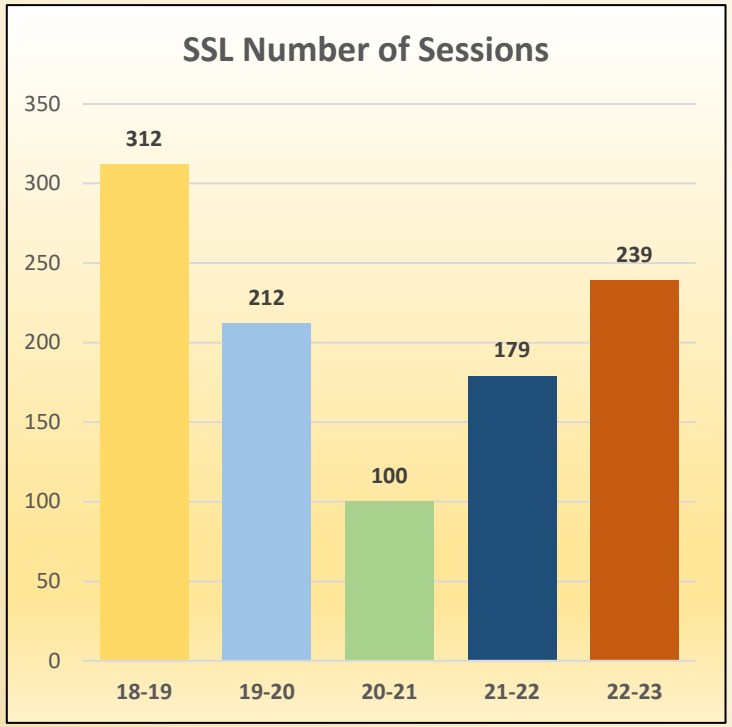
The CSL is a medical simulation facility that offers a modular and multi-disciplinary learning environment to enhance technical skills, patient safety, and learner safety. The facility is equipped with simulators such as task trainers, computerized manikins, and standardized patients, which provide learners with experiential learning opportunities to consolidate knowledge and reflect on their experiences. With a capacity to accommodate up to 60 learners at once, the CSL allows for numerous groups to work independently within functional spaces that permit private debriefing or conference-like presentations. This includes two dedicated simulation suites with control rooms and a large modular space that can be divided into six separate pods, each with a capacity for up to 6-8 learners.

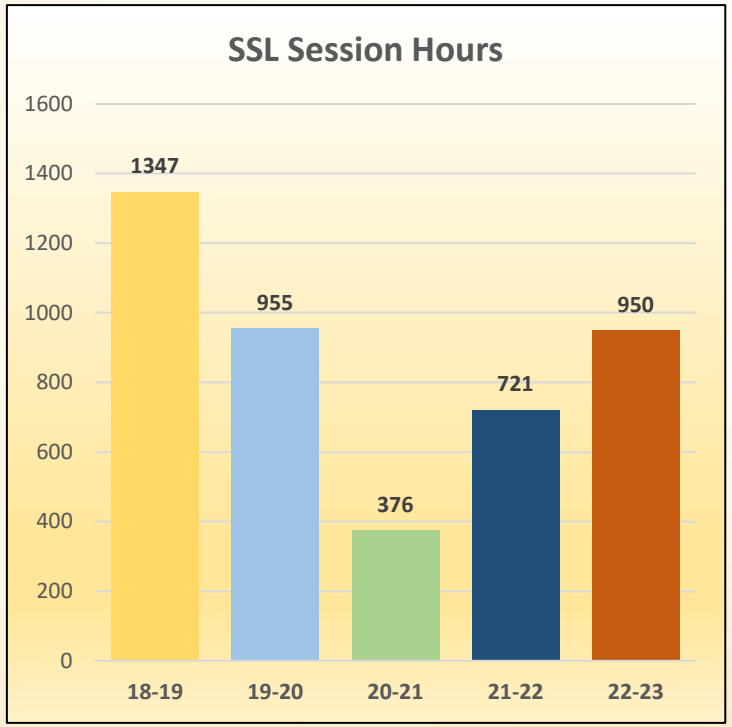
SPECIAL PROCEDURES LABORATORY (SPL)

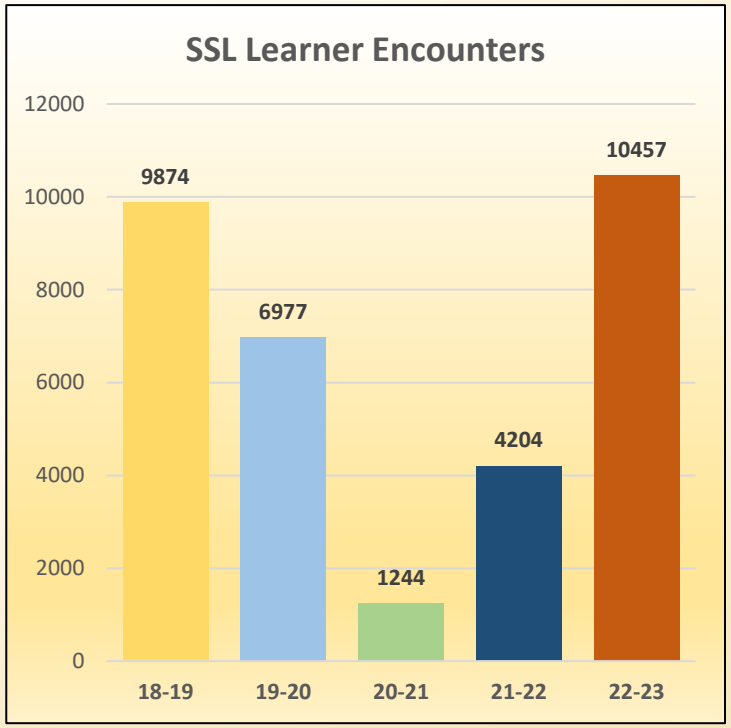
The SPL is a distinctive venue for simulation-based medical education, with a particular focus on anatomical sciences, such as developmental biology, gross anatomy, and neurobiology. The lab employs a variety of teaching tools, including embalmed and plastinated human cadaveric prosections, as well as plastic models, and a 3D atlas. The laboratory has a primary area dedicated to gross anatomy teaching and also supports cadaver procurement and preparation within the facility. The SPL provides space for multiple small groups of up to 30 individuals to observe demonstrations and practice procedures.

