



THE UNIVERSITY OF BRITISH COLUMBIA

Department of Surgery
Faculty of Medicine

WB & MH CHUNG LECTURESHIP AND RESEARCH DAY

November 7, 2022

ZOOM

ID 91770 392007

PASSCODE 392007

OR

IN PERSON

PAETZOLD AUDITORIUM

VANCOUVER GENERAL HOSPITAL



Scan to view/download this program book, Research Day schedule, and/or fill out evaluation:



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Message from the Department Head, Dr. Gary Redekop



I am very pleased to welcome all of our faculty, staff, and trainees to the 2022 edition of our Department of Surgery Research Day and Chung Lectureship. We are still impacted by the Covid-19 pandemic, and will conduct the day in a hybrid “in-person” and virtual format, which will allow for attendance and participation from all of our distributed sites.

Our Chung Professor is Dr. Chad Ball, a Professor of surgery and oncology at the University of Calgary as well as the current President of the Canadian Hepato-Pancreato-biliary Association. He currently practices Hepatobiliary, Pancreas, Trauma and Acute Care Surgery at the Foothills Medical Centre. We acknowledge with thanks the support and contribution of the benefactors of this prestigious lectureship, Drs. Wally and Madeline Chung.

Chung Day highlights the wide range of basic, clinical, and translational research in our department, and also provides an opportunity to recognize excellence in scholarship among our faculty. This year, the H W Johnson New Investigator Award goes to Dr. Hannah Piper, and the Richard Finley Senior Scholar Award goes to Dr. Robert Olson.

I would like to thank all of our faculty, staff, and trainees for their perseverance and contributions to surgical science and scholarship during the past year.

A handwritten signature in black ink that reads "Gary Redekop". The signature is written in a cursive, flowing style.

Gary Redekop
Head, Department of Surgery
November 2022

Founders of the W.B and M.H. Chung Lectureship



Prior to the establishment of the W.B. and M.H. Chung Research Day, the Department of Surgery only had Division specific research days. In 1995, the Dr. W.B. and M.H. Chung created an endowment that allows us to hold an annual research day that has become the premier, department-wide event at which we recognize our research achievements.

Wallace B. Chung, MDCM, FRCSC, DSc '94

Dr. Chung was born and raised in Victoria, British Columbia. After pre-medical education at Victoria College and UBC, he attended the McGill University and received his M.D. in 1953. Following internship and surgical residency training at VGH and UBC, Dr. Chung was appointed to the Department of Surgery at UBC as an Instructor in 1960. After being appointed to an Assistant Professor in 1961, Dr. Chung rose quickly through the ranks to become a full Professor in 1972. For his many professional and community contributions, Dr. Chung has received many awards, including being appointed to the Order of Canada in 2005.

Professional Career

Dr. Chung was noted as a technically gifted surgeon who pioneered Vascular Surgery in Western Canada. In particular, Dr. Chung was known for his excellent surgical results for carotid artery surgery for transient ischemic attacks. He established Vascular Surgery as a new specialty in BC, and as a separate division of surgery at VGH and UBC. He was one of founders of the Canadian Society for Vascular Surgery, and served as its president in 1982. Throughout his academic career, Dr. Chung has taken positions of responsibility (appointed University Head of the Division of General Surgery in 1970, Head of the University Division of General and Vascular Surgery in 1978, Head of the Department of Surgery at the University Hospital in 1981). During his nine year tenure he built the University Hospital Department of Surgery into an excellent academic unit with international recognition for vascular surgery and gastrointestinal surgery. He was also the Governor of the American College of Surgeons from 1980 to 1986. Dr. Chung has received many awards for his teaching and service, including being honoured by the vascular surgeons of British Columbia with a named day – The Wallace B. Chung Clinical Day.

Community Service

Dr. Chung has also been an effective and tireless pillar of the community. He has used his extraordinary gifts of wisdom and diplomacy to help advance the integration of the Chinese Community. He was one of the founding executives of the Chinese Cultural Centre of Vancouver serving as Chair from 1983-87. Under Dr. Chung's leadership, the Centre has become a model for other multicultural programs in Canada. Among his other community activities, Dr. Chung is a founding member and patron of the Sun Yat-Sen Gardens, served on the Board of Directors International Dragon Boat Festival Society, and Vice Chair of the Canadian Multiculturalism Council. Dr. Chung's contributions have been recognized by awards (Chinese Cultural Centre Outstanding Achievement Award in 1989 and Chinese Benevolent Association Outstanding Citizen Award in 1990) and his appointment to the B.C. Heritage Trust in 1993.

History Scholar

An avid reader and collector of first edition rare books, Dr. Chung became a renowned authority and collector of one of Canada's best libraries on the history of the Pacific Northwest exploration and Chinese Canadian immigration. Due to his interest in the Canadian Pacific Steamship Company, Dr. Chung was a guest curator of the Vancouver Maritime Museum for the "Empress to the Orient Exhibition" in 1991. In recognition of this interest, the Vancouver Maritime Museum has named its library, the W.B. and M.H. Chung Library. In 1999 he made a gift of more than 25,000 rare and unique items to the University of British Columbia. The Chung Collection is housed in

the Ike Barber Learning Centre (<http://chung.library.ubc.ca/>) and attracts scholars and visitors from around the world.

Madeline Chung, MD, FRCSC

Dr. Madeline Chung was born in Shanghai, China. Her medical education took place at the Yale Medical College of China. She did her internship in Victoria, B.C. followed by specialty training in Obstetrics and Gynecology in Montreal and at the Mayo Clinic in Rochester, Minnesota. Upon coming to Vancouver in the late 1950's, she was the first female and first Chinese-Canadian specialist in Obstetrics and Gynecology in British Columbia. She was appointed as a Clinical Instructor at the University of British Columbia and by the time of her retirement she had delivered over 6,500 babies over a 40 year career, and held the rank of Clinical Professor. Shortly after her retirement from clinical practice she was made an Honorary Life Member of the College of Physicians & Surgeons of British Columbia. Dr. Madeline Chung was also a Clinical Professor Emeritus of the Department of Obstetrics and Gynecology in the Faculty of Medicine at the University of British Columbia. She passed away on August 22, 2021.

Physician

She was known as a compassionate and empathic physician who gave freely and willingly of her time to her patients, often acting as a counselor to her patients and mentor to the children and adults who she had previously delivered. Frequently, the children she delivered would return to see Madeline years later when it was time for them to have their own babies.

Community Service

Dr. Madeline Chung extended her philosophy of volunteerism and service to the community in all aspects of her life. Not only was this evident in her professional life but she was active in her church and community as well. She served on boards of the Chinese United Church, the Vancouver Academy of Music, and was the founding Executive Director of the True Light Chinese School in Vancouver. Well into her eighties, she was given an honorary graduation certificate from York House School in recognition of her contributions to the school.

Family

Despite her tireless devotion and dedication to her patients she was still able to balance a healthy family life providing endless support to her husband, Wally, while raising two children who felt inspired enough by their home life to pursue careers in medicine. Their daughter Dr. Maria Chung is in the Division of Geriatric Medicine at the University of British Columbia. Their son Dr. Stephen Chung is the past University of British Columbia Head of the Division of General Surgery and the current Vancouver General Hospital Head of Hepatobiliary & Pancreatic Surgery. Late in her career, she experienced a life-threatening illness but was able to return to full-time work. At the same time, she was the primary caregiver to her elderly mother whom she looked after in her home.

Chung Keynote Speaker 2022



Dr. Chad Ball

Professor of Surgery and Oncology at the University of Calgary. He currently practices Hepatobiliary, Pancreas, Trauma and Acute Care Surgery at the Foothills Medical Centre (quaternary care regional referral facility). He completed his undergraduate degree at the University of Alberta (honors physiology), graduate degree at the University of British Columbia (MSc), medical school at the University of Toronto, general surgery residency at the University of Calgary, trauma and surgical critical care fellowships at Emory University and the University of Cape Town, and his HPB fellowship at Indiana University. He is also a 'Top 40 Under 40' alumni for the city of Calgary.

Dr. Ball has well over 450 peer-reviewed publications, 80 book chapters, and has written/edited surgical textbooks on arresting life-threatening hemorrhage, as well as technical approaches to HPB surgery. He is also the associate editor of the ninth edition of the industry reference textbook TRAUMA. He is the Editor-in-Chief of both the Canadian Journal of Surgery, as well as the Evidence-Based Reviews in Surgery (EBRS) program. He is an international speaker on a broad range of surgical and resuscitation topics with over 400 presentations and guest lectureships. He currently serves on the editorial board of more than a dozen high-impact, peer-reviewed journals. His research areas of interest include clinical injury care, hybrid operating environments, parabolic spaceflight surgery, and randomized controlled trials within both HPB and trauma surgery. He holds/has held numerous large research grants in the areas of pancreatic/hepatic surgical complications, abdominal wall reconstruction, and ongoing traumatic hemorrhage.

Dr. Ball is on a broad range of surgical society executive committees, as well as the current President of the Canadian HepatoPancreatoBiliary Association. He also remains the director for both the HPB and acute care surgery fellowship programs at the University of Calgary, in addition to supervising multiple graduate students. Dr. Ball is a founding member of C.H.A.P.P.S. This center is an organization devoted to funding research and improving outcomes for current and future cancer patients. He is also a founding board member of the annual Trauma Conference International (TCI)(www.traumacon.org) which is a trans-Americas simulcast-based continuing medical education conference which empowers technology to deliver trauma content to countries and sites that could not afford to travel to meetings. Dr. Ball is the host of the International podcast Cold Steel (<https://canjsurg.ca/podcasts>) that discusses current issues in surgery, career development and continuing surgical education.

History of the Chung Lectureship

In 1995, Madeline and Wally Chung made a generous donation to the Department of Surgery at the University of British Columbia. The purpose of the donation was to support an annual UBC Department of Surgery research day and invite the W.B. & M.H. Chung Lecturer to present new academic work as well as judge academic productivity, not only by the residents but also by the faculty. The Department is grateful for this wonderful legacy that Madeline and Wally Chung have left for the Department.

- 1995 Lloyd MacLean, Department Head, Surgery, McGill University and President of the American College of Surgeons
- 1996 John Duff, University of Western Ontario: *"Multisystem organ failure: manifestations and mediators"*
- 1997 K. Wayne Johnston, University of Toronto
"Issues in the management of abdominal aortic aneurysms in a rapidly changing health care environment"
- 1998 Charles H. Tator, Professor and Chair, Division of Neurosurgery, The Toronto Hospital: *"The breadth of surgical research in the 1990's"*
- 1999 Garth Warnock, Chief General Surgery, University of Alberta Hospitals, Director, Division of Surgical Research, University of Alberta
"Progress in transplantation of insulin-secreting tissues for diabetes mellitus"
- 2000 Paul Walker, Vice President, Toronto General Hospital
Professor of Surgery and Laboratory Medicine, Pathobiology, University of Toronto
"The continuing challenge of sepsis"
- 2001 James C. Thompson, Ashbel Smith Professor of Surgery, University of Texas Medical Branch
"Endocrine tumors of the pancreas"
- 2002 Richard J. Finley, Professor, Department of Surgery
Head, Division of Thoracic Surgery, University of British Columbia
"Future of image guided minimally invasive thoracic surgery"
- 2003 Douglas W. Wilmore, Frank Sawyer Professor of Surgery, Department of Surgery
Brigham and Women's Hospital, Boston, Massachusetts
"The pathophysiology and treatment of intestinal failure"
- 2004 John Wong, Chair of Surgery & Head, Department of Surgery
University of Hong Kong Medical Centre, Queen Mary Hospital, Hong Kong
"Complications of esophagectomy: confess and remember"
- 2005 Richard K. Reznick, R.S. McLaughlin, Professor and Chair, University of Toronto
Department of Surgery, Banting Institute, Toronto, Ontario
"Surgical training in 35 hours per week: laudable or lunacy?"
- 2006 James T. Rutka, Janes Visiting Professor in Surgery, Dan Family Chair in Neurosurgery, Professor and Chairman,
Division of Neurosurgery, University of Toronto
"Astrocytoma invasiveness: molecular mechanisms form the leading edge"
- 2007 Markus W. Büchler, Professor of Surgery, Division of General Surgery
Chairman Surgical Unit, University of Heidelberg
"Evidence based pancreatic surgery"
- 2008 Thomas M. Krummel, Emile Holman Professor and Chair, Stanford University School of Medicine, Department of Surgery
Susan B. Ford Surgeon in Chief, Lucile Packard Children's Hospital, Stanford, CA
"From Blood and Guts to Bits, Bytes and Beyond-- Upgrading the Surgical Apprentice Model"
- 2009 Andrea L. Pusic, Assistant Attending Surgeon, Plastic and Reconstructive Surgery, Memorial Sloan-Kettering Cancer Center, New York
"Measuring patient reported outcomes in surgery"
- 2010 Yvan Douville, Chief, Department of Surgery, University of Laval
"Evolution of Stentgraft for Treatment of Abdominal Aortic Aneurysms"
- 2011 Gerald Fried, Chair, Department of Surgery, McGill University
"Teaching Billy how to operate: can we do better?"
- 2012 Haile Debas, Executive Director of UCSF Global Health Sciences (GHS); former Dean of the UCSF School of Medicine (1993-2003); former Chair,
UCSF Department of Surgery . *"Precious Times"*
- 2013 Lorelei Lingard, Professor and Director of the Centre for Education Research & Innovation, Schulich School of Medicine & Dentistry, Western
University, London, ON
"Beyond communication skills: A rhetorical approach to communication for advancing the practice and teaching of teamwork"
- 2014 Thomas Waddell, Chair, Division of Thoracic Surgery, University of Toronto, Professor, Department of Surgery, University of Toronto
Head, Division of Thoracic Surgery, UHN, Senior Scientist, Toronto General Research Institute, UHN
"The role of research training in surgical education".
- 2015 Garnett Sutherland, Professor, Clinical Neurosciences, University of Calgary, Founder and Director, Seaman Family MR Research Centre, Alberta
Health Services. *"Magnetic resonance imaging and robotic surgery."*
- 2016 Dr. Ivar Mendez, Fred H. Wigmore Professor and Unified Head of the Department of Surgery at the University of Saskatchewan – *"Robotic and
distance tele-mentoring surgery."*
- 2017 Dr. Michael Tymianski, Head of UHN's Division of Neurosurgery and Senior Scientist at the Krembil Research Institute
Dr. Wendy Lai, President of Médecins Sans Frontières (Doctors Without Borders) Canada
- 2018 Dr. Richard Reznick, Dean, Faculty of Health Sciences Queen's University and CEO, Southeastern Ontario Academic Medical Association
"Large scale educational change: difficult, but doable."
- 2019 Dr. Teodor Grantcharov, Professor of Surgery, University of Toronto. *"Surgical innovation, surgical education and patient safety"*
- 2020 Dr. Melanie Morris, Medical Director, Global Surgery Office, University of Manitoba and Lead, Indigenous Health, The Children's Hospital of
Winnipeg. *"Something to Imagine: Equity in Pediatric Surgery."*
- 2021 Dr. Gelareh Zadeh, Professor and Dan Chair, Neurosurgery, University of Toronto Head, Division of Neurosurgery, Toronto Western Hospital.
"Equity and Inclusion in Surgical Leadership"

2022 Department of Surgery Faculty Achievement Awards

Hjalmar Johnson New Investigator Award – Dr. Hannah Piper



Dr. Hannah Piper is a pediatric general surgeon at BC Children’s Hospital and an Associate Professor in the Department of Surgery at the University of British Columbia. She did her pediatric surgical fellowship at Children’s Medical Center in Dallas, TX, followed by an additional fellowship in pediatric intestinal rehabilitation at the Hospital for Sick Children in Toronto, ON. Her clinical and research interest is pediatric intestinal failure, and she is currently the Surgical Director of the Intestinal Rehabilitation Program at BC Children’s Hospital. Her research focuses on nutritional interventions to improve growth and body composition in infants and children with short bowel syndrome with a specific interest in modulating the intestinal microbiota to minimize complications and improve outcomes.

Richard J Finley Senior Investigator Award – Dr. Robert Olson



Dr. Olson is a radiation oncologist and researcher. Clinically, he practices at BC Cancer Prince George, and focuses on patients with breast, head & neck, and metastatic cancer. His research is predominantly focused on clinical trials in patients with metastatic cancer, including the investigation of stereotactic ablative radiotherapy in patients with a few metastatic deposits, with hopes of increasing patients’ survival while minimizing their toxicity and maximizing their quality of life. He completed his undergrad and medical school at the University of Calgary, his residency at UBC, and his MSc in Epidemiology from Harvard. He spends his leisure time with his wife and 4 children, or training for triathlons and marathons.

J. H. Ennis Award in Medicine for Breast Cancer Treatment – Drs. Daegan Sit and Kadhim Taqi



Dr. Daegan Sit is a PGY-5 in Radiation Oncology at the University of British Columbia and BC Cancer. Prior to that, he completed his undergraduate in immunology at McGill University and medicine at McMaster. His clinical and research interests include breast cancer, lung cancer, stereotactic radiotherapy, and palliative radiotherapy. In his spare time, he is an avid plant collector and snowboarder. He has been accepted to MD Anderson’s fellowship in advanced radiation oncology for the 2023 year.



Dr. Kadhim Taqi is a current final-year general surgery resident at UBC. He pursued medical school at Sultan Qaboos University, Oman. He completed his internship in Oman before joining the general surgery residency program at UBC. He received the Sultan Qaboos Comprehensive Cancer Care scholarship to pursue a career in surgical oncology following residency. He was recently awarded the Gwyneth & J.T. Sandy Memorial Award for excellence in surgical oncology.

Learning Objectives

The University of British Columbia Division of Continuing Professional Development (UBC CPD) is fully accredited by the Committee on Accreditation of Continuing Medical Education (CACME) to provide study credits for continuing medical education for physicians. This event is an Accredited Group Learning Activity (Section 1) as defined by the Maintenance of Certification Program of the Royal College of Physicians and Surgeons of Canada and has been approved by UBC CPD for up to **5.5 MOC Section 1** Group Learning credits. Each physician should claim only those credits accrued through participation in the activity.

1. To describe and evaluate the clinical, education and basic science research being conducted in the Department of Surgery.
2. To discover new and innovative research techniques.
3. To participate in the collaborative research environment within the Department of Surgery.

Accredited by UBC CPD



CONTINUING PROFESSIONAL DEVELOPMENT
FACULTY OF MEDICINE

Research Day Schedule

Paetzold Lecture Theatre, VGH with Zoom Connections

8:00	Opening Remarks and Introductions	
8:15	<p>Chung Lecturer: Dr. Chad Ball, <i>Professor of Surgery and Oncology, University of Calgary</i> Surgical Innovation: Failure, Success, and Everything in Between</p>	
MORNING SESSION 1		
8-minute paper with 2-minute discussion		
9:15	MacNeill, Andrea	General Surgery P1 Defining Low-Carbon, High-Quality Kidney Care: Life Cycle Assessments of Kidney Transplant, Hemodialysis, and Peritoneal Dialysis
9:25	Heffernan, Austin	Otolaryngology P2 Carbon Savings Potential of Incorporating Virtual Care into the Management of Obstructive Sleep Apnea and Otitis Media with Effusion
9:35	Cherukupalli, Abhiram	Otolaryngology P3 Identifying Barriers to Care for Complex Airway Disease and Multidisciplinary Solutions to Optimize Therapy in Canada
9:50	Jump to Rapid Fire A schedule	RAPID FIRE Session A
1.5-Minute Talks		
10:40	BREAK	
MORNING SESSION 2		
8-minute paper with 2-minute discussion		
10:55	Chang, Stephano	Neurosurgery P4 Spatiotemporal Mapping and Decoding of Oculomotor Control in Human Frontal Eye Fields
11:05	Liu, Alice	Otolaryngology P5 The Timing of Drain Removal in Parotidectomies: A Canadian Survey of Practice Patterns and Outcomes of Early Drain Removal at <4 Hours
11:15	Price, Joel	Cardiac Surgery P6 Long-term Outcomes of Arterial Conduit Configurations in Multiarterial Coronary Artery Bypass Grafting
11:25	Nazareth, Ashleigh	Pediatric Surgery P7 External Validation of the PRESTO Pediatric Model for Predicting In-Hospital Mortality from Traumatic Injury
11:35	Guo, Michael	General Surgery P8 Use of Dual Energy Computed Tomography vs. Conventional Modalities for Preoperative Localization in Primary Hyperparathyroidism: Effect of Preoperative Calcium and Parathyroid Hormone Levels
11:45	Amanian, Ameen	Otolaryngology P9 Automated Segmentation of the Eustachian Tube for Applications in the Management of Eustachian Tube Dysfunction – A Deep Learning Framework
11:55	Mousa-Doust, Dorsa	Otolaryngology P10 Functional and Aesthetic Outcomes of Radial Forearm Free Flap Closure using Split-Thickness Skin Graft vs Primary Closure (Hatchet flap)
12:05	Watanabe, Akie	General Surgery P11 Building a National Synoptic Operative Report for Thyroid Surgery
12:15	Mankowski, Peter	Plastic Surgery, Urology P12 Functional and Aesthetic Outcomes of the Use of Integra Following Free Radial Forearm Phalloplasty
12:25	Mankowski, Peter	Plastic Surgery, Urology

[P13](#) Barriers to Completing Pre-Operative Hair Removal for Penile Inversion Vaginoplasty

12:35 LUNCH

12:45 [Jump to Rapid Fire B schedule](#) RAPID FIRE Session B
1-Minute Talks

AFTERNOON SESSION

8-minute paper with 2-minute discussion

13:30 Arneja, Jugpal;
Schechter, Steven *Plastic Surgery*

[P14](#) Do Delays Amidst a Surgical Slate Stimulate Speedup? Evidence from Operating Rooms