ATSSL
Surgical Skills Laboratory (SSL) 2018-2023 ACTIVITY
Year to Year Comparison

2018-2023
Surgical Skills Laboratory (SSL)

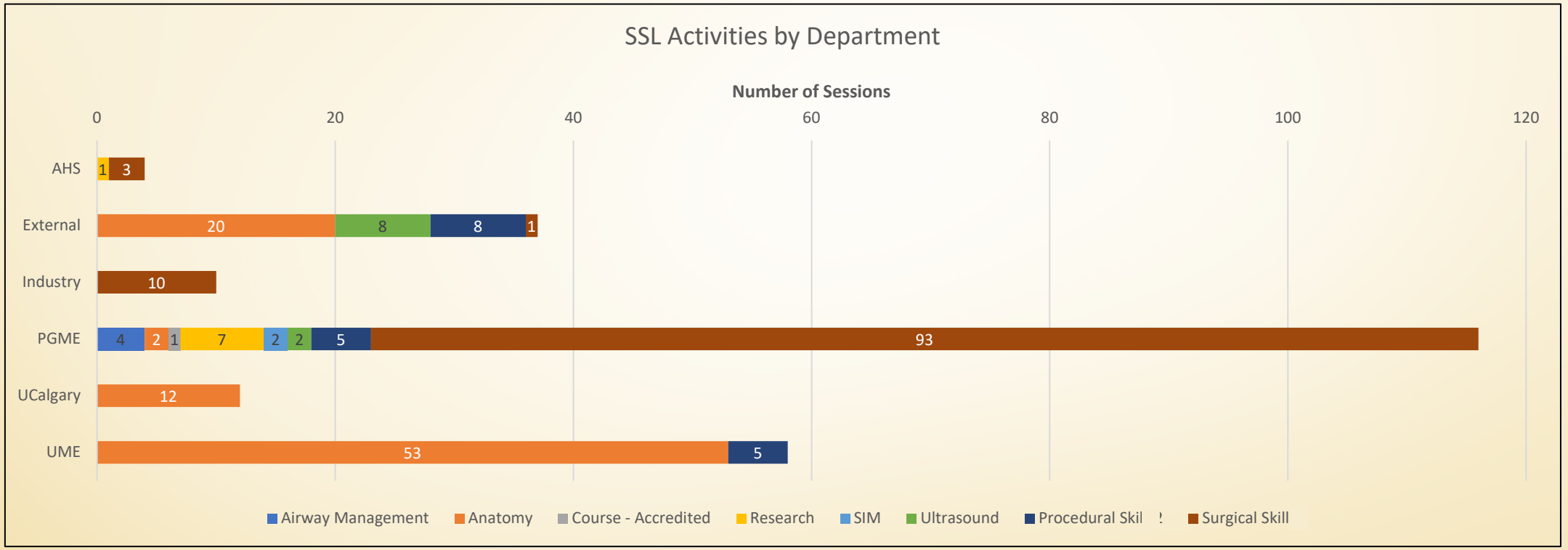






In 2022-23, the SSL hosted 223 sessions comprised of 10457 learner encounters. The majority (70%) of learners were from UME, followed by PGME (15%), external and UCalgary learners (14%), and Industry learners and AHS (less than 1%). For every 1 hour of scheduled lab session time (1319 hours in 2022-23), approximately 3 hours of ATSSL operating staff hours are required to ensure that quality of design, preparation, implementation, and facilitation of sessions are maintained.

2022-2023
Surgical Skills Laboratory (SSL) Activities

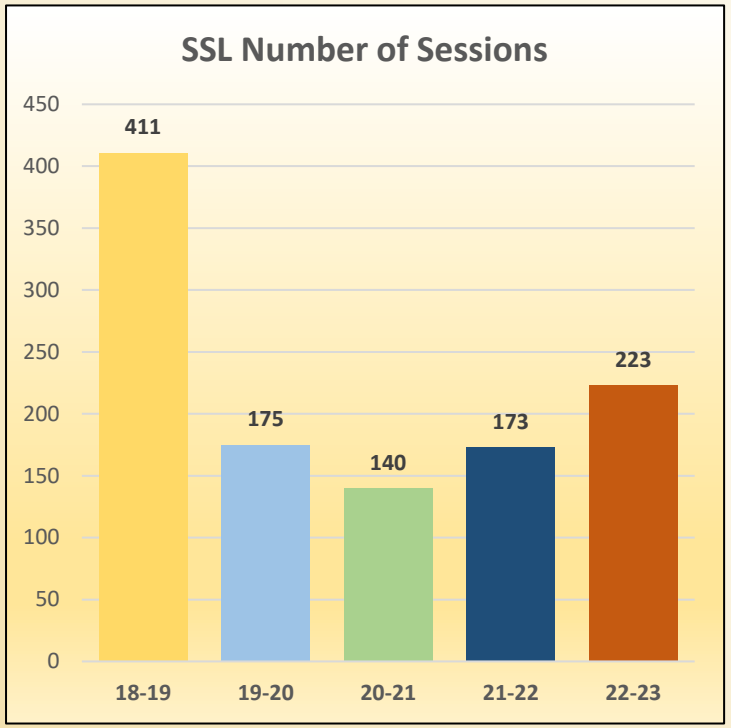


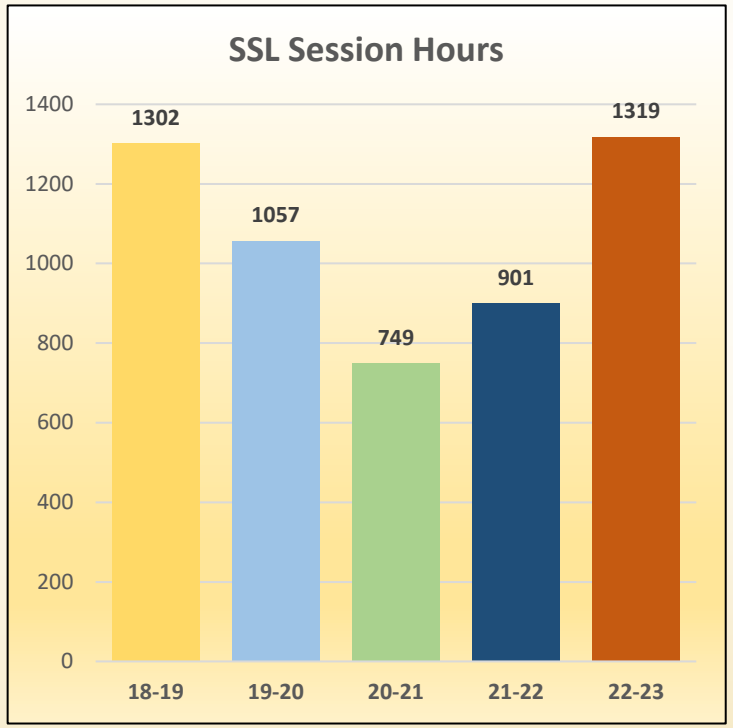
SSL Hosted:

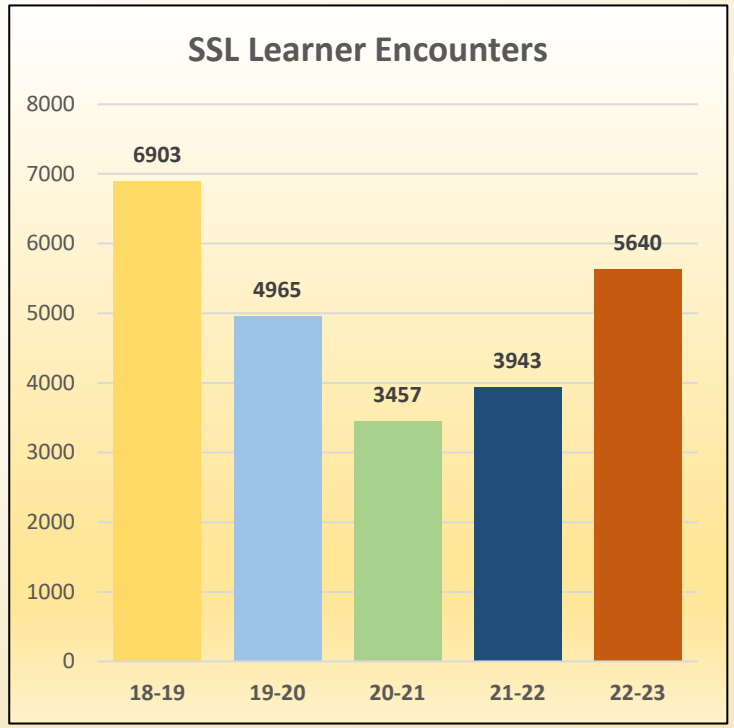
- 108 Surgical Skills sessions (93 for PGME, 10 for Industry)
- 89 Anatomy sessions (53 for UME, 20 for External groups, 12 for UCalgary courses)
- 18 Procedural Skills sessions and 10 Ultrasound sessions (primarily for External groups)

ATSSL
Clinical Simulation Laboratory (CSL) 2018-2023 ACTIVITY
Year to Year Comparison

2018-2023
Clinical Simulation Laboratory (CSL)

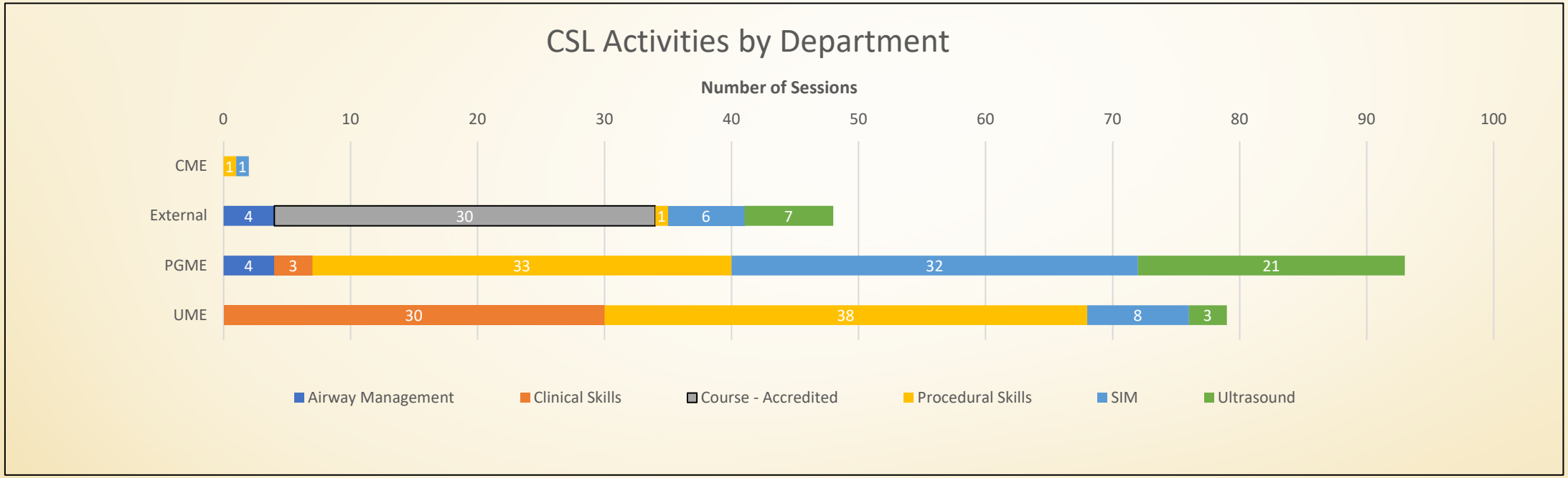






In 2022-23, the CSL hosted 223 sessions comprised of 5640 learners. The majority (52%) of learners were from UME, followed by PGME (34%), external learners (14%), other CME learners (less than 1%). Like the SSL, every 1 hour of active lab session time (1319 hours in 2022-23) requires approximately 3 hours of ATSSL operating staff hours to ensure that quality of design, preparation, implementation and facilitation of sessions are continuously upheld.