13:40 Barton, Anise *General Surgery*

[P15](#) The Impact of Targeted Fee Increases on Gender Pay Disparity Between Female and Male General Surgeons in British Columbia

13:50 Deane, Emily *Otolaryngology*

[P16](#) The Current Landscape of Insurance Coverage for Gender Affirmation Surgery in Canada

14:00 Zhang, Zach *Plastic Surgery*

[P17](#) Impact of Medico-legal Complaint Amongst Canadian Plastic Surgeons

14:10 Heo, Kayoung *General Surgery*

[P18](#) Creating Concise Reference Videos for an Essential Surgical Skills Training Program: A Médecins Sans Frontières-UBC Global Surgery Lab Collaboration

14:20 Hindi, Mathew *Pediatric Surgery*

[P19](#) The Utility of Three-Dimensional Modeling and Printing in the Surgical Treatment of Pediatric Thoracoabdominal Tumors

Rapid Fire Session A

9:50 am – 10:40 am

1.5-minute talks

Paetzold Lecture Theatre, VGH with Zoom Connections

Abstract ID	Division	Presenting Author	Abstract Title
A1	General Surgery	Lie, Jessica	Psychological Impact of the COVID-19 Pandemic on Surgical Residents: A Canadian Province-Wide Survey
A2	General Surgery	Schweitzer, Christina	Appendiceal Neoplasm is Seven Times More Likely in Elective Appendectomies than in Emergency Appendectomies in Cases without Pre-operative Diagnosis of Neoplasm: A Review of >52,000 ACS NSQIP Cases
A3	General Surgery	Clement, Elizabeth	The Association Between Gender and Confidence in UBC General Surgery Residents
A4	Otolaryngology	Liu, Alice	The Role of Tracheostomies in Head and Neck Reconstructions: Evaluating a Decrease in Tracheostomy Practice for Free Flaps and Associated Complications
A5	Radiation Oncology	Dang, Alexa	Organ Perforation and Clinical, Dosimetric and Treatment Outcomes During Image Guided Cervix Brachytherapy
A6	General Surgery	Mashat, Abdullah	The Influence of Papillary Features on the Risk of Malignancy in Thyroid Nodules Diagnosed as Atypia of Undetermined Significance or Follicular Lesion of Undetermined Significance
A7	Vascular Surgery	Udwadia, Farhad	Post-Operative Complications After Carotid Endarterectomy for Free Floating Thrombus
A8	Vascular Surgery	Udwadia, Farhad	Practical and Ethical Challenges of Maintaining Vascular Access in Chronic Kidney Disease: Patient Perspectives
A9	Otolaryngology	Amanian, Ameen	The Evolution and Application of Artificial Intelligence in Rhinology: A State of the Art Review
A10	Otolaryngology	Amanian, Ameen	Unintended Side Effects of Electronic Cigarettes in Otolaryngology: A Scoping Review
A11	Cardiac Surgery	Rokui, Soroush	Long-Term Outcomes of Isolated Mechanical versus Bioprosthetic Mitral Valve Replacement in Propensity Matched Patients
A12	Radiation Oncology	Pritchard, Andrew	Long Term Toxicities of Adolescent and Young Adult Survivors of Cervix Cancer who underwent Radiation Therapy: A Cross-Sectional Analysis
A13	Neurosurgery	Rizzuto, Michael	Quality of Life in Patients Diagnosed with Moyamoya Disease: A cross-sectional study
A14	General Surgery	Spoyalo, Karina	Assessment of Environmental and Economic Sustainability of Peri-operative Patient Warming Strategies in Hospitals
A15	Plastic Surgery	Knight, Paige	Reporting on Postmastectomy Radiotherapy Protocols in Immediate Breast Reconstruction: A Systematic Review and Pooled Analysis
A16	General Surgery	Lalande, Annie	Evaluating the Impact of Increased After-Hours Access to Healthy and Low Carbon Food on the Wellness of General Surgery Residents: A Pilot Study

Rapid Fire Session B

12:45 pm – 13:30 pm

1-minute talks

Paetzold Lecture Theatre, VGH with Zoom Connections

Abstract ID	Division	Presenting Author	Abstract Title
B1	Otolaryngology	Abgoon, Reyhaneh	Are Acute Changes in Serum miRNA Expression Levels in Sudden Sensorineural Hearing Loss Patients Stable over Time?
B2	General Surgery	Alam, Armaghan	Non-operative Management for Rectal Cancer: Patient Perspectives
B3	Radiation Oncology	Chai, Brandon	Assessment of Online YouTube Videos on Radiotherapy for Breast Cancer
B4	Otolaryngology	Desai, Veeral	Mental Practice in Athletes, What Can Surgeons learn? : A Scoping Review
B5	Otolaryngology	Desai, Veeral	A Cut Above: A Scoping Review of Mentorship in Surgical Residency Training
B6	Branch for Global Surgical Care	Gray, Katherine	Harnessing the Power of Digital Health to Create Videos and an Online Curriculum for Management of Obstetrical Emergencies: Training Non-surgeon Physicians in Low-resource Settings
B7	Pediatric Surgery	Hindi, Mathew	The Categorization of Surgical Problems by Junior and Senior Medical Students
B8	Otolaryngology	Lee, Melissa	Assessing Hearing Disability and Health-Related Quality of Life in Profound Unilateral Sensorineural Hearing Loss (USNHL): A Systematic Review and Meta-Analysis
B9	Urology	O'Dwyer, Cormac	Vaginal Self-Lubrication Following Penile Inversion, Peritoneal, and Colonic Gender Affirming Vaginoplasty: A Physiologic, Anatomic, and Histologic Review.
B10	Pediatric Surgery	Song, Wendy	A Comparison of Operative and Anesthetic Techniques for Inguinal Hernia Repair in Infants
B11	Surgical Oncology	Alexis, Stephanie	Nutritional Adequacy and Environmental Impacts of the Retail Food Environment at Vancouver General Hospital
B12	General Surgery	Zivkovic, Irena	Update on the Evaluation of a Surgical Task-Sharing Program in South Sudan
B13	Pediatric Surgery	Wu, Dana	The Impact of Infection on Growth in Neonates with Intestinal Failure
B14	Vascular Surgery	McGillivray, Meghan	Impact of Hospital Transfer on Acute Limb Ischemia Outcomes and Time to Revascularization
B15	Otolaryngology	Heffernan, Austin	The Impact of the Unified Airway on Upper and Lower Airway Non-type 2 Inflammation: A State of the Art Review
B16	Otolaryngology	Heffernan, Austin	Vestibular Rehabilitation Potential of Commercially Available Virtual Reality Video Games
B17	Otolaryngology	Banyi, Norbert	Incidence and Risk Factors of Hypothyroidism Post-laryngectomy: A Systematic Review
B18	Neurosurgery	Ong, Kenneth	Location Pattern of Recurrence of WHO Grade 1 Meningiomas
B19	Urology	Kumar, Sahil	Serum Estradiol Levels Further Decrease After Bilateral Oophorectomy in Transmasculine Individuals on Testosterone Therapy
B20	Urology	Jung, Hoyoung	Pars Fixa Urethral Stricture Repair after Gender-Affirming Phalloplasty or Metoidioplasty: A Retrospective Review
B21	General Surgery	Pang, ZhaoKai	Qualitative Patient-Reported Outcomes Should Supersede Quantitative Scores after Curative Parathyroidectomy.
B22	Plastic Surgery	Sachal, Sukhmeet	Level of Evidence in High Impact Surgical Literature: The Way Forward
B23	Otolaryngology	Kwon, Jamie	Risk Factors for Complications following Reconstruction Surgery for Mandibular Osteoradionecrosis
B24	General Surgery	Lee, Debon	Bibliometric Analysis of Articles Published in the Journal of the American College of Surgeons Over 28 Years: A Changing Surgical Publication Focus
B25	Plastic Surgery	Raman, Karanvir	Implications of the COVID-19 Pandemic on Immediate Breast Reconstruction Access

Evening Reception

6:00 pm - Cocktails

6:30 pm – Award Presentations

7:00 pm – Dinner

Location

The University Golf Club in the heart of the Pacific Spirit Park and the University Endowment Lands

5185 University Blvd, Vancouver, BC V6T 1X5

Abstracts

THANK YOU to our abstract reviewers

Each year we invite Division Heads, Postgraduate Program Directors and members of the UBC Department of Surgery Research Committee to review the abstracts. A big *THANK YOU* to the faculty members listed below who reviewed the abstracts this year.

Reviewer	Division
Dr. Robert Baird	Pediatric Surgery
Dr. Jamil Bashir	Cardiac Surgery
Dr. James Bond	Thoracic Surgery
Dr. Trevor Hamilton	Surgical Oncology
Dr. Chris Honey	Neurosurgery
Dr. Kathryn Isaac	Plastic Surgery
Dr. Henry Jiang	General Surgery
Dr. Fred Kozak	Otolaryngology
Dr. Ahmer Karimuddin	General Surgery
Dr. Kirk Lawlor	Vascular Surgery
Dr. Sheina Macadam	Plastic Surgery
Dr. Jonathan Misskey	Vascular Surgery
Dr. Desmond Nunez	Otolaryngology
Dr. Robert Olson	Radiation Oncology
Dr. Michael Peacock	Radiation Oncology
Dr. Hannah Piper	Pediatric Surgery
Dr. Alex Seal	Plastic Surgery
Dr. Maja Segedi	General Surgery
Dr. Ash Singal	Neurosurgery
Dr. Andrew Thamboo	Otolaryngology
Dr. Eric Webber	Pediatric Surgery

We welcome any other faculty members who would like to review abstracts next year (please email alice.mui@ubc.ca).

8-Minute Talk Session Abstracts

P1 – 9:15

Title: Defining low-carbon, high-quality kidney care: life cycle assessments of kidney transplant, hemodialysis, and peritoneal dialysis

Authors: Saba Saleem¹, Tasleem Rajan², Caroline Stigant², Kasun Hewage¹, Rehan Sadiq¹, Andrea MacNeill³, Chris Nguan⁴

Affiliations: ¹School of Engineering, University of British Columbia, ²Department of Medicine, University of British Columbia, ³Division of General Surgery, University of British Columbia, ⁴Department of Urologic Sciences, University of British Columbia

Background: Chronic kidney disease (CKD) demands some of the most resource-intensive clinical services, including kidney transplantation and various modes of dialysis. While there are clear indications for specific renal replacement strategies in certain circumstances, there are also instances of clinical equipoise in which environmental costs of care could be taken into account. CKD thus represents an ideal prototype for investigation and optimization of environmental costs of care.

Objective: To estimate the environmental impacts of the primary modes of renal replacement therapy in British Columbia.

Methods: A process-based life cycle assessment (LCA) was carried out of living donor kidney transplantation (KT), in-centre hemodialysis (HD), and automated peritoneal dialysis (PD), capturing all energy and material inputs and outputs for each process. Scenarios were modeled comparing an individual patient receiving each type of renal replacement therapy over a 1-year period. A comprehensive suite of environmental impacts was estimated using SimaPro™ LCA software.

Results: HD consistently generated the highest environmental impacts including climate change, air pollution, human toxicity, terrestrial acidification, and freshwater eutrophication, among other impact categories. KT was consistently the least impactful, generating 2-5% as many pollutant emissions to air, water, and soil as HD. PD occupied a range between the other two modalities. Greenhouse gas emissions

from HD were 95% higher than for KT and 45% higher than for PD. Within each modality, sources of highest impact were identified. For HD, patient commuting was responsible for the majority of environmental impacts. For KT, OR energy consumption was the single largest source of impacts. For PD, waste management was the dominant impact category.

Conclusions: Understanding the relative environmental impacts of alternative modes of renal replacement therapy can help inform clinical decision-making and policy. KT has a much smaller environmental footprint than the primary alternative, HD, and is associated with better clinical outcomes. Opportunities to optimize transplantation rates for the eligible end-stage kidney disease population should be explored. Between dialysis modalities, PD is environmentally preferable over HD and could be considered for more widespread use. These results can also guide efforts to optimize each modality, such as exploring low-carbon transportation options for HD patients, or the possibility of home over in-centre HD to eliminate the patient commute.

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P2 – 9:25

Title: Carbon Savings Potential of Incorporating Virtual Care into the Management of Obstructive Sleep Apnea and Otitis Media with Effusion
Authors: Austin Heffernan BMSc¹, Annie Lalande MD^{1,4}, Rashmi Chadha MBChB MScCH¹, Andrea MacNeill MD FRCSC^{1,4} and Neil Chadha MBChB MPHe FRCS¹⁻³.

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Background: Canada’s healthcare system contributes to 4.6% of the country’s total greenhouse gas emissions. This perpetuates climate change; a recognized public health threat. Therefore, decarbonizing Canadian healthcare is essential and virtual health is one strategy for achieving this goal.

Objective: To determine the carbon savings potential of incorporating virtual care into modeled pediatric care pathways for obstructive sleep apnea (OSA) and otitis media with effusion (OME).

Methods: A modeling cohort design was employed. Clinical care pathways were developed for pediatric patients (<19 years) diagnosed with OSA or OME requiring tertiary care. This study utilized the British Columbia healthcare system and geography to model emissions. Up to half of in-person visits were replaced with virtual visits. Carbon emissions were calculated using round-trip distances to the hospital from approximated home addresses. Carbon emissions for transport and virtual visits were estimated using published emission factors. Data were analyzed using population-weighted emissions and descriptive statistics.

Results: Up to 228 clinical care pathway and home address combinations were created. Utilizing 1, 2 or 3 virtual visits in the obstructive sleep apnea care pathway yielded potential emissions savings of 19.9%, 39.9% and 59.8%, respectively. Integrating 1, 2 or 3 virtual visits into the otitis media with effusion care pathway produced potential emissions savings of 16.6%, 33.2% and 49.7%, respectively. Integrating 3 virtual visits into the care pathways generated a substantial emissions reduction (up to 2156.8 kgCO₂e per patient) compared to in-person care.

Conclusions: Appropriately conducting up to 50% of clinical encounters virtually for children with obstructive sleep apnea or otitis media with effusion substantially reduced carbon emissions. For a single child, emission savings could reach 2156.8 kgCO₂e.

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P3 – 9:35

Title: Identifying Barriers to Care for Complex Airway Disease and Multidisciplinary Solutions to Optimize Therapy in Canada

Authors: Cherukupalli A.¹ MD MHSc, Yong M.¹ MD MBA FRCSC, Chan Y.² MD MSc FRCSC, Desrosiers M.³ MD FRCSC, Thamboo A.¹ MD MHSc FRCSC

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Background: Complex airway disease such as Chronic Rhinosinusitis with Asthma or Aspirin Exacerbated Respiratory Disease requires a multidisciplinary approach to management and treatment. Many centers in the USA have created collaborative multidisciplinary clinics to support the management of these patients; however, similar structures do not appear to exist in Canada.

Methods: This mixed methods study used a combination of structured interviews and a cross-sectional national survey. Interviewees included members of the Canadian Rhinology Working Group and survey participants were a combination of academic and community Rhinologists, Respirologists and Allergists. All participation was voluntary and selection criteria was based on their involvement in treating complex airway disease. Our objective was to identify the current state of diagnosis and treatment of complex airway patients in Canada between Rhinology, Respirology and Allergy and understand the barriers, challenges and propose solutions to establishing a multidisciplinary airway clinic in Canada.

Results: Four Rhinologists participated in qualitative interviews and a convenience sample of 42 specialists through our known network responded to our quantitative survey. From our survey, 54.8% believed multidisciplinary clinics were necessary in the management of complex airway disease, providing better outcomes and cost-savings (69%, 45.2%). Most specialties agreed that history, physical, pulmonary function and skin prick testing was important for diagnosis (92.9%, 92.9%, 88.1%). If clinicians were to participate in a multidisciplinary clinic, they would be willing to forego an average of 14.2% of their mean daily income for that clinic. The ideal clinic location was split between a neutral shared location vs. a Rhinology clinic space (38.1%, 45.2%).

Conclusions: Complex airway diseases are currently managed in subspecialty silos resulting in fragmented care. Our study highlights gaps in management, areas for improvement and support for establishing multidisciplinary complex airway disease clinics in Canada to better treat this population.

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P4 – 10:55

Title: Spatiotemporal Mapping and Decoding of Oculomotor Control in Human Frontal Eye Fields

Authors: Stephano J. Chang¹, Mohammad S. Mashayekhi², Hetsree Joshi¹, Gary J. Redekop¹, Ash Singhal³, Mandeep Tamber³

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Background: The frontal eye fields (FEFs) are linked to oculomotor control and hypothesized to reside in the prefrontal cortex, where electrical stimulation reportedly evokes contraversive eye movements. The exact location and function of the FEFs in humans is controversial with studies implicating multiple putative regions, including the posterior middle frontal gyrus and the inferior precentral gyrus. Additionally, these studies are performed in the operating room, where stimulation localization is suboptimal and neural function may be influenced by anesthetics. Stereo-electroencephalography (SEEG) is a minimally invasive technique used to guide epilepsy surgery by placing temporarily implanted depth electrodes into the brain for periods up to one or two weeks. It provides a unique opportunity to collect human neurophysiological data outside of the operating room and has been used by other groups to advance our understanding of specific brain functions.

Objective: To identify and map the FEFs in pediatric and adult patients after SEEG implantation in the post-operative setting, free of anesthetics.

Methods: Four pediatric and four adult subjects undergoing non-lesional epilepsy workup were enrolled into this prospective, IRB-approved study, and received brain MRI prior to SEEG implantation, followed by post-operative CT head for precise electrode localization. Post-operative stimulation testing and SEEG recordings were performed along with time-aligned video of the subjects' eyes while performing gaze-related tasks.

Results: Stimulation testing elicited contraversive head turning with or without eye deviation, depending on the site of stimulation. Low-threshold sites eliciting these stereotyped movements were located just deep to the inferior precentral gyrus. Stimulation of sites in the posterior middle frontal gyrus did not elicit eye deviation movements in our subjects in the post-operative setting. Analysis of SEEG from electrodes in the inferior precentral gyrus revealed high correlations to eye movements.

Conclusions: Our findings suggest that the human FEFs are located more posteriorly than widely held and reported in textbooks, involving the motor cortex. Further testing in pediatric and adult subjects is warranted to confirm this hypothesis and test for differences in these populations.

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P5 – 11:05

Title: The Timing of Drain Removal in Parotidectomies: A Canadian Survey of Practice Patterns and Outcomes of Early Drain Removal at <4 Hours

Authors: Alice Q Liu, MD¹, Oleksandr Butskiy, MD, FRSCSC¹, Veronique Wan Fook Cheung, MD, FRSCSC², Donald W Anderson, MD, FRSCSC¹

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Background: Parotidectomy is a common procedure in otolaryngology. The post-operative management is highly surgeon dependent. No guidelines are currently available for timing of parotid drain removal.

Objective: This study aimed to: (1) assess current Canadian parotidectomy drain removal practice; and (2) compare complications after early drain removal (<4 hours, POD 0) with late drain removal (POD ≥ 1).

Methods: An anonymous, cross-sectional parotidectomy drain practice survey was distributed to active members of the Canadian Society of Otolaryngology – Head and Neck Surgery mailing list. A single surgeon's ten-year parotidectomy practice was reviewed retrospectively, with extraction of patient demographic, disease, and complication variables. Descriptive statistics, Wilcoxon Rank Sum, and unpaired student's t-tests were calculated.

Results: The national survey had 176 responses (21.5% response rate). The majority (67.9%) reported routinely using drains after parotidectomy and 62.8% reported using a drain output based criteria for removal. The most common cut-off output was 30 ml in 24 hours (Range 5-70 ml). From the chart review, 536 patients were examined retrospectively and 44.7% (235/526) of drains removed early (POD0). There was no significant difference in hematoma, seroma, or infection rates between the early and late drain removal cohorts. Length of stay was significantly longer for the late removal cohort (p<0.001).

Conclusions: The variation in Canadian post-parotidectomy drain removal practice highlights a potential area for practice improvement studies aimed at minimizing unnecessary hospital resource usage. There was no difference in hematoma, seroma, or infection rates when parotid drains were removed at four hours post-operatively (POD0).

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P6 – 11:15

Title: Long-term Outcomes of Arterial Conduit Configurations in Multiarterial Coronary Artery Bypass Grafting

Authors: Edward Percy¹, Jungwon Shin², James Abel², Joel Price¹

Affiliations: ¹Division of Cardiovascular Surgery, University of British Columbia, Vancouver, BC

Background: Multiarterial grafting (MAG) in coronary artery bypass (CABG) has been associated with improved survival and graft patency. Despite this, MAG utilization remains very low. Several configurations utilizing the left internal thoracic artery (LITA) and the right internal thoracic (RITA) or radial (RAD) artery exist, however equipoise remains with respect to the ideal configuration.

Objective: To investigate the long term outcomes associated with various graft configurations in MAG.

Methods: 20,076 patients undergoing CABG in our province from Jan 2000 to Dec 2017 were considered. Those who received 2 arterial grafts were stratified into five groups by the conduits used, graft arrangement and territories grafted. Free LITA or RITA grafts were excluded.

Prospectively maintained baseline data were linked with a population database for long-term outcomes. Unadjusted survival and freedom from repeat revascularization were examined by Kaplan Meier analysis. Cox proportional hazards models were used to study adjusted outcomes and relevant pairwise comparisons.

Results: 5,647 patients met inclusion criteria with a median follow-up time of 9.1 years. The mean age was 60 years and 11% were female. Overall, 3,321 patients had a combination of one internal thoracic artery and a radial artery, and 2,326 had bilateral internal thoracic arteries. These were further stratified by left-, or right-sided distal target. After multivariable adjustment, graft configuration was not independently predictive of long-term survival or repeat revascularization for any configuration studied. Adjusted pairwise comparisons demonstrated no significant difference in outcomes between configurations with RITA to Left anterior descending (LAD) compared to those with LITA to LAD. Additionally, there were equivalent long-term mortality or freedom from repeat revascularization between the use of LITA and RAD compared to LITA and RITA.

Conclusions: In this long-term series of over 5500 patients with MAG, the choice of graft configuration did not affect long-term survival or freedom from revascularization. Importantly, the use of LITA and RAD, a technically simple configuration, yielded similar results to bilateral internal thoracic arteries. This has not previously been demonstrated in a large, long-term study. Also, configurations utilizing LITA or RITA to LAD yielded similar results. These data support a strategy of MAG using the simplest strategy for the individual patient and may provide the impetus for increased MAG utilization in CABG.

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P7 – 11:25

Title: External Validation of the PRESTO Pediatric Model for Predicting In-Hospital Mortality from Traumatic Injury

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Background: Traumatic injury is a major cause of pediatric mortality and disability. Comparison of observed outcomes to those expected based on the presence of specified risk factors, known as benchmarking, is crucial for quality improvement of trauma systems. The Injury Severity Score (ISS) is a widely used benchmarking model to predict in-hospital mortality in adults and children. It requires anatomical diagnoses, often obtained with expensive imaging, that can be impractical in lower resource settings. Conversely, the Pediatric Resuscitation and Trauma Outcome (PRESTO) model was recently developed to predict in-hospital mortality using pediatric-specific low-cost point-of-care variables. It has been validated in multiple resource-constrained settings and trended towards superiority over ISS.

Objective: Our aim was to validate PRESTO in a high-resource setting, such as a Canadian province, using provincial Trauma Registry (TR) data, and compare it to the standard benchmarking model, ISS.

Methods: This retrospective case-control study collected demographic, vital sign, and outcome data from the TR for patients aged <16 years sustaining major trauma from 2013-2021. Missing data were assumed to be not-at-random. To minimize bias, we simulated the missing data with multiple imputation. In total, 42 rounds of multiple imputation were completed to account for the 42% of the cohort that were missing data. The PRESTO model estimates predicted probability of in-hospital mortality (Pm) using the age, heart rate, blood pressure, oxygen saturation, neurological status, and use of airway supplementation. PRESTO was assessed by comparison of Pm in patients who died and survived and comparison of area under the receiver-operator curve (AUROC) with that of ISS. Statistical analysis was performed using R.

Results: We included 647 patients, of which 69 died in-hospital (11%). The cohort was 37% female, with a median age of 8 and median ISS of 17. In-hospital death was significantly associated with low systolic blood pressure, use of airway interventions, ISS > 15 and lower neurological status ($p < 0.001$ for all). The median Pm for cases was significantly higher compared to controls (1.0 vs 5.2×10^{-5} , $p < 0.001$). The AUROC for PRESTO and ISS were not significantly different (0.819 and 0.816, respectively; $p = 0.95$).

Conclusions: PRESTO is valid in a resource-rich environment, such as a Canadian province. It performs equally well to ISS but is less costly. In the future, PRESTO may serve to benchmark levels of in-hospital mortality within or across institutions over time in different populations across Canada.

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P8 – 11:35

Title: Use of Dual Energy Computed Tomography vs. Conventional Modalities for Preoperative Localization in Primary Hyperparathyroidism: Effect of Preoperative Calcium and Parathyroid Hormone Levels.

Authors: Michael Y. Guo¹, Daniel B. Lustig², and Sam M. Wiseman³

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Background: Treatment of primary hyperparathyroidism (PHP) with focused neck dissection relies heavily on accurate localization of the hyperactive gland on preoperative imaging. Several factors influence the accuracy of these tests, including pre-operative biochemical factors, but have not been studied in newer imaging techniques such as dual energy computed tomography (DECT).

Objective: We aim to study how preoperative calcium and parathyroid hormone (PTH) levels affect the sensitivity and accuracy of DECT, single positron emission computed tomography with and without sestamibi (SPECT-MIBI) and ultrasound (US) in localizing parathyroid adenomas.

Methods: A retrospective study was conducted in a tertiary referral center, including all patients undergoing parathyroidectomy for PHP who received DECT, SPECT-MIBI, and US between 2012-2021. Preoperative calcium and PTH were used to stratify patients: normal calcium high PTH, high calcium normal PTH and high calcium high PTH.

Results: 278 patients were included for analysis. In patients with high pre-operative calcium and PTH, both sensitivity of detecting a parathyroid adenoma and accuracy of predicting correct lateralization of the adenoma was higher for DECT+US (90.0%, 77.1%, respectively)

than SPECT+US (80.8%, 72.1%), and CT-MIBI+US (77.9%, 69.6%). This was similar in the high calcium normal PTH (DECT+US: sensitivity 61.5%, specificity 30.8%), and normal calcium normal PTH (DECT+US: sensitivity 69.6%, specificity 56.5%) subgroups. DECT correctly predicted parathyroid adenoma location in 34 patients whose preoperative US and CT-MIBI localization failed.

Conclusions: Preoperative calcium and PTH influence the sensitivity and accuracy of pre-operative tumor localization in PHP. DECT is more sensitive and accurate for preoperative localization and can also be used to predict location of parathyroid tumors that are not successfully localized by combined US and CT-MIBI.

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P9 – 11:45

Title: Automated Segmentation of the Eustachian Tube for Applications in the Management of Eustachian Tube Dysfunction – A Deep Learning Framework

Authors: Ameen Amanian, MD MSE¹, Yuliang Xiao, BSE³, Chanha Kim, BS³, Andy S. Ding, MD, MSE², Manish Sahu, PhD³, Russell Taylor, PhD³, Mathias Unberath, PhD³, Bryan Kevin Ward, MD², Francis Creighton, MD²

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Introduction: Eustachian tube dysfunction (ETD) is a common condition within the Otolaryngology domain seen in both the pediatric and adult population. However, there are a lack of validated tools used to accurately diagnose and manage a patient with ETD. Clinicians have thus turned towards imaging to better understand the complex structure of the eustachian tube (ET).

Methods: Computed tomography (CT) images from a tertiary referral center for adult patients (>18 years of age) referred for a clinical complaint within the Otolaryngology department were included. A deep learning architecture was developed via the nnU-Net architecture with segmentation of the eustachian tube, internal carotid artery (ICA), and torus tubarius (TT). The Dice Similarity Coefficient (DSC) and Average Hausdorff Distance (AHD) was calculated to quantify the performance of the framework on the test CT volumes.

Results: Thirty-one CT images were included for training and validation of the deep learning framework. Predictions were performed on 9 test CT volumes. The DSC for the ET, ICA, and TT were 0.649, 0.891, and 0.735 respectively, whereas the AHD was 0.455, 0.205, and 0.402 for the three respective structures. The framework showed increased accuracy along the bony and pharyngeal openings of the ET whereas there was decreased accuracy along the mid-cartilaginous segment.

Conclusion: We have developed the first deep learning framework for automated segmentation of the eustachian tube and surrounding anatomical structures with good accuracy. This pipeline has the potential to further evolve our understanding of the eustachian tube and improve the diagnostic toolbox pertaining to ETD.

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P10 – 11:55

Title: Functional and Aesthetic Outcomes of Radial Forearm Free Flap Closure using Split-Thickness Skin Graft vs Primary Closure (Hatchet flap)

Authors: Dorsa Mousa-Doust¹, MD; Anat Bahat-Dinur¹, MD; Donald W Anderson¹, MD; J Scott Durham¹, MD; Eitan Prisman¹, MD.

Affiliations: ¹Department of Otolaryngology – Head & Neck Surgery, University of British Columbia, Vancouver, British Columbia, Canada

Background: Radial forearm free flap (RFFF) is widely used in head and neck surgeries. There are aesthetic and functional concerns regarding closure of RFFF donor site. Split-thickness skin graft (STSG) and hatchet flap are two popular closure techniques commonly used at our institution.

Objective: The primary objective of this study was to determine if there are any subjective functional and aesthetic differences between the STSG and the hatchet flap closure techniques.

Methods: All patients who underwent head and neck tumor resection with RFFF reconstruction from January 1, 2015 to November 15, 2020 at Vancouver General Hospital were retrospectively identified. Patients who were willing to participate were asked to fill out the Patient-Observer Scar Assessment Scale (POSAS) and Michigan Hand Outcome Questionnaire (MHOQ) over the phone or via email. Patients' demographics and donor site complications were collected retrospectively from the medical records.

Results: Out of 198 RFFFs that met our inclusion criteria, 81 patients were available to participate in our study (hatchet flap n= 42, STSG n= 39). Patient in the hatchet group were on average younger (60 versus 66, p=0.0283) and had a higher BMI (28.3 versus 25.4, p= 0.0170) than the STSG group. The flap size was significantly larger in the STSG group compared to the hatchet flap, with a mean of 46.2 cm² and 33.4 cm², respectively (p = 0.0192). The scar quality in the STSG group was superior to the hatchet flap in all domains of the POSAS patient scales and showed a statistically significant difference in four out of seven domains (itch, color difference, irregularity, thickness) as well as the overall score. The mean MHOQ scores were similar between both groups in all 6 subscales (overall hand function, ADLs, work performance, pain, appearance, and patient satisfaction) with no statistical difference in the overall MHOQ scores between the two groups (p= 0.2165). Unlike STSG group, in the hatchet flap group, the mean MHOQ scores were significantly lower for the operated arms than the non-operated arms for all subscales that involved both arms (overall hand function, one-handed ADL, appearance, satisfaction and overall MHOQ score).

Conclusions: Subjective evaluations revealed that the STSG and the hatchet flap closure of the RFFF donor site have comparable functional outcomes. However, the STSG is superior to the hatchet flap closure based on our intragroup analysis of the functional outcomes. With regards to scar quality, the STSG is superior to the hatchet flap closure based on patients' opinions.

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P11 – 12:05

Title: Building a National Synoptic Operative Report for Thyroid Surgery

Authors: Akie Watanabe¹, Eitan Prisman¹, Elliot Mitmaker², G. Ross Walker³, Jonn Wu⁴, Debon Lee¹, Anne Nguyen¹, Sam M. Wiseman¹

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Background: Information documented in narrative operative reports influences the management of thyroid disease but often lacks consistency. This study aimed to investigate current national thyroid operative reporting practices and develop an evidence based synoptic operative report.

Methods: Canadian surgeons who perform thyroidectomy were surveyed for their opinions on current operative reporting practices and asked to provide de-identified narrative reports dictated for benign and/or malignant disease. Commonly reported elements were identified and ranked by surgeons and non-surgeon specialists who manage thyroid disease on a 1–5-point Likert scale of importance. Using the Modified Delphi Method, a national advisory committee interpreted the results to create a standardized synoptic operative report for thyroid surgery.

Results: 42 surgeons from 9 Canadian provinces were surveyed with 89% performing >16 thyroidectomies annually. Narrative reporting was utilized by 88% of surgeons, of which 35% expressed dissatisfaction and 100% expressed interest in adopting a synoptic template if available. Amongst 142 narrative reports evaluated, essential operative reporting elements such as the status of the recurrent laryngeal nerve(s) (100%) were adequately reported while the presence/absence of gross extrathyroidal cancer extension (36%) or residual cancer (6%) were not. Nonessential elements such as incision placement (100%) were routinely reported. A total of 136 elements were identified and ranked by 46 Canadian specialists. Type of procedure (4.93 +/- 0.25) and type of neck dissection (4.83 +/- 0.49) were the most important basic items. Cancer specific items including invasion of structures (4.76 +/- 0.68), the presence of residual gross disease (4.74 +/- 0.71), and gross extrathyroidal extension (4.74 +/- 0.71) also received high scores. After 2 rounds of voting and a review conference, consensus was achieved by a national advisory committee on a 21-item synoptic operative report, of which 5 items are cancer specific.

Conclusions: Narrative operative reporting dominates current practice but fails to document important information establishing a need for synoptic operative reporting. Multidisciplinary review of current literature and items in narrative reports helped develop a standardized national synoptic operative report that could boost user-satisfaction, increase consistency, benefit quality of patient care and improve patient outcomes.

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P12 – 12:15

Title: Functional and Aesthetic Outcomes of the Use of Integra Following Free Radial Forearm Phalloplasty

Authors: Peter Mankowski^{1,3}, Smita Mukherjee³, Anthony Papp¹, Elise Bertin², Alex Kavanagh^{2,3}, Krista Genoway^{1,3}

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Background: For transgender patients, free radial forearm flap (FRFF) phalloplasty utilizes the skin and soft tissue of the distal forearm to create a neophallus. The resulting donor site is left with a depressed and irregular contour that has suboptimal cosmesis when covered by a split thickness skin graft. Integra artificial dermal matrix was introduced as an optional tool for donor site reconstruction of the forearm. Integra integrates into the donor site wound bed as a dermal substitute that can then be covered by a split thickness skin graft in a stage fashion. The use of Integra is thought to decrease the donor site deformity, improve scar cosmesis and minimize scar adhesions which can result in functional impairment.

Objective: The goal of this study is to review a case series of patients that have completed donor site reconstruction after FRFF phalloplasty to identify the benefits and drawbacks of the Integra coverage technique.

Methods: Patient who are at least 6 months post FRFF phalloplasty and had received Integra reconstruction were identified within the UBC Gender surgery program records. These patients were evaluated by physical examination of their forearms assessing radial sensory neuroma, objective tendon glide, tendon adhesion and hypertrophic scar formation. Two scar metric tools, POSAS (The Patient and Observer Scar Assessment Scale) and the Vancouver Scar Scale (VSS) were also completed by the patient to qualitative evaluate their healed scars. De-identified photographs of the donor sites were also obtained to correlate patient assessment with objective images.

Results: A total of 7 patients met study inclusion criteria. Assessment of objective tendon guiding revealed no restriction of forearm movement post operatively when compared to the contralateral arm. Patient scar assessment by the POSAS and VSS revealed a range of post-operative scar characteristics in terms of scar color and thickness. However, the majority of patients reported overall scar scores of 6/13 on the VSS suggesting a moderate degree of scar features remained notable at 6 month post-operative time period.

Conclusions: Integra reconstruction of the RFF is an alternative to the traditional sheet graft approach that provides effective coverage over the donor site. This two-stage approach minimizes adhesion risk and helps to ensure optimal functional status post procedure. Additional long-term evaluation of Integra reconstruction sites is necessarily to critical review final scar cosmesis.

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P13 – 12:25

Title: Barriers to Completing Pre-Operative Hair Removal for Penile Inversion Vaginoplasty

Authors: Peter Mankowski^{1,3}, Smita Mukherjee³, Cormac O'Dwyer³, Krista Genoway^{1,3}, Alex Kavanagh^{2,3}

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Background: Penile inversion vaginoplasty (PIV) is a gender affirming surgical procedure where the skin of the penis and scrotum are reconstructed into the vaginal lining. To prevent hair bearing skin from becoming incorporated into the vaginal canal, patients are encouraged

to undergo permanent hair removal of their external genitalia even though there is limited evidence showing this prevents post-operative complications.

Objective: In order to better support pre-operative hair removal this treatment, we surveyed patients about their satisfaction with the hair removal process and identify current treatment barriers.

Methods: A cross sectional survey of patients' experiences with preoperative hair removal in advance of anticipated PIV was constructed *de novo*. Survey questions focused on experiences with different hair removal modalities, pain management strategies, and interactions with the hair removal service providers. The survey was constructed by an iterative process with key stakeholders. Patients actively enrolled in hair removal through the UBC gender surgery program were sent the survey using the Qualtrics platform. The data we captured were analyzed with either descriptive statistics or parametric tests using R software.

Results: Sixty-seven patients met the study's inclusion criteria of which 47 patients participated (70% response rate). Both laser hair removal (LHR) and electrolysis were utilized by the study population. The majority of patients had not completed their hair removal therapy after an average of 10 treatment sessions and achieved approximately 66.9% of their expected hair clearance at the time of data collection. Overall satisfaction with pain management strategies was low at 50.6 ± 31.9 when scored out of 100. LHR was associated with a significantly lower degree of procedural pain compare to electrolysis (p -value <0.05). The average global satisfaction with the hair removal process was 56.5 ± 34.6 out of 100 and service provider mistreatment was associated with a statistically significant reduction in overall satisfaction (p -value = 0.02).

Conclusions: Our survey of the hair removal experience of patients who have or are awaiting PIV surgery was undertaken to help guide clinicians on how to optimize the current patient treatment experiences. Given that LHR is associated with similar hair clearance compared with electrolysis but a significantly lower procedure pain score, offering it to tolerate patients may improve patient compliance.

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P14 – 13:30

Title: Do Delays Amidst a Surgical Slate Stimulate Speedup? Evidence from Operating Rooms

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Background: Although service providers in various industries strive to complete scheduled activities on time, deviations are inevitable, and actual operations may run behind or ahead of schedule. Service providers' responses to schedule deviations may vary, and we categorize them into three types including negative (balancing) feedback, positive feedback and no apparent feedback loop.

Objective: Herein, we study how surgical teams respond to real-time deviations from planned schedules and investigate whether teams change their service speed when they are ahead of or behind the original planned schedule.

Methods: We take an econometric approach to investigate the response mechanisms and their effects on surgical teams' service speed. We utilize a comprehensive administrative data set from April 1, 2018 to October 31, 2019 at BC Children's Hospital. The data set records both the actual and scheduled start and end times for each surgery case. By comparing the actual and planned time schedules for each surgical case, we calculate the relative procedure and turnover duration, the deviation from the scheduled start, and the ultimate effects on the slate. We construct a dynamic panel model and utilize the Arellano-Bond approach for estimation.

Results: The final sample comprises 8,612 surgery cases from 2,029 surgical slates, with three to nine cases per slate and 111 different procedure types. The average patient age is 7.6 years and elective cases comprise 99.87% of the data. Admitted patients account for 13.27% of all cases, and the remainder surgical daycare. As a measure of the relative speed of surgical teams, the average relative procedure and relative turnover deviations are -0.813 minutes and 1.64 minutes, respectively, in the setting of the average realized procedure duration 77.35 minutes and turnover 27.61 minutes. Using econometric methods, we find evidence of a negative (balancing) feedback response, in which surgical teams expedite subsequent surgeries when they fall behind schedule and vice-versa. When facing a one standard deviation (34.5 minutes) increase in delay, the surgical team speeds up the next surgery by 8.5% - 10% on average. This effect is more evident among cases operated by senior surgeons.

Conclusions: The operating room is a representative service site where deviations from prescribed schedules often occur. Such deviations are expensive both operationally and financially and affect customer service and internal human resources. Our findings unveil the existence of a negative feedback mechanism of surgical teams in the OR. The heterogeneity of this mechanism among different surgeon seniority groups is of further interest. The absence of incentives and the high utilization/long waitlist nature of our healthcare system may contribute to these behaviors.

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P15 – 13:40

Title: The Impact of Targeted Fee Increases on Gender Pay Disparity Between Female and Male General Surgeons in British Columbia

Authors: Hamish Hwang¹, Anise Barton¹, Daniel Jenkin¹, Tracy Scott¹

Affiliations: ¹Division of General Surgery, University of British Columbia, Vancouver, BC

Background: High level payment data provided by Doctors of BC showed a 21.7% gender pay disparity in annual payments between female and male general surgeons in 2019-20, and this was previously as high as 30% in 2012-13.

Objective: This study aimed to examine the impact of targeted fee increases on gender pay disparity over time.

Methods: The top 35 fees billed by female surgeons, representing 76.3% of total payments, were retrospectively analyzed, and the gender pay disparity was calculated for each individual fee from 2000-2019.

Results: There were notable billing differences between female and male surgeons. Female surgeons billed breast oncology procedures, malignancy consultations and visits, and peritoneal malignancy surgery in greater proportion than male surgeons. Male surgeons billed hemorrhoid banding and rigid proctosigmoidoscopy in greater proportion. With targeted fee increases, gender pay disparity worsened in

17/35 fees but improved in 18/35 fees from 2010 to 2019, to varying degrees, resulting in an overall reduction in pay disparity from 23% to 15%. If across the board fee increases had been implemented instead of targeted fee increases, the disparity in 2019 would have been 19% instead of 15%.

Conclusions: Targeted fee increases reduced gender pay disparity compared to theoretical across-the-board fee increases in BC from 2010 to 2019, but not uniformly; some fee increases resulted in increased disparity. Physician groups should conduct a similar analysis and allocate future fee changes with the aim of improving rather than worsening disparity.

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P16 – 13:50

Title: The Current Landscape of Insurance Coverage for Gender Affirmation Surgery in Canada

Authors: Allen L¹, Deane EC¹ (Presenter), Hu A¹

Affiliations: ¹Division of Otolaryngology-Head & Neck Surgery, University of British Columbia, Vancouver, BC

Background: Gender Affirmation Surgery (GAS) encompasses a variety of procedures, including those offered by General Surgeons, Urologists, Obstetricians/Gynecologists, Otolaryngologists, and Plastic surgeons. Globally, GAS is evolving in terms of operative techniques and access to care. In Canada, there has been limited research on GAS, and none that compares provincial insurance coverage.

Objective: The objectives of this study were to compare provincial health funding models for GAS and to identify gaps in coverage based on geographic location and type of surgery.

Methods: A cross-sectional study of provincial and territorial funding for GAS in Canada was conducted in August 2022. Funding details for GAS were collected from official government resources. Data on insured and uninsured procedures, GAS referral processes, and voice therapy coverage for each province were collected. Results were compared and discussed.