2022-2023
Clinical Simulation Laboratory (CSL) Activities

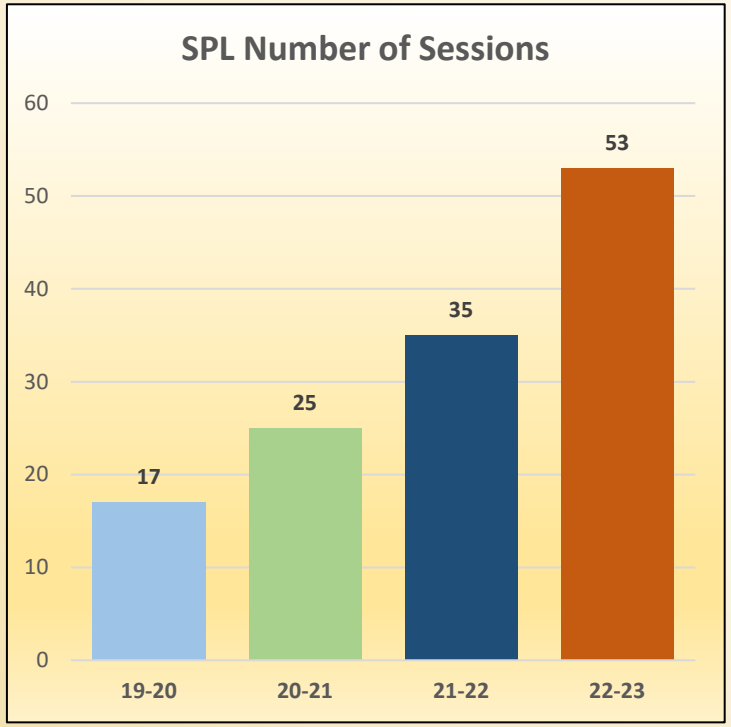


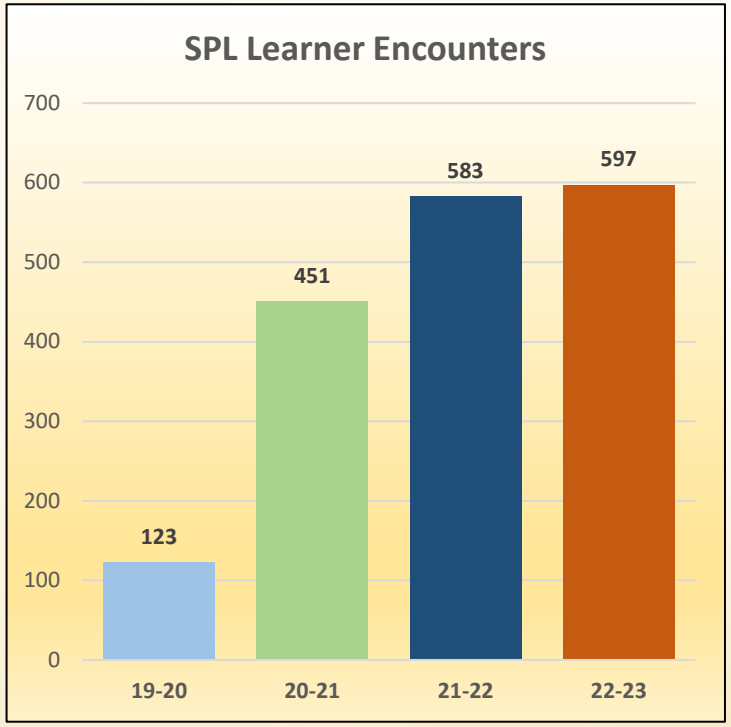
CSL Hosted:

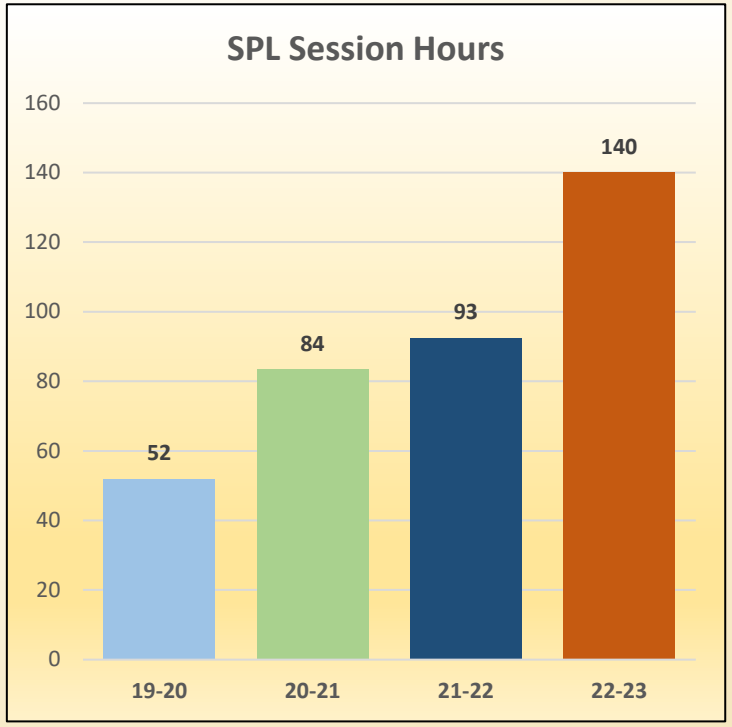
- 73 Procedural Skills sessions (including 38 for UME, 33 for PGME)
- 47 Simulation sessions (32 for PGME)
- 33 Clinical Skills sessions (30 for UME)
- 31 Ultrasound sessions (21 for PGME)
- 30 Accredited Course sessions (primarily ATLS)

ATSSL
Special Procedures Laboratory (SPL) 2019-2023 ACTIVITY
Year to Year Comparison

2019-2023
Special Procedures Laboratory (SPL)