Results: Canadian provinces are overall comparable in coverage for GAS, but not for all types of procedures. Major reconstruction of the genitalia and sex organs (vaginoplasty, hysterectomy, bilateral salpingo-oophorectomy, phalloplasty, mastectomy), termed “top” and “bottom” surgeries, are universally covered across the provinces and territories (n=12; data not available for Nunavut). Where regions differed significantly was in their policies surrounding so-called “non-medically necessary” procedures in GAS. These included breast augmentation (n=8) and chest contouring (n=10), with the most poorly funded being facial feminizing procedures (n=2), facial masculinizing surgery (n=1), chondrolaryngoplasty (“tracheal shave”; n=1), voice surgery (n=1) and adjunctive hair removal or restoration procedures (n=3). Speech therapy was supported by more than half of the healthcare service authorities (n=7).

Conclusions: There is very little academic literature describing the status of GAS in Canada. Provincial variation exists in health coverage for these procedures. Facial plastic and voice-related GAS are the least frequently insured. The types of GAS accessed by patients and provincial insurance plans continue to evolve. Awareness and advocacy by physicians is necessary to support patient access to transgender healthcare provisions.

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P17 – 14:00

Title: Impact of Medico-legal Complaint Amongst Canadian Plastic Surgeons

Authors: Zach Zhang MD¹, Hassan ElHawary MD², Paul Oxley MD FRSCS³, Miroslav Sergio Gilardino MD MSc FRSCS FACS², Jugpal Arneja, MD FRSCS MBA¹

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Background: Being named in a medico-legal complaint can be a lengthy process filled with uncertainties. Its current impact on Canadian plastic surgeons is unknown. We aim to review the impact of medico-legal complaints and provide education for surgeons on how to prevent, minimize, and navigate through the medicolegal process.

Method: An anonymous survey was sent to registered Royal College certified plastic surgeon members of the Canadian Society of Plastic Surgeons and Canadian Society for Aesthetic Plastic Surgery. The survey collected data on surgeon demographics (clinical status, gender, practice type, volume), medico-legal complaint history and outcome, impact on practice, and insights into the process. Surgeons with an inactive practice and invalid contact information were excluded.

Results: The survey response rate was 24% (108/456). Of the 102 disclosing respondents, 63% (64/102) have been named in a medico-legal action. The most common reason for medicolegal complaints were related to treatment complications (38%, 24/64) and poor outcome/disease progression (33%, 21/64). Majority of legal rulings were in favour of the surgeon, in which 56% were dismissed or withdrawn before trial, 17% (11/64) were settled before trial, 8% (5/64) received a trial verdict in favour of the surgeon, and 3% (2/64) received a trial verdict in favour of the plaintiff. Most respondents (73%, 47/64) felt the outcome of the medicolegal complaint was fair. Duration of medicolegal process varied widely from under one to over five years and majority of surgeons spent up to 25 hours on their legal defense. Overwhelmingly, respondents agreed that the Canadian Medical Protection Agency (CMPA) provided adequate legal defence (83%, 53/64). However, most felt the process had a significantly negative impact on their mental health (75%, 48/64). After being involved in a complaint, many surgeons modified their practice pattern by increasing documentation/ consent process (45%, 29/64), avoiding certain procedures (22%, 14/64), and avoiding care of high-risk patients (19%, 12/64).

Conclusions: Despite the strong protection offered by the CPMA and generally favourable medicolegal outcome, medicolegal complaints can have a significant impact on plastic surgeons’ practice, time, and mental health. Greater understanding of the medicolegal actions may help surgeons navigate the process better, reduce complaints, and improve patient safety.

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P18 – 14:10

Title: Creating Concise Reference Videos for an Essential Surgical Skills Training Program: A Médecins Sans Frontières-UBC Global Surgery Lab Collaboration

Authors: Catherine Binda¹, Kayoung Heo¹, Samuel Cheng¹, Hannah Foggin¹, Grace Hu², Sheila Lam², Lydia Feng², Alisha Labinaz¹, Jayd Adams², Rachel Livergant³, Sacha Williams⁴, Tamilarasy Vasanthakumaran⁵, Katherine Grey², Nina Maerkl², Youcef Lounes⁶, Juan Mata², Philip Hache⁷, Christian Schamberg-Bahadori⁸, Adaw Monytui⁹; Emmanuel Mayom⁹, Shahrzad Joharifard¹⁰, Emilie Joos⁶

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Background: The UBC Global Surgery Lab and Médecins Sans Frontières (MSF) piloted an Essential Surgical Skills Training Program (ESSTP) for non-surgeon physicians in low-resource settings in South Sudan (2020-2022). In response to trainees' feedback, educational surgical skills videos were created to augment the curriculum.

Objective: Our objective was to create short, educational videos describing essential surgical procedures that could be used as "just-in-time" reference guides for trainees in the ESSTP. By doing so, we endeavoured to increase the availability of high-value, relevant surgical training materials in low-resource settings.

Methods: Consultation with stakeholders including ESSTP trainees, MSF surgeons, and UBC educators prioritized high-yield procedures relevant to the low-resource contexts. Video footage from MSF Training Sessions (Düsseldorf, September 2020) and the UBC Cadaver Lab (November 2021-April 2022) was paired with original graphics created using Procreate, Microsoft Powerpoint, and Adobe Illustrator. A multidisciplinary team of 4 undergraduate students, 6 medical trainees, and 10 content experts collaborated to identify the goals, indications, and key steps of each procedure. Videos were scripted and assembled using iMovie, Resolve, and Apple VoiceMemos. A cue-card summarizing each procedure was created with an accompanying QR code. Using the Plan-Do-Study-Act cycle, videos were reviewed by trainees and content experts and adjusted based on qualitative feedback. Project outcomes include qualitative feedback from stakeholders and the number of videos produced.

Results: Videos describing limb fasciotomies, chest tubes, and B-Lynch sutures were identified as high-yield procedures. Between February 2021 and April 2022, 7 videos and cue cards were completed. Final videos average 3.6 minutes in length and have been well received by stakeholders, including the South Sudanese trainees who have used them twice to perform fasciotomies independently.

Conclusions: Concise educational videos can augment ESSTP for non-surgeon physicians. Hosting videos on accessible platforms like GoogleDrive, storing videos at lower resolutions, and creating cue cards increase the accessibility of video resources in low-resource settings.

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P19 – 14:20

Title: The Utility of Three-Dimensional Modeling and Printing in the Surgical Treatment of Pediatric Thoracoabdominal Tumors

Authors: Mathew N Hindi BSc¹, Sima Zakani PhD², Chelsea Stunden MPH², Daniel Rosenbaum MD FRCPC³, John Jacob MSc MBA², Shahrzad Joharifard MD MPH FRCSC⁴

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Background: Three-dimensional (3D) modeling and printing has shown promise in improving care delivery and training in numerous surgical fields. Evidence surrounding the use of this technology in the treatment of pediatric thoracoabdominal tumors, however, is scarce.

Objective: We conducted a prospective cross-sectional study to examine the impact of 3D modeling and printing on perioperative planning, inter-team communication, and patient and caregiver education during the surgical treatment of children with thoracoabdominal tumors.

Methods: Pediatric surgeons at BC Children's Hospital prospectively identified patients with thoracoabdominal tumors who might benefit from 3D modeling and printing. A virtual patient-specific anatomical model was generated based on standard cross-sectional imaging (CT or MRI). A physical replica was printed if deemed potentially helpful by the surgeon. The 3D models (virtual and/or physical) were then used as the clinical care team saw fit. Surgeons and radiologists involved in care delivery subsequently responded to a RedCap survey investigating the perceived impact of the models. A thematic analysis was used to examine survey data.

Results: Seven patients were included in the study. Mean patient age was 5.8 years (range: 11 months to 14 years). Pathologies included neuroblastoma, ganglioneuroblastoma, ganglioneuroma, nephroblastoma, hepatoblastoma, epithelioid sarcoma, and suspected pleuropulmonary blastoma. 6 pediatric surgeons and 5 radiologists participated in 11 clinical impact surveys. 91% of respondents found the model useful. 63.6% reported a perceived improvement of the clinical team's understanding of the anatomy. 66.7% endorsed a positive effect on perioperative planning and provider confidence. All surgeons described an increase in length of consultation time with the patient and caregivers, leading to a perceived improvement in their understanding of the condition and the treatment plan. Only 28.6% reported a change in the time required to develop an interventional plan, while 80% stated that the treatment strategy remained the same despite the model. 50% of respondents reported a perceived reduction in operative time, while 60% endorsed a perceived reduction in complications. Respondents did not report perceived changes in the amount of radiation exposure, blood loss, anesthesia time, or use of human resources.

Interestingly, 80% of radiologists did not perceive an improvement in the clinical team's understanding of the patient's anatomy. One radiologist, however, reported the model led to the discussion of a new therapeutic strategy.

Conclusion: Our study suggests that 3D modeling and printing have the potential to improve perioperative planning, inter-team communication, and patient and caregiver education for children undergoing surgical treatment of thoracoabdominal tumors, particularly for complex or atypical cases. Overall, clinicians found the models useful and stated they would recommend their use to others. Our next study will investigate the view points of patients, caregivers, and other clinical team members who are impacted by the use of this novel technology.

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Rapid Fire Session A Abstracts

A1

Title: Psychological Impact of the COVID-19 Pandemic on Surgical Residents:

A Canadian Province-Wide Survey

Authors: Jessica J. Lie¹, Caroline Huynh¹, Jennifer Li¹, Nicole Mak¹, Sam M. Wiseman¹

Affiliations: ¹Department of Surgery St. Paul's Hospital & University of British Columbia, Vancouver, BC

Background: The COVID-19 pandemic has affected healthcare workers in unprecedented ways. Surgical residents at baseline have higher prevalence of burnout and depression, and now face unique challenges related to the pandemic.

Objective: The objective of this study was to evaluate the psychological impact of the COVID-19 pandemic on surgical residents.

Methods: An online survey was distributed to surgical residents in British Columbia between June 2020 and January 2021. It included multiple domains: demographics, health and socioeconomic factors, clinical experience, educational experience, and psychological outcomes. The Mayo Clinic Resident Well-Being Index (RWBI) was used as a validated measure of resident mental health. Analysis was performed with logistic regression.

Results: A total of 31 residents responded to the survey, corresponding to a 36.0% response rate. Respondents were trainees from General Surgery, Orthopedic Surgery, Otolaryngology, Urology and Vascular Surgery training programs. Seventeen respondents (54.8%) were female, and 24 respondents (77.4%) were senior residents. Most residents were concerned about infecting family members (71.0%) and worried about personal protective equipment (PPE) supply (54.8%). Most residents (64.5%) were satisfied or very satisfied with their operative experience, but only 41.9% were happy with their educational activities. Despite measures that were put in place to support resident wellness, 57.1% and 46.4% reported feeling burnt out or depressed, respectively. Residents who were concerned about PPE supply had a 6.67 (range 1.24-35.71) times the odds of depression compared to those not concerned ($p=0.027$). The median RWBI was 2.5, higher than the median of 2 that was previously reported in the United States National resident survey.

Conclusions: The pandemic had a considerable negative impact on the psychological well-being of surgical residents. Continued study of ways to prevent and minimize psychological stress is needed to improve future responses of surgical training programs to current and future unexpected stressors.

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A2

Title: Appendiceal Neoplasm is Seven Times More Likely in Elective Appendectomies than in Emergency Appendectomies in Cases without Pre-operative Diagnosis of Neoplasm: A Review of >52,000 ACS NSQIP Cases

Authors: Christina Schweitzer¹, Sam Wiseman^{1,2}

Affiliations: ¹Division of General Surgery, University of British Columbia; ²St. Paul's Hospital, Vancouver

Background: Indications for elective appendectomy include resection of pre-operatively diagnosed or suspected appendiceal neoplasms, as well as missed appendicitis initially managed non-operatively. A portion of appendicitis cases will ultimately be due to underlying appendiceal neoplasms.

Objective: The objective of this study was to investigate differences in neoplasm diagnosis rates on final pathologic analysis of resected appendectomy specimens between elective and emergency appendectomies.

Methods: The American College of Surgeons (ACS) National Surgical Quality Improvement Program (NSQIP) registry data on appendectomy surgeries were analyzed from 2016-2019. Cases were divided into emergent and elective appendectomies. The primary outcome was rate of final pathologic diagnosis of malignancy or tumour involving the appendix. Cases were excluded if the pre-operative diagnoses included neoplasm, of any origin. In addition, cases were excluded from the appendectomy subgroup analysis if there were conflicting indicators for classification of the case as elective vs. emergency.

Results: There were 52,559 appendectomies included in the NSQIP database from 2016-2019. Of these, 828 cases (1.6%) had a pre-operative diagnosis of neoplasm and were excluded from further analysis, leaving 51,731 appendectomies in the study population. Within the remaining study population, 31,828 cases (61.5%) were emergent and 4,475 (8.7%) were elective appendectomies. For all appendectomy cases, the incidence of final pathologic diagnosis or malignancy involving the appendix was 463 cases (0.9%). This represented 177 emergency cases (0.6% of all emergencies), and 166 elective cases (3.7% of all elective cases). The relative risk of appendiceal neoplasm was 667.0% for elective compared to emergency appendectomies, or an absolute risk increase of 3.2%, with an odds ratio of 6.88 (95% confidence interval of 5.6-8.5). Differences between all 3 groups (elective, emergency and all appendectomies) were statistically significant ($p<0.001$) using the chi-square test with 95% confidence level.

Conclusions: A final pathologic diagnosis of neoplasm or malignancy involving the appendix is seven times more likely for elective than emergency appendectomy surgeries. Surgeons should have a higher index of suspicion of cancer for patients undergoing elective

appendectomy. Interval colonoscopy or appendectomy should be selectively considered for patients after recovery from missed appendicitis that was initially managed non-operatively.

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A3

Title: The Association Between Gender and Confidence in UBC General Surgery Residents

Authors: Elizabeth Clement, MD, MSc, FRCSC¹, Claire Lange, BSc¹, Ahmer Karimuddin, MD, FRCSC¹, Tracy Scott MD FRCSC¹

Affiliations: ¹Division of General Surgery, University of British Columbia, Vancouver, BC

Background: Confidence is integral to a successful and safe surgical practice, and recently, it has been suggested that a confidence crisis exists among graduating residents. Many factors influence a trainee's confidence; these include external factors like the trainee-evaluator relationship, as well as internal factors, like operative experience and level of stress. Interestingly, it has been shown that the male sex is associated with self-reported increased confidence, implying that females' confidence lags relative to their male counterparts.

Objective: This study set out to determine whether there is an association between gender and confidence in general surgery trainees as captured through narrative comments In-Training Evaluation Reports (ITERS).

Methods: All narrative comments from general surgery ITERS between April 2014 and April 2019 were deidentified and searched for "confiden," capturing variations in the use of "confidence." Comments using the word were then rated independently by two raters on a scale of 1-5, where the use of the word relayed: 1 – how staff felt in relation to the resident; 2 – that the resident was not demonstrating the expected level of confidence; 3 – the resident's confidence was appropriate; 4 – that the resident was overconfident; and 5 – other. Comments with discordant scores were moderated by a third rater and excluded from analysis if all three raters scored it differently. Data was then unblinded and Chi-squared analysis performed to determine significant differences, with p-value set at 0.05.

Results: In all, 2469 ITERS were searched and 145 used "confiden." After scoring, interrater reliability was 0.91; 13 discordant scores were mediated, 12 were resolved and 1 was excluded.

Of the 2469 ITERS, 1196 had male targets and 1273 had female targets. Of those that used confidence, 63 had male targets and 82 had female targets. Chi-squared analysis of ITERS commenting on confidence revealed no significant difference between males and females (p=0.215). After scoring, there were 29 comments in relation to staff's confidence in the resident (M=12, F=17), 57 relaying lack of confidence (M=24, F=33), 50 relaying appropriate confidence (M=20, F=30), 3 relaying overconfidence (M=3, F=0) and 5 "others" (M=3, F=2).

Chi-squared analysis of all comments about confidence did not reveal any significant difference between males and females (p=0.308), however, analysis of comments regarding discrepant levels of confidence alone (scores and 2 and 4 only) revealed a significant association between gender and confidence (p=0.0495).

Conclusions: It is just as likely for males and females to receive narratives comments about their levels of confidence when being evaluated, and overall, there is no association between gender and a resident's confidence. However, an association between gender and confidence emerges when analyzing residents with discrepant levels of confidence, suggesting that males are more likely to demonstrate overconfidence than females.

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A4

Title: The Role of Tracheostomies in Head and Neck Reconstructions: Evaluating a Decrease in Tracheostomy Practice for Free Flaps and Associated Complications

Authors: Alice Q Liu¹, Kevin Zhao¹, Emily C Deane¹, Sally Nguyen¹, Jamie Kwon², Donald W Anderson¹, J Scott Durham¹, Eitan Prisman¹

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Background: Tracheostomies in large free tissue transfers (FTT), or flaps, in the head and neck has historically been part of practice due to concerns about airway compromise and provider preference. Nonetheless, tracheostomies are also associated with their own host of complications such as tracheoesophageal fistulas, wound breakdown, pneumonias, and poor swallowing and voice outcomes.

Objective: The primary objective was to identify patient characteristics associated with tracheostomy at the time of free tissue transfer (FTT) in head and neck ablative surgery. The secondary objective was to determine if non-tracheostomy FTT had increased morbidity.

Methods: Retrospective review of all patients ≥ 18-years who underwent a FTT from 2015–2021 at a single tertiary centre. Patient demographic variables, including comorbidities as measured by the Charlson Comorbidity Index (CCI), disease variables, surgical variables, and post-operative variables were extracted. Analysis included descriptive statistics, paired t-test, and Chi-square tests. A stepwise univariate and multivariate linear regression were performed to identify variables associated with tracheostomy.

Results: Tracheostomies were completed in 54.7% (292/535) of the 535 patients included. There was a significant decrease in the frequency of tracheostomies in since 2018 (p<0.001) Only 16.7% of patients in 2021 who had head and neck flaps received a tracheostomy. Tracheostomy patients had higher alcohol use (p<0.001), higher BMIs (p<0.05), and were more comorbid (p<0.001). Tracheostomy patients also had longer operative times (p<0.001), lengths of stay (p<0.001), delayed resumption of oral diets (p<0.001), and more severe post-operative complications, as measured by the Clavien Dindo (p = 0.01). There was no significant difference in airway compromise between the two cohorts. Site of primary lesion (p<0.001), clinical nodal stage (p<0.05), and total surgical time (p<0.001) were associated with tracheostomy on multiple linear regression.

Conclusions: The site of primary lesion, clinical nodal stage, and length of surgery were significantly associated with patients receiving tracheostomies after FTTs. There was no difference in airway compromise between groups, but the tracheostomy cohort was more likely to have severe post-operative complications. The number of tracheostomies performed has significantly decreased over the years at our institution.

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A5

Title: Organ Perforation and Clinical, Dosimetric and Treatment Outcomes During Image Guided Cervix Brachytherapy

Authors: Alexa Dang^{1,2}, Sarah Zehnder², Katherine Sunderland³, Ryan Urban¹, Peter Lim¹, Iwa Kong¹, Beverly Lester⁴, Caroline Holloway⁵, Francois Bachand⁶, Sarah Hamilton¹

Affiliations: ¹BC Cancer- Vancouver Centre, Department of Radiation Oncology, ²University of British Columbia, ³BC Cancer- Cancer Surveillance & Outcomes, ⁴BC Cancer- Abbotsford, Department of Radiation Oncology, ⁵BC Cancer- Vancouver Island Centre, Department of Radiation Oncology, ⁶BC Cancer- Centre for the Southern Interior, Department of Radiation Oncology

Objective: Research in cervical brachytherapy has shown suboptimal implants to be associated with worse local control in the 2 dimensional planning era. This study evaluates the dosimetric and local control outcomes in patients with cervical cancer treated with modern image guided cervical brachytherapy who have a suboptimal insertion because of organ perforation.

Methods: A retrospective analysis was performed for patients with invasive cervical carcinoma treated at BC Cancer between 2015 to 2018 who received radical intent radiotherapy and ultrasound-guided brachytherapy boost. Patient demographics, tumor and treatment characteristics were compared between implants with versus without perforation using Fisher's exact test. Overall survival (OS), cancer specific survival (CSS) and local regional recurrence (LRR) were evaluated with Kaplan-Meier estimates.

Results: Our cohort includes 167 patients with 718 implants performed, of which 20 (2.8%) had an associated perforation. Within the perforation group, 11 (55%) implants were associated with a perforation at the fundus, 1 (5%) anteriorly, 1 (5%) at the cervical-vaginal junction, 2 (10%) into the parametrium, 2 (10%) posteriorly and 3 (15%) into a separate organ including bladder and sigmoid. Of the 20 implants associated with perforation, 17 were treated despite perforation and 3 had the apparatus removed and re-inserted on a separate day. Patient and treatment characteristics were similar between groups including age, smoking status, FIGO stage, pathology, vaginal stenosis, prior LEEP, prior gynecologic surgery, chemotherapy, applicator used, and use of interstitial needles (all $p > 0.05$). There was a significant difference in complication rates with the perforation group having higher rates of hematuria (5%) and hospitalization (5%) ($p = 0.04$). The rectum D2cc was significantly higher in perforated implants (3.1 Gy vs 2.3 Gy, $p = 0.04$). The bowel bag, sigmoid, bladder D2ccs were similar, as were the high-risk clinical target volumes (HR-CTV) D90 (all $p > 0.05$). Overall treatment duration of external beam radiation and brachytherapy was similar between both groups ($p > 0.05$). Median follow-up was 3.4 years. Five year LRR free survival was 69% vs 85% ($p = 0.32$), CSS 56% vs 81% ($p = 0.04$) and OS 47% vs 77% ($p = 0.003$) in the perforated versus non-perforated groups respectively. On multivariate analysis, lower FIGO stage (HR 0.21, $p = 0.002$) and higher D90 (HR 0.95, $p = 0.015$) predicted for improved CSS. Lower stage (HR 0.21, $p = 0.0007$) and higher D90 (HR 0.95, $p = 0.0028$) predicted for improved OS. Perforation predicted for worse OS (HR 2.8, $p = 0.017$).

Conclusion: The rates of perforation in 3D image guided brachytherapy are low. Organ perforation was associated with poorer OS and CSS. Although LRR free survival was not statistically significantly worse for patients with perforation, the low numbers limit drawing firm conclusions.

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A6

Title: The Influence of Papillary Features on the Risk of Malignancy in Thyroid Nodules Diagnosed as Atypia of Undetermined Significance or Follicular Lesion of Undetermined Significance

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Background/Objective: objective of this study is to assess the risk of malignancy in thyroid lesions that were characterized as atypia of undetermined significance or follicular lesion of undetermined significance (AUS-FLUS) when papillary feature are present or absent.

Methods: A retrospective review was conducted on patients with a cytology diagnosis of AUS-FLUS that underwent a thyroidectomy at a single center. Cytology slides were re-reviewed by a pathologist and were subclassified into a major and minor concern group based on the presence or absence of papillary features, and then the risk of malignancy (ROM) was calculated and compared between the two groups.

Results: A total of 55 patients underwent thyroidectomy and had an AUS-FLUS preoperative diagnosis between 2017 and 2021. The minor and major concern groups represented 67.2% and 32.7%, respectively. The overall ROM in all of the study patients was 27.2%. The minor concern group had a 13.5% associated ROM, while the major concern group had a significantly higher ROM (55.5%), ($p = 0.0025$).

Conclusions: The presence of papillary features in thyroid lesions with an AUS-FLUS diagnosis is associated with a significantly higher ROM than what is currently suggested by the Bethesda System for Reporting Thyroid Cytopathology for AUS-FLUS lesions. Subclassification of AUS-FLUS thyroid lesions as having papillary features warrants further study as it may allow for better tailored patient management.

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A7

Title: Post-Operative Complications After Carotid Endarterectomy for Free Floating Thrombus

Authors: Farhad R. Udawadia MBE, MD¹, Sara Al-Adawi, MD¹, Abdalla A. Butt¹, David C. Taylor, MD FRCS¹, Jerry C. Chen MD MSc FRCS¹, Jonathan Misskey, MD, MHPE, FRCS¹.

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Background: The standard of care for patients with symptomatic, severe carotid artery stenosis includes carotid endarterectomy (CEA) plus best medical therapy. A rare cause of this etiology is acute thrombus within the internal carotid artery, referred to as Free-Floating Thrombus (FFT). This pathology is reported to have unstable plaque characteristics and an incidence rate of 0.4–1.5%. Given its rarity there remains a significant gap in understanding of the management of this condition.

Objective: To examine patient outcomes after carotid endarterectomy (CEA) for symptomatic carotid artery stenosis with free floating thrombus (FFT).

Methods: A retrospective review of patients in a prospectively collected database was conducted on all patients who underwent CEA for symptomatic carotid artery stenosis at a single institution from 2010-2020. Patients with FFT were identified after review of computed tomography (CT) angiography at admission. Time from admission to procedure, medical management options and post-operative complication rates were analyzed.

Results: During the study period 802 CEA were performed, of which 45 patients had FFT. Patients in this cohort presented more frequently with stroke, as opposed to transient ischemic attacks, and experienced higher rates of post-operative stroke (4.4% vs. 1.6%). The incidence of hematoma formation or cranial nerve damage were equal (8.8% vs. 10.1%). The FFT cohort were also less likely to be discharged home (82.3% vs. 95.8%). 13/45 (29%) had complete resolution of the FFT with preoperative heparinization and an additional 9 (20%) cases demonstrated significant reduction in thrombus size.

Conclusions: FFT is a high-risk phenotype of carotid stenosis associated with a threefold risk of postoperative stroke. Heparinization was associated with significant reduction in size of the FFT.

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A8

Title: Practical and Ethical Challenges of Maintaining Vascular Access in Chronic Kidney Disease: Patient Perspectives

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Background: Chronic kidney disease (CKD) affects 16.8% of adults in the United States, for which hemodialysis is often required. Arteriovenous fistula (AVF) is the preferred method of vascular access over other options such as catheters, which are associated with a greater risk of bacteremia, stenosis and increased mortality. However, AVFs are not without their own set of complications such as primary or secondary failure. As a result, patients are often subject to numerous procedures to reestablish patency. Furthermore, they are hampered by regular follow-up appointments, frequent imaging, and the psychological and economic impact that accompanies repetitive surgical or endovascular intervention. Given the chronicity and severity of the disease process, it is unclear whether repetitive interventions are justified and if they align with patient goals and values. These burdens associated with repetitive attempts to maintain vascular access are not well documented in the literature and having these answers will influence future goals of care discussions and decisions.

Objective: To examine the experiences of chronic kidney disease (CKD) patients who have undergone repetitive reintervention to maintain arteriovenous fistula (AVF) patency for dialysis access.

Methods: Using a provincial database of renal failure patients (PROMIS), we selected patients who had undergone 5 or more interventional procedures (open or endovascular) to maintain vascular access within 20 years from a single institution. Semi-structured interviews were conducted with these patients and analyzed qualitatively using the constant comparative approach.

Results: Seventeen patients who met the inclusion criteria were recruited from across British Columbia. The cohort included patients of both genders (10 male, 7 female) between the ages of 52 and 87. Four major thematic categories emerged from the interviews: treatment values, the impact of the disorder, disposition towards AVF, and impact of repeated surgical intervention (Figure 1). For the treatment values category, 11/17 of patients stated survival was of primary importance, with a reduction in dialysis frequency being secondary. With regards to the impact of the disorder category, loss of independence (14/17) was a dominant theme, with the psychological impact being secondary. The dominant theme in disposition towards AVF was displeasure with high rates of failure (15/17). Pain associated with using the fistula emerged as secondary. Finally, interruption to daily life (12/17) was dominant for the impact of repeated surgical intervention category, with travel interruptions and fatigue being minor themes. Only 8/17 expressed satisfaction with their management pathway.

Conclusions: Reduced independence and interruption to daily routine were the most cited difficulties concerning dialysis and surgical intervention. As expected, survival was a key treatment value. Recurrent access failure and reintervention were significant causes of impaired quality of life, and a substantial number of patients did not recall the potential for this explained during their informed consent process.

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A9

Title: The Evolution and Application of Artificial Intelligence in Rhinology: A State of the Art Review

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Introduction: Artificial Intelligence (AI) has seen increasing popularity within the surgical realm from image segmentation to disease prognostication. The objective of this study was to provide a comprehensive review on the applications of artificial intelligence in rhinology, highlight its limitations, and identify gaps for future research.

Methods: A scoping review of Medline, Embase, CENTRAL, Ei Compendex, IEEE, and Web of Science databases was conducted. The study followed PRISMA-ScR guidelines and was registered on Open Science Framework. English studies from inception until January 2022 were included. Study selection was performed by two authors; discrepancies were resolved by the senior author. Studies were categorized based on rhinology theme and data collection comprised the type of AI utilized, sample size, and performance metrics outcomes.

Results: A total of 5435 articles were identified, of which, 59 articles were selected for data extraction. Eleven of the included studies were grey literature. Articles were stratified into: image processing, segmentation, and diagnostics (n = 27), rhinosinusitis classification (n = 15),

treatment and disease outcome prediction (n = 8), optimizing surgical navigation and phase assessment (n = 3), robotic surgery (n = 2), olfactory dysfunction (n = 2), and diagnosis of allergic rhinitis (n = 2). Most AI studies were published from 2019 onward (n = 35).

Conclusions: Current literature mainly focuses on diagnostics and rhinosinusitis classification. To translate AI platforms into the clinical realm, prospective validation and multidisciplinary collaboration is needed. Future areas of research should focus on the interplay of AI with robotics and surgical education.

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A10

Title: Unintended Side Effects of Electronic Cigarettes in Otolaryngology: A Scoping Review

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Objective: Electronic cigarettes (E-cigs) are nicotine delivery systems with increasing popularity. The US Food and Drug Administration defines side effects as unwanted or unexpected events or reactions. Our objective was to examine the unintended otolaryngology-related side effects associated with E-cigs.

Data Sources: Medline, EMBASE, CINAHL, Web of Science, and CENTRAL databases.

Review Methods: The review protocol was published in the Prospective Register of Systematic Reviews (CRD42020177790). Study selection was independently performed by 2 authors in accordance with the PRISMA-ScR statement (Preferred Reporting Items for Systematic Reviews and Meta-analyses Extension for Scoping Reviews); discrepancies were resolved by the senior author. English studies from database inception to May 1, 2020 were included. The main outcome was defined as otolaryngology-related side effects following E-cig use. Levels of evidence per the Oxford Centre for Evidence-Based Medicine were used to determine study quality.

Results: From 1788 articles, 32 studies were included. The most common unintended side effects were throat irritation (n = 16), cough (n = 16), mouth irritation (n = 11), and oral mucosal lesions (n = 8). A large proportion of participants reported conventional tobacco use in addition to E-cigs. Eight studies investigated the effectiveness of vaping on smoking cessation. The quality of the literature was level 2 to 4. Given the significant heterogeneity in the studies, a meta-analysis was not performed.

Conclusion: The most reported side effects were throat and mouth irritation, followed by cough. The long-term impact of E-cigs is not known given their recent emergence. Future studies are warranted.

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A11

Title: Long-Term Outcomes of Isolated Mechanical versus Bioprosthetic Mitral Valve Replacement in Propensity Matched Patients

Authors: Soroush Rokui, Defen Peng, Jian Ye

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Background: Prosthesis choice in mitral valve replacement (MVR) is often associated with age. Because of long-term durability, young patients often receive mechanical prostheses, whereas older patients often receive bioprostheses. However, in patients aged 55-75 years, optimal valve choice has not been definitively clarified. Previous studies comparing mechanical and bioprosthetic MVR have included large proportions of combined operations, wherein risks and benefits are influenced by concomitant procedures.

Objective: The aim of the present study is to compare long-term outcomes of isolated mechanical versus bioprosthetic MVR using propensity matched populations.

Results: From January 2000 to December 2017, 1954 isolated MVR (821 mechanical, 1133 bioprosthetic) were performed in British Columbia. Propensity matching based on demographics, cardiac and non-cardiac comorbidities, illness severity, and previous cardiac intervention yielded 445 each of mechanical and bioprosthetic MVR, each with 226 patients aged <65 years and 171 patients aged 65-75 years. Patients were followed up for a mean 12.6 years. Primary outcomes included survival and freedom from reoperation.

Combining all ages, 10-year survival was similar between groups (mechanical 51% vs bioprosthetic 36%; p=0.14). However, 10-year freedom from reoperation was significantly better with mechanical MVR (49% vs 32%; p=0.005).

For patients younger than 65 years, 10-year survival with mechanical MVR was significantly higher than that with bioprosthetic MVR (53% vs 38%; p=0.048), as was 10-year freedom from reoperation (51% vs 31%; p<0.001).

For patients between 65-75 years, 10-year survival (50% vs 40%; p=0.74) and 10-year freedom from reoperation (49% vs 39%; p=0.23) were similar. Rates of post-operative stroke, gastrointestinal bleeding, renal failure, and permanent pacemaker insertion were similar between groups.

Conclusions: In patients younger than 65 years, mechanical MVR confers significantly higher long-term survival and freedom from reoperation when compared to bioprosthetic MVR. Patients aged 65-75 years appeared to have similar survival and reoperation rates. Focused, large study is likely required to elucidate optimal valve choice for patients aged 65-75 years.

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A12

Title: Long Term Toxicities of Adolescent and Young Adult Survivors of Cervix Cancer who underwent Radiation Therapy: A Cross-Sectional Analysis

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Background: Survivors of adolescent and young adult (AYA) cervical cancer who undergo radiation therapy are at risk of significant long-term health sequelae. This study seeks to evaluate long-term toxicities and their impacts on survivors.

Methods: Patients treated for cervical cancer with radiation therapy between ages 18-39 in the years 2000-2010 from any centre from our province were eligible. 100 patients with current mailing addresses were identified and mailed a package containing a questionnaire devised by a multi-disciplinary team, which included open-ended questions and validated patient-reported quality of life surveys for cervical cancer patients, the EORTC QLQ-30 and CX-24.

Results: A total of 22 responses were received (22% response rate). The mean age of respondents was 53.1 years (range: 41-62). The mean age at treatment was 35.6 years (range: 25-40), and the average time since treatment was 17.0 years (range: 12-22). The majority (73%) were married or common-law. A relationship status change following cancer treatment was reported by 32%, and 60% noted a change in sexual function/desire as the cause. Most respondents (77%) had children prior to treatment, with a mean of 2 children (range: 1-4). A single respondent had a child after treatment through adoption, none had children through embryo banking and surrogacy. Fertility preservation prior to treatment was discussed with 41% of respondents and offered to 36%. Nearly all respondents (86%) had used hormone replacement therapy since treatment completion, with 23% presently taking hormone replacement.

EORTC scores are calculated on a scale of 0-100, with higher scores being positive for quality of life and functioning, and worse for symptoms. Mean Quality of Life score was rated as 63.9. Most patients maintained adequate functional status, with mean scores of 84.4, 83.3, 67.1, 70.6, and 77 for physical, role, emotional, cognitive, and social functioning, respectively. Elevated symptom scores include sexual/vaginal functioning (53.5), sexual worry (55.6), fatigue (35.4), diarrhea (38.1), body image concerns (41.7), peripheral neuropathy (39.7), and menopausal symptoms (38.1).

A wide array of bothersome symptoms were reported by patients in the open ended questions. Most frequent (32%) was symptoms related to sexual and vaginal health. Other common symptoms include permanent bowel changes (27%), bladder changes (27%), mood disorders (27%), and lymphedema (18%). Multiple respondents (18%) specifically commented on regrets for not pursuing fertility preservation, or explicit statements that more thorough fertility counselling should be offered prior to treatment.

Conclusions: Long-term survivors of AYA cervix cancer who participated in this study have significant late toxicities. Many patients experience ongoing sexual health concerns, GI issues, body image concerns, mood disorders, premature menopausal symptoms and fertility issues. Respondents in our study indicated a desire for improved fertility counselling. This study helps to identify important survivorship issues for AYA cervix patients.

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A13

Title: Quality of Life in Patients Diagnosed with Moyamoya Disease: A cross-sectional study

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Background: Moyamoya disease (MMD) is an idiopathic, chronic, intracranial arteriopathy characterized by progressive steno-occlusive disease of the bilateral proximal intracranial vasculature. The hallmark of MMD is the development of small basal collateral vessels in attempt to perfuse affected brain parenchyma resulting in a classic “puff of smoke” appearance on cerebral angiography. Natural history of MMD is limited and varies by presentation, though there is inevitable progression of the arteriopathy. Patients may present incidentally or with symptoms ranging from headache to transient ischemic attacks, ischemic stroke, or intracranial hemorrhage. There is a paucity of literature outlining the impact of MMD on patient quality of life.

Objective: To better understand the impact of MMD and its variable presentations on patient quality of life and function.

Methods: This cross-sectional analysis included patients undergoing longitudinal follow-up for incidental, hemorrhagic, and ischemic MMD (TIA or ischemic stroke) at the Vancouver General Hospital Moyamoya Disease Clinic between May 2018 and August 2022 were included. Quality of life was assessed via the SF-36 physical component summary (PCS), SF-36 mental component summary (MCS), EQ5D and Stroke-Specific Quality of Life Scale. Mean scores were compared between groups and against normative data sets. Modified Rankin Scale scores were captured at the time of first assessment.

Results: Forty-nine patients with MMD were included; 27 were female and median age was 47 (range: 21-80 years). Seven patients were found to have MMD incidentally, 21 presented with TIA, 14 presented with ischemic stroke and 7 presented with intracranial hemorrhage. Modified Rankin Scale scores at time of presentation were more favourable in patients presenting incidentally or with TIA as compared to those presenting with stroke or hemorrhage. There was no significant difference in SF-36 PCS, SF-36 MCS, EQ5D or SSQOL between patient presentations. However, quality of life as measured by MCS, PCS, EQ5D summary and EQ5D visual analogue scale scores were significantly reduced in those with MMD compared to normative population data.

Conclusions:

Significant heterogeneity exists in how patients with MMD arrive at medical care. Irrespective of presentation, patients with MMD experience reduced function and quality of life.

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A14

Title: Assessment of Environmental and Economic Sustainability of Peri-operative Patient Warming Strategies in Hospitals

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Background: Intra-operative hypothermia is associated with adverse events including coagulopathy, dysrhythmia and myocardial infarction, increased hospital length of stay, and surgical site infections. Current guidelines recommend pre- and intra-operative warming using forced air warmers (FAW) to maintain patient normothermia, although there is emerging evidence that other active warming techniques such as carbon fibre warming blankets and circulating water garments may be equally effective. In practice, a combination of passive and active warming is used with considerable variability in individual clinical practice, resulting in different environmental and economic impacts. We hypothesize that the absence of a standardized approach to patient warming results in excess consumable use and avoidable waste.

Objective: This study will assess and compare currently available patient warming devices and strategies to determine whether an ideal patient warming strategy can optimize resource efficiency and reduce waste while maintaining patient normothermia.

Methods: This two-phase study will compare the environmental and economic performance of commonly used patient warming methods (FAW and flannel blankets) with other available and effective devices through Life Cycle Assessment (LCA) and Life Cycle Costing (LCC). A concomitant quality improvement study will focus on refining and standardizing current patient warming practices at Vancouver General Hospital and UBC Hospital to optimize resource efficiency and ensure maintenance of intra-operative normothermia.

Results: LCA and LCC have been carried out for four patient warming techniques: passive warming with warmed flannel blankets, forced air warming with the Bair Hugger Flex Gown, a resistive warming blanket (Gentherm's Astopad), and a circulating water garment (Belmont's Allon Thermo Wrap). Primary activity data has been collected and is currently being analyzed using OpenLCA™ to generate a comprehensive report of environmental impacts (e.g. climate impact, ozone depletion, carcinogenicity, energy consumption and water consumption) for each technique. The results will be completed in 4 weeks' time using a combination of multiple methodologies (IPCC 2021, ReCiPe, AWARE, and CED). Early audits of current warming practices at VGH and UBC have identified excessive and ineffective use of warmed flannel blankets, which will be targeted with a coordinated quality improvement intervention.

Conclusions: Understanding the environmental and economic impacts of current peri-operative patient warming practices and alternative available devices allows for a streamlined pathway that optimizes resource use and promotes sustainable clinical practice without compromising patient care.

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A15

Title: Reporting on Postmastectomy Radiotherapy Protocols in Immediate Breast Reconstruction: A Systematic Review and Pooled Analysis

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Background: Postmastectomy radiotherapy (PMRT) may increase morbidity in the setting of immediate breast reconstruction (IBR). There is variability in the quality of PMRT reporting after IBR in the literature, whereby it is challenging to elucidate generalizable outcomes to inform clinical practice.

Objective: This systematic review aimed to investigate the quality of reporting of radiation protocols given its impact on the generalizability of study outcomes to clinical practice and the reproducibility of study findings. Our secondary aim was to investigate the influence of radiation protocol metrics on patient outcomes.

Methods: A systematic review of OVID MEDLINE, EMBASE, Cochrane Central Registrar of Controlled Trials, and Web of Science was undertaken up until 2019 following PRISMA guidelines. All clinical outcome studies including adult females who underwent radiotherapy after mastectomy and IBR for breast cancer were included. PMRT protocols were analyzed based on five variables of interest, namely PMRT modality, dose, frequency, nodal target region and boost dose, and were analyzed across geographical regions (North America versus the world). Descriptive statistics were used to examine the reporting behaviours of included studies.

Results: A total of 13,239 women were included across 133 unique studies. 61.7% of studies were published in North America, and 38.3% in other continents. Of the 133 studies, only five (3.7%) reported on all variables of interest and the remainder reported on at least one of PMRT modality, dose, treatment frequency, nodal target region, or boost dose. PMRT dose was reported in 62% of studies published within North America and 82% of studies published in other continents. Treatment frequency was the least reported on variable (16%) and modality (71%) was the most reported variable.

Conclusions: Reporting quality of PMRT protocols for women undergoing IBR is highly variable. Few studies (3.7%) provided comprehensive reporting of PMRT variables of interest, PMRT modality, dose, treatment frequency, nodal target region, or boost dose, which may influence the interpretation and generalizability of study outcomes to clinical practice.

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A16

Title: Evaluating the Impact of Increased After-Hours Access to Healthy and Low Carbon Food on the Wellness of General Surgery Residents: A Pilot Study

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Background: Food is not only a critical determinant of health, it also plays an important role in attention, information processing, and memory, all of which are essential for physicians' responsibilities in patient care. However, accessing nutritious food in many healthcare facilities, can be difficult, particularly during evenings and weekends. Residents carrying out call shifts of 24h or more must often rely on

readily available, highly processed and carbon-intensive foods from vending machines, or coordinate pick-up with delivery services, which presents financial, logistical, and environmental challenges.

Objective: The aim of this study is to evaluate the impact of an after-hours healthy, low-carbon meal pilot program on emotional, physical, and financial wellbeing for general surgery residents covering overnight in-house call on the Trauma and Acute Care Surgery services at Vancouver General Hospital (VGH).