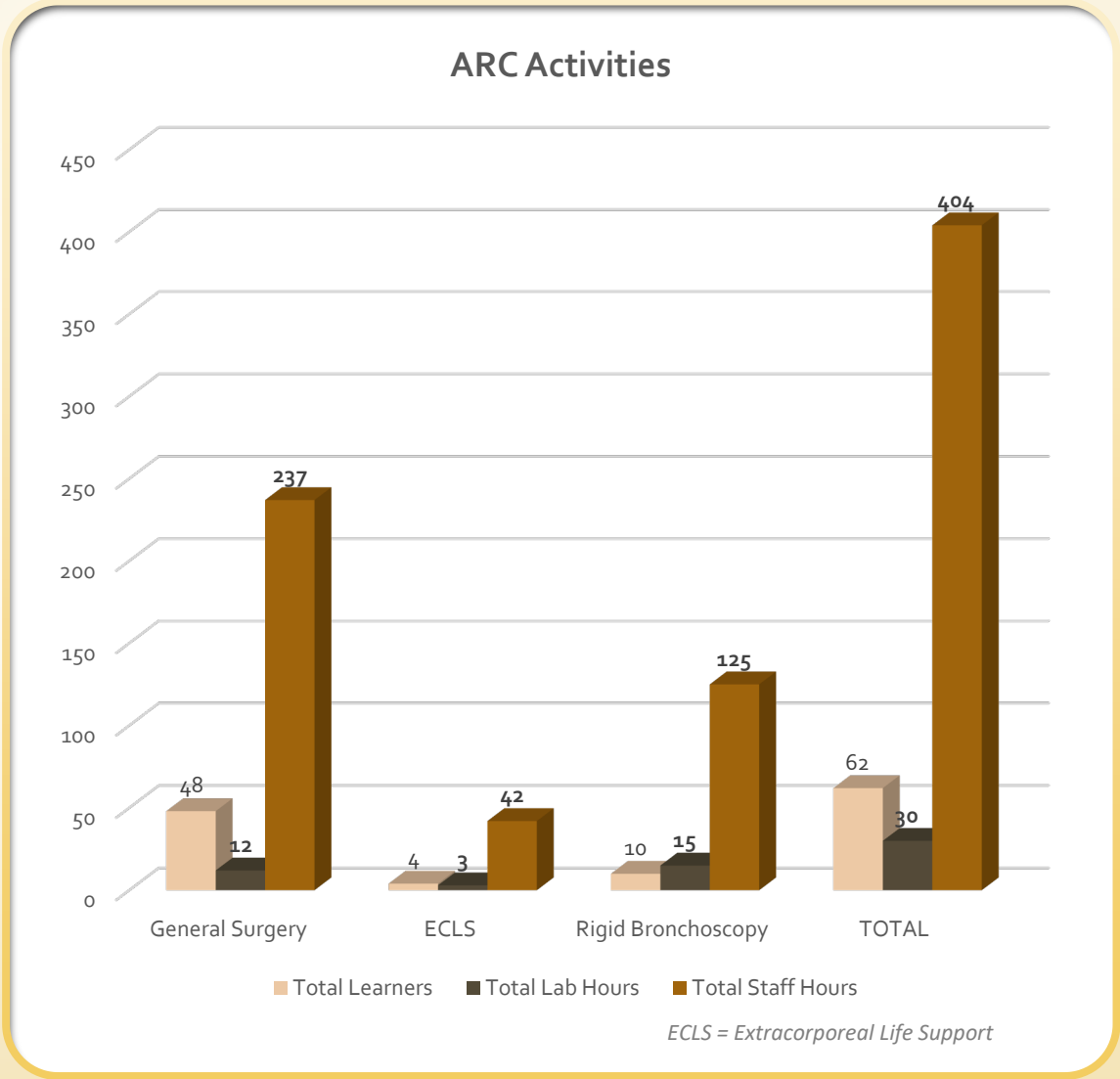
The SPL offers primarily anatomy review sessions to staff, residents, medical students, and select specialty groups. The SPL aims to foster a conceptual understanding of human anatomy. In 2022-23, there were 587 learner encounters in the 53 sessions hosted for a total of 140 session hours. The main users of the SPL were UCalgary (69%), UME (27%), and PGME (4%).

ATSSL
Animal Research Centre (ARC) 2022-2023 ACTIVITY

2022-2023 Animal Research Centre (ARC)

- The ARC offers training to senior level residents using porcine and ovine models for mastery of surgical skills. These labs require a considerable amount of staff time and expertise.

- The ARC users include the following PGME programs:
  - Emergency Medicine
  - General Surgery
  - Respirology
  - Cardiology
  - Pediatric General Surgery.



- For every hour, each learner spends in the ARC laboratory, an average of 3 staff hours are allocated to support or assist them.

UCALGARY BODY DONATION PROGRAM

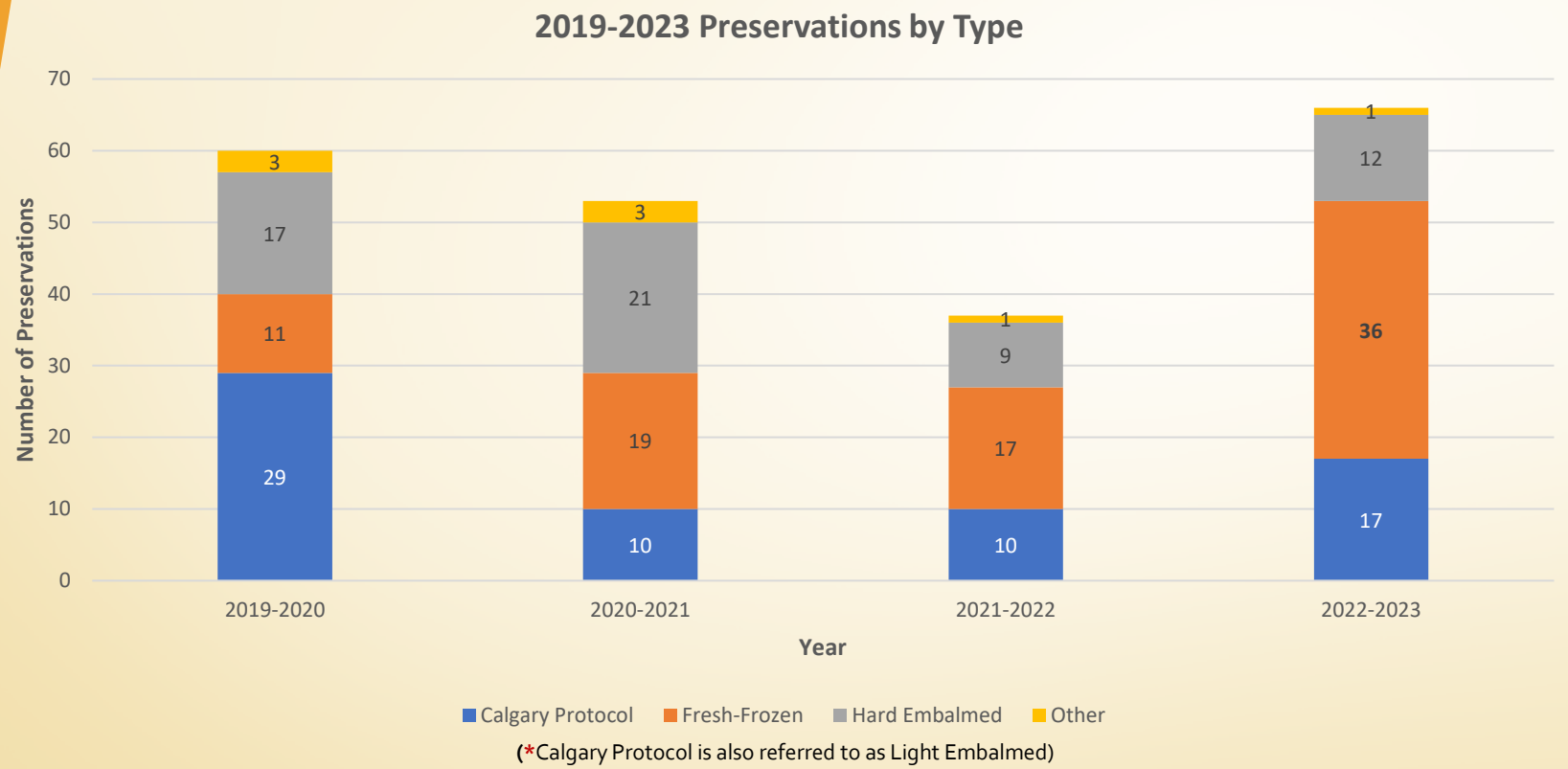
The primary goal of the UCalgary Body Donation Program (BDP) is to offer individuals in various healthcare disciplines and training levels the chance to explore cadaveric human body. Our commitment to providing lifelike training at every educational phase is aimed at cultivating exceptionally skilled professionals. Our approach to donor care is characterized by unwavering dignity, respect, and a strong emphasis on empathy.