Methods: A pre-intervention survey was sent to all UBC General Surgery residents to assess baseline means of accessing food on call, associated stressors, levels of burnout and interest in an after-hours meal program. Free, healthy, low-carbon meals were procured for all residents on-call for Trauma and Acute Care Surgery at VGH over three blocks, beginning in August 2022. A post-intervention survey was distributed at the end of each block to examine the impact of the meal pilot on reported levels of stress and burnout, and ongoing interest in the program.

Results: A total of 38 (84 %) UBC General Surgery residents participated in the pre-intervention survey. Out of a maximum of 7 calls per month, all residents used delivery services at least once and on average 2.8 times per month, relied on the cafeteria 3.1 times each month, and ate no dinner (only snacks) 3.7 times per month. Residents reported spending on average \$36 and up to \$100 per call shift on food. Nearly all residents (91%) reported time-associated stress related to sourcing food while on call, with an additional 24 (69%), 21 (60%), and 27 (77%) also reporting emotional, physical, and financial stress, respectively. Occupational exhaustion, defined as feelings of energy depletion and/or decreased personal efficacy, was reported by 11 (35%), and 3 (9%) felt depersonalization, characterized as a loss of regard for others, more than 50% of the time. Residents anticipated partaking of the meals 6 out of 7 calls per month if these were available on an ongoing basis. Comments in anticipation of the trial were overwhelmingly positive, with residents emphasizing the significance of this problem to them, and the considerable benefit they anticipate to overall well-being. Two rounds of post-intervention surveys (estimated n=30) will have been analyzed by the time of the presentation.

Conclusions: Increasing food access for on-call residents is anticipated to be an impactful intervention to improve their health and well-being, and provides an opportunity to change the discourse around the importance of food to personal and planetary health. The results of this study will inform the possible expansion of this pilot to other residency programs and healthcare providers, guide discussions about requirements for after-hours access in healthcare institutions, and help identify opportunities to align healthcare practices with planetary health principles.

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A17

Title: Neoadjuvant Chemotherapy, Excision, and Observation for Early Rectal Cancer: The Phase II NEO Trial (CCTG CO.28) Primary End Point Results

Authors: Hagen F Kennecke¹, Chris J O'Callaghan², Jonathan M Loree³, Hussein Moloo⁴, Rebecca Auer⁴, Derek J Jonker⁴, Manoj Raval⁵, Reilly Musselman⁴, Grace Ma⁶, Antonio Caycedo-Marulanda⁶, Vlad V Simianu⁷, Sunil Patel², Lacey D Pitre⁸, Ramzi Helewa⁹, Vallerie L Gordon¹⁰, Katerina Neumann¹¹, Halla Nimeiri¹², Max Sherry², Dongsheng Tu², Carl J Brown⁵

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Background: Organ-sparing therapy for early-stage I/IIA rectal cancer avoids functional problems or permanent ostomy associated with total mesorectal excision (TME) and preferred by patients.

Purpose: The objective of this phase II trial was to determine the outcomes and organ-sparing rate of patients with early-stage rectal cancer treated with neoadjuvant chemotherapy followed by transanal excision surgery (TES).

Methods: This phase II trial included patients with clinical T1-T3abN0 low- or mid-rectal adenocarcinoma eligible for endoscopic resection who were treated with 3 months of chemotherapy (modified folinic acid-fluorouracil-oxaliplatin 6 or capecitabine-oxaliplatin). Those with evidence of response proceeded to transanal endoscopic surgery 2-6 weeks later. The primary end point was protocol-specified organ preservation rate, defined as the proportion of patients with tumor downstaging to ypT0/T1N0/X and who avoided radical surgery.

Results: Of 58 patients enrolled, all commenced chemotherapy and 56 proceeded to surgery. A total of 33/58 patients had tumor downstaging to ypT0/T1N0/X on the surgery specimen, resulting in an intention-to-treat protocol-specified organ preservation rate of 57% (90% CI, 45 to 68). Of 23 remaining patients recommended for TME surgery on the basis of protocol requirements, 13 declined and elected to proceed directly to observation resulting in 79% (90% CI, 69 to 88) achieving organ preservation. The remaining 10/23 patients proceeded to recommended TME of whom seven had no histopathologic residual disease. The 1-year and 2-year locoregional relapse-free survival was, respectively, 98% (95% CI, 86 to 100) and 90% (95% CI, 58 to 98), and there were no distant recurrences or deaths. Minimal change in quality of life and rectal function scores was observed.

Conclusion: Three months of induction chemotherapy may successfully downstage a significant proportion of patients with early-stage rectal cancer, allowing well-tolerated organ-preserving surgery.

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A18

Title: Non-operative Management of Suspected Calvarial Langerhans Cell Histiocytosis in Children – A Prospective Multicenter Study

Authors: Paul Steinbok¹, Alexander Cheong¹, David Dix², Sanjiv Bhatia³, Michael Handler⁴, David Limbrick⁵, Toba Niazi³, Angela Price⁶, John Ragheb³, Mark Souweidane⁷, Mandeep Tamber¹, David Sandberg⁸

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Background: Surgical resection/curettage is the commonly recommended treatment for solitary calvarial Langerhans Cell Histiocytosis (C-LCH) in children. However, a few retrospective case series have demonstrated spontaneous regression of these lesions.

Objective: We report a prospective international multi-center study evaluating children with solitary C-LCH managed with observation only.

Methods: Patients from eight centers were enrolled prospectively and consecutively between September 2012 and January 2020. Suspected solitary C-LCH was diagnosed based on clinical and radiological features supplemented with bone scans and/or skeletal survey. Management was observation only without biopsy. Surgery as rescue intervention was prescribed if the lesion increased rapidly, continued increasing at 2-months, was not stabilizing or shrinking at 3-months, or caused unacceptable pain. Eligible patients who opted for intervention over observation were followed. Outcomes were determined at 1 year.

Results: 28 children, mean age 11.5 (0.8-19.5) years, were enrolled. Calvarial lesions at initial consultation ranged from 0 (disappeared already) to 75 mm in maximum diameter. 17 patients underwent observation only, with decreased size or disappearance of lesions by 2 months. 15 were assessed at 1 year and all had complete regression and reconstitution of the bony cranial defect. The other two did not return for 1 year assessment. No patient met the pre-specified criteria for surgery as rescue intervention. No recurrences or other complications were identified after 2.7 to 9.8 years. 11 patients opted for intervention as initial treatment. Ten underwent craniotomy/excision of lesion, two with adjuvant chemotherapy, and one patient had intralesional injection of steroids. All 10 with surgery had LCH confirmed histologically. Six patients received a cranioplasty after craniotomy.

Conclusions: Contrary to current recommendations, observation rather than surgical intervention should be the management of choice for solitary C-LCH in children. This would avoid many unnecessary surgeries, with their associated risks.

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A19

Title: Machine Learning and Radiomics for Classification of Bony Union on Post-Operative CT scans of Mandibular Reconstruction Patients

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Background: Patients with advanced oral cavity cancer may require extensive surgical resection of their disease and surrounding margins. In the case of mandibular resections, bony reconstruction options often include the fibula or scapula. During the surgery, the free flap is revascularized, and the bony segments heal via osteogenesis and remodeling. Unfortunately, one complication of bony reconstruction includes non-union, when adjacent bony interfaces do not fuse. Patients with non-union have difficulty eating, are at higher risk for revision surgery, and are restricted from receiving dental implantation. Non-union is primarily a radiographic determination, but due to logistical and time constraints, it is not routinely assessed by care providers. The presence of CT data allows machine learning techniques to be used for determination of bony union. Specifically, radiomics is the study of extracting features from medical images, which has been combined with machine learning techniques for a wide variety of tasks within medicine.

Objective: To combine machine learning and radiomic analysis to determine the union status of bone-bone interfaces following mandibular reconstruction from CT scans.

Methods: Post-operative CT scans of mandibular reconstruction with a fibular and scapular free flap taken at 6-months or greater at Vancouver General Hospital between 2015 and 2022 were collected. A radiologist assessed all bone-bone interfaces in each scan to determine union status. Using PyRadiomics, radiomic features were extracted from a rectangular prism region of interest overlaying each intersection. The radiomic features and union data were used to train and evaluate a logistic regression classifier using 4-fold cross validation. In each fold the features were selected via recursive feature elimination and model training were performed on ¾ of the data. Model evaluation was performed using the remaining ¼ of the data. The number of features selected in each fold was 3, corresponding to approximately 1 feature for every 10 events.

Results: The range of CT scan date ranged from 6 to 63 months (mean 15.8) post-operatively. Union and radiomic data were collected from 98 patients, corresponding to 254 interfaces, 34 of which were non-union. The average AUC over the 4 folds was 0.71. The mean and 90th percentile voxel intensity were selected in multiple folds.

Conclusions: The preliminary results shows that machine learning radiomic classification of union status is a promising approach. Determining whether a patient's reconstruction has improperly healed allows physicians to explore additional therapeutic options. The performance of the models is likely to be significantly improved by more data. An additional future avenue of investigation is passing the region of interest directly through a neural network, bypassing the need for feature selection.

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Rapid Fire Session B Abstracts

B1

Title: Are Acute Changes in Serum miRNA Expression Levels in Sudden Sensorineural Hearing Loss Patients Stable over Time?

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Background: Sudden sensorineural hearing loss (SSNHL) is a type of acquired idiopathic hearing loss. Serum levels of small, non-coding RNAs, microRNAs (miRNAs) miR-195-5p/-132-3p/-30a-3p/-128-3p/-140-3p/-186-5p/-375-3p/-590-5p are differentially expressed in SSNHL patients within 28 days of hearing loss onset compared to normal hearing individuals.

Objective: This study determines if these changes persist by comparing the miRNA expression profile in the serum of SSNHL patients within 1 month of hearing loss onset with that of patients 3-12 months after hearing loss onset.

Methods: We collected serum of consenting adult SSNHL patients at presentation or during clinic follow-up. We matched patient samples drawn 3-12 months after hearing loss onset (delayed group) by age and sex to those from patients presenting within 28 days of hearing loss (immediate group). Total RNA was extracted from 200µl of patient's serum. RNA extraction, and Reverse transcription (RT) was undertaken followed by TaqMan™ MicroRNA quantitative real-time PCR. We calculated the miRNA expression level using the delta Ct method. We compared the expression levels of the miRNAs of interest between the immediate and delayed group using Welch's t-test SPSS version 26. We performed pure tone audiometry to confirm the diagnosis of SSNHL, categorize the degree of hearing loss at presentation, and determine patient's hearing recovery status. We calculated the averaged air conduction pure-tone audiometric thresholds in affected ears at 4 low (0.5,1,2 and 3 or 4kHz) or 3 high (3 or 4,6 and 8kHz) frequencies. The same initial audiogram frequencies were averaged in all follow-up audiograms for each patient. We classified the patients hearing outcome status as either hearing recovered or not recovered. Patients with PTA averaged hearing gain on follow-up of 10 dB or greater were categorized as hearing recovered. We undertook inter-group comparisons of hearing outcome status, initial and final averaged PTA thresholds in the affected ear with a Chi-squared test and independent samples Student's t-tests.

Results: 7 delayed group serum samples from 7 males (mean age 56.8 years, Std. deviation 17.3) and 5 (4 male) immediate group (mean age 57.53 years, Std. deviation 17.63) were analysed here was an inter-group difference in the expression level of miR-195-5p and miR132-3p (p<0.005). However, the expression levels of miR-30a-3p/-128-3p/-140-3p/-186-5p/-375-3p/-590-5p were similar in both groups. There was no significant inter-group difference in hearing recovery status, initial and final averaged PTA thresholds in the affected ears.

Conclusions: There is evidence of a change in the serum miRNA expression profile of SSNHL patients over time.

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B2

Title: Non-operative Management for Rectal Cancer: Patient Perspectives

Authors: Armaghan Alam¹, Farhad Udwadia², Ameer Farooq^{3,4}, Amandeep Ghuman^{3,4}, Manoj Raval^{3,4}, Ahmer Karimuddin^{3,4}, Terry Phang^{3,4}, Carl J. Brown^{3,4}

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Background: Patients with rectal cancer are predominantly managed with total mesorectal excision which can be associated with significant morbidity and mortality. As a result, stakeholders have sought alternative and novel strategies to manage patients, including local excision and "watchful waiting" or nonoperative management (NOM), especially given the increasing incidence of advanced rectal cancer in younger patients. While NOM spares radical surgery, it does come with certain challenges. These include a high rate of recurrence and intensive follow-up. The psychosocial impacts of NOM are also unclear in these patients

Objective: To obtain a better understanding of treatment values, decision making features, perspectives, and impact on patients undergoing NOM.

Methods: Using purposive sampling methods, we recruited rectal cancer patients over 18 years old who underwent NOM after displaying total or near total response to neoadjuvant chemoradiotherapy. Semi-structured interviews were conducted with these patients and analyzed qualitatively using the constant comparative approach to generate dominant themes and their constituent subthemes.

Results: Fourteen patients who met the inclusion criteria were recruited from across British Columbia. The cohort included patients from both genders (7 male, 7 female) between the ages of 27-88 years old. Four major thematic categories emerged from the interviews: impact of rectal cancer, treatment values, decision-making factors, and impact of NOM pathway. For the impact of rectal cancer category, the psychological impact emerged as a dominant theme (12/14), with the effects of chemotherapy being secondary. With regards to treatment values, 10/14 patients stated being ostomy-free was of primary importance, with survival emerging as a secondary theme. The dominant theme in decision-making factors was avoidance of an ostomy (11/14), with trust in physician being secondary. Finally, with regards to the impact of NOM, the psychological impact emerged as a dominant theme (13/14). Despite this burden, however, 13/14 participants expressed satisfaction with their choice of NOM.

Conclusions: The psychological impact of having rectal cancer and initiating chemotherapy were the most cited difficulties in initial management of rectal cancer. Avoiding an ostomy was a dominant treatment value, as well as an important decision-making factor in favor of NOM. Trust in their physician aided significantly in their decision making. Despite the psychological burden associated with this novel approach, patients were satisfied with their choice. One limitation of this study was that there was a selection bias as these were individuals who self-selected NOM.

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B3

Title: Assessment of Online YouTube Videos on Radiotherapy for Breast Cancer

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Background: Radiotherapy (RT) is an important component of breast cancer management but is underutilized due to barriers such as the lack of proper education. YouTube is commonly used for obtaining health information, yet the quality of information has been a previous concern. No previous studies have examined the characteristics of YouTube videos on RT for breast cancer.

Objective: This study systematically evaluates the characteristics of educational YouTube videos on RT for breast cancer.

Methods: The terms “Radiotherapy for breast cancer”, “Radiation for breast cancer”, “Radiation therapy for breast cancer” and “Radiation treatment for breast cancer” were searched on YouTube using the “Relevance” filter and a clear cache browser. The top 50 results of each search were recorded. Duplicates were removed, the videos were rank-ordered and the titles were screened against pre-determined criteria. The top 50 eligible videos were evaluated and general parameters, source & content information were characterized. Two independent reviewers were used.

Results: Positively skewed distribution were observed for most general parameters including views (mean 42 237, SD 88 092), likes (mean 246, SD 446) and length (median 5 minutes 49 seconds). The Like Ratio and Video Power Index could not be calculated due to the absence of dislikes, so the View Ratio (mean 28.3, SD 51.5) was the best estimate of video popularity. The View Ratio for physician videos (mean 26.1) was lower than non-physician videos (mean 33.1) although not significant. The USA (66%) or UK (20%) were the most common locations of publication. Publishers were frequently affiliated with health care facilities (48%) or non-profits (30%), and included a physician (68%) or patient (32%) as a presenter. The physician (68%) or patient (26%) interview was the most common media type, with B-roll footage with narration (48%) as the second most common. Most videos were targeted towards patients (96%), had comments (56%) and subtitles available (96%). Few videos contained advertisements (6%) or gross bias (2%). Eleven themes were identified from the videos, with the most common being Explaining RT (54%), Acute Side Effects (40%) and Patient Care Experience (32%). Specific RT modalities were less commonly discussed.

Conclusions: The current study systematically assessed the characteristics of educational YouTube videos on RT for breast cancer. This overview may be useful for healthcare providing when providing video recommendations to patients and to inform the future development of video resources in this topic. Though parameters were variable and inconsistently followed best practice guidelines, YouTube remains as a potentially important tool for the dissemination of health information.

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B4

Title: Mental Practice in Athletes, What can Surgeons learn? : A Scoping Review

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Background: Mental imagery is a dynamic mental state involving the cognitive visualization and rehearsal of motor movements or positions without overt motor output. Mental imagery is known to have numerous benefits for athletic performance and is often incorporated into elite athletic training programs. The literature on the effects of mental imagery in surgery, which shares many of the high-performance qualities of elite athletics, remains limited. We hypothesize that many of the benefits of mental imagery on sports performance may be extrapolated to the field of surgery.

Objective: The purpose of this study is to qualitatively assess the components of mental imagery approaches used in high-level athletics and assess their applicability to surgical training.

Methods: A scoping review was conducted using Ovid Medline, Ovid EMBASE, PubMed, Cochrane Central Register of Controlled Trials, and Google Scholar databases. Two reviewers screened all abstracts and full texts according to predefined inclusion and exclusion criteria in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses 2020 guidelines. A thematic analysis was then performed on studies included in the review.

Results: Of 1252 citations, 7 studies met the inclusion criteria. Five themes were identified from the thematic analysis (internal vs external, open vs closed, level of expertise, visual vs kinesthetic, and psychological effects). The literature suggests that when implementing imagery training for experienced surgeons, internal imagery approaches should be used preferentially over external imagery interventions, whilst external imagery may be better suited for the development of new skills and training novice surgeons. Additionally, the data supports the use of kinesthetic and closed-skill imagery interventions in the improvement of surgical motor skills. Mental practice appears to be beneficial in both experienced and novice surgeons leading to improved performance and decreased anxiety.

Conclusion: Although the current evidence on the use of mental imagery in surgery remains limited, we hypothesize that the benefits of mental imagery in athletes are likely transferable to the field of surgery. More studies are required to directly assess the impact of mental imagery in surgery at various levels of educational training and skill maintenance.

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B5

Title: A Cut Above: A Scoping Review of Mentorship in Surgical Residency Training

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Background: Surgical resident physicians experience long work hours, high rates of burnout, and attrition. Effective mentorship has been proven to be a valuable element in resident wellness, professional development and career satisfaction across multiple surgical disciplines. Formal mentoring relationships between attending physicians and trainees are associated with positive outcomes such as career choice and

guidance, improved career satisfaction, personal growth, enhancement of professional academic skills, higher rates of promotion, and research productivity. Despite the studied benefits of these relationships, formal mentorship programs are not a standardized component of residency training curriculums.

Objective: The purpose of this study was to summarize the current body of evidence of formal mentorship initiatives within accredited surgical residency programs in the United States and Canada and to assess the components of successful mentorship interventions.

Methods: A scoping review was completed in accordance with PRISMA guidelines. A comprehensive search of Ovid Medline, Ovid EMBASE, Pubmed, Cochrane and Web of Science was conducted. Inclusion criteria consisted of English-language studies investigating the impact of formal mentorship programs within surgical residencies. Studies based outside of the United States and Canada or those that incorporated fellows, peer-peer mentorship and non-surgical disciplines were excluded.

Results: The search strategy yielded 1119 citations, with 14 studies meeting final inclusion criteria. A thematic analysis was performed on all 14 studies included in the review. Formal mentorship interventions found positive improvements in surgical skills, research productivity and overall satisfaction for residents. Broadly, the studies either featured focused mentorship blocks (weeks to months) or longitudinal programs spanning multiple years of residency. Both formats showed positive outcomes, although improvements in research productivity were found in longitudinal studies. Method of matching was not associated with differences in outcomes.

Conclusions: This review emphasizes the positive outcomes associated with formal mentorship programs in surgical residency. Within the United States and Canada, the implementation of these programs results in the improvement in resident skills, interprofessional relationships, research productivity and satisfaction. Programs varied in length and mentor allocation, but all showcased positive trends and contributed to the literature affirming the beneficial aspects of these interventions on the personal and professional development of resident physicians. Formal mentorship is a protective intervention that surgical residency programs can be easily implemented to support their trainees through the challenges of residency education.

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B6

Title: Harnessing the Power of Digital Health to Create Videos and an Online Curriculum for Management of Obstetrical Emergencies: Training Non-surgeon Physicians in Low-resource Settings

Authors: Katherine Gray¹, Hannah Foggin¹, Rachel Livergant², Nina Maerkl³, Catherine Binda⁴, Kayoung Heo¹, Samuel Cheng¹, Alisha Labinaz¹, Tamilarasy Vasanthakumaran⁵, Emilie Joos⁶.

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Background: The Essential Surgical Skills Training Program (ESSTP) was created by the UBC Global Surgery Lab in partnership with Médecins Sans Frontières in 2019. It is a modular virtual curriculum geared towards non-surgeon physicians. Given the frequency and mortality of obstetrical emergencies, reference surgical skills videos, illustrations, Entrustable Professional Activities (EPAs), online modules, and post-module quizzes were created to support non-surgeon physicians responding to obstetrical emergencies.

Objective: Create readily available reference videos and online curriculum that demonstrate surgical approaches to common obstetrical emergencies.

Methods: A module featuring foundational obstetrical skills was created for the EESTP. Three trainees in South Sudan completed the module and provided feedback on the curriculum. In response to trainees' feedback, assessments and multimedia tools were created to enhance interactivity. Illustrations detailing important anatomical landmarks and key surgical steps in common obstetrical procedures were developed using Procreate, Microsoft PowerPoint and Adobe Illustrator. Videos demonstrating common procedures were created with accompanying "pocket cards" using iMovie and Canva. EPAs and post-module quizzes focusing on clinical competencies were developed.