It is important to note that the learning experiences offered are only made possible by the generosity of individuals and their families who donate their bodies to the UCalgary BDP. The program coordinates the acceptance and preparation of donated bodies for medical education and research purposes. The act of donation is greatly appreciated, as it contributes to the education and ongoing professional development of healthcare practitioners, allowing them to develop proficient clinical skills and surgical techniques that cannot be replicated by task trainers and manikins.

Annually, the BDP receives 60-70 donors, and notably, 11,000 individuals have formally expressed their intention to donate in the program over the past 50 years. Biennially, the BDP orchestrates a graveside commemoration service at Queen's Park Cemetery. This event provides an opportunity for the UCalgary learners and staff along with the loved ones of those who have generously contributed their bodies to medical education to gather and pay their respects. It is at this poignant occasion that many of the cremated remains find their resting place.

To learn more about the UCalgary Body Donation Program, please visit:
https://cumming.ucalgary.ca/body-donation-program

2019-2023
Preservation Statistics



2022-23 Donor Demographics:

- Average age was 85
- Average BMI of 23
- 36 females (20 with uterus)
- 30 males
- 3 MAID donations

- The increased demand for surgical skills training requires the utilization of a greater number of Fresh Frozen cadavers.

ATSSL
UniForum Program Analysis

UniForum Program

UniForum Program:

- university benchmarking program of operational/administrative services that support the university's teaching and research activities
- there are 162 activities within the Staff and Supplier Activity Framework, grouped by 'sub-function' and 'function'
- these activities represent the complete scope of professional services support work that could be undertaken within a university

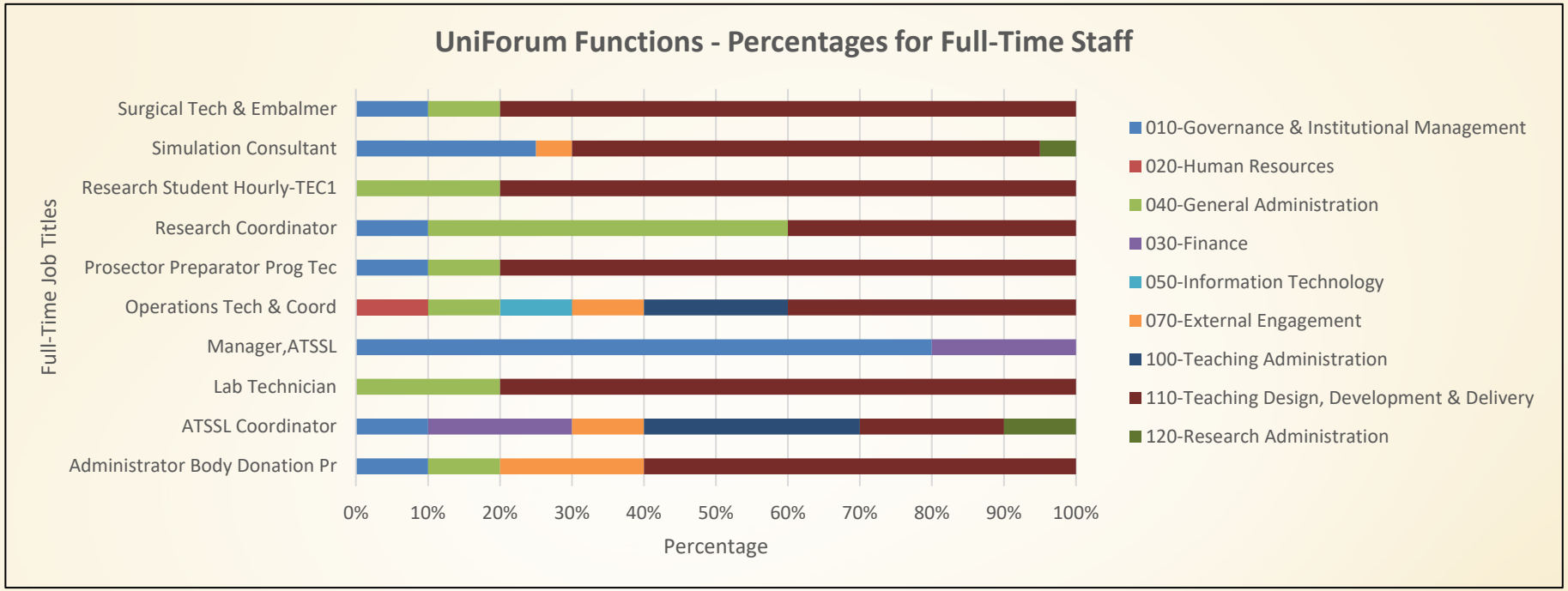
UniForum data enables members to:

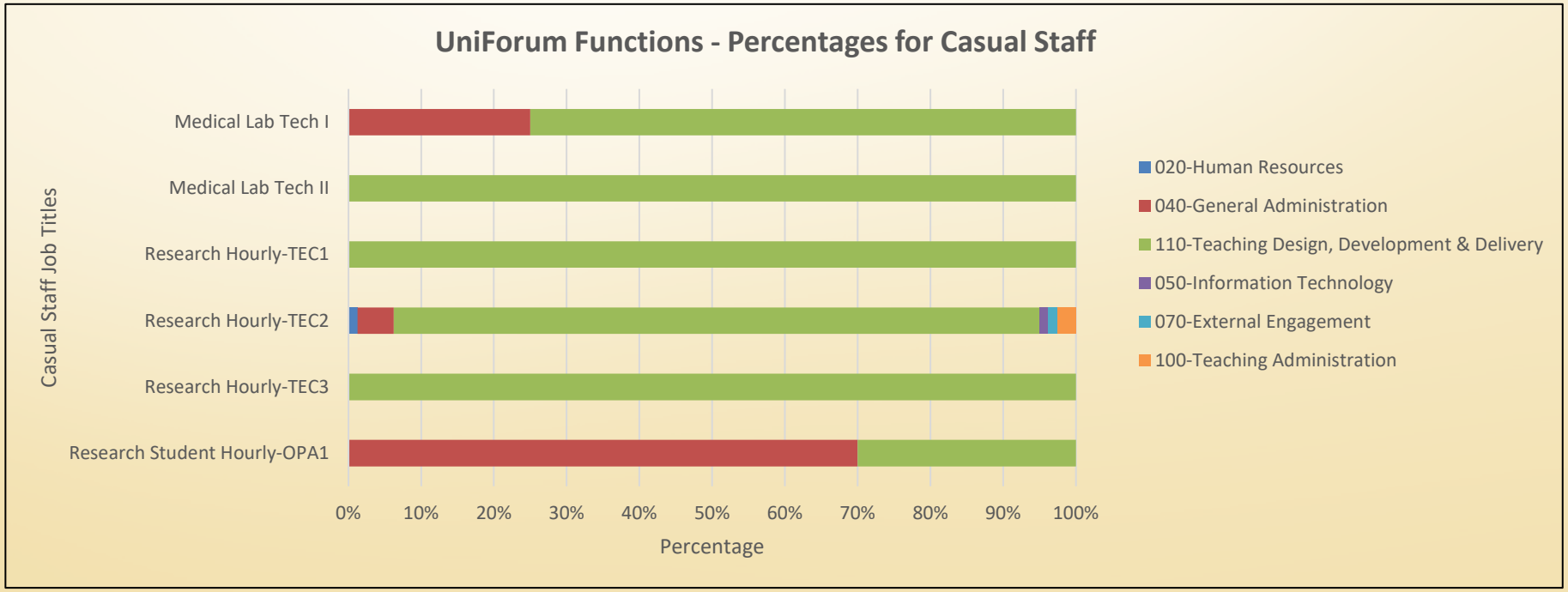
- see their institution in comparison with others
- build an understanding of how services that support the teaching and research of the university are resourced across the university
- deliver insights into strategic choices that university management can make to improve the efficiency and effectiveness of their support services

The goal of the data collection is to quantify our university's:

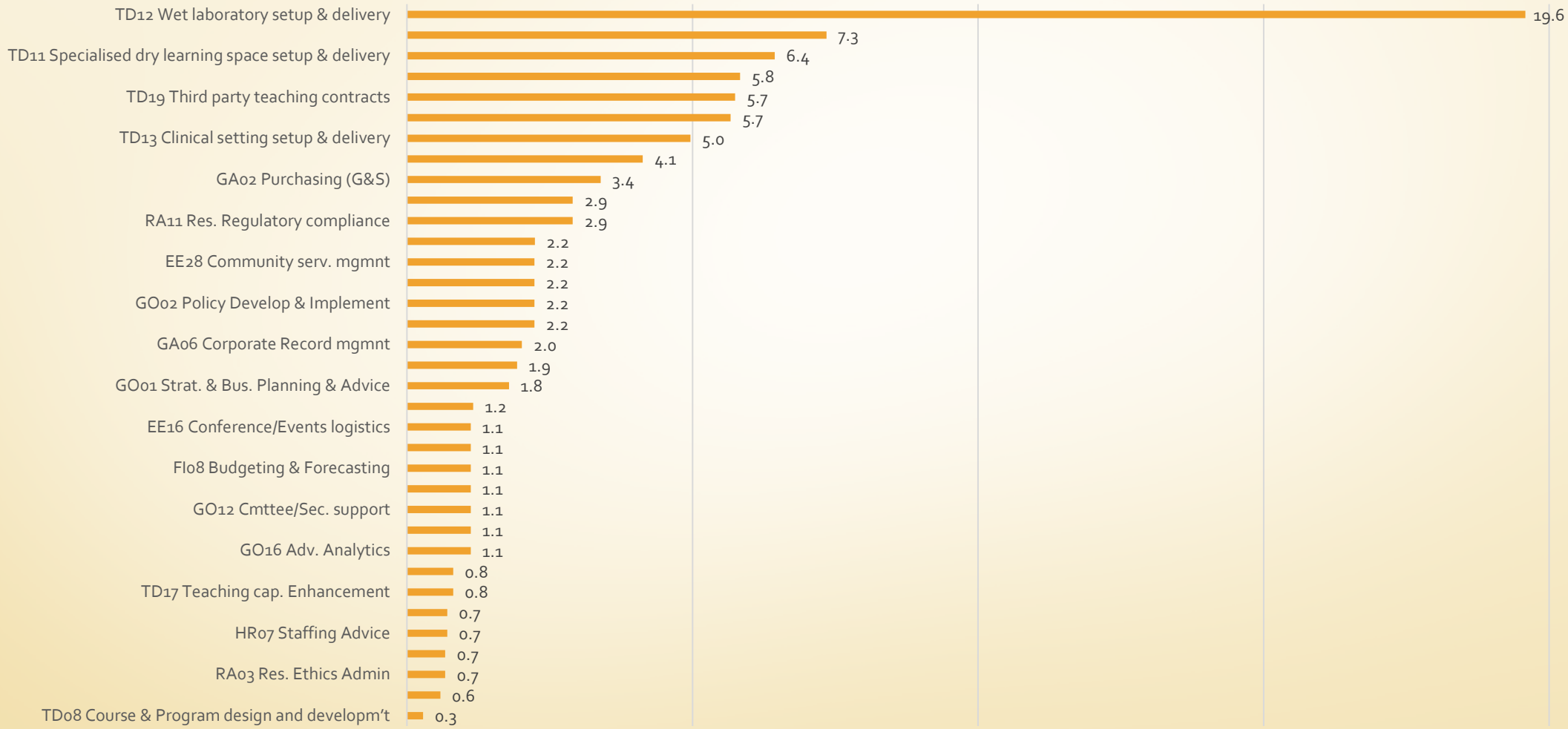
- staff resourcing levels for activities that support teaching and research
- organisational choices for the delivery of these support services
- complement the activity data from the Supplier collection