Results: Open-access virtual modules outlining management of postpartum hemorrhage including emergency Cesarean section, triple vessel ligation and hysterectomy, as well as manual vacuum aspiration for molar pregnancy were created. 19 EPAs and 20 post-module quiz questions were created to assess clinical reasoning and competency. One quick reference video and pocket guide have been completed to date, with three in production.

Conclusions: In low-resource settings, a virtual curriculum consisting of videos, illustrations, EPAs, and quizzes can be a valuable tool in training non-surgeon physicians in the management of obstetrical emergencies. By working in partnership with Canadian and African surgeons and local stakeholders - the trainees - we created an accessible, interactive resource that is adaptable and scalable.

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B7

Title: The Categorization of Surgical Problems by Junior and Senior Medical Students

Authors: Mathew N Hindi, BSc (Hons)¹, Geoffrey Blair, MD¹

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Background: Previous work has suggested that novice learners tend to categorize and classify problems in a manner different from experts. Through a surgical problem categorization exercise we explore how medical students conceptualize surgery.

Objective: To better understand how pre-clinical (junior) and post-clerkship (senior) medical students categorize and conceptualize surgical pathology to evaluate the surgical clinical education model at UBC.

Methods: 32 pre-clinical and 30 post-surgical clerkship students were enrolled in our study. They completed a survey asking for their categorization of 30 surgical scenarios through short answer responses. Responses were sorted by the subjects' stage of training and were designated at least one theme using inductive thematic analysis: anatomical, specialty, urgency, pathophysiology, management, diagnosis,

etiology, or other. Student's t-test was used to compare the proportion of responses across each group, with $p < 0.10$ being considered statistically significant.

Results: Both pre-clinical and post-clerkship students classified scenarios according to etiology of the problem most of the time (50% vs 60%, $p = 0.22$). While pre-clinical students classified problems more by urgency (37.5% vs 16.7%, $p = 0.04$), post-clerkship students classified more often by the underlying pathophysiology (20% vs 6.3%, $p = 0.06$). There was a trend towards post-clerkship students classifying more by surgical specialty (43.3% vs 28.1%, $p = 0.11$) and using more than 1 term to classify problems (80% vs 68.8%, $p = 0.16$). Similar proportions of pre-clinical and post-clerkship students classified by anatomic (21.9% vs 16.7%, $p = 0.30$), diagnostic (12.5% vs 13.3%, $p = 0.46$) and a management (25% vs 30%, $p = 0.33$) approach.

Conclusions: Seven themes of classification emerged. Notions of pathophysiology were more evident from post-clerkship students, whereas notions of urgency were more common in the pre-clerkship responses. How medical students conceptualize surgical problems should inform surgical educational methods.

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B8

Title: Assessing Hearing Disability and Health-Related Quality of Life in Profound Unilateral Sensorineural Hearing Loss (USNHL): A Systematic Review and Meta-Analysis

Authors: Melissa Lee¹, Aysha Ayub¹, Reyhaneh Abgoon², Desmond A Nunez^{2,3}

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Background: Invasive and non-invasive hearing-assistive solutions have been developed for the treatment of unilateral sensorineural hearing loss (USNHL). Currently, it is unclear which hearing solution offers the most subjective benefit to patients for hearing and health-related quality of life (HRQoL).

Objective: To compare invasive hearing assistive devices and non-invasive hearing assistive devices to no treatment in improving short-term and long-term hearing disability and HRQoL as measured through hearing-specific and generic patient-reported outcome measures (PROMs) in adults with profound acquired USNHL.

Methods: Evidence of invasive and non-invasive hearing assistive devices in USNHL patients over 18 years of age is reviewed. MEDLINE, EMBASE, CENTRAL, CINAHL, Web of Science, CAB, ICTRP, Clinicaltrials.gov, ISRCTN databases were searched. The mean post-intervention change in global score of disease-specific PROMs measuring hearing disability and generic PROMs measuring HRQoL at less than 12 months (short-term) and greater than or equal to 12 months (long-term) were the primary outcomes. The secondary outcome was intervention-related adverse effects. Risk of bias assessment and meta-analysis were performed where appropriate.

Results: Results are currently available for short-term analysis (<12 months) of hearing disability and HRQoL with long-term analysis (>12 months) to be completed this month. Of the 3,101 records initially identified, 1,013 duplicates and 1,844 articles were excluded based on article type, title, and abstract. The full texts of 122 articles were reviewed, of which 101 were excluded due to wrong population (65 articles) and wrong follow-up period (36 articles). A further 11 articles were excluded due to missing outcome data reported. Four prospective repeat-measure observational studies with a total population of 66 participants who had received an invasive (3 articles) or non-invasive (1 article) hearing solutions were studied. A random-effects meta-analysis showed invasive hearing solutions were favoured over no hearing solution (mean difference, 17.68 points, 95% CI, 32.72-2.64 points; $I^2 = 87\%$). No studies were identified assessing the short-term effects of hearing solutions on HRQoL with generic PROMs.

Conclusions: In this systematic review and meta-analysis, invasive hearing solutions were significantly associated with improved hearing disability in patients with USNHL in comparison to no hearing intervention in the short-term, with long-term results to follow. The results of our study will inform policy makers and current healthcare delivery, especially within a publicly-funded healthcare system, and guide patients and clinicians in choosing an appropriate treatment for profound USNHL.

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B9

Title: Vaginal Self-Lubrication Following Penile Inversion, Peritoneal, and Colonic Gender Affirming Vaginoplasty: A Physiologic, Anatomic, and Histologic Review.

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Background: Vaginal self-lubrication is central to the sexual satisfaction and healthy genitourinary function of patients who have undergone gender-affirming vaginoplasty (GAV). The secretory capacities of different neovaginal lining tissues have been variably described in the literature, with little evidence-based consensus on their success in providing a functionally self-lubricating neovagina to transfeminine and gender-diverse patients. As such, we review the anatomy, histology and physiology of penile and scrotal skin, urethra, colon, and peritoneum to better characterize their capacity to be functionally self-lubricating when used as neovaginal lining in the setting of GAV.

Objective: To review, compare, and summarize the capacity of penile and scrotal skin grafts, and urethral, colon, and peritoneal flaps, to produce functional lubrication analogous to that of the phenotypical vagina in the setting of GAV.

Methods: A broad literature search was conducted to identify current studies that discuss neovaginal graft or flap function in penile-inversion, colonic and peritoneal GAV, as well as the anatomic, physiologic, and histologic secretory capacities of penile and scrotal skin, urethra, colon, and peritoneum.

Results: Data on neovaginal lubrication is limited to qualitative clinician observations and patient satisfaction measures. No studies quantifying neovaginal secretions were identified for any GAV graft or flap technique. Penile and scrotal skin are understood to have no self-

lubricating potential, though penile-inversion vaginoplasty, which utilizes these tissues, may produce a small volume of sexually-responsive secretory fluid when urethral tissue is incorporated and lubricating genitourinary accessory glands are retained. Colonic and peritoneal tissues both have secretory capacity, but fluid production by these tissues is continuous, non-responsive to sexual arousal, and likely inappropriate in volume, so may not meet the needs or expectations of some patients. The impact of surgical tissue translocation on their innate secretory function has not been well-characterized.

Conclusions: The possibility of neovaginal self-lubrication impacts patient health, satisfaction, and quality of life. It is an important consideration for patients choosing between GAV graft or flap options. The paucity of robust data leaves patients and clinicians with little evidence to inform their decision between GAV techniques, and may contribute to misrepresentations of the functional outcomes of each technique. Finally, many pathologies of the neovagina can present with symptomatic discharge or leakage of body fluids, thus confounding clinicians' and patients' assessment of neovaginal self-lubrication.

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B10

Title: A Comparison of Operative and Anesthetic Techniques for Inguinal Hernia Repair in Infants

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Background: While inguinal hernia repair (IHR) remains one of the most common pediatric surgical procedures, there still exists variation amongst clinicians between the operative approach and anesthetic techniques offered to families. Traditionally, IHRs are performed using the high-ligation open surgical technique under general anesthesia (GA). More recently, a laparoscopic approach for pediatric IHR has gained in popularity, as have regional approaches to anesthesia for open IHRs.

We have recently described a novel technique combining caudal anesthesia with laparoscopy (CL) for IHR in infants that previously established its safety and feasibility. Over the last 5 years, surgeons and anesthesiologists at BC Children's Hospital have utilized 4 different combinations of surgical and anesthetic techniques for pediatric IHR at our institution: GA-open (GO), caudal-open (CO), GA-laparoscopy (GL), and caudal-laparoscopy (CL).

Objective: To compare and evaluate the surgical outcomes and resource utilization of infants undergoing IHR between these different surgical and anesthetic combinations.

Methods: All infants <1 year-of-age undergoing elective IHR without concomitant procedures from July 2016 to July 2021 at a single tertiary care teaching center were retrospectively reviewed. Eight surgeons and 25 anesthesiologists contributed patients, with approach dictated by practitioner preference. Data collected included patient demographics, surgical and anesthetic details, and operating room (OR) utilization metrics. Post-operative complications were evaluated and aggregated, including recurrent hernia, metachronous hernia, hematoma, hydrocele, testicular atrophy, and acquired cryptorchidism. Descriptive statistics were performed with R Studios ($p < 0.05$).

Results: Of the 338 patients included for analysis, most underwent an open procedure ($n=275$) while anesthetic technique was evenly split between GA ($n=185$) and caudal ($n=153$). Most patients were male (87.6%) and born premature with mean gestational age of 31.4 ± 4.1 weeks. MIS-to-Open conversion was noted once (3.3%) in the GA MIS group, but none in caudal. Median follow up was 2.5 (1.4–3.8) years. No differences were noted in aggregate complication ($p=0.4$) and metachronous hernia ($p=0.63$) rates. The Caudal Open group had the shortest total OR time ($p < 0.01$) and the Caudal Laparoscopy group had the longest. There was no difference between the groups in anesthetic preparation time or skin-to-skin time, but the overall post-procedure time was shorter in patients receiving a caudal blockade ($p < 0.01$) compared to GA.

Conclusions: MIS IHR performed under caudal block and sedation yields comparable complication rates compared to the open approach or GA. Open IHR with caudal blockade was the most efficient operative room utilization.

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B11

Title: Nutritional Adequacy and Environmental Impacts of the Retail Food Environment at Vancouver General Hospital

Authors: Stephanie Alexis¹, Annie Lalande^{2,3}, Karina Spoyalo², Sunny Mak⁴, Neha Ghardari⁴, Jiaying Zhao³, Andrea MacNeill^{2,3,4}

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Background: As outward-facing entities, retail food outlets in healthcare institutions should align with the healthcare mandate to promote health and model dietary approaches for disease prevention and treatment. In reality, hospital food environments commonly offer an abundance of calorie-dense, nutrient-poor, and carbon-intensive options that are poorly aligned with evidence-based guidelines for healthy and sustainable eating.

Objectives: This study aimed to evaluate the current retail food environment of the Vancouver General Hospital (VGH) cafeteria with respect to nutritional value and environmental impacts.

Methods: A comprehensive audit of all foods and beverages available for sale at the VGH cafeteria was conducted over six consecutive days (Monday to Saturday). Nutritional value was assessed for each item based on weight, caloric value, macronutrient and sodium content, and its alignment to the 2019 Canada's Dietary Guidelines (CDG). The level of food processing was estimated using the validated 4-point NOVA classification. Greenhouse gas (GHG) emissions associated with each item were calculated using published emissions factors, and cost and marketing strategies were recorded.

Results: Six items were regularly available at lunch daily (falafel plate, chicken plate, shawarma plate, hot dog and macaroni salad, burgers and fries, poutine). Nutritionally, the falafel plate was best aligned with CDG, followed by the chicken plate and the shawarma plate. The remaining three options had strikingly poor alignment with CDG, with high levels of saturated fat and sodium (burgers and fries: 50% of daily

saturated fat, poutine: 100% of daily sodium). None of the options achieved guideline-based recommendations for fruit and vegetable consumption. The falafel and chicken plates were considered processed (NOVA 3), while all other items were ultra-processed (NOVA 4). GHG emissions ranged from 0.97 kg CO_{2e}/meal (falafel plate) to 4.57 kg CO_{2e}/meal (burgers and fries). The most affordable options were the hot dog and poutine. Analysis is ongoing and will be completed within the next 4 weeks.

Conclusions: Most regularly available lunch options had poor nutritional value, were ultra-processed, and had a high environmental impact. None were emblematic of the plate model recommended in CDG, though the two meals most compliant with healthy eating guidelines were also the least carbon-intense. The most affordable options were some of the least nutritious. This study highlights a discrepancy between the healthcare mandate and current retail food practices. Transforming the retail food environment therefore presents an opportunity for improved personal and planetary health. This project lays the foundation for work planned to reduce the environmental footprint and improve the accessibility, affordability, and nutritional value of retail food at VGH as part of a broader objective to support staff wellness and heighten awareness of the impact of global food systems on planetary health.

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B12

Title: Update on the Evaluation of a Surgical Task-sharing Program in South Sudan

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Background: Globally, sub-Saharan Africa (SSA) is the region with the most limited access to surgical care. Growing the surgical workforce is crucial in closing this gap in care accessibility. In 2019, the University of British Columbia collaborated with Médecins Sans Frontières to create the Essential Surgical Skills program, launched at Aweil State Hospital, South Sudan, in order to increase local surgical capacity.

Objective: To evaluate the progress and surgical competencies of trainees enrolled in the ESS program.

Methods: This is a mixed-method prospective cohort study evaluating trainee progress in the ESS program. Quantitative data include pre- and post-training outputs (procedure logbooks, morbidity and mortality rates) and surgical proficiency (quizzes, Entrustable Professional Activities (EPAs)). Qualitative data includes trainee semi-structured interviews.

Results: From May 2019–December 2021, trainees performed 416 procedures. The most common procedures were skin grafting (15.6%), abscess drainage (13.1%) and reduction and splinting (12.3%). 327 EPAs were completed, out of which 254 (77.6%) showed that the trainee could independently perform the procedure. Trainees have demonstrated full competency in the burn management and safe surgery modules. The pass rate for all quizzes was 100%. Surgical mortality rates recorded during the implementation of the ESS program remained unchanged from pre-implementation rates (pre-training: 0.6%; during-training: 0.1%; p=0.0541). Surgical morbidity rates demonstrated a decline from 17% pre-implementation to 12% post-implementation (p=0.1767). Semi-structured interviews indicated that trainees felt the program was empowering and key to their career development.

Conclusions: Our study suggests that providing essential surgical skills training to general practitioners in under-resourced settings via a virtual platform is feasible. The COVID-19 global pandemic highlighted the need to make Low- and Middle-income Countries independent from fly-in trainers and traditional apprenticeship models. Future work includes the expansion of this program to the MSF project in Bangui, Central African Republic.

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B13

Title: The Impact of Infection on Growth in Neonates with Intestinal Failure

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Background: Neonates with intestinal failure (IF) are at high risk for poor growth in the first few months of life, despite receiving adequate parenteral and enteral nutrition. Suboptimal growth is likely multifactorial but is not well understood. These infants also frequently develop infections while in the neonatal intensive care unit (NICU) which can result in systemic inflammation, potentially impacting growth. The purpose of this study was to compare growth in infants with IF who had either a bloodstream or other infection with infants without infection in the first few months after diagnosis, to identify possible modifiable risk factors for growth failure.

Methods: A retrospective review of infants cared for at BC Women's and Children's NICU with IF between 2018 to 2022 was conducted. Clinical characteristics, intestinal pathology, nutritional intake, days on PN, and growth trajectory were compared among infants who developed a bloodstream infection, those who developed a non-bloodstream infection (including urinary tract, respiratory and wound infections) and those without any infection in the first 2 months after diagnosis of IF. Means and Medians among groups were compared using Mann-Whitney and Kruskal-Wallis test with p-values <0.05 considered significant.

Results: 87 infants with IF were reviewed including 27 with no infection (NI), 30 with a bloodstream infection (BSI), 30 with other infection (OI). Infants with either a BSI or OI had a lower gestational age at birth compared to those with NI (27.2 weeks vs. 29.3 weeks, vs. 36 weeks, p<0.0001). The most common causes of IF were necrotizing enterocolitis (NEC) and gastroschisis, accounting for 29% and 60% of infants respectively. Significantly more infants who developed an infection had an underlying diagnosis of necrotizing enterocolitis, compared to infants without infection (38% vs. 7%, p=0.0244). Infants with either BSI or OI were more likely to have a stoma than infants with NI (83% vs. 70% vs. 30%, p=0.0001). Infants with BSI received PN for significantly longer than infants with OI or NI (109 vs. 65 vs. 36 days, p=0.0001). Neither mean daily weight gain nor mean Z-scores for weight differed significantly among the three groups at one, four and eight weeks after diagnosis with IF.

Conclusions: The majority of infants with IF are diagnosed with an infection in the first few months of life. Risk factors include prematurity, necrotizing enterocolitis and the presence of a stoma. Bloodstream infections were associated with prolonged PN use, but growth did not differ among infants with or without infection.

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B14

Title: Impact of Hospital Transfer on Acute Limb Ischemia Outcomes and Time to Revascularization

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Background: Acute limb ischemia (ALI) is a common surgical emergency that is challenging to manage with high rates of limb loss and mortality. The relationship between time to revascularization and major limb amputation or mortality is well established, with guidelines indicating revascularization be achieved within a critical 6-hour period. While this recommendation is an ideal practice, it is important to recognize that there may be foreseeable delays in treatment due to hospital transfers from peripheral hospital sites as well as late patient presentation and diagnosis. As such, it is imperative to address the implications of delay to revascularization and resultant patient outcomes in this patient population.

Objective: To evaluate the role of hospital transfer and delayed presentation of acute limb ischemia on time to revascularization, type of intervention and patient outcomes.

Methods: A retrospective review of all cases with lower extremity ALI was conducted on patients presenting to Vancouver General Hospital between 2010 and 2019. Patient data was collected on patients who were directly admitted from our emergency department or admitted following hospital transfer from a peripheral hospital. This data was compared to evaluate time to revascularization, interventions performed, and postoperative outcomes of patients with direct admission versus patients who were transferred to our hospital.

Results: 173 patients were identified, 80 of which were direct admits while 93 were transfers from peripheral hospitals. The median transfer distance was 91.3km. Transferred patients had a significantly higher time of initial assessment to revascularization (9.83 hours vs. 6.04, p=0.01), however time of symptom onset to revascularization was not significantly different between the two groups (24.92 vs. 20.75, p=0.28). Thromboembolectomy was the most common treatment intervention for direct admit and transfer patients, 91.3% and 89.3%, respectively. There was no significant difference in intra-operative fasciotomy between direct admit and transfer patients (31.3% vs. 38.7%, p=0.31). In the post-operative period, directly admitted patients had a higher percentage of full recovery with no documented limb deficits at discharge compared to transfer patients (78.8% vs. 57%, p<0.01). Transferred patients experienced higher rates of major limb amputation (8.6% vs. 2.5%, p=0.04), discharge to another hospital (35.5% vs. 10% p<0.01) and mortality (16.1% vs. 8.8%, p<0.01).

Conclusions: Patients with ALI who required transfer to our hospital from a peripheral site suffered from increased major limb amputation and mortality despite comparable total ischemic time, interventions and hospital stay, compared to patients who present and are admitted directly from our emergency department.

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B15

Title: The Impact of the Unified Airway on Upper and Lower Airway Non-type 2 Inflammation: A State-of-the-Art Review

Authors: Austin Heffernan BMSc¹, Amir Shafiee BSc¹, Sydney Sparanese BSc¹, Tefran Chan MD^{1,2} and Andrew Thamboo MD MSc^{1,2}

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Background: The unified airway concept (UAC) classifies upper (UA) and lower airways (LA) as one unit. Understanding the UAC's inflammatory endotypes could impact the management of patients with comorbid UA and LA pathologies.

Objective: To discuss how the UAC impacts non-type 2 inflammation in patients diagnosed with CRS and comorbid LA disease (LAD).

Methods: This state-of-the-art review followed PRISMA-P guidelines and the protocol was registered on the Open Science Framework. The search strategy was peer-reviewed by two medical librarians. Databases included Medline, Embase, National Institute for Health and Care Excellence, TRIP Database, ProQuest, Clinicaltrials.gov, Cochrane Central Registry of Controlled Trials, Web of Science, government, and health organizations, and graduate-level theses. Studies were included if they utilized airway sampling, non-type 2 cytokines, and patients were diagnosed with CRS and LAD.

Results: A total of 27 of 7060 articles were included. Samples were collected from UA (77.7%, n=21), LA (11.1%, n=3) or UA and LA (UALA) (11.1%, n=3). Journal articles studied CRS comorbid with Asthma (74.1%, n = 20), AERD (22.2%, n = 6), COPD and or bronchiectasis (3.7%, n = 1). In patients with CRS and comorbid Asthma, AERD or COPD/bronchiectasis; 60% (n = 12), 33% (n = 2) and 100% (n = 1) respectively demonstrated mixed or non-type 2 endotypes. Comorbid CRS and Asthma produced elevated type 1 (7.5%, n=1.5), type 2 (40.0%, n=8), type 3 (5.0%, n=1), mixed 1 and 2 (5.0%, n=1) and mixed 1, 2 and 3 (42.5%, n=8.5). Patients with AERD demonstrated elevated type 2 (n=4), mixed 2 and 3 (n=1) and mixed 1, 2 and 3 (n=1) endotypes. Comorbid CRS with COPD or Bronchiectasis demonstrated a mixed 1 and 2 (n=1) endotype shift in sputum samples.

Conclusions: A large proportion of patients diagnosed with CRS and comorbid asthma, AERD or COPD/bronchiectasis demonstrated mixed or non-type 2 inflammatory endotypes. The former emphasizes the need for a CRS endotype classification system that includes isolated and mixed endotypes in the setting of comorbid lower airway disease.

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B16

Title: Vestibular Rehabilitation Potential of Commercially Available Virtual Reality Video Games

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Background: Peripheral vestibular disorders affect 6.5% of people and the standard treatment is vestibular rehabilitation (vrb) therapy. This is considered physical rehabilitation, thus it is subject to the related preconceptions, perceived exertion, financial barriers, and inconvenience that negatively affect adherence to therapy. Adjunctive virtual reality (VR) vrb could address these adherence issues and simultaneously improve vrb therapy outcomes.

Objective: The objective of this study was to identify a VR video game that is congruent to vrb therapy.

Methods: “Virtual reality racing” was searched on the App Store. Results were screened for free point-of-view racing games compatible with Android and iOS devices. An author was filmed playing each game and videos were distributed to 237 physiotherapists with vrb experience. Physiotherapists completed a survey with 5-point Likert scale questions that assessed video game vrb potential. Data were analyzed using Kruskal-Wallis one-way ANOVA on ranks and Dunn-Bonferroni post-hoc test (alpha=0.05).

Results: The search yielded 58 games, 4 met eligibility criteria. Physiotherapists agreed (median scores) that VR Tunnel Race (VRTR) and VR Real World Bike Racing (VRWBR) had the highest global scores (18.00), are efficacious adjunctive treatments, and would be recommended. They agreed that VRWBR replicates prescribed exercises including gaze stabilization. There were no significant differences in the aforementioned scores. There was a statistically significant difference in habituation scores, H (3,n=40)=14.607, p=0.002, with mean rank scores 73.74, 68.21, 101.28 and 73.74 for VR X-Racer, Derby VR, VRTR and VRWBR respectively. VRTR habituation scores were significantly (p<0.05) higher than Derby VR and VRWBR.

Conclusions: VRTR and VRWBR are effective adjunctive therapies, would be recommended, and had the highest global scores. VRTR is likely more congruent to vrb due to it replicating habituation exercises significantly better than 50% of selected games. Prospective studies are needed.

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B17

Title: Incidence and Risk Factors of Hypothyroidism Post-laryngectomy: A Systematic Review

Authors: Norbert Bany¹, Jamie JY Kwon², Thomas D Milner², Sena Turkdogan², Eitan Prisman² **Affiliations:** ¹The University of British Columbia, Faculty of Medicine, ²Division of Otolaryngology - Head and Neck Surgery, Department of Surgery, Vancouver General Hospital

Background: Hypothyroidism is a common complication of laryngectomy and results from thyroid tissue resection, division of thyroid vasculature to allow ablation or to provide recipient vessels for reconstruction, or (neo)adjuvant therapies. Understanding the incidence and factors associated with the development of hypothyroidism in laryngectomy patients can aid in reducing the risk of its occurrence and allow for proactive management. Moreover, hypothyroidism post-laryngectomy is associated with laryngectomy-specific complications, which can be far-reaching. Early detection of hypothyroidism and prediction of those at high risk of hypothyroidism may reduce the risk of complications and improve patient quality of life.

Objective: To characterize the incidence and predictors of postoperative hypothyroidism in laryngectomy patients.

Methods: This study was conducted in accordance with the Preferred Reporting Items for Systematic and Meta-Analyses (PRISMA) protocol. A literature search was conducted on June 9 for all studies, irrespective of publication date, in the PubMed (MEDLINE), EMBASE, SCOPUS, Cochrane Library, Web of Science, and CINAHL databases. Studies eligible for inclusion were observational or interventional and reported on incidence, risk factors, predictors, management, or complications of hypothyroidism following laryngectomy. Case reports, abstracts, review articles, letters, commentaries, editorials, books, animal studies, articles in a language other than English or French, articles with full-text unavailable, and case series with less than 10 laryngectomy patients were excluded. Two independent reviewers (NB, JK) screened studies by title and abstract based on pre-established inclusion and exclusion criteria. The same reviewers extracted data from included studies using predefined categories and assessed bias using the JBI Critical Appraisal Checklist for Quasi-Experimental Studies Bias Assessment Tool.

Results: 49 of the 580 records identified by our search strategy were included in the review. A total of 6469 laryngectomy patients were studied (89.7% male, age range: 22-92 years). 48 studies analyzed post-laryngectomy hypothyroidism incidence rates, where the median reported incidence of any type of treatment with laryngectomy was 50.8%, ranging from 3.0-89.0% between studies. Radiation with laryngectomy was identified as a risk factor for post-laryngectomy hypothyroidism. 15 studies (N=1054 patients) characterized the incidence of post-laryngectomy clinical and subclinical hypothyroidism where the median incidences were 26.9% (range: 0.0-43.5%) and 28.4% (range: 2.4-56.5%), respectively. Total thyroidectomy led to postoperative hypothyroidism in all cases.

Conclusions: A significant portion of laryngectomy patients develop postoperative hypothyroidism; those who receive (neo)adjuvant radiation are at higher risk. Centers that do not routinely test for hypothyroidism or treat with prophylactic levothyroxine post-laryngectomy, may face clinically undetected hypothyroidism.

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B18

Title: Location Pattern of Recurrence of WHO Grade 1 Meningiomas

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Background: Meningiomas are the most common primary brain tumour accounting for 1/3rd of all primary CNS lesions (1). Even though up to 80% of the tumours are classified as benign under the World Health Organization (WHO) classification system, their presence can lead to significant morbidity and mortality (2). (3–6) Primary surgical excision with goal for maximal safe resection is the standard treatment with adjuvant Radiation Therapy (aRT) used to help treat atypical and recurrent cases. However, the efficacy of adjuvant RT is still being

investigated especially for Grade 1 lesions (1,7,8). Elucidating the pattern and location of tumour recurrence could help focus the target therapies for recurrent Grade 1 meningioma.

Objective: Our primary objective is to determine if there is a predictable localization of WHO Grade 1 meningioma recurrence help target aRT based on initial tumour characteristics. Secondary objectives involve analyzing the clinical presentation, rate of tumour growth, and risk factors for recurrence.

Methods: In a retroactive chart analysis, we identified all Grade 1 meningiomas treated with primary surgical resection at Vancouver General Hospital (VGH) between 2001 and 2021 that demonstrated recurrence. We collected information on the presenting characteristics of the tumours, extent of resection, and location of recurrence.

Results: Out of the 1078 patients with a meningioma resection at Vancouver General Hospital, 197 (18.3%) were determined to have had a recurrence. Upon further review of this group, 63 (32%) had missing documents, 27 (13.7%) had a subtotal initial operation, 10 (5.1%) had NF2, and 12 (6.1%) developed or were found to have an Atypical/Grade 2 meningioma. This left 85 eligible participants after accounting for the exclusion criteria that included neurofibromatosis type 2 diagnosis, missing documents, and subtotal resection.

In a preliminary analysis, 7 (17.5%) had recurrence at a distal site (> 1cm) from the original lesion, while patients (82.5%) had recurrence at the resection site. There were no distal recurrences noted.

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B19

Title: Serum Estradiol Levels Further Decrease After Bilateral Oophorectomy in Transmasculine Individuals on Testosterone Therapy

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Background: Transmasculine individuals, considering whether to undergo total hysterectomy with bilateral salpingectomy, have the option for concomitant oophorectomy. Data are currently limited to support health outcomes regarding the decision to retain or remove the ovaries. Previous studies have not specifically addressed the question if serum estradiol levels are significantly altered in transmasculine patients after oophorectomy. We hypothesized that serum estradiol levels would further decrease following oophorectomy compared to pre-surgical levels when testosterone (T) dosing was maintained.

Objective: To explore the changes in serum estradiol levels in transmasculine individuals before and after a bilateral oophorectomy.

Methods: We performed a retrospective chart review of 160 transmasculine and gender-diverse patients maintained on testosterone therapy at a single endocrine clinic in Vancouver, B.C. between Jan 1, 2012 – July 31, 2020. Patients were included in the study if they 1) underwent bilateral oophorectomy after a minimum of 12 months of T therapy, and 2) had serum data collected in the 12 months preceding and 24 months after the surgery. We identified 12 matched-control transmasculine subjects, who were on T therapy for at least 12 months and did not undergo oophorectomy during the study period, from our pool of patient charts.

Results: Twelve case subjects had a mean age of 32±3 years at the time of surgery. The average time to follow-up visit was 316±55 days. Mean BMI was 27.2±6 kg/m², and median weekly T dose was 75 mg [IQR 50, 75]. There was a statistically significant decrease in the mean estradiol levels of case subjects after oophorectomy, when compared to pre-surgical estradiol levels (239.3±49.0 vs. 133.6±17.5 pmol/L, p=0.02). There was no significant difference between baseline estradiol levels between matched-control and case subjects; however, the difference in estradiol levels at follow-up measurements was significant (290.1±68.4 vs. 133.6±17.5 pmol/L, p=0.03). The mean total serum T levels were not different between control and case subjects at baseline and follow-up (baseline: 24.4 vs. 27.8 nmol/L, p=0.50; follow-up: 24.9 vs. 26.1 nmol/L, p=0.89).

Conclusions: Our analysis revealed that oophorectomy can attenuate serum estradiol levels below what is achieved by high-dose exogenous T alone. While our study was limited by a small sample size, further research is needed to determine the implications of oophorectomy on how gender-affirming surgery may impact transmasculine endocrinological and overall health.

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B20

Title: Pars Fixa Urethral Stricture Repair after Gender-Affirming Phalloplasty or Metoidioplasty: A Retrospective Review

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Background: The pars fixa is an essential urethral segment created during gender-affirming phalloplasty and metoidioplasty, that allows for standing urination in transmasculine patients. Strictures in this region of the neophallus is common, and there have been no studies focusing on surgical management of strictures in this specific region.

Objective: To evaluate outcomes of three urethroplasty techniques for pars fixa stricture repair and characterize optimal treatment method based on stricture characteristics.

Methods: Retrospective chart review of 47 patients undergoing 63 urethroplasties for pars fixa stricture repair was conducted. The three types of urethroplasty performed were a) Heineke-Mikulicz, b) substitution with ventral onlay buccal mucosal graft, and c) two-stage Johansen urethroplasty. Information regarding patient demographics, surgical history, and stricture characteristics were collected. Success rate of each surgical approach was determined by need for further intervention.

Results: Median stricture length was 10mm (range: 2 – 55mm). Most strictures (48%) were located at distal pars fixa, including the anastomosis between the pars fixa and the pars pendulans urethra. Choice of surgical technique for stricture repair depended on stricture location, length, and severity. Heineke-Mikulicz urethroplasty was used for 25 strictures and had a success rate of 56%. Substitution urethroplasty with ventral onlay buccal mucosal graft was used for 24 strictures and had a success rate of 96%. Two-stage Johansen urethroplasty was used for 14 strictures and had a success rate of 71%.

Conclusions: Substitution urethroplasty with ventral onlay BMG has the highest success rate, while Heineke-Mikulicz urethroplasty has the lowest success rate. Staged urethroplasty remains acceptable for long, dense strictures not amenable to single stage repair.

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B21

Title: Qualitative Patient-Reported Outcomes Should Supersede Quantitative Scores after Curative Parathyroidectomy.

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Background: Successful surgical cure of primary hyperparathyroidism (PHPT) results in improved quality of life (QoL) in the majority of symptomatic patients based on validated parathyroid-specific QoL tools (PAS score). However, symptoms attributable to PHPT are nonspecific and patients may have difficulty expressing symptom severity leading to misrepresentation of patient reported outcomes (PROs) after curative surgery.

Objective: As we strive to implement a value-based healthcare approach (which is grounded in improving outcomes that matter to patients) to our PHPT patients, we aimed to compare qualitative to quantitative PROs to ensure we use the optimal outcome measurements.

Methods: 492 patients who underwent successful parathyroidectomy (defined by normal calcium >6months postoperatively) between August 2010 and June 2020 were retrospectively reviewed. Patients completed a PAS questionnaire preoperatively and 2 weeks and 6 months postoperatively. PAS score improvement postoperatively was rated 0 if it did not change or was worse, 1 if it was up to 100 points better, and 2 if it was >100 points better. The surgeon also qualitatively recorded patients' verbally reported symptoms at each of these visits (preoperatively, 2 weeks and 6 months postoperatively). Qualitative symptom improvement was rated 0 if the patient reported no improvement, 1 if they report minimal improvement, and 2 if they reported significant improvement. The chi-square, Wilcoxon signed rank and Kruskal-Wallis rank sum tests were used to compare categorical variables; a p-value of <.05 was considered statistically significant.

Results: 390 patients completed reporting preoperatively and 2 weeks postoperatively while 303 completed reporting at all 3 time points. As shown in prior studies, quantitative symptoms score improved significantly after surgery when comparing both the 2 week and 6 month postoperative scores to the preoperative baseline score (p<.05). Qualitative and quantitative symptom improvement after parathyroidectomy were significantly correlated (p<0.01, Cramer's V: 0.34). There was no statistically significant difference between the quantitative and qualitative assessment scores at the 2-week postoperative time point (p=0.58). However, 6 months postoperatively, patients tend to report more improvement qualitatively than their quantitative PAS score demonstrates (p=0.02). Subgroup analysis revealed that females, patients undergoing focused parathyroidectomy, and patients older than 50 years were more likely to report more improvement qualitatively compared to their PAS scores at 6 months compared to males (p=0.02), those undergoing subtotal parathyroidectomy (p=0.01), and those younger than 50 years (p=0.03) respectively.

Discussion: Six months after curative parathyroidectomy for primary hyperparathyroidism, patients report more improvement qualitatively than their quantitative PAS scores would suggest. This finding was more pronounced in females, patients undergoing focused parathyroidectomy, and those older than 50 years. Our results underscore the critical importance of verbally reported PROs as a key outcome measurement in value-based healthcare initiatives.

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B22

Title: Level of Evidence in High Impact Surgical Literature: The Way Forward

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Background: Evidence-based medicine stipulates that clinical decision-making should revolve around scientific evidence. While previous studies have brought attention to the low level of evidence published in surgical journals, it remains unclear whether these trends have changed in recent years, specifically within high-impact surgical journals.

Objective: The goal of the present study is to evaluate the methodological quality of surgical research recently published in JAMA Surgery and Annals of Surgery, the two surgical journals with the highest impact factor.

Methods: An electronic search of the PUBMED database was performed to retrieve all articles published in the JAMA Surgery and Annals of Surgery in the year 2020. Three authors independently reviewed all retrieved articles, and methodological designs of the publications were analyzed and rated using a modification of Oxford Centre for Evidence-Based Medicine Levels of Evidence (Oxford levels of evidence scale).

Results: The initial search on identified 2127 articles of which 1306 were excluded after title and abstract screening. The remaining 821 underwent full text/methods read, of which 202 did not meet the inclusion/exclusion criteria. A total of 619 studies were included in the analysis. The average level of evidence was 2.74 ± 0.85 across all studies assessed. The majority of study designs comprised retrospective cohorts ($n=237$), case controls ($n=80$), and RCTs ($n=74$). A total of 70 case series, 58 cross sectional studies, 49 prospective cohort studies, and 4 case reports were also observed. Moreover, a total of 16 systematic reviews and/or meta-analyses of RCTs, and 31 reviews of non RCTs were assessed. The average level of evidence in JAMA surg articles was higher than the Ann Surg publications; 2.80 ± 0.83 vs 2.47 ± 0.91 , respectively; $p=0.0003$.

Conclusions: The current study demonstrates that the majority of clinical studies published in the highest impact factor surgical journals consists of level of evidence III, which is in line with earlier literature. However, our analysis demonstrates a relatively higher percentage of level of evidence I and II compared to other surgical journals, which is encouraging. We hope that this paper serves as a call to action to surgeon-scientists and surgical institutions to implement strategies to propel the surgical research field forward.

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B23

Title: Risk Factors for Complications following Reconstruction Surgery for Mandibular Osteoradionecrosis

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Background: Mandibular osteoradionecrosis (MORN) is a late complication of radiation therapy (RT) for the treatment of head and neck cancer. While radical surgery involving segmental mandibulectomy followed by microvascular free flap reconstruction is indicated for advanced-stage ORN, this procedure is fraught with complications including flap failure, fistula formation, non-union of the osseous flap to the irradiated mandible, and recurrence.

Objective: To identify factors contributing to postoperative complications for MORN.

Methods: Patients who underwent mandibular resection and reconstruction for MORN between 2015 and 2021 were included. Charts reviewed to extract clinical, radiotherapeutic, operative, and outcomes data, including radiation dosage and volume, prior chemotherapy, age at presentation, sex, smoking and alcohol consumption history, Charlson Comorbidity Index (CCI), total operative time, reconstruction method (free-hand or virtually pre-planned), choice of free flap (scapula or fibula), number of free flap segments used to reconstruct the defect, postoperative complications, and time for development of ORN. Complications included flap failure requiring revision surgery, infection, plate exposure, fistula formation, recurrence, and non-union. Univariate analyses followed by cox proportional hazards regression models were used to identify risk factors for complications.

Results: 33 patients were included. The mean age at presentation was 64 (range 45-78), and the mean time to development of MORN was 8.8 years (range 0-28). On univariate analysis, higher complication rates were associated with free-hand surgery ($P = 0.047$) and smoking history ($P = 0.032$). There was a trend towards significance for the number of bony segments used for reconstruction ($P = 0.10$). On multivariate analysis, a free-hand surgical approach (HR 0.64, 95%CI 0.25-1.60), higher pack-years (HR 1.11, 95%CI 0.98-1.03), and a greater number of bony segments used for reconstruction of the defect (HR 1.73, 95%CI 0.93-3.23) remained as significant predictive factors for surgical complications.

Conclusions: The preliminary results show that free-hand surgical approach, greater number of bony segments, and smoking history are dominant risk factors for complications after mandibular reconstruction for MORN. Based on these findings, a dosimetry-guided virtual surgical planning approach is being investigated through integration of the RT plan with preoperative CT imaging for optimal resection margin identification.

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B24

Title: Bibliometric Analysis of Articles Published in the Journal of the American College of Surgeons Over 28 Years: A Changing Surgical Publication Focus

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Background: The *Journal of the American College of Surgeons* (JACS) has continued to grow in the pursuit of providing high quality peer reviewed articles relevant to all aspects of surgery. Despite the increasing accessibility and use of bibliometric analysis to evaluate a broad range of publication types and subject areas, these methods have not been previously utilized to analyze the JACS.

Objective: The objective of the present study was to perform a bibliometric analysis of articles published in JACS, since its renaming in 1994, to identify areas of focus and trends in publication within this prominent surgical journal.

Methods: Bibliometric data from articles published in the JACS between January 1, 1994, and December 31, 2021, was extracted from the Web of Science database. Descriptive analysis was performed utilizing the Bibliometrix software package, and further co-citation and co-occurrence analysis was performed using VOSViewer.

Results: 20,775 articles were found to have been published in the JACS, with a majority being single-country publications (95.56% of articles) of American origin (87.24% of articles). Annual publication counts in JACS have been increasing yearly (7.57% growth yearly on average), with annual citation counts decreasing from 2013 onwards. When excluding meeting abstracts, annual growth was less (0.71% growth yearly on average) and annual citations counts have plateaued. Reference and keyword analysis suggest a shift in publication focus towards improving the quality of surgical care.

Conclusions: Bibliometric analysis of the JACS has revealed continued growth, and a shift in publication focus, that has allowed it to accomplish its mission of providing research of relevance to practicing surgeons.

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Title: Implications of the COVID-19 Pandemic on Immediate Breast Reconstruction Access

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Introduction: As a result of COVID-19, there have been restrictions on surgical interventions across Canada. Immediate breast reconstruction (IBR), while an essential component of cancer care, is classified as elective surgery and therefore, has been restricted in access over the course of the pandemic. The purpose of this study was to compare wait times for breast cancer patients undergoing surgical intervention for IBR prior to and since the COVID-19 pandemic.

Objective: The objective of this study is to assess the implications of the COVID-19 Pandemic on wait times to ablative and reconstructive surgical interventions in patients with breast cancer undergoing IBR.

Methods: This was a retrospective cross-sectional study of consecutive patients who underwent IBR between August 2017 and October 2021 by 1 of 5 Plastic Surgeons in Vancouver Coastal Health and Providence Health Care. Wait times to consultation and surgical intervention between Pre- and Post-COVID-19 cohorts were analyzed.

Results: A total of 161 patients met inclusion criteria. For ablative surgery there was no difference in wait times to Surgical Oncology consultation [14.0 +/- 12.3 vs 14.0 +/- 11.0 days; P = 0.991] and surgical intervention with IBR [41.0 +/- 49.8 vs 35.0 +/- 58.0 days; P = 0.621] between the Pre- and Post-COVID-19 cohorts. For breast reconstruction, while time to consultation with Plastic Surgery [12.5 +/- 14.8 vs 11.0 +/- 12.8 days; P = 0.775] remained unchanged, usage of autologous techniques were reduced [n = 13 (16%) vs n = 2 (2%); P = 0.006], and time to second stage alloplastic reconstruction increased [230 +/- 102 vs 325 +/- 224 days; P = 0.044] Post-COVID-19.

Conclusions: Swift adoption of evidence driven protocols has resulted in comparable wait times for breast cancer ablative procedures. However, utilization of autologous techniques and wait times to second stage reconstructions have increased.

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