UniForum Analysis Results





Percentages of Allocated Uniforum Key Duties



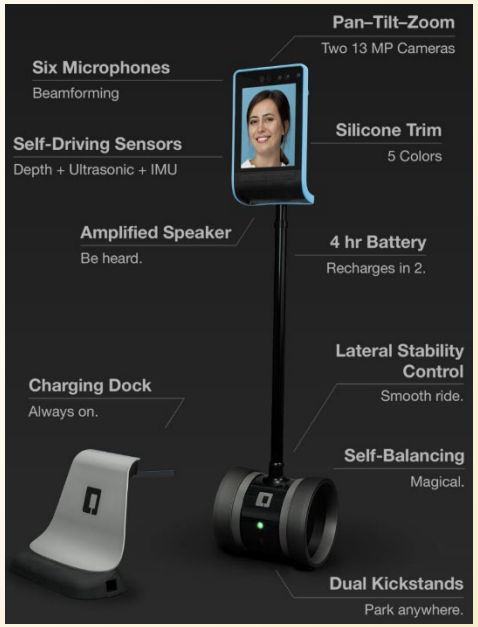
*A number pertinent tasks for ATSSL have been excluded from the report owing to UniForum's coding approach, which only encompasses 10% minimum time allocation of an individual's responsibilities. It is acknowledged that these activities collectively could amount to the equivalent of an FTE.

ATSSL
Events and Activities

EVENTS

Innovative Technology

- **RnR Rounds** (*CPD for Rural & Remote Practitioners)* started monthly sessions in Sept 2022. This is a revenue-neutral CPD program operated by Community Health Network Ltd and provides virtual participation through the use of the 'Double Robotics' robot.



Additional Sessions

- Animal Research Centre Surgical Simulations are now entirely, including staff, managed by ATSSL.
- EDE Ultrasound courses increased their frequency of bookings of multi-day sessions with approximately 20 learners per session.
- ATLS refresher course was first provided in January, 2023 in the ATSSL. ATSSL has been as an accredited site for ATLS related courses since 2021.

ACTIVITIES

International Medical Conference (IMSH)

PGME supported 3 ATSSL staff members to attend the IMSH 2023 Conference in Orlando, Florida

- four-day event that included multi-disciplinary education, vendor displays, hands-on workshops, and research regarding guidelines in healthcare simulation.

Enhanced Cadaveric Processes

Optimized the intake, preparation, and utilization protocols for donors to the greatest extent feasible within the realm of medical simulation education.

- in accordance with UME's latest anatomy program and the increasing demand for cadavers in various PGME programs for surgical practices.

Publication Collaboration

ATSSL collaborated on the manuscript entitled "*Personal Protection Equipment: Preliminary Evidence of Effectiveness from a Three-Phase Simulation Program*" which has been successfully submitted online and is presently being given full consideration for publication in **Journal of Infection Prevention**.

RESEARCH

ATSSL strives to uphold optimal approaches by actively engaging in research and development within the SBME domain. A directive from the Royal College mandates that the program engages in both participation and substantial contributions to the wider research community in health professions education, consequently driving the field's advancement. This goal is achieved by initiating research endeavors and offering support and valuable insights to external researchers' initiatives.

All researchers are required to send ATSSL an email with their research request. The research study will undergo an internal review. If approved a Letter of Support from the current Medical Director will be given. Any research conducted is subject to evaluation by the UCalgary Conjoint Health Research Ethics Board.

Further details can be found on our website.

2022-2023 research studies with ATSSL involvement:

Project Title	Principle Investigator
A Comprehensive Analysis of the Novel Tubarial Glands	Dr Lian Willetts
Patient-specific 3D printed pin guides for use in the modified Harrington procedure	Dr Michael Monument
Enhancing Patient Care with Point of Care Ultrasound: A Pilot Study in Upper Extremity Musculoskeletal Ultrasound Teaching for Residents and Medical Students	Dr Maleka Ramji
In vivo cadaveric analysis of volar tilt correction using a kickstand screw technique in volar plate fixation for distal radius fractures	Dr Peter Longino
Dual fluoroscopy for in-vivo analysis of the 3D kinematics of cervical and lumbar degeneration	Dr Ganesh Swamy
Ex vivo characterization of ultrasound properties of human skull	Dr Samuel Pichardo
Exploring how interdisciplinary obstetrical team simulation affects the understanding and experience of situational awareness in practice	Dr Julia Haber
Simulator-Based Training of Orthopedic Residents in Pedicle Screw Fixation via a Minimally-Invasive Surgery	Dr Peter Lewkonia
Optimal Construct for Fixation of Femoral Neck Fractures: A Biomechanical Analysis	Dr Prism Schneider
Mechanical Analysis of the epitendinous suture in 4- and 6- strand cadaveric flexor tendon repair	Dr Justin Yeung
Quantifying In Vivo Cervical Spine Motion and Influence of Cervical Total Disc Arthroplasty	Dr Ganesh Swamy

Advanced Technical Skills Simulation Laboratory

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